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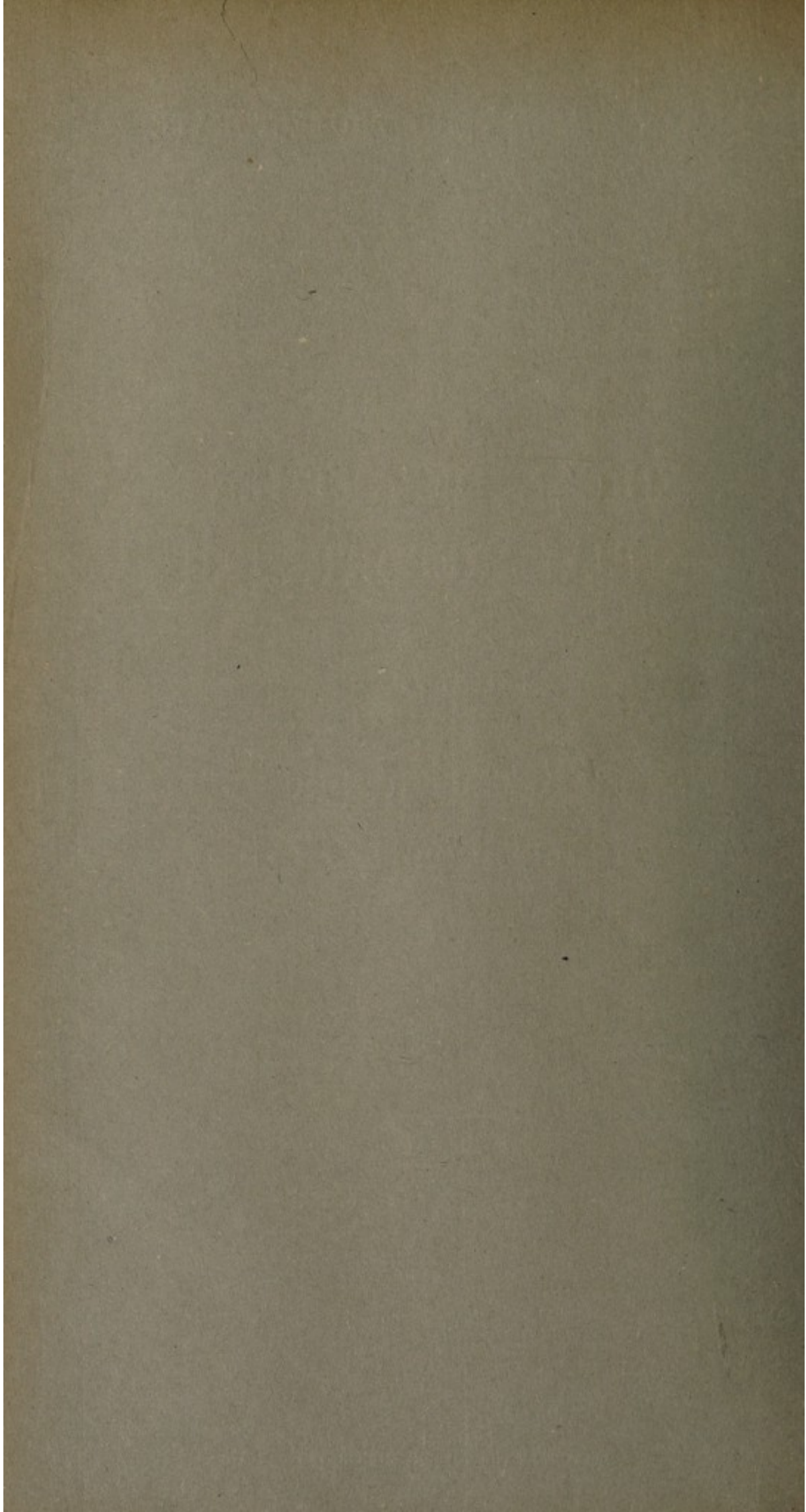
MEDICAL DEPARTMENT
ANNUAL REPORT, 1931

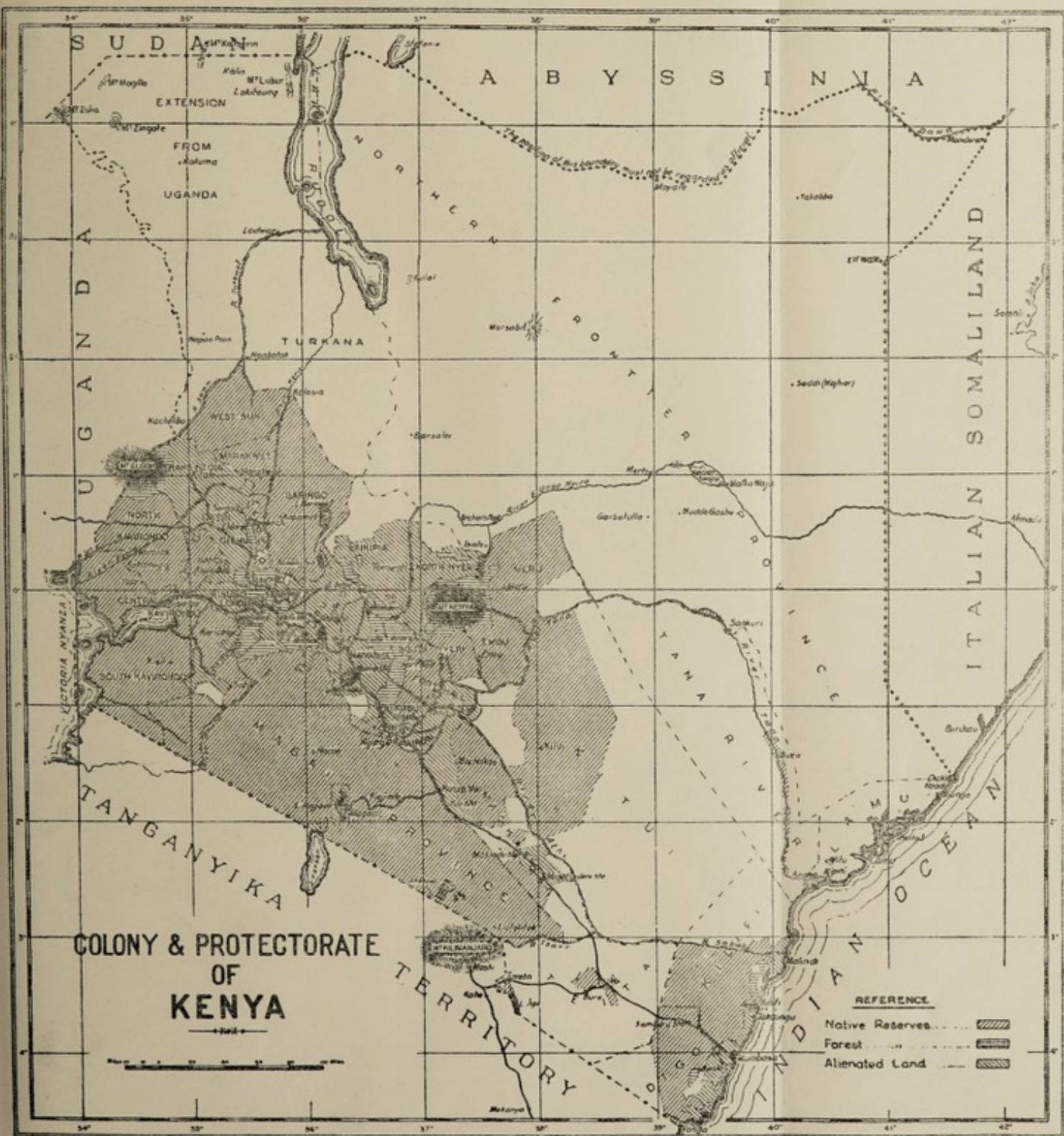
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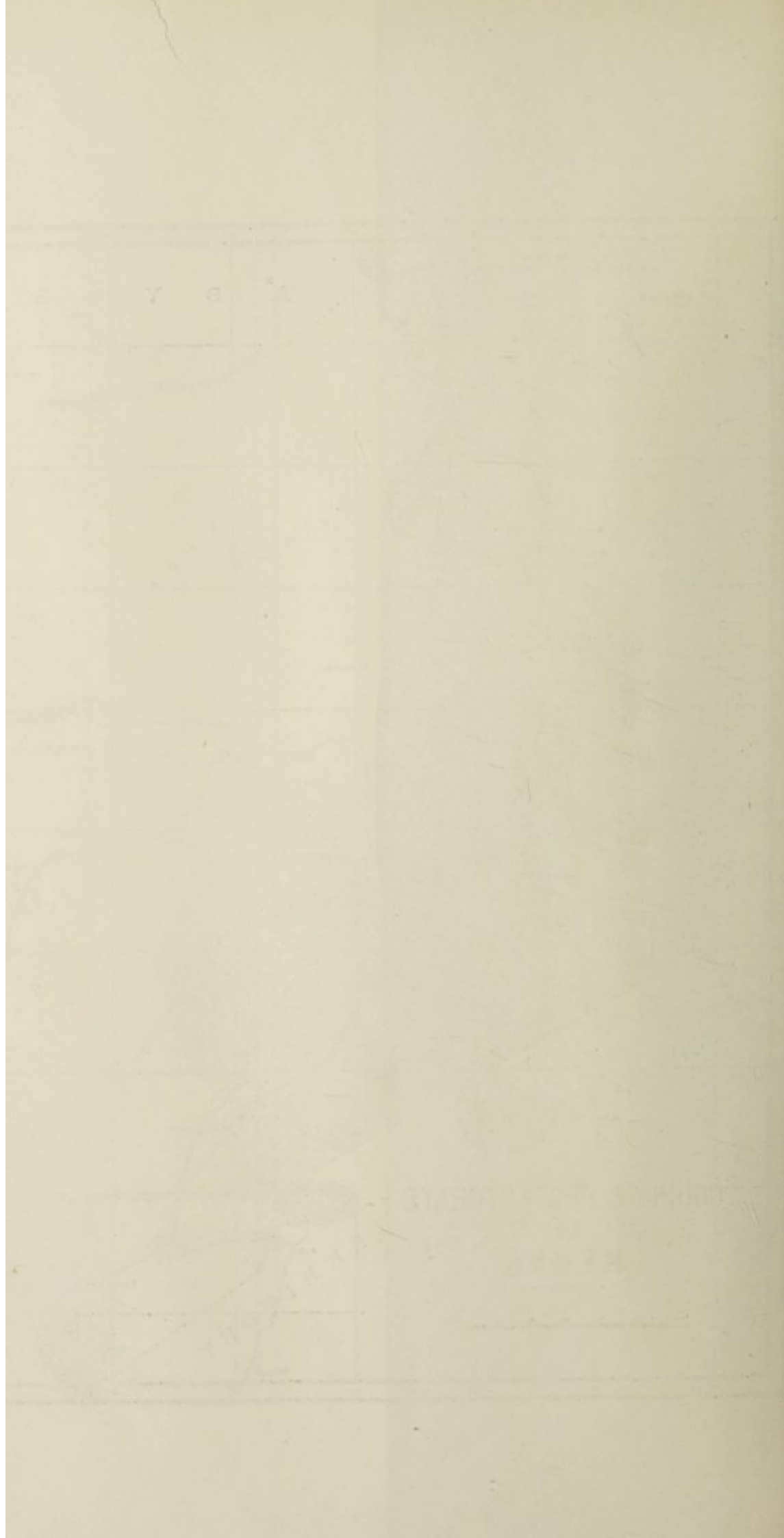
Medical Research Laboratory
Annual Report, 1931

PRICE 5/-









No. 16/720/30.

MEDICAL DEPARTMENT HEAD OFFICES,

NAIROBI.

23rd June, 1932.

SIR,

I have the honour to submit for the information of His Excellency the Governor, and for transmission to the Right Honourable the Secretary of State, the Medical Report on the Health and Sanitary Conditions of the Colony and Protectorate of Kenya for the year 1931, together with the Returns, etc., appended thereto.

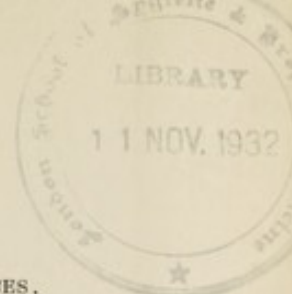
I have the honour to be,

Sir,

Your obedient servant,

JOHN L. GILKS,
*Director of Medical and Sanitary
Services.*

*The Honourable The Colonial Secretary,
Nairobi.*





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MEDICAL DEPARTMENT

ANNUAL REPORT, 1931

I.—ADMINISTRATION.

The general lines on which the Department was conducted remained the same as in previous years.

Two notable events were the completion and occupation of the new Laboratory and new Medical Store. Modern facilities and adequate space are provided in both instances and it is already apparent that the improvement of conditions at the Store will result in no inconsiderable saving on recurrent expenditure.

Administration was rendered difficult throughout on account of continuous demands for reduction of expenditure occasioned by the general financial position which culminated in the latter half of the year in retrenchment of personnel. Fortunately vacancies, owing to promotions, resignations, etc., had occurred earlier and these had not been filled so that the number of officers whose services had to be dispensed with was reduced accordingly.

The following shows the reductions in staff which took place during the year :—

Resident Surgical Officer	...	...	...	1
Senior Health Officer	...	...	...	1
Senior Medical Officer	...	...	...	1
Medical Officers	...	...	...	8
Nursing Sisters	...	...	...	3
Sanitary Inspectors	...	...	...	4
Sanitary Overseers	...	...	...	2
Malarial Field Overseer	...	...	...	1
Nursing Orderly	...	...	...	1
Laboratory Assistants (one Learner Grade)	...	...	...	2
Dispenser	...	...	...	1
Office Superintendent	...	...	...	1
Clerks	...	...	...	3

The general principle which was followed in reduction of staff and expenditure was to maintain existing activities as far as possible but on a restricted basis. The only service which was completely closed down was the School Inspection Service. The post of Medical Officer of Health, Nakuru, had to be abolished. This is not so serious a step as might at first sight appear as the financial depression in that District is so acute as to render constructive work out of the question for the present.

Further progress was made in the appointment of municipal sanitary staff by the Municipal Council of Nairobi and the Mombasa Municipal Board and at the close of the year only one officer, a senior health officer acting as medical officer of health, Mombasa, remained seconded from the Government service.

(a) The following are the principal appointments, promotions, changes, etc., made during the year :—

- (1) Dr. H. S. de Boer, M.C., transferred to Northern Rhodesia on promotion to Deputy Director of Sanitary Service on 20th March, 1931.
- (2) Dr. C. S. Davies, transferred to Northern Rhodesia on 26th September, 1931.
- (3) Dr. A. J. Wilkins, transferred to Northern Rhodesia on 2nd October, 1931.
- (4) Dr. H. L. Gordon, appointed as Visiting Physician to Mathari Mental Hospital on 1st July, 1931.
- (5) Mr. G. F. Newbury, Sanitary Inspector, transferred to Northern Rhodesia on 28th September, 1931.

New Appointments.

Visiting Physician to Mathari Mental Hospital	1
Nursing Sisters	4

Resignations.

Medical Officers	4
Nursing Sisters	4

Retirement.

Nursing Sister	1
-----------------------	---

Invalided.

Senior Medical Officer	1
-------------------------------	---

Death.

Nursing Sister	1
-----------------------	---

Appointments Terminated.

Resident Surgical Officer	1
Medical Officers	2
Sanitary Inspectors	3
Sanitary Overseers	2
Malarial Field Overseer	1
Nursing Orderly	1
Laboratory Assistant	1
Nursing Sister	1
Dispenser	1
Clerks	3
Office Superintendent	1
Laboratory Assistant (Learner)	1

(b) No Ordinances primarily affecting public health were enacted during the year.

FINANCIAL.

The total of the sanctioned estimates for the Medical Department for the year 1931 was £253,699, a decrease of £3,716 on the previous year, but owing to the general financial situation reduction had to be effected and the actual expenditure during the year amounted only to £222,898, viz. £30,801 below the estimate as originally passed.

The comparative table of the sanctioned estimates and expenditure of the Medical Department for the past three years is as follows :—

YEAR	Sanctioned Estimates	Sanctioned Extraordinary Estimates	Total Sanctioned	Actual Recurrent Expenditure	Actual Extraordinary Expenditure
1929 ..	£ 233,506	£ 15,055 81	£ 248,561	£ 222,184	£ 11,573
1930 ..	250,834	6,5	257,415	236,729	5,037
1931 ..	252,061	1,638	253,699	221,202	1,696

No new votes were included in the estimates for the year.

The revenue collected amounted to £28,284, against £30,859 in 1930.

Of the total estimated expenditure in 1931 of £3,442,932 for the Colony and Protectorate, £253,699 represented expenditure on Public Health and Medical Relief, a ratio of 1 to 13.57 or 7.37 per cent.

Detailed returns of the revenue and expenditure are given in Table II at the end of the report.

II.—PUBLIC HEALTH.

No epidemics of any magnitude occurred during 1931.

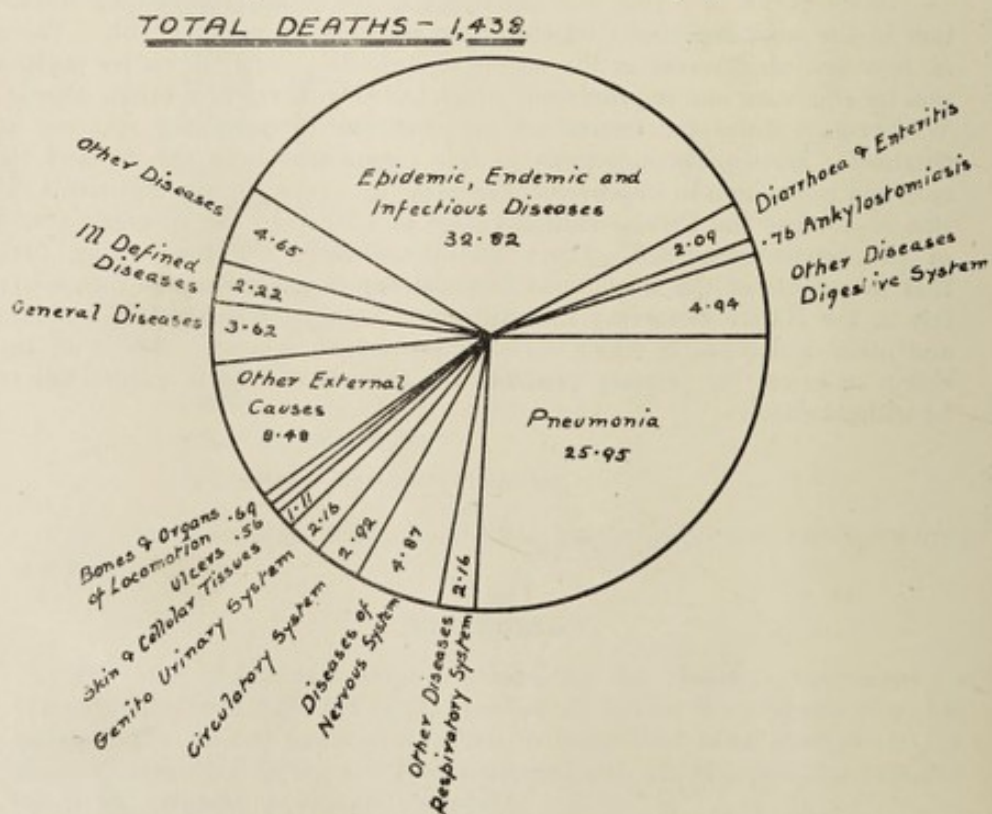
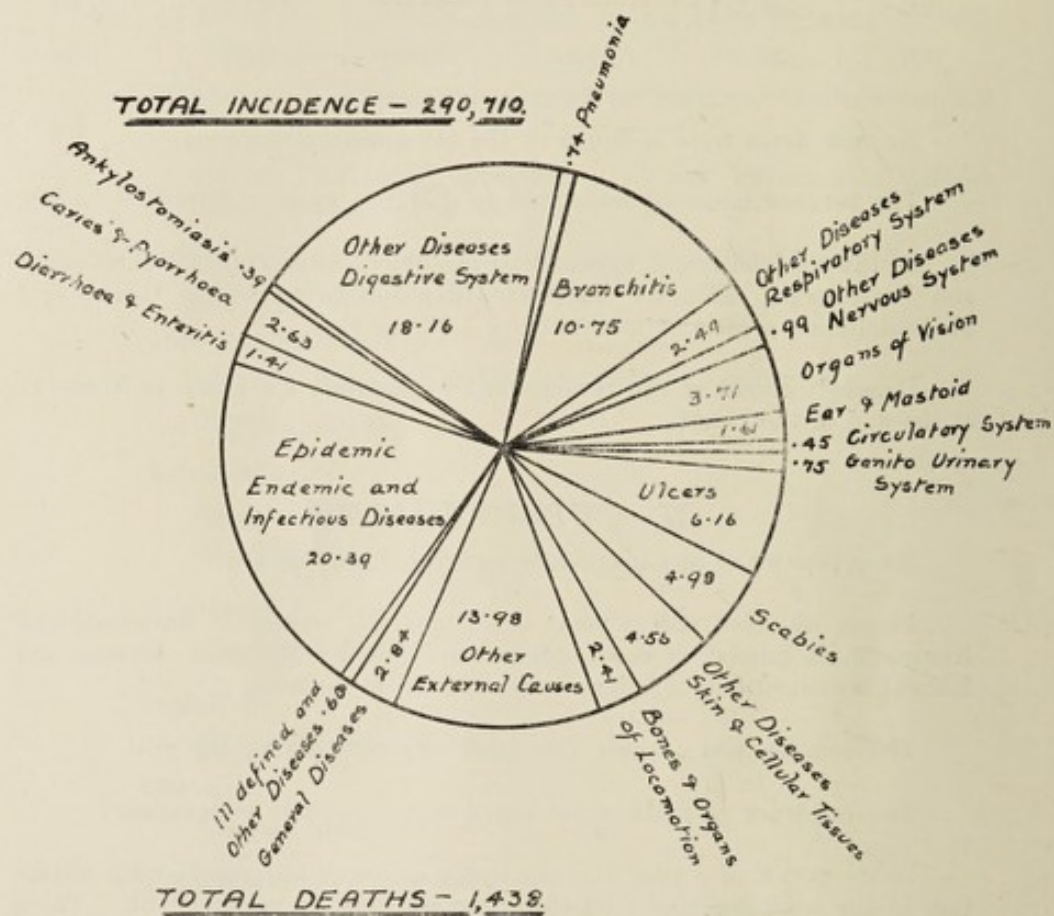
Plague was observed as usual in the endemic centres of Kavirondo and Kikuyu and a number of cases occurred in Nairobi. Mombasa, Kisumu and Eldoret remained free. A few cases occurred at Nakuru.

The country was entirely free from smallpox during the year.

The incidence of malaria did not assume epidemic proportions.

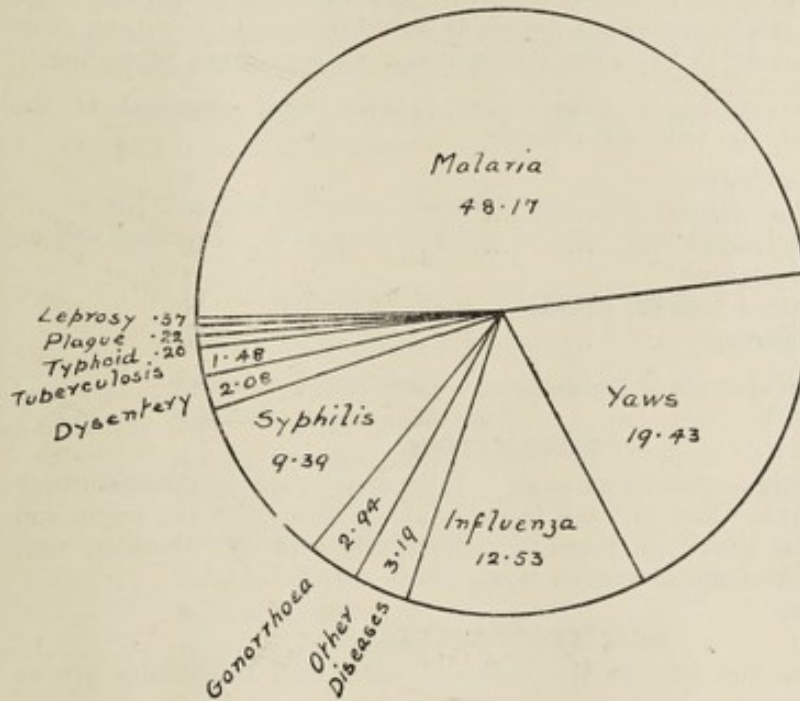
In the period of a year it is impossible to record any considerable alteration in the basic conditions which govern the state of public health. There is, however, no decrease in the wide-spread desire among the native population for education and improvement which has been noted in previous reports. Wherever facilities for instruction are instituted a gratifying response is obtained. Particularly noticeable in this respect has been the demand for help and instruction in improvement in housing. It is obvious that amelioration of housing and living conditions must be limited by the economic status of the people concerned. There was considerable evidence during 1931 that the effects of the world-wide financial depression had made themselves felt in the Native Reserves; this will result in the curtailment of building and other activities on which social improvement depends. Added to the slump in prices for primary products the ravages of locusts cannot fail to be without effect.

The Proportion of Epidemic, Endemic, Infectious, Systemic, and other Diseases shown as percentages of Total Cases treated at Hospitals and Dispensaries

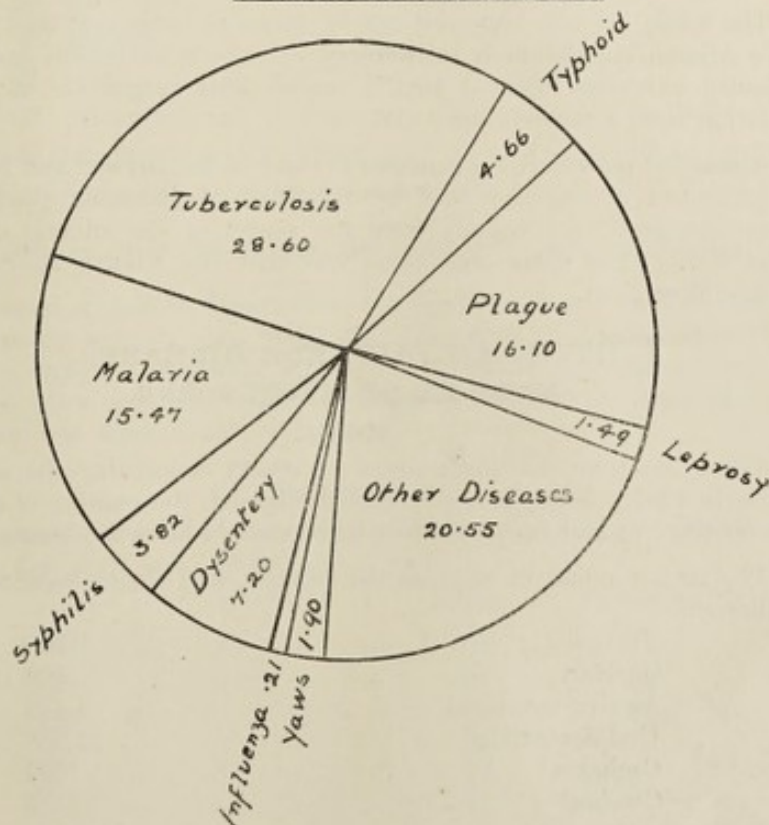


Proportion in percentages of Epidemic, Endemic, and Infectious Diseases, In and Out Patients, treated at Hospitals and Dispensaries

TOTAL INCIDENCE - 59,261.



TOTAL DEATHS - 472



(I) GENERAL DISEASES.**MALIGNANT DISEASE.**

As in previous years malignant disease has been reported as occurring among natives. The total, 104 cases, is slightly higher than the previous year but this figure cannot be taken as representing in any way the incidence of malignant disease among the native population and forms no basis for comparison with other races. It has to be remembered that the higher age groups among which malignant disease is most common in European races are not represented to the same extent among an uncivilized population.

Forty-three specimens from native patients were examined at the Laboratory with the following results :—

Carcinoma	...	...	...	...	6
Epithelioma	...	...	...	...	10
Melanoma	...	...	...	...	10
Myeloma	...	...	...	...	1
Mixed tumour, parotid	...	...	...	...	1
Sarcoma	...	...	...	...	15

The large proportion of melanomata is noteworthy.

RHEUMATISM.

As usual large numbers of cases have been returned as rheumatism or acute rheumatism. Few of these probably are of true rheumatic origin and the classification should be taken as representing arthritis, fibrositis, etc., the result of infections of various types.

DEFICIENCY DISEASES.

The figures for diseases the result of nutritional deficiencies are as follows :—

Scurvy	...	...	...	...	48
Beriberi	...	...	...	...	3
Rickets	...	...	...	...	12

The totals are low but must not be taken as indicating that the dietary of the African population is satisfactory. There is no reason to modify the previously expressed opinion that a considerable proportion of the native population is in a pre-deficiency state.

A detailed report on the nutritional state of the Kikuyu and Masai tribes was published during the year by the Medical Research Council. The matter was dealt with mainly from the aspect of the mineral constituents of the diet. The main conclusion was that the Kikuyu suffered from a shortage of calcium.

(II) COMMUNICABLE DISEASES.**MOSQUITO OR INSECT BORNE.****Malaria.**

There has been nothing unusual to report concerning the incidence of malaria in 1931. No epidemics occurred although the number of cases which were observed at Kakamega seemed to be rather above the normal.

The total number of cases in the returns, and their classification, were as follows :—

Tertian	...	...	...	...	1,158
Quartan	...	...	...	...	569
Aestivo autumnal	...	...	...	...	4,139
Undifferentiated	...	...	...	...	22,005
Cachexia	...	...	...	...	629
Cerebral	...	...	...	...	7
Total	...	...	...	...	28,507

The total is slightly above that of the preceding year but this occurs as a result of extension of facilities rather than an increased incidence.

In Nairobi, according to figures supplied by the Medical Officer of Health, the number of cases notified was considerably less than in 1930 when malaria was first made a notifiable disease. The following passages are taken from the report of the Medical Officer of Health:—

“ During 1931, 724 were notified, 420 being residents and 304 non-residents, compared with 1,031 cases during the eleven months of 1930, comprising 789 residents and 232 non-residents.

The death rate per thousand of population was 0.35, a considerable decrease from 0.82 in 1930.”

In the Machakos Native Reserve figures were collected to show the malaria incidence. A summary of the findings is as follows:—

A.—SUMMARY OF SPLENIC INDICES.

Number of children examined	...	...	1,676
Spleen not enlarged	...	...	1,201
Spleen 1 finger enlargement	...	...	329
Spleen 2 fingers enlargement	...	...	99
Spleen 3 fingers enlargement	...	...	35
Spleen 4 fingers enlargement	...	...	7
Spleen 5 fingers enlargement	...	...	1
Splenic Index	...	...	28.3 per cent.
Splenometric Index	...	...	1.4 per cent.

B.—SUMMARY OF BLOOD EXAMINATIONS.

Number of films (thick) examined	...	3,300
Number of films negative	...	2,161
<i>P. falciparum</i>	...	991
<i>P. malariae</i>	...	66
<i>P. vivax</i>	...	7
<i>P. falciparum</i> and <i>P. malariae</i>	...	58
<i>P. falciparum</i> and <i>P. vivax</i>	...	10
<i>P. falciparum</i> , <i>P. malariae</i> and <i>P. vivax</i>	...	1

Of 3,300 films examined 34 per cent contained malaria parasites.

Sub-division of data to demonstrate the incidence in the various locations and sub-locations showed wide variations. Percentages ranging from 0—10 to 80—90 as regards the splenic index were found in the various localities. Roughly the same grouping was found when information concerning the parasite rates was worked out.

Blackwater.

The comparative table of cases treated by the Government medical staff for the past five years is as follows:—

					Cases.	Deaths.
1927	...	...	...	...	34	7
1928	...	...	...	...	35	13
1929	...	...	...	...	38	11
1930	...	...	...	...	50	8
1931	...	...	...	...	41	10

Thirty-two of the cases and eight deaths occurred among the non-European population.

Plague.

The cases of plague which came under observation during 1931 numbered only 604 as against 959 in the preceding year. In accordance with what may be considered normal the disease was present in the Kavirondo and Kikuyu Provinces. There is no accurate information by which the incidence can be judged, but there is some indication that the number of cases in these two endemic areas may have been less than was the case in previous years. It has been suggested that the considerable rat mortality which occurred in 1931 was responsible.

In Nairobi the epidemic of 1930 continued during the first two months of 1931; thereafter isolated cases, probably related to others occurring in the Thika District, were detected. The total number reported in the municipal area was fifty-one.

Kisumu, Mombasa, Eldoret and Kitale were entirely free during the year. The only considerable centre on the Railway besides Nairobi from which cases were reported was Nakuru and District with a total of twenty-two.

Trypanosomiasis.

The investigation into the incidence of sleeping sickness which was begun in 1930 was continued during the first seven months of 1931 and completed. A census of cases was made and all those detected were treated with Bayer 205 and tryparsamide. After completion of examination of the total population of the areas where the disease was likely to be present, a re-examination of the chief centres of infection was carried out. The summary of the final results is as follows:—

SOUTH KAVIRONDO.

<i>Location.</i>	<i>Population examined.</i>	<i>Positive.</i>
Kaniadoto	3,987	79
Kaniamwa	8,442	63
Kaniamkago	1,849	11
Kabwoch	4,378	3
Karachonyi	9,459	1
Kasigunga	3,647	3
Rusinga Island	3,207	4

In addition one positive case was found from location Kwabwai and one from Sakwa. Both patients had formerly resided in Kaniadoto.

CENTRAL KAVIRONDO.

<i>Location.</i>	<i>Population examined.</i>	<i>Positive.</i>
Uyoma	11,252	38
Kadimu	11,345	77
Samia	9,540	58
Sio	7,821	1
Alego	8,828	4
Sakwa	4,888	9
Seme	7,245	7
Total populaiton examined ...		94,039
Total number of cases of trypano- somiasis found		360

The results of the re-examination which subsequently took place are given below :—

<i>Location.</i>	<i>Number of new or previously undiagnosed cases found.</i>				
SOUTH KAVIRONDO.					
Kaniadoto	...	...	...	...	59
Kaniamwa	...	...	...	...	19
CENTRAL KAVIRONDO.					
Samia	...	...	...	...	16
Kadimu	...	...	...	...	5
Uyoma	...	...	...	...	9
Total					108

The grand total of cases discovered during the course of the investigation is therefore 468.

It will be observed that the grand total varies very little from that of 1927 when 388 cases were detected and that the excess is more than accounted for by the re-examination.

After the completion of the census, trained native assistants who had been occupied in the investigational work were installed in temporary dispensaries at centres of high incidence to keep a watch on the position and to examine and treat cases under the supervision of the medical officers in charge of districts. Through this agency sixty-one fresh, or previously undiagnosed, cases were detected in South Kavirondo alone. It is evident that the position cannot be controlled solely by treatment measures and that what is required is the adoption by Government of a definite plan of campaign. The necessary information on which such could be based was completed and proposals were almost ready for submission to Government at the end of the year.

The total number of cases treated in hospital was only six; the reason for the small number will be apparent from perusal of the foregoing paragraphs.

Relapsing Fever.

The numbers of cases appearing in the returns remains small. Totals have been :—

1929	...	...	...	...	...	...	58
1930	...	...	...	...	...	...	62
1931	...	...	...	...	...	...	74

More than half of the cases were reported from Meru where the disease appears to be endemic. The only noteworthy fact in connexion with the incidence of relapsing fever is that, contrary to previous experience, no cases came under observation in the Voi District. The medical officer in charge suggests that the Wateita are practically immune to the disease as the tick vector is found in abundance. In support he points out that in 1930 there was a small outbreak on a plantation, entirely confined to imported labour, but that locally recruited resident employees were not affected.

Typhus.

The total number of cases notified to medical officers of health was thirty, of which sixteen appear in returns from Government hospitals. The distribution was as follows :—

						<i>Cases.</i>
Nairobi	...	...	...	...	...	11
* Nairobi District	...	...	...	...	...	1
Mombasa	...	...	...	...	...	1
Nakuru	...	...	...	...	...	16
Eldoret	...	...	...	...	...	1

It will be remembered that 1930 was the first year in which the disease was detected at Mombasa.

Hitherto cases have only been reported as occurring among Europeans; 1931 is noteworthy in that an Indian official stationed at Nyeri was diagnosed as suffering from the disease while what appears to be an undoubted case in an African was treated at Nairobi.

The etiology of the local disease was investigated at the Laboratory during the year, and the fact that it is true typhus was established.

INFECTIOUS DISEASES.**Pneumonia.**

The comparative table of admissions to Government hospitals for pneumonia, and deaths, for the past five years appears below :—

	Admissions	Deaths	Death rate per hundred
1927	1,301	279	21.4
1928	1,314	362	27.5
1929	2,175	398	18.3
1930	2,014	389	19.2
1931	1,628	373	22.9

The figures for 1931 differ but little from those of preceding years.

Reports and returns continue to indicate that pneumonia is the most killing disease among Africans outside the Reserves. The following, extracted from the reports of Medical Officers of Health, gives the information concerning 1931 in tabular form :—

				<i>Deaths from Pneumonia.</i>			<i>Percentage of Total Deaths.</i>
Nairobi	...	...	...	248	...	...	37.75
Nakuru	...	...	...	61	...	...	36.81
Kisumu	...	...	...	43	...	...	33.59
Mombasa (and bronchitis)	...	...	...	79	...	...	10.97
Eldoret	...	...	...	23	...	...	37.09

Information concerning the incidence of pneumonia in the Reserves is not in existence.

Research at the Laboratory during the year has shown that in a very large majority of cases the infecting organism belongs to Group IV pneumococci.

Smallpox.

The Colony and Protectorate were completely free from smallpox during 1931.

Syphilis.

The total number of cases which were under treatment during the year was slightly less than in 1930. The small decrease must not be taken necessarily as indicating the the incidence of the disease is less. Comparative figures for the last five years are :—

1927	...	...	...	...	...	17,054
1928	...	...	...	...	...	24,442
1929	...	...	...	...	...	18,496
1930	...	...	...	...	...	25,205
1931	...	...	...	...	...	23,733

As in previous years, a large proportion of the cases were treated at dispensaries staffed by native dressers. This fact alone introduces an element of unreliability into the figures.

No new evidence has come to light which necessitates variation of the conclusions concerning the incidence of syphilis throughout the country which were given in detail in the 1930 Report.

Yaws.

The total of the returns for yaws is some 11,000 less than in the preceding year. This is accounted for, in part at least, by the fact that in some districts cases which might or might not be the result of old yaws, but of the proof of which there was no evidence, were not included under this head. There is no doubt, however, that yaws is a vanishing disease, and that the present centres of highest incidence are those areas where the population most nearly remains in its original backward and uncivilized condition. The adoption of cleanliness, even in a small degree, appears to be no less potent against the incidence of yaws than is bismuth or arsenic therapy.

The comparative table of cases treated during the past five years is shown below :—

1927	...	...	...	...	...	70,253
1928	...	...	...	...	...	85,617
1929	...	...	...	...	...	89,615
1930	...	...	...	...	...	103,711
1931	...	...	...	...	...	92,050

Tuberculosis.

The small increase in the number of cases treated at Government hospitals which has appeared in former reports was again evident. The figures are :—

1929	...	...	...	...	...	676
1930	...	...	...	...	...	756
1931	...	...	...	...	...	874

It is highly probable that the figures give no real indication of the incidence of the disease, and that it is far more common than is suggested by the small total of cases.

Notifications in Mombasa and Nairobi were :—

		<i>Europeans.</i>	<i>Asians.</i>	<i>Africans.</i>	<i>Total.</i>
Mombasa	...	1	7	39	47
Nairobi	...	5	16	33	54

Only one death from tuberculosis occurred among prisoners, out of a total of deaths for all prisons of 37. In 1930, nine deaths from tuberculosis occurred in the prisons.

All varieties of the disease are found.

Leprosy.

Four hundred and seventy cases of leprosy were treated during the year, of which two hundred and thirty-eight were new admissions. It is certain that the number of patients who apply for treatment bears no relation whatsoever to the incidence of the disease. Without a systematic, laborious and expensive survey of populations, individual by individual, no true appreciation of the amount of leprosy present in the country can be obtained, on account of the fact that the disease is not regarded as serious by the large majority of the inhabitants, while the treatment of individual cases is so protracted that the average native has little faith in its efficacy.

Enteric.

Comparative figures for the past three years are as follows :—

				<i>Cases.</i>		<i>Deaths.</i>
1929	...	...	...	107	...	25
1930	...	...	...	102	...	17
1931	...	...	...	118	...	22

Of the above, 19 were reported from Nairobi, 6 from Kisumu, 6 from Eldoret, 7 from Nakuru and 58 from Mombasa. Cases and deaths among natives total 105 and 20 respectively. Of the 58 cases reported from Mombasa, 28 were admitted to hospital from a plantation in the neighbourhood. The outbreak was traced to a native woman, a sweetmeat and fruit seller, who had been ill and who had been hidden away in the lines by her friends. All the patients affected were up-country contract labourers, who were accustomed to buying fruit, etc., from this woman. The locally engaged boys had their own sources for these commodities, and were not affected.

Laboratory classification of Widal reactions according to the organism concerned was :—

B. typhosus	...	...	...	...	...	39
B. paratyphosus A.	...	...	...	...	...	4
B. paratyphosus B.	...	...	...	...	...	3
Group T.A.B.C.	...	...	...	...	...	21

Dysentery.

If the comparatively small number of cases is taken into consideration, a considerable increase occurred during 1931 as compared with 1930. The figures for the two years are as follows :—

				<i>Cases.</i>		<i>Deaths.</i>
1930	...	...	...	885	...	30
1931	...	...	...	1,233	...	34

The classification of cases in the returns is :—

				1930.		1931.
Amoebic	...	...	...	269	...	364
Bacillary	...	...	...	146	...	173
Undefined	...	...	...	470	...	696

The increase in amoebic dysentery will be observed. In this connexion, it is noteworthy that during the year the *Entamoeba histolytica* was detected at the Laboratory on 56 occasions, as compared with twice only in 1930.

Diphtheria.

Seven cases appeared in the returns for the year, one of which, a native patient, was a carrier, and was admitted to hospital on this account. Four were reported from Nairobi, and three, all Europeans, one of whom died, from Nakuru. The following table shows the incidence of the disease since it was first detected in 1924 :—

Year	Europeans	Asians	Natives	Total
1924	6	2	3	11
1925	2	..	..	2
1926	..	4	1	5
1927	3	1	..	4
1928	12	..	2	14
1929	3	..	8	11
1930	11	..	..	11
1931	3	2	2	7

Only one case, that referred to above, terminated fatally.

Cerebro-spinal Fever.

The epidemic which occurred in the Machakos district in 1930 died out before the end of the year. In 1931, only 36 cases with 16 deaths were reported, as against 131 and 51 in the previous year.

Of the total cases, 19 came under observation at Nairobi and 9 at Machakos.

Scarlet Fever.

One European case was reported. This is the first time that the disease has been definitely diagnosed, though suspicious cases have been observed in the past. The source of infection was not determined.

Anthrax.

The total number—114—of cases of anthrax is 35 in excess of that for the preceding year. Nairobi and Meru, as in 1930, headed the list, with 39 and 19 cases respectively.

Undulant Fever.

An increased number of cases was reported during the year, the total being 52 as against 7 only in 1930. The largest number was reported from Meru, whence a total of 38 was returned.

Encephalitis Lethargica.

Eight cases—one European and seven native—were reported. The European case terminated fatally.

Parkinsonism is not infrequently met with among natives.

HELMINTHIC DISEASES.

It has been remarked in previous reports that helminthiasis is practically universal among the native population. There is no necessity to modify that statement. It is unlikely that the incidence of helminthiasis will decrease until the sanitary habits of the population are materially altered for the better.

Ankylostomiasis.

Infestation with ankylostomes is commonly met with throughout the country, but morbidity caused by this parasite is infinitely more common at the Coast than elsewhere. There are indications that cases of ankylostomiasis showing the symptoms and signs usually produced by this infestation are more frequently met with in the Kikuyu Reserve than was formerly the case. A total of 522 was returned from Fort Hall.

Ascariasis.

The number of cases of ascariasis which were returned from various stations amounts to 7,985. The total gives no indication of the incidence of the infestation throughout the country. Among children especially, the parasite is the cause of a large amount of morbidity and probably considerable mortality.

Taeniasis.

The annual returns show that 15,794 cases came under treatment. As with ascariasis, the number probably has no relation to the total cases of infestation throughout the country.

Schistosomiasis.

Another increase in the total of cases of schistosomiasis which came under treatment was reported during 1931. This must be taken as being the result of the increased number of microscopic examinations of faeces and urine which are performed as the result of the larger number of trained native laboratory assistants employed, and does not necessarily indicate that the disease is more common than in previous years.

The largest number of cases was returned from Kisumu, where infection probably takes place in the swamps which occur on the borders of the Lake. In the coastal districts, the water supply is mainly obtained from swamps or dams, and the disease is endemic in these areas.

Three Europeans came under treatment for schistosomiasis during the year. The disease had been contracted as a result of bathing in a small lake in a remote part of the Northern Frontier District. A very heavy infection appears to have occurred, as the systemic disturbance in each case was acute to a degree, with marked heart failure in one instance.

VITAL STATISTICS.

The non-native population of the Colony and Protectorate was determined by census on the night of March 6th, 1931. Advantage of the organization was taken to enumerate at the same time natives resident in Nairobi and Mombasa. The previous census took place in 1926. Comparative figures, including the estimated African population, appear below:—

POPULATION IN KENYA.

	1926.	1931.
European	12,529	17,285
Asians	26,759	56,903
Arabs	10,557	
Africans (estimated) ...	2,515,330	2,966,993

REGISTRATION OF BIRTHS AND DEATHS.

The position in connexion with registration of births and deaths remains unsatisfactory. The existing legislation on the matter has not been put into effect, as the necessary machinery has not yet been set up. The figures which appear hereafter give such information concerning the larger centres as is available, but it is necessary to point out that they should be accepted with caution.

NAIROBI.**Health and Mortality—Vital Statistics.****A.—POPULATION.**

The population, as determined by the census taken during the year, is as follows:—

Europeans	5,195
Asians	15,374
Africans	27,350
Total all races ...	47,919

B.—BIRTHS.

One hundred and sixty-four European births were registered during the year as compared with 152 in 1930. Only European births are compulsorily notifiable.

C.—MARRIAGES.

The following marriages were registered :—

European	...	...	...	...	96
Other races	...	...	...	...	11

D.—DEATHS.

The total number of deaths reported in Nairobi during the year was 773, equivalent to a crude death rate for all races of 16.21 per thousand of population, compared with 17.91 in 1929 and 20.79 in 1930.

The number of deaths from all causes among persons stated to be normally resident in Nairobi was 657, equivalent to a recorded death rate for all races of 13.78 per thousand of population, compared with 13.77 in 1929 and 16.20 in 1930.

Of the 657 deaths, 450 were of males and 207 of females.

Twenty-five deaths occurred amongst Europeans, equivalent to a rate of 4.78 per thousand.

Two hundred and twenty-five deaths occurred among Asians, equivalent to a rate of 14.31 per thousand.

Four hundred and seven deaths occurred among Africans, equivalent to a rate of 15.23 per thousand.

E.—INFANT MORTALITY.

The total number of deaths in infants under one year of age was 194, or 29.52 per cent of the total deaths.

As there is no means of ascertaining the number of births during the year, no infant mortality rate can be worked out.

Race.	INFANT DEATHS IN RELATION TO TOTAL DEATHS		
	Infants	Total	Percentage
Europeans	3	25	12.0
Asians	107	226	47.3
Africans	84	406	20.6
All races	194	657	29.52

The small percentage of native deaths is accounted for by the fact that the native infant population is small.

Eighty-one infant deaths, or 41.75 per cent of the total, were attributed to pneumonia.

MOMBASA.

Health and Mortality—Vital Statistics.

A.—POPULATION.

The population, as determined by the census taken in March, 1931, is as follows :—

Europeans	...	...	...	1,132
Indians	...	...	...	11,841
Goans	...	...	...	1,077
Arabs	...	...	...	6,679
Africans	...	...	...	20,077
Other races	...	...	...	466

Total all races ... 43,252

B.—BIRTHS.

Twenty-two European births were registered, as compared with 19 in 1930. Non-European births are not compulsorily registrable.

C.—DEATHS.

Deaths from all causes reported as occurring among all races in Mombasa numbered 746, yielding according to population a crude death rate of 17.25 per thousand population, compared with 19.99 in 1929 and 18.46 in 1930.

As compulsory registration of deaths is not in force in Mombasa, the figures were obtained from the police; they include deaths on ships and cases where bodies are brought into Mombasa for burial or medico-legal purposes.

Of the 720 deaths reported as occurring amongst resident, 426 were of males and 294 of females.

The following are the numbers and rates as affecting the various sections of the population :—

Race	Number of Deaths	Death Rate
Europeans	6	5.03 per thousand Europeans.
Indians and Goans ..	195	15.09 per thousand Indians and Goans.
Arabs	162	24.25 per thousand Arabs.
Africans	357	16.17 per thousand Africans.

D.—INFANT MORTALITY.

The total number of infant deaths amounted to 151, or 21 per cent of deaths at all ages.

The incidence of infant deaths among the various races was as follows :—

Race	Infant deaths	Total deaths	Percentage
European	..	6	..
Indians and Goans ..	70	195	36
Arabs	49	162	30
Africans	32	357	9

KISUMU.

Health and Mortality—Vital Statistics.

A.—POPULATION.

The population in 1931 was as follows :—

Europeans	...	...	...	155
Asians	...	...	...	2,018
Africans (estimated)	...	...	...	2,853
Total all races				5,026

B.—DEATHS.

The total number of deaths reported was 176, of which 4 were European, 44 Asian and 128 African.

NAKURU.

Health and Mortality—Vital Statistics.

A.—POPULATION.

The population in 1931 was as follows:—

Europeans	...	...	...	...	1,713
Indians	...	...	...	...	2,107
Other races (estimated)	...	...	...	...	3,500
Total all races					7,320

B.—BIRTHS.

Europeans	...	...	...	...	48
Indians	...	...	...	...	9
Goans	...	...	...	...	4
Other races	...	...	...	...	1

C.—DEATHS.

The total number of deaths registered during 1931 was 182, of which 83 were resident and 95 non-resident, the remaining 4 being reported from outlying districts.

ELDORET AND KITALE AND THE UASIN GISHU AND TRANS NZOIA DISTRICTS.

Health and Mortality—Vital Statistics.

A.—POPULATION.

The population in 1931 was as follows:—

Uasin Gishu District (including Eldoret).

Europeans	...	...	...	...	1,947
Indians	...	...	...	...	1,099
Goans	...	...	...	...	138
Other races	...	...	...	...	129
Africans (estimated)	...	...	...	...	20,661
Total all races					23,974

Eldoret, Elgonview, Kapsoya, Ortleppville and West Eldoret.

Europeans	...	...	...	...	612
Indians	...	...	...	...	799
Goans	...	...	...	...	117
Other races	...	...	...	...	123
Africans (estimated)	...	...	...	...	2,500
Total all races					4,151

Trans Nzoia District (including Kitale).

Europeans	...	...	...	...	983
Asians	...	...	...	...	591
Other races	...	...	...	...	69
Africans (estimated)	...	...	...	...	24,700
Total all races					26,343

Kitale Township.

Europeans	...	...	...	...	163
Indians	...	...	...	...	577
Goans	...	...	...	...	45
Other races	...	...	...	...	34
Africans (estimated)	...	...	...	...	852
Total all races					1,671

B.—BIRTHS.

Forty-six European and 18 Asiatic births were recorded in Eldoret, and 23 European births in Kitale during the year.

C.—MARRIAGES.

Fifteen European marriages were registered in Eldoret and one in Kitale during the year.

One Asiatic and one native marriage were also registered.

D.—DEATHS.

European deaths were registered in all areas. African and Asian deaths were registered in Eldoret for the whole year.

The following figures concerning deaths are given for comparison with 1930 :—

	1930			1931		
	European	Asian	African	European	Asian	African
Eldoret and Uasin Gishu	16	4	62	20	6	62
Kitale and Trans Nzoia	4	..	19	10	7	31

A crude death rate, based on the population for 1931, is 10.2 per thousand for Europeans, as compared with 7.4 in 1929 and 5.7 in 1930.

The chief causes of death are pneumonia and broncho-pneumonia, which account for 45 out of a total of 167 deaths. Malaria and blackwater fever account for 14 deaths, as compared with 9 in 1930.

(1) GENERAL NATIVE POPULATION.

The estimated native population again shows an increase. It will be remembered that this has been a feature of the statistics for several years past. The figures for the past three years are :—

1929	...	...	...	...	2,930,604
1930	...	...	...	...	2,951,023
1931	...	...	...	...	2,966,993

The estimate is arrived at as the result of the hut count made for taxation purposes.

The registration of births and deaths is not compulsory anywhere among Africans, and no census has ever been conducted outside the towns of Nairobi and Mombasa, where the count which was made in March, 1931, was in the nature of an innovation. It is unlikely that attempts to carry out a census in

the Reserves would meet with success. The superstitions and beliefs of natives are opposed to any such procedure, and there is some evidence that a certain number left Mombasa and Nairobi temporarily on the occasion of the census in order to escape enumeration.

Observation was maintained on the 698 families in the Teita Reserve, concerning whom statistics had been kept for some years. The particulars concerning the period 1920-1930, inclusive, were incorporated in the 1930 Report, and those for the last five years appear here below :—

Year	Births	DEATHS UNDER—					Infant mortality per 1,000 deaths
		1 yr.	2 yrs.	3 yrs.	4 yrs.	5 yrs.	
1927	119	11	.	1	1	..	92
1928	114	15	3	2	..	..	131
1929	134	19	1	..	..	..	142
1930	93	11	..	..	..	..	118
1931	64	12	..	..	..	..	187.5

For the reasons mentioned in the 1930 Report, the group must not be considered as representative of the general native population, in that it has absorbed certain of the elements of civilization as the result of mission influence.

(2) GENERAL EUROPEAN POPULATION.

The only figures available concerning the general European population are incorporated in the statistics relating to the various districts which have been included in an earlier section.

Members of the general European population are generally attended by private practitioners, and when needing hospital treatment are admitted to nursing homes or non-Government hospitals. Detailed information as regards sickness and invaliding is therefore not available.

There is evidence that the financial depression is affecting the standard of life among the European general population. Unemployment among Europeans is becoming a problem.

(3) EUROPEAN OFFICIALS.

The figures relating to morbidity, mortality and invaliding among European officials show a distinct improvement as compared with those of 1930. With the exception of the "total number invalided," an all round drop appears in the statistics. The main causes of sickness, as in previous years, were malaria and influenza.

Comparative figures for in-patients and out-patients for the last three years are :—

	<i>In-patients.</i>			<i>Out-patients.</i>		
1929	...	...	1,376	...	...	635
1930	...	...	1,443	...	...	976
1931	...	...	1,175	...	...	878

Deaths among European officials were five in 1931, as against seven in 1930. The causes were :—

Typhoid fever	...	...	...	2
Pneumonia	...	...	...	2
Head injuries	...	...	...	1

The number of invalidings was five in excess of 1930. The details are :—

Tuberculosis	...	...	...	2
Neurasthenia	...	...	...	5
Diabetes mellitus	...	...	...	1
Bronchitis and debility	...	...	...	1
Cellulitis and loss of vision	...	...	...	1
Asthenopia	...	...	...	1
Syphilis of central nervous system	...	...	...	1
Hemiplegia	...	...	...	1
Disease of cardio-vascular system	...	...	...	1
Mental disease	...	...	...	1

TABLE SHOWING THE SICK, INVALIDING AND DEATH RATES AMONGST EUROPEAN OFFICIALS IN THE COLONY AND PROTECTORATE OF KENYA

	1929	1930	1931
Total Number of Officials Resident	2,297	2,280	2,228
Average Number Resident	1,629	1,717	1,647
Total Number on Sick List	1,376	1,462	1,206
Total Number of Days on Sick List	9,723	9,596	9,040
Average Daily Number on Sick List	26.64	26.29	24.76
Percentage of Sick to Average Number Resident	1.63	1.53	1.50
Average Number of Days on Sick List to each Patient	7.07	6.56	7.49
Average sick time to each Resident	5.97	5.59	5.48
Total Number Invalided	16	10	15
Percentage of Invaliding to Total Residents	.70	.44	.67
Total Deaths	3	7	5
Percentage of Deaths to Total Residents	.13	.31	.22
Percentage of Deaths to Average Number Resident	.18	.41	.30
Number of Cases of Sickness contracted away from Residence	—	—	—

(4) NON-EUROPEAN OFFICIALS.

As in the case of European officials, a distinct fall in morbidity is recorded in the statistics. Comparative figures concerning in-patients and out-patients for the past three years are as follows :—

	<i>In-patients.</i>	<i>Out-patients.</i>
1929	4,782	2,677
1930	5,022	5,536
1931	3,668	6,275

The most frequent causes of sickness again were malaria and influenza. Deaths numbered seven, as against eighteen in the previous year. The causes were :—

Malaria	...	...	...	1
Blackwater	...	...	...	2
Diabetes	...	...	...	1
Pneumonia	...	...	...	2
Cystitis	...	...	...	1

The number of invalidings was the same as in 1930. The causes were :—

Loss of vision	...	...	...	2
Tuberculosis	...	...	...	1
Diabetes mellitus	...	...	...	1
Chronic intermittent intestinal obstruction	...	...	...	1
Trigeminal neuralgia	...	...	...	1
Mental disease	...	...	...	2
Heart disease	...	...	...	1
Senility	...	...	...	1
Debility	...	...	...	1

TABLE SHOWING THE SICK, INVALIDING AND DEATH RATES AMONGST
NON-EUROPEAN OFFICIALS IN THE COLONY AND PROTECTORATE OF
KENYA.

	1929	1930	1931
Total Number of Officials Resident	3,224	3,365	3,240
Average Number Resident	2,694	2,882	2,706
Total Number on Sick List	4,287	5,022	3,711
Total Number of Days on Sick List	24,237	23,040	19,030
Average Daily Number on Sick List	66.40	76.82	52.27
Percentage of Sick to Average Number Resident ..	2.46	2.67	1.93
Average Number of Days on Sick List to each Patient ..	5.65	5.58	5.14
Average sick time to each Resident	8.99	9.73	7.05
Total Number Invalided	15	11	11
Percentage of Invaliding to Total Residents	.46	.33	.34
Total Deaths	11	18	7
Percentage of Deaths to Total Residents	.34	.53	.21
Percentage of Deaths to Average Number Resident ..	.41	.62	.25
Number of Cases of Sickness contracted away from Residence	—	—	—

III.—HYGIENE AND SANITATION.

A.—General Review of Work Done and Progress Made.

(1) PREVENTIVE MEASURES.

In a Colony such as Kenya which is essentially an agricultural country and where the great bulk of the population consists of a poor and comparatively primitive peasantry, the primary measures necessary to secure any notable diminution of the incidence of disease are general rather than particular. They are in effect all those measures which are aimed at securing an improvement in the economic position and in the cultural standard of the average peasant, and among these measures are the following—

- (a) measures directed towards altering the outlook of the peasant,
- (b) measures directed towards improving his methods of cultivation and of stock management,
- (c) measures directed towards the education of women with regard to the care and management of children and of the home, and
- (d) technical and literary education.

With all of these groups of measures the sanitarian is of necessity more or less directly concerned and it is of interest to note that in almost all of the annual medical reports which have been received from the native reserve districts for the year 1931 there is evidence of a growing realization of the fact that for the African cultivator as for the European an essential preliminary to better living is better farming. To an increasing degree therefore the energies of medical officers have been directed towards demonstrating this dependency and to endeavouring to inculcate in their people a wider outlook with regard to life. In this connexion, however, the sanitarian has another function to perform, namely to advise his local authority, if he be a local officer, or if his duties be more general, to advise Government or the particular department concerned, as to the precise fashion in which the existing social and agrarian systems effect the people, and as to the directions in which change may be required with a view to securing an improvement in the sanitary environment.

In previous reports on sanitary conditions in the rural areas of Kenya and on the preventive measures which have been taken with a view to securing a reduction in the incidence of disease the relations between environment and disease have been detailed. In the year now under review no notable alteration has taken place in these conditions so far as the great mass of the people are concerned, for great changes in environment seldom take place within so short a period as a year, nor have any of the specific measures which have been taken been more notably successful than in the past, nevertheless there has been progress, for in season and out of season the

doctrine has consistently been preached that without co-ordinated effort directed towards the education of the peasantry in the hygiene and sanitation of crops, cattle and land in the first instance, progress with regard to the hygiene of man and the sanitary improvement of his environment is unlikely to take place. It is pleasing to be able to record the fact that to an increasing extent the truth of this doctrine is being appreciated. In other words the essential social object of all technical and administrative activities is beginning to receive greater recognition.

At the root of almost all sickness and insanitation in rural Africa lies ignorance with regard to crop and animal husbandry, and systems of land tenure which, though adequate in their time are now unfavourable to progress and unsuited to the needs of a population which is beginning to increase in numbers. To ensure improvement, however, much preliminary investigation, great measures of reform, and an educational scheme which embraces both the adult cultivator and his wife as well as his children are required. At the present moment owing in no small part to the call for increased production, which is an inevitable outcome of the impact of western civilization on a primitive people and one which is desirable and necessary not only in the interests of the world at large but of the African himself, population is increasing and pressing hard on the heels of production. This increase, however, both of folk and produce is taking place before methods of maintaining the fertility of the soil have been universally inculcated and the land in many areas is, in consequence, deteriorating, and in so far as this is so the prospects of prosperity and health are being jeopardized. To inculcate better methods of living under such circumstances is but to plough the sands unless better methods of farming and better methods of business are at the same time demonstrated and made possible.

During the year under review some progress has been made with regard to both of these matters, but it is doubtful whether so far it has kept pace with the work which has been done by the sanitary inspector, the medical officer, and the school teacher. If the efforts of the first two have not been ineffective it will chiefly have been due to the fact that as a primary preventive measure they have endeavoured at every point to indicate the interdependence of better living and better farming, and to induce an outlook on life which provides a reason for endeavouring to achieve in the first place that better farming, without which neither a better dietary nor a cash income sufficient to purchase either education or the hundred and one things on which cleanliness is dependent, can be obtained.

As a general indication of the lines on which public health work is now being prosecuted in the native reserves, of the outlook which now characterises the medical officer who is engaged both on public health and clinical work, and of the fashion in which the clinical unit fits into the general scheme and itself serves an educational purpose, the following précis of an annual report with regard to one native reserve district may be of value.

Precis of an Annual Report relating to a Native Reserve District.

This district carries of population of about 30,000 souls.

MEDICAL SERVICES.

The Government Medical Services comprise the following :—

- I. A central hospital of thirty-six beds of which six are reserved for maternity cases with a staff of one European medical officer, two European nursing sisters and native subordinate laboratory and nursing staff.
- II. A smaller hospital of twenty beds under an Asiatic sub-assistant surgeon.
- III. An out-dispensary in charge of an African dresser.

In addition there are three mission dispensaries.

EDUCATIONAL SERVICES.

Education is provided by three missions. At one of the mission centres there is a technical school which has forty pupils in residence and there is also a day school with about 200 pupils, at another mission centre there is a large day school with about 600 pupils. At other centres also technical education is given and in all there are about a dozen out-schools.

AGRICULTURAL EDUCATION.

There is one Government African agricultural instructor.

FORESTRY.

There is one Government African instructor.

PUBLIC HEALTH.

Medical policy in the district during the year has been as follows:—

- (a) *To carry to completion the pit-latrines campaign* and to ensure that the latrines are kept in repair and used. Pit latrines are now universal throughout the district.
- (b) *To get the surroundings of the villages and houses kept clear and clean.* This has been done and all villages present a very much better appearance than was the case in the past.
- (c) *To improve housing.*—The technical instructors at the missions have done a great deal of work in this direction and near one mission alone there have been constructed during 1931 thirty-six square houses of sundried brick, while three stone houses are still under construction. Sundried brick houses have also been built in other parts of the reserve and altogether there are in the district over 300 well built houses and there is a constant desire for more. The Medical Department is now helping directly by measuring out houses and by assisting in other ways where possible, while at the hospital sundried bricks are being made.

The people of this district are an intelligent law abiding people who are easy to get on with. Round each of the mission are the dwellings of Christians. These dwellings are mostly of the better type and for several miles round some of the missions are villages and houses of sundried bricks. Between these centres are the primitive grass roofed huts of the pagans. Windows are wanting in these huts while the huts themselves are the abode of all manner of vermin.

RAINFALL AND AGRICULTURE.

The rainfall in 1931 was poor with the result that a large portion of the maize crop failed. Locusts appeared in the district towards the close of the year.

The communal system of land holding prevails and the native does not stick to one piece of land but has several patches under cultivation. His methods of agriculture are primitive. Maize, beans, muhogo, etc., are all grown together and weeds are allowed to grow up freely with the idea of preventing erosion. The maize cribs are primitive and rats have easy access.

The cattle are small in numbers and grazing for them is very scarce. The milk supply is scarce. Tsetse fly still takes its toll of cattle in the valleys.

"In view of the above facts we are making efforts to improve methods of agriculture but so far little has been done. It would not appear that a demonstration plot serves any useful purpose; what the native requires is instruction on his own land. Many now realize the value of manuring and several natives have made inquiries about improved maize cribs but none have been erected up to date."

TREES.

There are three small forests in the district but elsewhere timber is scarce.

Tree planting is also being encouraged and it is being pointed out how useful it is to have plenty of trees grown not only as wind breaks for plantations and for fuel, but also for housing, for making maize cribs and for burning bricks. It is also pointed out that if wattle be grown the bark can be sold.

HOSPITAL WORK.

During the year 448 in-patients were treated, the hospital being full practically throughout the year. The total number of new out-patients treated was 7,108.

An endeavour is being made to make the central hospital a model of cleanliness and in many ways an educational centre. Grass lawns have been laid out and shade trees and hedges have been planted. Flower beds have also been made and a tree plantation started.

SANITATION STAFF.

The sanitation staff of four Africans are being taught sundried brick making and house building. In the past these boys have done useful work in demonstrating latrine construction and in supervising village cleansing, now they could be of great assistance in helping the natives, both Christian and pagan alike, to make bricks and to build better houses.

GENERAL DISEASES.

Malaria.

This disease is confined for the most part to the plains and throughout the infected areas an attempt has been made to carry out some anti-malaria measures. These measures consisted in the oiling of pools in the neighbourhood of houses and villages and the free distribution of quinine. The work has been done by Africans employed by the Local Native Council and supervised by the medical officer.

At the hospital routine blood examinations were carried out.

Relapsing Fever.

No cases were seen though the spirillum tick is common in the huts in the reserve.

Yaws.

This disease is said to have been common once but would seem now to be disappearing. Eight hundred and forty-two cases were treated but the majority were in the tertiary stage, secondary yaws is not nearly so common as in the previous year.

Syphilis.

This disease is seldom seen except in natives who have gone to Mombasa to work.

Helminthiasis.

Infestation with intestinal parasites is still common. Native opinion is to the effect that the children have greatly improved recently and that there are fewer deaths among them since they took to regular treatment for round-worms.

Out of 7,108 out-patients in 1931 2,890 were found to be infested with, and were treated for, intestinal worms.

Of 338 in-patients 161 were found to be infested, ascaris being present in no less than 112 of these cases.

MATERNITY AND CHILD WELFARE.

This work was commenced actively in September under the charge of one of the nursing sisters assisted by the trained African midwives. The attendances, small at the beginning, are increasing and 411 patients were seen in four months. Mothers return fairly regularly for the weighing of their babies. The diseases met with are chiefly ascariasis, bronchial troubles,

diarrhoea and malnutrition. A great deal of education is required for mothers of native children. The child is fed whenever it cries and in many cases breast feeding goes on until the child is two years old. One wing of the hospital is devoted to maternity work and twenty cases were delivered during the year. Mothers are taught about feeding in the wards, sewing, the making of children's garments, etc. Home visiting round the hospital has still to be commenced.

INFANT MORTALITY.

As already noted the natives say that morbidity due to ascariasis is much less than in former years.

Figures of infantile mortality for the reserve as a whole are not available but the following figures which refer to an area under the educational influence of one of the missions may be of interest. The figures refer to 698 families.

Total number of deaths at all ages	...	50
Total number of births	... ..	64
Total number of deaths under 1 year	...	12
Infantile mortality rate ... 187.5 per 1,000 births.		

SCHOOL INSPECTION.

Two central schools and a number of out-schools were inspected during the year.

SUMMARY.

The people of this district are gradually improving but more education is required and more help with regard to agriculture. Methods of marketing also require attention.

MOSQUITO- AND INSECT-BORNE DISEASES.

Malaria.

No unusual incidence of malaria occurred in any area of the Colony during the year and no epidemics were reported. In the towns sanitary conditions as regards malaria have on the whole improved while the incidence generally has been lower than in previous years. Nevertheless malaria, except in the towns, still remains the most important disease with which the Colony has to contend, and while it is possible that in the settled European farming districts changes are gradually taking place which in the course of time may render these areas less susceptible to epidemic outbreaks, even there the danger of such outbreaks is not yet past. In the great native reserves on the other hand no changes have yet taken place which would justify any suggestion that an amelioration of the situation either as regards endemicity or the possibility of devastating outbreaks has yet come about. In Kenya, as in many other countries where the population is backward, poor and uncultured, malaria is a social disease and the primary measure of prevention here as elsewhere must therefore be the development of the land and the education of the people.

During the year special investigations as indicated in the report for 1930 were still carried on both in the laboratory and in the field, and the routine methods of prevention were as outlined in the report for that year. Generally speaking, there has been consistent improvement in the townships throughout the year.

Trypanosomiasis.

During the year the medical officer who had been posted to the Nyanza Province for the investigation of sleeping sickness was withdrawn on the completion of the special work which he had been required to undertake and a scheme for dealing with the infected areas was ready for submission to Government by the end of the year. No preventive work other than the treatment of the sick was undertaken.

EPIDEMIC DISEASES.**Plague.**

Throughout the Colony plague was rather less prevalent than usual and no outbreaks of any magnitude were recorded. Of the larger towns, Mombasa, Kisumu and Eldoret remained free from the disease while in Nakuru only one case occurred. In Nairobi on the other hand the epidemic which was in progress at the end of 1930 continued for the first two months of 1931 and there were occasional sporadic cases during the remainder of the year. The total number of cases which occurred in Nairobi was fifty-one.

In towns the most important anti-plague measures are scavenging, general sanitary measures, and the improvement of housing, and with regard to all of these matters there has on the whole been progress, though with regard to each there is still room in most cases for much improvement.

Rat trapping is a routine measure in the three larger towns and the numbers destroyed during the past three years were as follows:—

	1929.		1930.		1931.
Nairobi	8,667	...	19,767	...	25,007
Mombasa	55,782	...	59,000	...	22,530
Kisumu	19,862	...	9,877	...	1,271

During the year experiments in connexion with the de-verminization of plague infected premises by means of cyanogas were carried out and much useful information was obtained. The chief difficulty which occurred arose in connexion with the provision of a suitable pump, while on account of lack of funds no field experiments on a large scale could be carried out.

Smallpox.

The Colony remained free from smallpox throughout the year.

Routine vaccination was carried out as usual while in the South Kavirondo District of the Nyanza Province which marches with Tanganyika a special campaign was undertaken in view of the possible danger of the introduction of the disease from that territory.

The vaccine lymph used was prepared at the Government Laboratory in Nairobi and gave satisfactory results.

The total number of vaccinations performed was 34,046.

Dysentery.

No outbreaks of dysentery were reported during the year and no special preventive measures have been taken against the disease.

Enteric.

Enteric did not appear in epidemic form during 1931 and the incidence in the towns when due consideration is given to the facilities which still exist for its transmission has remained surprisingly low.

Tuberculosis.

Cases of tuberculosis occur both in the towns and in the native reserves but no new information is available as to the extent to which it prevails in any of these places. In the towns institutions for the diagnosis and treatment of the disease have not yet been established and until this has been done and *ad hoc* investigations carried out both there and in the native reserves comment as to the incidence of the disease would be unwise. For the moment the institution of special preventive measures is impracticable.

HELMINTHIC DISEASES.**Ankylostomiasis.**

No special anti-hookworm campaigns were carried out during the year but in almost all districts propaganda with regard to the institution and use of latrines is now carried out as a routine matter with considerable success. In one district, namely, Kilifi, a particularly creditable piece of work was

performed. In this district owing chiefly to the great interest which was taken in the matter by the district officer over 14,000 pit latrines were installed during the course of the year among a population of about 68,000 souls.

Other Helminthic Diseases.

Cases of infestation with tænia, ascaris and schistosomiasis occur throughout the Colony and in almost every area either one or another or all of these helminths are responsible for a very serious amount of ill health.

The preventive measures adopted included the prosecution of the general latrine campaign, the dissemination of information with regard to the modes of infection and the general sanitary measures which require to be adopted, while in one reserve at least a village cleansing campaign was attended with considerable success.

(2) GENERAL MEASURES OF SANITATION.

The execution of general measures of sanitation in the larger towns of Nairobi and Mombasa, Nakuru and Eldoret, is now a matter which lies within the province of statutory local representative authorities.

In Nairobi and Mombasa the health and sanitary staff, with the exception of the Medical Officer of Health in the case of Mombasa, is employed by the local authority. In Nakuru, Eldoret and elsewhere the health and sanitary staff is provided by Government though these officers act as a rule in an advisory rather than an executive capacity. On the whole general sanitary work has been well carried out during the year though in Nairobi and Mombasa there have been considerable difficulties owing to shortage of staff and in consequence certain branches of work such as house to house inspection have had to be left in abeyance for the time being.

Sewage Disposal.

No new water-borne sewage schemes have been inaugurated during the year and progress has been confined to some small extensions in Nairobi which is still the only town in the country which is provided with a water-borne system of sewage disposal.

In Mombasa the need for the inauguration of a proper sewage system becomes yearly greater but here, as elsewhere, reliance is still placed on the bucket system.

Scavenging and Refuse Disposal.

A considerable improvement took place in Nairobi during the year as a result of the erection of a large modern destructor.

Drainage.

No major works of importance have been carried out, though in Kitale certain lengths of drains have been laid down which should entirely remove a serious nuisance which existed in one part of the town.

Water Supplies.

No major works other than the relaying of the Mombasa pipe line have been carried out during the year in the township areas.

With regard to water supplies in the rural native districts some work was done during the year in the coastal districts of Kilifi and Digo and in the Northern Frontier Province by means of boring. The problem presented by the need for better water supplies in the native reserves is, however, a very large one and the whole question merits further and very careful investigation.

Sanitary Inspections.

In the townships of Nairobi and Mombasa sanitary inspection is carried out by inspectors employed by the local authorities and in other townships by Government inspectors. The work has followed the usual course but in the two larger towns mentioned has been limited by shortage of staff.

In the seven native reserve districts where qualified European sanitary inspectors are now employed much useful work has been done. The venture of so posting officers of this type is now well out of the experimental stage and it has been shown not only that there is here great scope for their activities but also that the African population is anxious and ready to avail itself of their services. For the most part their work consists in instruction rather than inspection, and as a general rule they receive many more applications from natives to assist them in the designing of houses, the layout of homesteads and the preparation of estimates and the purchase of material than they can cope with. In one area where the people are more advanced than in most others the inspector has been instrumental in introducing the craft of brick burning, and it is not improbable that provided there is a revival in trade and provided that complementary instruction in the means of obtaining a fair livelihood from the soil can be provided on an adequate scale, great improvements in environmental conditions will be seen in this and other areas during the next few years.

(3) SCHOOL HYGIENE.

Early in the year under review the health officer who for a period of nearly three years had been solely engaged in the work of school medical inspection proceeded on leave and owing to the financial situation it was not possible to make provision for his relief. This service has therefore been in abeyance throughout the greater part of the year and for the immediate future at any rate will so remain.

(4) LABOUR CONDITIONS.

Owing to the general financial depression the number of employed labourers decreased very greatly during the year while for the same reason it became almost entirely impracticable for any employers to embark on capital expenditure with regard to housing projects. Under these conditions the staff of the Medical Department so far as it is concerned in the inspection of labour conditions had for the most part to confine its attention to the investigation of reported outbreaks of disease and to suggesting improvements which could be carried out at small expense. Labour conditions both on estates, on the Railway, and in the townships have remained therefore much as in the preceding year.

(5) HOUSING AND TOWN PLANNING.

Housing.

In spite of the financial depression, there has been considerable building activity during the year, and the position so far as the European section of the community is concerned is now fairly satisfactory in all townships. Such is not, however, yet the case with regard to either the Asiatic or the African communities, and in all townships—with the exception of Nairobi, where there has been some improvement in Asiatic housing conditions, and with the exception of Eldoret, where a new native location has been established—the housing situation with regard to these communities still leaves much to be desired. For the solution of the problem which is presented by the need to find reasonably satisfactory accommodation for the urban African community, it would appear to be essential that State or Municipal housing schemes should be inaugurated. The experiment, as has been recorded in previous Reports, has now been made both in Nairobi and in Eldoret, and it is satisfactory to record that as a result of the year's working the Eldoret experiment has very clearly shown that, provided due attention is given to detail and to economy, a municipal African housing venture can be undertaken without involving the community in undue expense. The general situation, both urban and rural, is reviewed in some detail in the following paragraphs.

Housing in the Colony and Protectorate may be considered under four headings, subdivided as follows :—

- I. European Housing—
 - (a) Urban.
 - (b) Rural.
- II. Indian Housing—
 - Urban.
- III. Arab Housing—
 - (a) Urban.
 - (b) Rural.
- IV. African Native Housing—
 - (a) Urban.
 - (b) Rural—(1) on farms in the European settled areas, in fuel camps, etc.; (2) in the Native Reserves.

I.—EUROPEAN HOUSING.

European housing in the towns of Kenya may be said on the whole to be exceedingly good. For the most part, the houses are of stone or concrete, of sound sanitary construction, and provided with modern conveniences. There is no lack of housing, and as, up to the present, there has been no large poor European community no housing problem exists as such.

Of European housing in the rural areas, it may be said that it is steadily improving, and that much of it is now either good, or very good. On some farms, nevertheless, the housing is still far from satisfactory, even where the owners are not restricted either financially or by lack of culture. On the improvement of this housing the prevention of malaria, which is the most important of the rural diseases among Europeans, largely depends. The position with regard to housing which is unnecessarily bad is slowly improving, partly as the result of propaganda and partly as the result of experience. On other farms, however, the housing is bad either because the owners are in financial straits or on account of lack of culture or education. In many of these instances, no remedy is likely to be forthcoming in the case of the present generation, and amelioration will only be achieved as a result of the education of the children. The question of the education of the European child is therefore of fundamental importance in this connexion.

II.—INDIAN HOUSING.

The Indian population of Kenya lives almost entirely in the towns, and in almost every town in Kenya there is much Indian housing which can only be described as slum property. In Nairobi and Mombasa especially, the problems which are thereby presented are large and by no means easy of solution.

The factors involved are as follows :—

- (a) Poverty.
- (b) Ignorance.
- (c) Lack of alternative accommodation of a good type.
- (d) Interests vested in the large amount of existing slum property.
- (e) Lack of experience and lack of funds on the part of the local authorities concerned.

The solution of the problem lies chiefly in the gradual acquisition of experience on the part of the local authorities, and in the education of the Indian child to be—

- (a) more knowledgeable as regards hygiene in living;
- (b) a more efficient and therefore a higher wage earning individual.

The provision of general educational facilities of a good standard is therefore of fundamental importance in connexion with Indian housing. During the past few years, considerable advance has been made in the provision of educational facilities for Indians, but till education is general and compulsory, and has been so for a generation, the housing problem will remain.

Nevertheless, there has been during the past few years very considerable advance with regard to the housing of many members of the Indian community. This has come about as the result partly of education, partly of prosperity, and partly of the provision of better building sites together with the sanitary control of new buildings. To a less extent, the demolition of insanitary dwellings has also played a part, while the example of some good Indian housing in every town is undoubtedly having a marked educational effect. To achieve notable improvement, however, it is essential that, as and when experience and funds permit, large improvement schemes for the slum areas, together with schemes for much alternative and additional housing, should be undertaken. The conditions which pertain to-day in many of the Indian areas of Nairobi, Mombasa, and some other towns as well, reflect credit neither on the communities nor the authorities concerned. The local authorities now established have as yet not had either much time or large funds at their disposal, and for these reasons the problem of the improvement of Indian housing has not yet received the attention which it merits.

III.—ARAB HOUSING.

The housing of an urban Arab population is a problem only in Mombasa, and there it will require to be considered as part of the general Asiatic housing question. The conditions which give rise to the problem and the methods of solution are the same in the case of both Arabs and Indians.

IV.—AFRICAN NATIVE HOUSING.

It is in connexion with African native housing that the largest and most important problems arise both in the towns and in the rural areas.

(a) *African Native Housing in Urban Areas.*

This problem varies according to circumstances, and notable differences occur in—

- i. Mombasa,
- ii. Nairobi,
- iii. The smaller townships.

In Mombasa, where the large majority of the population consists of Africans, many of whom have been born and bred there, the problem is in part very similar to the Asiatic problem, in that it is dependent for its solution chiefly on education, the raising of the wage-earning power, and the provision of good houses. Another part of the problem is, however, the housing and control of the large new immigrant and floating population of untutored Africans who in ever-increasing numbers are drifting to the town in search of work, the education of these people, and the education of their children. The problem of housing the settled class of African is for the moment being met by themselves in conjunction with the private enterprise of some of the larger landowners, who have subdivided extensive areas into temporary occupation plots, which are rented by Africans, and on which the latter build houses of wattle and daub. These houses, though of temporary construction, are of much better design than the ordinary huts of the reserve, in that they have high—in most cases, very high—walls, and are fairly well lit and ventilated. Nevertheless, the material of the walls and roof does not lend itself to being thoroughly cleaned, and, further, it tends to harbour rats. Nor are the houses provided with, or capable of being provided with, modern conveniences. A pit latrine serves for the disposal of human excreta, water has to be brought from some distance, the storage of foodstuffs presents difficulties, and the disposal of sullage water is extremely difficult. In addition, these houses, though of temporary construction, cost from £50 to over £100 to build, and the owners are precluded from building better, since they are only tenants at will till such time as the landlord may find a more profitable use for his land.

The system has met a need, but it affords a far from satisfactory solution to the problem, and essentially it is unjust, since the tenant, though paying well for the use of the land, has no security of tenure and is ever in a precarious situation and liable at a stroke of the pen to the almost entire loss of the fruits of years of industry and months of labour. This problem is one of the most urgent with which the local authority in Mombasa is faced.

Newly arrived Africans in Mombasa are housed for the most part as lodgers in the houses of the first class. The solution of the problem presented by these people lies in the provision of locations where immigrant Africans can hire rooms or houses, and where adequate provision can be made for their social needs.

In Nairobi the problem is somewhat different from that in Mombasa, since Nairobi is a new town, and there is not therefore any large section of the African population which has urban culture or experience. The position up to the present has been largely met in much the same manner as in Mombasa, namely, some Africans have built houses and have let these houses in lodgings to others. There are these differences, however, that, firstly, owing to the absence of good building poles and suitable earth, and owing also to a lack of experience, the houses are much poorer than in Mombasa; secondly, the supply is far from adequate and very serious overcrowding is therefore almost universal, and thirdly, the habits and customs of the people are those of the bush and not those of the town. Furthermore, wages in Nairobi are much lower than in Mombasa.

Some attempt at a solution has been made in Nairobi by the provision of permanent housing by the Municipal Council, and further provision to the extent of £50,000 is proposed. For the moment, and for some years to come, it will be along these lines, and along these lines only, that a solution will be found, but the solution will only be partial until adequate provision is made for the general compulsory education of the children who are being born in the town of parents who very rapidly are becoming urbanized. Furthermore, in Nairobi as in Mombasa, the provision of housing will never catch up on demand until the drift to the town flows less strongly.

In the smaller townships the problem is as in Nairobi, but on a smaller scale. In one of these townships, however—namely, Eldoret—it is satisfactory to be able to record that within the past year a model location has been established which in its way is an example of African town planning carried out with due regard to all the social needs of the community. Accommodation varying from single rooms to detached two-room dwellings, each with a separate kitchen, has been provided. A market place with lock-up shops and tea-rooms, has also been established, and sites have been set apart for baths, recreation grounds, churches and schools. A child welfare centre has also been provided. If the location is developed and extended along the lines which have been planned, it should provide an adequate solution to the African housing problem in this town for many years to come and an outstanding example to local authorities elsewhere of the advantages to be obtained from tackling the African housing problem in a comprehensive manner.

As part of the problem of the housing of Africans in townships there stands the question of the housing of Government employees. Both in Nairobi, Mombasa, and the smaller townships, much has been done in recent years, and in all towns a number of examples of fairly good housing can now be found. In no town, however, is the amount of housing provided by Government for its own employees yet sufficient, and in all, some new and better housing, suitable for the requirements of the more educated African staff which is gradually emerging, is also very urgently required.

It is satisfactory to note that the Kenya and Uganda Railway, the largest employer of urban labour in the country, has made excellent provision for the accommodation of its African staff in all towns. Supervision is not always equally good, however, and the improvement of this, together with the provision of more commodious housing as the demands arise, are problems which at the present time merit consideration.

(b) *Rural African Housing in the European Settled Areas, in Fuel Camps, etc.*

On some of the larger European estates, excellent permanent housing has in the past few years been provided. On the great majority of the larger estates, however, and on almost all the smaller farms, this is not yet so. Partly, the difficulty has been financial, and at the present time financial considerations stand almost universally in the way of the incurrence of capital expenditure; but in great part the difficulty in the past has lain in the fact that the majority of employers do not fully appreciate the economic advantages of devoting either time or funds to the housing and supervision of their labourers. For some years past, Government has carried out systematic propaganda with regard to this matter, but it is clear that until the labourer himself has been educated to demand better housing it will be essential to carry out routine inspection, and to enforce reasonable housing provision by law.

The solution to the problem here lies in the provision of an adequate labour inspectorate, and the promulgation of adequate laws, so soon as the financial position permits.

The Housing of Africans in the Native Reserves.

It is in the Native Reserves that the essential housing problem of the Colony lies. It is in these reserves also that the means towards the solution of the problems in the urban areas and in the settled European farming districts will also be found. It is a large question, involving the re-housing of some 3,000,000 people, or about 750,000 families, for at the moment not one in a hundred of these families is housed under conditions which are not insanitary to the last degree. Darkness and filth, to put it very shortly, are the universal and outstanding characteristics of the average African hut. In many of the reserves, however, the housing problem, though an outstanding one, is not yet an immediate one. There are many things to do first—to improve food supplies in both quality and quantity, to raise the economic status of the population by improved agriculture and by education and by provision of markets, even to improve water supplies. But in other reserves, and throughout a population of at least a million, good housing can now be an immediate object. There are many steps still to be taken it is true before good housing can be general even among that population, but nevertheless it can now be an immediate object.

In three at least of the Kikuyu districts, in three districts in the Nyanza Province, in the Machakos district, and in the Teita, Digo and Kilifi districts, there are thousands of African natives who are now anxious to build better houses and to improve their amenities, and many hundreds who are financially in a position to do so, but they do not know what or how to buy, and they do not yet know how to design or build.

To meet the difficulties of those who can afford to build but do not know how, it has been the policy of the Medical Department during recent years to post to the more developed districts qualified European sanitary inspectors who have had some technical experience, and who also, as far as possible, have been specially trained to undertake work among Africans.

To-day there are six districts to which European sanitary inspectors have been appointed, and the experiment promises to be eminently successful. These inspectors are not required to carry out sanitary inspections as ordinarily understood. Their business is to teach, and, as far as possible, to provide practical assistance in the way of designing and laying out houses, advising as to methods of construction and, very particularly, advising the prospective builder as to how far his money will go and where and what and how to buy. One of the greatest difficulties of the African is to obtain building material, and an important matter in the future will be to organize the supply. Another function of the sanitary inspector is to determine the best local materials for building, and, if he can, to devise new methods where these are required. In the district where most interest is at present being displayed by the natives in new housing, the sanitary inspector has been able to establish a brick-burning industry in three separate areas where the art was previously unknown.

An essential matter in these housing campaigns is supervision, and it is surprising in how many instances it has been found that natives who had undertaken housing ventures before the arrival of the sanitary inspector had expended comparatively large sums of money, up to even £100 and £150, with anything but satisfactory results.

The functions of the sanitary inspector comprise more, however, than advice with regard to the house and the usual sanitary annexes. The people with whom he has to deal are farmers—poor farmers, it is true, but still farmers—and it is not only a house that they require but also a homestead and all that appertains thereto.* The sanitary inspector has therefore to advise with regard to the construction of latrines, grain stores, fowl houses and fowl runs, cow, calf and cart sheds, the conservation of manure, the digging of manure pits, and even the construction of carts. These matters are dealt with only, however, after, in consultation with the agricultural officer, a general policy has been laid down. In addition, the sanitary inspector is expected to have a general knowledge of the economic needs of the people, and of the way in which these can be met by means of increased production and better farming. On occasion also it is very definitely his business to advise a man with exiguous capital that he would be much wiser to expend his capital in the first instance on buying the means of improving his holding by better cultivation than in frittering it away on a poor attempt to build a house which he has not even the means to keep clean. To the many who wish to build but have no means, it is his business to preach better farming, and to point out that by application to the agricultural officer they may be put in the way of ultimately being housed with the best.

The basic difficulty in the reserves referred to above is not the lack of will to build good houses, but the lack of means, which again results from a combination of two causes—

- (a) a lack of realization on the part of the individual that he has the capacity and opportunity to be a prosperous farmer;
- (b) lack of the means of demonstrating this fact to a sufficient number of Africans and lack of staff to teach willing individuals how to farm.

A powerful aid in the improvement of housing in Native Reserves is the provision of demonstration houses, homesteads and farms. Some are already in existence, but large numbers are required if any considerable proportion of the population is to have an opportunity of appreciating their advantages. Some of the local native councils are taking a praiseworthy interest in the matter, and are themselves providing funds to establish model demonstration houses and farms.

Town Planning.

No major schemes were proposed or inaugurated during the year.

(6) FOOD IN RELATION TO HEALTH AND DISEASE.

Inspection and Control.

The routine inspection of meat, milk and other foodstuffs was continued throughout the year at the larger centres on the usual lines, either by municipal or by Government sanitary inspectors.

Markets, Dairies and Slaughterhouses.

As regards markets, the only notable improvement undertaken during the year was the erection of a large and modern building in Nairobi, which is now nearing completion.

With regard to dairies, there has on the whole been a general improvement.

The Improvement of Food Supplies.

One of the directions in which improvement and reform is perhaps more urgently required than any other, with a view to securing a robust and healthy African population, is in connexion with food supplies. The essential problem from the public health point of view is the prevention of under-nourishment, and from the medical point of view the essential method of

prevention is the education of the people as to the value of the various common foodstuffs and the need for a balanced dietary. The value of such education is, however, dependent on the availability of the essential articles of diet, and if the cultural standard of the common people or their social organization be such that many of these articles are not or cannot be produced, education in another direction is a primary preliminary measure. And such is the case, for while there is no reason why the great majority of all the African families in the Colony should not each produce on its own land and at its own doorstep all that is necessary for human nourishment, there are yet but few who do so, for but few know how.

Concomitantly therefore with an educational campaign as to the value of foodstuffs, there must be an educational campaign with regard to agriculture, vegetable-growing, fruit-growing and animal husbandry. In effect, a balanced or a properly mixed dietary is dependent on that mixed farming which, while it inculcates the keeping of cattle not on some distant communal grazing ground but on the farm itself in order that manure may be available for the fields, at the same time ensures a milk supply for the children and animal fats for the adults. Medical officers in all districts are at the moment inculcating precepts both with regard to consumption and production, but an agricultural educational campaign on the widest and most intensive scale with regard to the practice of correct production will be required before a well nourished, robust and healthy population occupies the Native Reserves.

B.—Measures Taken to Spread the Knowledge of Hygiene and Sanitation.

A noteworthy feature of the year has been the success which has attended the efforts of the European sanitary inspectors in certain Native Reserves. The chief function of these inspectors is, as has been noted before, instruction rather than inspection, and in most areas it is a matter of difficulty for these officers to meet all the demands which are made on them for assistance in the layout of houses and homesteads, in estimating for materials, and, in places, with regard to the manufacture of burnt bricks.

Propaganda with regard to better living is also now a recognized function of all medical officers in the Native Reserves, and by these officers, as well as by their subordinate African staff, much work has been done.

Towards the end of the year, a beginning was made with a project for the systematic training of out-dispensary health workers, whereby a number of literate Africans will undergo a special course of tuition at the Jeanes School. The course, which will last for two years, includes such part of the ordinary Jeanes School curriculum as is suitable, while in addition lectures will be given by medical and health officers and by sanitary inspectors on the treatment and prevention of disease, the improvement of housing, and general rural sanitation and hygiene. The object of the course is to turn out a dispensary boy who, in addition to having a sounder knowledge of simple out-dispensary work than that of those who are employed at the present time, will have a real appreciation of the needs of the people with regard to the improvement of their houses, and a correct conception of the value of their own time and of the real meaning of social work.

During the year three health exhibits were organized in connexion with agricultural shows.

The first exhibit was staged at the January show of the Royal Agricultural and Horticultural Society of Kenya, which was held in Nairobi, and is the chief European agricultural show of the year. The exhibit was in two parts. One part, consisting of the usual propaganda material set out in a pavilion, dealt with the more ordinary diseases and the sanitary methods which should be adopted for their prevention, the care of labourers, etc.; the second part consisted of a complete farm homestead such as might be erected and maintained by a progressive African native in connexion with a small farm in the Native Reserves. The homestead consisted of the usual outbuildings, and a three-roomed burnt brick and tiled house, completely furnished in a simple

fashion. For the burnt bricks and timber used in the construction of the house, the Department was indebted to two European firms, while the wheat meal which was used for a baking demonstration which was given in the kitchen of the house throughout the period of the show was kindly presented by an important European marketing association.

The second exhibit was staged in connexion with a large native agricultural show in North Kavirondo, and was designed to show the inter-relationship of better living, better farming and better business. To this end, in addition to pavilions containing exhibits which demonstrated in a systematic fashion the causes of disease, the cures and the special preventive measures which should be adopted, there was staged, with the co-operation of the Agricultural, Veterinary, Education, Forest and Postal Departments, an exhibit consisting of a full sized model homestead in which agricultural operations were being carried on, various shops and workshops, a dispensary and child welfare centre, and a post office and savings bank, according to the general scheme which is outlined on the plan which is reproduced in this report (*See page 36*).

The third exhibit was staged in connexion with a smaller European agricultural show which was held later in the year at Eldoret.

C.—Training of Sanitary Personnel.

Beyond the scheme already mentioned in the preceding paragraphs for the training of dispensary health workers, no attempt has been made to undertake the systematic training of sanitary personnel. On the other hand, much useful training has been given to individual African subordinates by the European sanitary inspectors and by medical officers.

D.—Recommendations for Future Work.

It is unnecessary to recapitulate here the recommendations made in previous reports in regard to future work, but it is necessary to stress the fact that in order to secure that alteration of environment which must take place before it can be said that the conditions under which the African peasant is born, lives and dies, are other than insanitary to a degree, it is essential that a general educational scheme should be embarked upon which might enable him in the first place to be more prosperous, and in the second to use wisely and well such wealth as he might acquire. In Africa, progress with regard to the public health will depend firstly on the progress which may be made in agriculture, and secondly on the steps which may be taken to educate adult women in the care of their children and the management of their homes.

Two primary sanitary measures of outstanding importance are therefore agricultural education and the training of women.

One other matter of very great importance may be mentioned here, namely, the provision of good housing for Africans in urban areas, and it is to be hoped that the results of the experiment which has been carried out at Eldoret, and to which reference was made in the paragraph dealing with housing, will be carefully studied by all local authorities with a view to the provision of similar or better housing elsewhere.

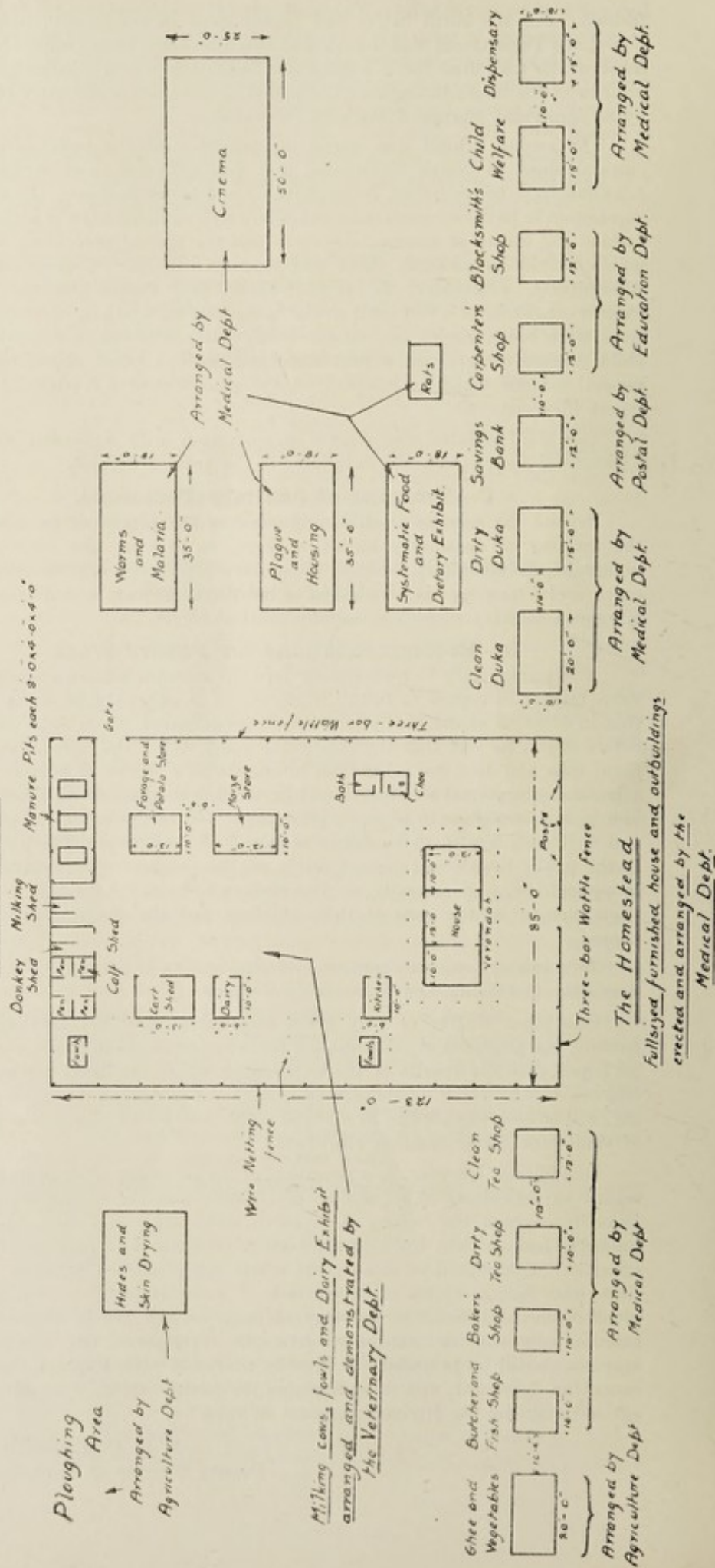
In addition, however, to a general plan for providing adult education with regard to agriculture and the care of children and the management of the home throughout the Colony on a much wider scale and in a much more intensive fashion than has hitherto been possible, it is of paramount importance that with regard to those areas where the physical conditions are such that either lack or excess of water, lack of transport facilities or impoverishment of the soil stand in the way of progress and are in themselves the essential causes of backwardness, systematic development or "bonification" schemes should be prepared. Except by means of such schemes these areas cannot be developed, and in such places the health officer, if unaided by the agriculturist and the engineer, labours in vain.

A. R. PATERSON,

Deputy Director of Sanitary Service.

LAY-OUT OF THE GOVERNMENT CO-OPERATIVE DEPARTMENTAL EXHIBIT AT THE NORTH KAVIRONDO SHOW HELD AT MUMIAS IN JANUARY 1931.

Scale 1 Inch = 30 Feet



IV.—PORT HEALTH WORK AND ADMINISTRATION.

The number of vessels which entered Kilindini or Mombasa Harbours during the past three years was as follows :—

		1929.		1930.		1931.
Steamships	... ..	687	...	667	...	584
Dhows	... ..	1,444	...	1,341	...	1,500
		2,131	...	2,008	...	2,084

In November, the Old Port (Mombasa Harbour) was closed for the landing and shipment of cargo other than that conveyed by dhows, and is now used only by dhows and fishing craft.

PORT HEALTH STAFF.

During the first half of the year, the Port Health Department was under the charge of a health officer, assisted by an assistant surgeon. On the 1st August, however, the senior health officer seconded to the Municipal Board of Mombasa was placed on a part time basis and assumed the duties of port health officer, the health officer becoming assistant port health officer and the services of the assistant surgeon being dispensed with. No sanitary inspector was available for duty throughout the year.

PORT HEALTH ADMINISTRATION.

The general administration of the port remained unchanged until November 3rd, on which date notice was given in the Official Gazette that coasting vessels plying between the ports of the Colony and Protectorate would be exempted from the rules requiring vessels to await boarding and clearance by the Port Health Officer.

No difficulties or untoward events have been experienced as a result of this innovation, and during the coming year consideration will be given to the possibility of extending the principle with regard to foreign-going vessels in respect of ports on the Tanganyika and Zanzibar seaboards as well. In addition, there would now appear to be a case for the reconsideration of the whole procedure of boarding and pratique in view of the facts that owing to the establishment of the Eastern Bureau at Singapore we are now well acquainted with the sanitary state of most foreign ports, and that most vessels are equipped with wireless installations.

INFECTIOUS DISEASES IN VESSELS.

No vessel arrived in port having on board a case of dangerous infectious disease, nor did any such case occur in any vessel while in harbour.

Only on one occasion was action taken in regard to infection which had occurred during the voyage prior to arrival at Mombasa. In this case the S.S. *Ellora*, of the British India Steam Navigation Co., Ltd., on the 23rd January reported, by wireless, infection with smallpox detected five days after leaving Bombay. The ship was directed to make Zanzibar, and land all deck passengers in quarantine prior to calling at Mombasa. This was done, and, after disinfection, the ship arrived at Mombasa on 28th January with saloon passengers only. These were permitted to land under medical surveillance. Deck passengers followed after expiry of the quarantine period.

INFECTIOUS DISEASE IN THE PORT.

The town and port of Mombasa remained free from plague and smallpox, and no infectious disease occurred in epidemic form. Clean bills of health were therefore issued throughout the year.

V.—MATERNITY AND CHILD WELFARE.

Activities in connexion with maternity and child welfare were continued during the year, but no new centres were opened. Progress was maintained at the hospitals in the reserves and elsewhere with regard to the clinics for women and children, the germs from which maternity and child welfare centres will develop.

In Nairobi, Mombasa and Eldoret, attendances showed a steady increase. In Nairobi, the old unsatisfactory quarters previously occupied in the native location were closed, and the centres and clinic transferred to a new and up-to-date building which had been erected by the Municipality for the purpose. During the year the staff retained by Government for this work was as follows :—

In Nairobi.—One woman medical officer, two health visitors.

In Mombasa.—One woman medical officer, two health visitors.

In Eldoret.—One health visitor.

In Nairobi there was a total attendance of 33,101 at the centres, and 7,554 health visits were paid. At Mombasa the total attendances were 11,284, while 11,166 visits were paid to the homes of the people.

The maternity centres established by the Lady Grigg Child Welfare League for Asians and Africans at Nairobi and Mombasa continued to do useful work, being financed by Government to a large extent.

In the Native Reserves much work was as usual done by the missionary societies, while at the Government hospitals and dispensaries there was an increasing number of attendances. It has, in fact, been an outstanding feature of the year that native women are now showing an increased tendency either to enter hospital for confinement, to attend for gynecological complaints, or to continue to bring up their children for inspection. The total number of native confinements which took place in Government hospitals was 263, and in this connexion it is interesting to note that no less than six cases of ectopic gestation were detected. Death resulted in only one instance. There is no doubt that if more accommodation for maternity cases were available at certain places, notably Kisumu, full advantage would be taken of it.

The ante-natal clinics, both in Nairobi and Mombasa and in the reserves, were well attended.

As a result of the work of the year, it has become increasingly clear that in many reserves there would now be an adequate field of work. With regard to the general question of staff, I cannot do better than quote the closing paragraph of the Annual Report of the Government Child Welfare Officer, Nairobi, which runs as follows :—

“ I have stressed always the fully trained health visitor, because I believe that the best procurable is only good enough to overcome the difficulties of this work, or, to quote Dudley Kidd : ‘ The problem is the progress of a backward race, and we allow inefficient teachers, whose only qualification for the difficult work is their own kind hearts, to form the character of the rising generation and to complicate our difficulties. Has any State the right to allow unqualified people to intensify national problems in this gratuitous fashion? ’ ”

VI.—HOSPITALS, DISPENSARIES AND VENEREAL CLINICS.

Another considerable increase in the totals for in-patients and out-patients has to be recorded for 1931. This is partially due to the fact that new hospitals, which had been completed in 1930, were in commission for the whole of the year under consideration.

It is gratifying to note that the Government decision, recorded in the 1930 Report, concerning the hospital policy to be followed in Nairobi has been reversed. The course of events which led up to this is briefly as follows: In April, a public meeting took place at which a motion was passed by an overwhelming majority to the effect that a completely new European hospital was necessary, that no money should be expended by way of reconstruction of the existing European hospital, and that the new hospital should be erected in proximity to the Laboratory. It will be remembered in this connexion that a decision had already been taken by Government that the native hospital should remain at the present site, i.e. near the Laboratory. Shortly afterwards, a letter, signed by past presidents (unofficials) of the local branch of the British Medical Association, appeared in the Press, advocating the group system of hospitals, and at a later date representations to this effect were made to His Excellency the Governor by the branch itself. Subsequently, resolutions were passed by the Nairobi Municipal Council, the Chamber of Commerce, and the Nairobi Association, urging Government to provide new hospitals in Nairobi and to adopt the group system. The political considerations on which the previous decision was based appear completely to have lost their force, and the present policy has received the approval of the large majority of responsible individuals.

It is unfortunate that the financial position appears to render it impossible for the new hospitals for all communities, which are badly needed both in Mombasa and Nairobi, to be erected in anything like the near future; their construction has been approved in principle by Government.

On occasions when extension of an existing non-Government non-native hospital or the erection of a new non-Government non-native hospital has been found to be necessary, the practice in the past has been that Government should pay a fifty per cent contribution on account of approved schemes. This applied only to buildings and no account was taken of the necessary furniture. The position was obviously anomalous, and the matter was adjusted by a motion passed in Legislative Council during the year. As a result, a contribution of £609 was made to the Nakuru War Memorial Hospital for the furniture, etc., required for the extension which had been approved.

EUROPEAN HOSPITALS.

The new European hospital at Kisumu, which was under construction at the end of 1930, was taken into commission in 1931. Accommodation for ten beds is provided. The building is adequately screened, and experience has shown that the planning conduces to efficient and economical administration. Two beds for maternity cases are provided. This is an innovation in Government hospitals in the Colony and Protectorate. Owing, however, to it being impossible to increase the number of nursing sisters, full use could not be made of the maternity facilities provided.

No structural changes took place at the Government European hospitals at Mombasa and Nairobi.

Comparative figures, showing in-patients treated at Government European Hospitals during the last three years, are as follows:—

		1929	1930	1931
Total Number	Treated ..	1,249	1,056	1,629
"	Discharged ..	1,200	998	1,577
"	of Deaths ..	23	28	27
"	Remaining ..	26	30	25

The commonest cause of admission at Mombasa and Kisumu, as usual, was malaria. At Nairobi, surgical cases predominated, as in previous years.

As a result of the difficulties mentioned in the 1930 Report in connexion with the maintenance of the non-Government European Hospital at Eldoret, arrangements were concluded during 1931 by which the hospital was taken

over jointly by the Municipal Board and the District Council. In order that the institution might start on the new phase of its existence on a sound financial footing, it was necessary for Government to make a free grant to the Board of £1,607/10, and a loan of a similar amount. The existing system, whereby the cost of maintenance in hospital of indigent patients was defrayed by Government, each individual case being considered on its merits, was replaced by a payment of £350, to be made annually. A rate of twenty shillings per annum on all male European adults for the support of the hospital is to be enforced during succeeding years.

Suggestions were put forward to the effect that the time is now ripe for the handing over by Government of the European hospital situated at Nairobi to the non-official community, to be run in future as a non-official concern, Government making a contribution on a basis to be agreed. The matter is one of difficulty, and was under consideration for practically the whole of the year.

NATIVE HOSPITALS.

Construction from loan funds of new native hospitals was continued during the year.

The Kericho hospital was taken into commission in February. Quarters for nursing sisters were included, but only one such officer could be posted for duty. Accommodation for thirty beds is provided.

The hospital at Kabarnet was approaching completion at the end of the year, and a commencement had been made with construction at Kilifi and Digo.

At Kisii a house was built for the accommodation of European nursing sisters. The staff position was such that only one sister could be posted instead of two, as had originally been intended.

At Kisumu, two wards of temporary construction which had been blown down were replaced by permanent buildings of modern type, giving accommodation for 12 and 24 beds respectively.

One of the features of the year in connexion with work at native hospitals has been the increased number of women and children who have attended, and the gratifying increase in the number of cases admitted to maternity wards.

In large part due to the employment of European nursing sisters, the nursing and care of patients at native hospitals has improved very greatly during the past few years, and progress in this direction is steadily maintained. The organized training of natives for subsequent employment in subordinate capacities in native hospitals, which is being undertaken at Nairobi, will effect still further improvement. The progress which these pupils make is most gratifying.

The comparative table of admissions, etc., to native hospitals in the past three years is as follows:—

	1929		1930		1931	
	In.	Out.	In	Out.	In.	Out.
Patients	22,966	191,227	29,212	215,417	30,090	246,335
Deaths	1,283	..	1,440	..	1,400	..
Death-Rate per 1,000 admissions	55.8	..	49.3	..	46.5	..

The policy to be adopted in the future with regard to the provision of hospital facilities for employed natives was settled by Government during the year. It was decided that, when funds allow, hospitals shall be erected and staffed by Government at selected centres, and that fees for admission of employees shall be charged to employers which will cover the cost of maintenance and other charges.

No new mission hospitals have been erected during the year, but extensions to the Church of Scotland Mission hospital at Tumutumu, towards the cost of which Government contributed a sum of £700, were completed as part of a larger scheme.

The subsidy paid by Government towards the maintenance of mission hospitals remained unchanged during the year.

INFECTIOUS DISEASES HOSPITALS.

Large infectious diseases hospitals are maintained at Mombasa and Nairobi. The type of cases admitted covers a wide range, as accommodation has to be provided for Africans on account of diseases which among Europeans would not commonly necessitate admission to hospital. Provision is made at these hospitals for patients suffering from yaws and venereal diseases.

DISPENSARIES.

The total number of dispensaries maintained in connexion with the hospitals in Native Reserves was increased during the year by 9, as follows:—

South Kavirondo	...	...	...	...	1
Central Kavirondo	...	...	...	...	1
Kericho	...	...	...	...	1
Kabarnet	...	...	...	...	2
Kitui	...	...	...	...	2
Lamu	...	...	...	...	2

The two first were instituted in order to keep a watch on the sleeping sickness position, and specially trained staff was posted for this purpose. The increase at Kabarnet and Kericho came about as a result of opening new medical posts at these stations. Contrary to the usual custom, the new dispensaries at Kitui and Kericho were not only built but staffed and maintained by the Local Native Councils.

The total number of dispensaries maintained at the end of the year was 106.

Proposals were put forward by several Local Native Councils for the building of dispensaries in districts other than those mentioned above, but the financial position precluded advantage being taken of the offers. Progress was, however, continued with the replacement of old and unsatisfactory buildings by permanent structures, funds being provided by the Local Native Councils.

The question of the future of the reserve dispensaries was a matter to which a great deal of consideration was given during the year. These institutions have been very useful centres for public health propaganda by medical officers on tour, but the duties which have hitherto been carried out by the dressers in charge have been concerned entirely with the treatment by simple methods of individuals. Very valuable work, especially in connexion with the campaign against yaws, has been carried out and is still continuing, but for various reasons it seemed that the time is now ripe for an expansion of the functions of dispensaries by rendering them permanent centres of instruction in the elements of hygiene. For this purpose a special course for dressers will be necessary. It was decided that this could best be effected by special classes at the Jeanes School, combining the ordinary training of a dresser with education in public health of a nature simple enough for it to be passed on to and understood by the native in his ordinary surroundings, the whole training being designed on the lines of that given to a Jeanes teacher. Arrangements for this special course have been completed, and effect will be given to them at the beginning of 1932.

VENEREAL CLINICS.

Special clinics for the treatment of venereal disease in women are held weekly at Mombasa at each of five centres and at Nairobi at each of four centres. Men are dealt with at three clinics weekly at Nairobi and one at Mombasa. Two of the clinics for men at Nairobi commence at 4 p.m. and 5 p.m. respectively, to allow of attendance by those at work during the day.

Steady progress is being made on the whole, the only centre at which the results are really disappointing being that at Mombasa for males. The reason is probably because of the comparative remoteness of the infectious diseases hospital where the clinic is held.

At Nairobi, the attendances by women totalled 3,123, being an increase of 14.5 per cent over those for the previous year. The medical officer in charge remarks, in the annual report submitted by herself: "It is becoming progressively less difficult to get native women to come regularly for comparatively prolonged treatment. Cases of gonorrhoea are the exception, in that there appears to be established a belief that treatment by vaginal irrigation causes sterility."

VII.—PRISONS AND ASYLUMS.

PRISONS.

The general conditions at the large prisons of the country remained unchanged. The question of the buildings and accommodation available at Nairobi received the earnest attention of Government. It is unfortunate that the financial position is not likely for some time to allow of the provision of the additional facilities which it is agreed are necessary.

A new ward of permanent construction was erected as part of the Prison Hospital at Nairobi for patients suffering from pulmonary tuberculosis. Accommodation is provided for ten beds.

The comparative figures for sickness and deaths in prisons for the past three years are given below:—

Year.	Daily Average in Prison.	Admissions to Hospital.	Daily Average on Sick List.	Percentage of Total Inmates.	Deaths.
1929	2,328	1,671	81	3.5	83
1930	2,380	1,729	95	4.0	29
1931	2,508	1,612	90	3.6	56

It will be observed that the number of deaths which took place in 1931 is almost twice that of the preceding year yet there is a distinct drop in the figures relating to morbidity as opposed to mortality.

Of the total of fifty-six deaths pneumonia was responsible for twenty-nine and dysentery for eleven. Deaths from tuberculosis were only two as opposed to nine in the preceding year.

Thirty-three cases of pulmonary tuberculosis were under treatment at the Nairobi Prison during the year.

Detailed figures of sickness and mortality for the three largest prisons are as follows:—

	Nairobi.			Mombasa.			Kisumu.		
	1929	1930	1931	1929	1930	1931	1929	1930	1931
Average Daily Number in Gaol	828	913	878.5	221	225	247.5	281	296	381
Average Daily Number on Sick List	38	57	55.6	9	9	4.6	7	3	5.19
Percentage of Average Daily Sick to Average Number in Gaol	4.6	6.2	6.3	4.1	3.8	1.8	2.5	1.0	1.5
Total Deaths (Excluding Executions)	36	18	16	6	3	7	16	1	18
Percentage of Deaths to Average Daily Number in Gaol	4.3	1.9	1.8	2.7	1.3	2.4	5.7	0.3	4.7

It will be observed that the Nairobi Gaol heads the list for the morbidity rate.

MATHARI MENTAL HOSPITAL.

As a result of the re-organization of duties which took place in Nairobi during the year it was possible to make a new post of Visiting Physician to the Mental Hospital. A psychiatrist practising as a consultant in the town was appointed. In so far as it has not generally been possible to find among the ordinary medical staff of the Colony officers with experience of mental diseases, the new appointment is likely to lead to additions to our knowledge concerning the mental diseases which affect natives.

Serious consideration has again been given to the question of the accommodation and facilities available at Mathari. A decision was arrived at during the year that separate quarters for Asiatic patients should be constructed without delay. The new building, when it is taken into commission, will tend to relieve the congestion existing in the quarters for natives in which hitherto Asian patients have been accommodated. Although relief will be afforded to some extent, it will not render the accommodation in the native block sufficient for the demands made upon it.

The accommodation for physically ill native patients was increased during the year from nine to fourteen beds by bringing another room into use as a sick ward.

The total number, thirty-eight, of deaths which occurred during 1931 exceeded that of 1930 by four. No epidemics occurred but the numbers of deaths due to tuberculosis is disquieting. The communicable diseases to which deaths were attributed were :—

Tuberculosis	...	...	...	...	...	8
Pneumonia	...	...	...	...	...	7
Dysentery	...	...	...	...	...	3
Relapsing fever	...	...	...	...	...	1
Septicæmia	...	...	...	...	...	1

An arrangement was made by which all deaths occurring the second half of the year were followed by post-mortem examination.

The comparative table of admissions, discharges and deaths for the past three years is :—

	ADMISSIONS			DISCHARGES			DEATHS		
	1929	1930	1931	1929	1930	1931	1929	1930	1931
Males	110	111	80	75	87	55	19	30	23
Females	20	33	23	16	24	19	6	4	15
TOTALS	130	144	103	91	111	74	25	34	38

The total number of patients treated during the year was 236, males 169 and females 67, and the average daily number was 148.4.

The forms of mental disorder for which patients were admitted were classified as follows :—

Mania	...	...	...	...	...	31
Melancholia	...	...	...	...	...	5
Dementia	...	...	...	...	...	15
Delusional insanity	...	...	...	...	...	2
Paranoia	...	...	...	...	...	1
Other mental diseases	...	...	...	...	...	47
Epileptics	...	...	...	...	...	2

Total ... 103

One hundred and twenty-four patients remained at the end of the year as against 133 at the end of 1930.

European Section.

The total number treated during the year was sixteen. The details are :—

				<i>Males.</i>	<i>Females.</i>
Remaining from 1930	...	...	...	3	4
Admissions	...	...	...	6	3
Discharges	...	...	...	4	4
Deaths	...	...	...	0	0
Remaining	...	...	...	5	3

Asiatic Section.

The total number treated during the year was ten. The figures are :—

				<i>Males.</i>	<i>Females.</i>
Remaining from 1930	...	...	...	4	2
Admissions	...	...	...	3	1
Discharges	...	...	...	3	1
Deaths	...	...	...	0	0
Remaining	...	...	...	4	2

Native Section.

The total number treated during the year was 210. The figures are :—

				<i>Males.</i>	<i>Females.</i>
Remaining from 1930	...	...	...	84	38
Admissions	...	...	...	71	19
Discharges	...	...	...	48	14
Deaths	...	...	...	23	15
Remaining	...	...	...	84	28

VIII.—METEOROLOGY.

The statistics supplied by the Director of the British East African Meteorological Service are contained in Table IV appended to this report.

JOHN L. GILKS.
*Director of Medical and Sanitary
Services.*

RETURNS.

TABLE I.

Administrative Division.

Dr. J. L. GILKS	..	..	..	Director of Medical and Sanitary Services.
.. A. D. J. B. WILLIAMS, O.B.E.	..	..	..	Deputy Director of Medical Service.
.. A. R. PATERSON	..	..	..	Deputy Director of Sanitary Service.
.. P. F. NUNAN	..	..	..	Senior Medical Officer.
.. F. J. C. JOHNSTONE	..	..	..	Senior Health Officer.
Mr. A. P. LING	..	..	..	Chief Sanitary Inspector.
.. H. OGDEN	..	..	..	Office Superintendent.
.. G. E. SCATTERGOOD	..	..	..	Accountant.
.. H. ELLIOTT, M.B.E.	..	..	..	Medical Storekeeper.
.. T. R. WILSON, D.C.M.	..	..	..	Clerk.
.. A. E. W. WEBB	..	..	..	"
.. R. L. O'SHEA	..	..	..	"
Mrs. E. L. FEAST	..	..	..	"
Mr. J. W. SHEARMAN	..	..	..	"
Miss M. E. CAMERON	..	..	..	"
.. M. A. CORFE	..	..	..	"
.. T. M. RAPER	..	..	..	"
.. J. M. C. MILLETT	..	..	..	"
.. K. L. GRANT	..	..	..	"
Mrs. G. E. FREISLICH	..	..	..	"
(1) Miss J. WEBSTER	..	..	..	"
(2) .. L. E. SHELTON	..	..	..	"
.. E. C. GANNON	..	..	..	"
.. J. M. GILBERT	..	..	..	"

Medical Division.

Dr. N. P. JEWELL, O.B.E., M.C.	..	..	..	Resident Surgical Officer
.. T. H. MASSEY, M.C.	..	..	..	Senior Medical Officer.
.. V. M. FISHER	..	..	..	" " "
(3) .. D. S. SCOTT	..	..	..	" " "
.. C. B. B. REID	..	..	..	" " "
.. J. H. NEILL	..	..	..	" " "
.. R. C. BRISCOE	..	..	..	Medical Officer.
.. C. V. BRAIMBRIDGE	..	..	..	" "
.. K. T. K. WALLINGTON	..	..	..	" "
.. R. A. W. PROCTER, M.C.	..	..	..	" "
.. R. J. HARLEY-MASON	..	..	..	" "
.. J. C. J. CALLANAN	..	..	..	" "
.. C. H. BRENNAN	..	..	..	" "
.. P. MILNE	..	..	..	" "
(4) .. F. R. L. MILLER	..	..	..	" "
.. E. W. C. JOBSON	..	..	..	" "
.. A. R. ESLER	..	..	..	" "
.. A. J. ENZER	..	..	..	" "
.. C. R. PHILIP	..	..	..	" "
.. W. WILKINSON	..	..	..	" "
.. J. R. DAVIES	..	..	..	" "
.. A. G. THOMSON	..	..	..	" "
.. J. A. CARMAN	..	..	..	" "
.. D. BELL	..	..	..	" "
.. J. H. H. CHATAWAY	..	..	..	" "
.. R. McFiggans	..	..	..	" "
.. P. ROSS	..	..	..	" "
.. N. McLEAN	..	..	..	" "

(1) Appointment terminated, 18th October, 1931.

(2) " " 1st March, 1931.

(3) Invalided, 31st March, 1931.

(4) Resigned, 12th August, 1931.

Medical Division.—Contd.

	Dr. G. S. HALE	..	..	..	Medical Office
	.. A. T. HOWELL	..	..	..	..
	.. W. A. BULLEN	..	..	..	..
	.. E. A. TRIM	..	..	..	..
	.. T. F. ANDERSON	..	..	..	..
(1)	.. J. D. S. THOMAS	..	..	..	..
	.. C. S. DAVIES	..	..	..	..
	.. G. D. DRURY	..	..	..	..
(2)	.. J. W. BOWDEN	..	..	..	..
	.. P. G. PRESTON	..	..	..	..
	.. M. A. W. ROBERTS	..	..	..	..
	.. H. A. McMILLAN	..	..	..	..
	.. J. C. D. CAROTHERS	..	..	..	..
	.. H. C. TROWELL	..	..	..	..
(3)	.. A. B. SWARBRECK	..	..	..	..
	.. M. S. R. BROADBENT	..	..	..	..
	.. H. N. TURNER	..	..	..	..
	.. J. D. ROBERTSON	..	..	..	..
	.. R. M. DOWDESWELL	..	..	..	..
	.. E. C. W. MAXWELL	..	..	..	..
	.. H. L. GORDON	..	..	..	Consulting Physician, Mathari.
	.. F. L. HENDERSON	..	..	..	District Surgeon.
	.. J. FORBES	..	..	..	..
	.. C. E. COWEN	..	..	..	..
	Mr H. L. SARGENT	..	..	..	Assistant Surgeon.
	.. W. N. SARGENT	..	..	..	..
	.. L. LONG	..	..	..	Chief Instructor.
(4)	.. F. E. WELCH	..	..	..	Dispenser.
	.. W. C. A. SKEDGE	..	..	..	..
	.. H. THEOBALD	..	..	..	..
	.. J. C. GOWER	..	..	..	..
	.. G. D. SHEEL	..	..	..	..
	.. F. G. VIE	..	..	..	Wardmaster
	.. T. JOHNSTON	..	..	..	Nursing Orderly
(5)	.. F. GALLOWAY	..	..	..	..
	Miss I. WILSON	..	..	..	Matron.
	.. M. I. RHIND	..	..	..	Nursing Sister.
	.. R. ANDERSON	..	..	..	..
	.. D. M. KENNY	..	..	..	..
	.. F. M. BIGGAR	..	..	..	..
	.. A. K. WILSON	..	..	..	..
	.. C. E. EASON	..	..	..	..
	.. E. M. BIRCH	..	..	..	..
	.. M. E. ROCHE	..	..	..	..
	.. S. I. BEAZLEY	..	..	..	..
	.. I. M. NICOLSON	..	..	..	..
	.. M. S. NEVILLE	..	..	..	..
	.. M. McLEOD	..	..	..	..
	.. M. E. E. CLELLAND	..	..	..	..
	.. V. M. MORDAUNT	..	..	..	..
	.. R. M. HOOK	..	..	..	..
	.. H. M. COCHRANE	..	..	..	..
	.. M. D. KENNEDY	..	..	..	..
	.. M. A. MARSHALL	..	..	..	..
	.. A. M. THOM	..	..	..	..
	.. R. F. McLACHLAN	..	..	..	..

(1) Resigned, 18th July, 1931.

(2) Resigned, 9th September, 1931.

(3) Appointment terminated, 18th December, 1931.

(4) Appointment terminated, 8th December, 1931.

(5) Appointment terminated, 14th March, 1931.

Medical Division.—(Contd.)

(1)	Miss F. E. JACKSON	Nursing Sister
	" M. V. TODRICK	" "
(2)	" D. L. BARTLETT	" "
(3)	" M. E. BENNET	" "
(4)	" G. EVANS	" "
	" D. V. GLANVILLE	" "
	" M. POWLES	" "
	" R. WALPOLE	" "
	" R. M. REID	" "
(5)	" B. J. MAC MANUS	" "
	" M. G. ALLEN	" "
	" J. SCOTT	" "
	" E. McNAB	" "
	" G. M. HENERY	" "
	" E. SEATON	" "
(6)	" D. A. PORTER	" "
	" F. M. BABBAGE	" "
	" G. E. HAYES	" "
	" L. I. M. HOLMES	" "
	" K. R. JARDINE	" "
	" D. E. ROBINSON	" "
	" A. MACDONALD	" "
(7)	" M. GORDON SMITH	" "
	" M. I. SMART	" "
	" L. PEARSONS	" "
	" E. M. MUNRO	" "
	" E. E. WILLIS	" "
	Mr. W. G. HOWE	Superintendent, Mathari Mental Hospital
	Mrs. A. T. HOWE	Matron, Mathari Mental Hospital.
	Mr. S. J. BOSCH	Warder, Mathari Mental Hospital.
	Mrs. M. A. BOSCH	Asst. Matron, Mathari Mental Hospital
	Mr. F. M. SMURTHWAITE	Warder, Mathari Mental Hospital.

Sanitation Division.

(8)	Dr. H. S. DE BOER, M.C.	Senior Health Officer.
	" R. N. HUNTER	" " "
	" P. C. C. GARNHAM	Health Officer.
	" K. A. T. MARTIN	" "
	" P. P. D. CONNOLLY	" "
	" R. F. G. DICKSON	" "
	" G. M. HARGREAVES	" "
	" M. MICHAEL SHAW (Mrs.)	" "
(9)	" C. N. TWINING (Miss)	" "
(10)	" A. J. W. WILKINS	" "
(11)	" I. M. D. GRIEVE	" "
	Mr. J. P. COOK	Senior Sanitary Inspector.
	" A. BUNKER	" " "
	" D. P. BROAD	Sanitary Inspector.
	" R. C. MILLS	" "
	" H. E. TAYLOR	" "
	" F. HEWITT	" "

-
- (1) Resigned, 4th December, 1931.
 (2) Invalided, 25th February, 1931.
 (3) Resigned, 31st March, 1931.
 (4) Resigned, 4th September, 1931.
 (5) Appointment terminated, 8th May, 1931.
 (6) Invalided, 25th August, 1931.
 (7) Resigned, 22nd February, 1931.
 (8) Transferred to Northern Rhodesia, 20th March, 1931.
 (9) Resigned, 31st May, 1931.
 (10) Transferred to Northern Rhodesia, 2nd October, 1931.
 (11) Appointment terminated, 29th August, 1931.

Sanitation Division.

	Mr. H. O. SALT	..	..	..	Sanitary Inspector
(1)	.. A. C. ARNOLD	..	..	..	" "
	.. H. MARTIN	..	..	..	" "
	.. H. H. RODGERS	..	..	..	" "
(2)	.. D. MACKINTOSH	..	..	..	" "
	.. C. A. LEWIS	..	..	..	" "
(3)	.. T. HUGHES	..	..	..	" "
	.. F. FRANKS	..	..	..	" "
	.. R. D. PEARSON	..	..	..	" "
	.. F. C. GAFFNEY	..	..	..	" "
(4)	.. G. F. NEWBURY	..	..	..	" "
	.. H. JORDAN	..	..	..	" "
	.. J. S. STIRTON	..	..	..	" "
(5)	.. G. E. SHAW	..	..	..	Sanitary Overseer.
(6)	.. H. COCK	..	..	..	" "
(7)	.. C. A. HARVEY	..	..	..	Clerk
	Miss R. K. SHARP	..	..	..	Nursing Sister.
	.. M. G. RICE-OXLEY	..	..	..	" "
	.. M. A. PERKIN	..	..	..	" "
	.. G. A. DONEGAN	..	..	..	" "
	.. A. M. BURNS	..	..	..	" "
	.. G. M. WARRINGTON	..	..	..	" "
	.. C. M. SUMMERFIELD	..	..	..	" "
	.. E. M. BUNCLE	..	..	..	" "
	Mr. W. J. HENFREY	..	..	..	Superintendent, Infectious Diseases Hospital

Laboratory Division.

	Dr. W. H. KAUNTZE, M.B.E.	..	..	..	Deputy Director of Laboratory Services
	.. R. P. CORMACK	..	..	..	Senior Bacteriologist.
	.. F. P. G. DE SMIDT	..	..	..	Assistant Bacteriologist.
	.. H. D. TONKING	..	..	..	" "
	.. F. W. VINT	..	..	..	" "
	Mr. M. H. FOX	..	..	..	Government Analyst.
	Dr. D. HARVEY	..	..	..	Chemical Officer.
	Mr. C. B. SYMES	..	..	..	Entomologist.
	.. J. I. ROBERTS	..	..	..	" "
	.. F. A. BAILEY	..	..	..	Laboratory Superintendent
	.. H. M. NEFDT	..	..	..	Assistant.
	.. A. H. DAWS	..	..	..	" "
	.. J. McMAHON	..	..	..	" "
	.. W. L. TITMAN	..	..	..	" "
	.. W. A. DOUST	..	..	..	" "
	.. E. C. YOUNG	..	..	..	" "
(8)	.. C. E. J. LAMPERD	..	..	..	" "
	.. E. W. GRAINGER	..	..	..	" (Learner Grade).
	.. T. JONES	..	..	..	" " " "
	.. L. BURTON	..	..	..	" " " "
(9)	.. G. BEVERLEY	..	..	..	" " " "
(10)	.. J. S. NIMMO	..	..	..	Malarial Field Overseer.

(1) Appointment terminated, 14th October, 1931.

(2) Appointment terminated, 14th October, 1931.

(3) Appointment terminated, 14th October, 1931.

(4) Transferred to Northern Rhodesia, 28th September, 1931.

(5) Appointment terminated, 8th March, 1931.

(6) Appointment terminated, 25th January, 1931.

(7) Appointment terminated, 30th April, 1931.

(8) Appointment terminated 23rd December, 1931.

(9) Appointment terminated 31st January, 1931.

(10) Appointment terminated, 15th October, 1931.

TABLE II.

Financial.

The sanctioned Medical Budget for the year 1931 was a total of £253,699, as compared with £257,415 for the preceding twelve months.

Of the 1931 grand total £222,898 was expended leaving an unexpended sum of £30,801.

The savings were due to retrenchments and curtailed activities owing to the financial situation.

The headings under which the vote was arranged were as follows :—

MEDICAL DEPARTMENT.		Actual
<i>Administrative Division.</i>	<i>Estimates.</i>	<i>Expenditure.</i>
Personal Emoluments ...	£19,671	£19,328
<i>Medical Division.</i>		
Personal Emoluments ...	£91,111	£86,310
<i>Sanitation Division.</i>		
Personal Emoluments ...	£27,369	£23,045
<i>Laboratory Division.</i>		
Personal Emoluments ...	£16,003	£15,662
<i>Medical Department.</i>		
Other Charges ...	£97,907	£76,857

REVENUE.

The total amount of revenue collected was as follows :—

Hospital fees ...	£10,092
Bills of health ...	657
Infectious Diseases Hospital, Fees, Nairobi Municipality ...	292
Infectious Diseases Hospital, Fees, Mombasa Municipality ...	120
Fees from Medical Research Laboratory	727
Fees from Government Analyst ...	208
Registration fees ...	88
Sales of medicines, etc. ...	1,152
	£13,336
Reimbursement from Uganda Govern- ment on account of Zanzibar Sanitary Station ...	425
Reimbursement from Kenya and Uganda Railways and Harbours on account of :	
(a) Medical Services ...	10,427
(b) Dental Services ...	204
Reimbursement from Nairobi Muni- cipality on account of Public Health Staff	640
Reimbursement from Mombasa Muni- cipality on account of Public Health Staff	2,690
Reimbursement on account of messing expenses, European Hospital, Nairobi	562
	14,948
	£28,284

Last year the total revenue collected amounted to £30,859.

TABLE III.

Return of Statistics of Population for the year 1931.

COLONY AND PROTECTORATE OF KENYA	Europeans and Whites	Africans and Others	Asiatics
Number of Inhabitants in 1930	12,529*	2,930,604†	26,759*
Number of Births Registered in 1931	361	Figures not available	358
Number of Deaths Registered in 1931	107	do.	196
Number of Immigrants during 1931	5,716	1,122	9,168
Number of Emigrants during 1931	5,703	1,032	12,802
Number of Inhabitants during 1931	17,285‡	2,966,993§	56,903‡

* 1926 Census.

† 1931 Census.

‡ Estimated at 31-12-1929.

§ Estimated at 31-12-1931.

TABLE IV.

METEOROLOGICAL RETURNS FOR THE YEAR 1931.

MONTH.	TEMPERATURE			RAINFALL		
	Shade Maximum.	Range.	Max. and Min. mean combined.	Mean Shade Minimum.	Amount in Inches.	Degree of Humidity 9 a.m.
SCOTT AGRICULTURAL LABORATORY—KABETE						
January	79.4	24.6	67.1	54.8	1.01	72%
February	79.6	22.7	68.3	56.9	1.82	71
March	78.3	20.6	68.0	57.7	5.78	74
April	75.8	17.3	67.1	58.5	13.32	82
May	73.4	16.2	65.3	57.2	4.30	80
June	71.7	19.3	62.1	52.4	1.49	79
July	71.8	18.5	62.5	53.3	0.62	79
August	71.6	18.8	62.2	52.8	1.35	82
September	74.9	21.0	64.4	53.9	4.21	82
October	77.5	22.1	66.5	55.4	2.66	75
November	75.3	18.4	66.1	56.9	3.76	84
December	75.3	20.2	65.2	55.1	2.61	72
YEAR AVERAGE ..	75.4	20.0	65.4	55.4	42.93	78%
Yearly Total ..						
NAIROBI:						
January	76.5	22.7	65.1	53.8	0.88	71%
February	77.4	21.1	66.9	56.3	1.94	71
March	75.4	18.0	66.4	57.4	5.96	73
April	73.9	16.3	65.7	57.6	14.43	82
May	71.4	14.6	64.1	56.8	4.68	83
June	69.6	16.9	61.1	52.7	1.21	82
July	69.6	16.9	61.1	52.7	0.55	79
August	69.6	17.3	60.9	52.3	1.46	78
September	73.0	19.4	63.3	53.6	4.25	77
October	75.7	20.7	65.3	55.0	3.21	69
November	72.9	16.4	64.7	56.5	4.11	79
December	72.0	18.4	62.8	53.6	2.91	77
YEAR AVERAGE ..	73.1	18.2	64.0	54.9		77%
Yearly Total ..					45.59	
FORT HALL:						
January					0.00	
February					0.44	
March					7.13	
April					13.36	
May					6.84	
June	No	records	available		0.30	
July					0.57	
August					1.77	
September					3.16	
October					5.19	
November					11.87	
December					2.28	
YEARLY TOTAL ..					52.91	

METEOROLOGICAL RETURNS—Contd.

MONTH	TEMPERATURE			RAINFALL		
	Shade Maximum	Range	Max. and Min. mean combined	Shade Minimum	Amount in Inches	Degree of Humidity
MOMBASA :						
January	90.1	11.5	84.3	78.6	0.10	74%
February	91.2	11.3	85.5	79.9	0.70	75
March	91.6	11.5	85.9	80.1	0.58	76
April	89.6	10.4	84.4	79.2	0.85	76
May	83.5	8.5	79.3	75.0	24.14	84
June	84.0	9.9	79.0	74.1	1.89	75
July	82.6	9.4	77.9	73.2	7.01	79
August	82.4	9.7	77.5	72.7	2.35	80
September	82.4	10.4	77.2	72.0	4.83	83
October	84.7	10.6	79.4	74.1	2.48	80
November	88.5	13.3	81.9	75.2	0.79	78
December	87.6	11.9	81.7	75.7	5.71	81
YEAR AVERAGE ..	86.5	10.7	81.2	75.8	..	78%
YEARLY TOTAL ..	..	..	..	..	51.43	..
KISUMU :						
January	83.0	17.3	74.3	65.7	1.07	65%
February	86.4	18.8	77.0	67.6	2.28	55
March	81.1	14.8	73.7	66.3	7.38	71
April	80.4	14.3	73.3	66.1	7.72	74
May	80.0	14.1	72.9	65.9	6.31	74
June	79.1	15.0	71.6	64.1	3.81	71
July	78.0	14.8	70.6	63.2	2.66	70
August	79.7	15.5	71.9	64.2	3.14	68
September	80.3	16.8	71.9	63.5	2.38	67
October	83.0	18.2	73.9	64.8	1.01	57
November	83.1	17.6	74.3	65.5	2.54	58
December	80.5	16.8	72.1	63.7	4.38	59
YEAR AVERAGE ..	81.2	16.2	73.1	65.0	..	66%
YEARLY TOTAL ..	..	..	..	..	44.68	..

TABLE SHOWING MEAN ANNUAL RAINFALL AT VARIOUS POINTS IN THE DIFFERENT AREAS FOR THE YEAR 1931.

COAST AREA.			MOUNTAINOUS AREA—(Contd.).		
STATION.	1931.		STATION	1931.	
Malindi	39.22	inches	Kabete Reformatory ..	53.03	inches
Mombasa Observatory ..	51.43	"	Naivasha	27.00	"
Mazeras	38.65	"	Nakuru	34.14	"
Mackinnon Road	44.18	"	Molo	46.79	"
Voi	22.16	"	Eldama Ravine	46.27	"
Taveta	17.36	"			
MOUNTAINOUS AREA.			NYANZA AND KENYA PROVINCE.		
Masongaleni	27.02	inches	Lumbwa	45.27	inches
Makindu	15.97	"	Muhuroni	72.94	"
Athi River	28.19	"	Kisumu	44.68	"
Kiu	18.40	"	Mumias (Kakamega) ..	84.79	"
Nairobi (Department of Agriculture) ..	closed		Kericho	76.27	"
Nairobi, Scott Agricultural Laboratory ..	42.93	"	Nandi (Kipkarren) ..	52.97	"
			Fort Hall	52.91	"
			Nyeri	34.27	"
			West Kenya (Naro Moru)	23.50	"

TABLE V.
COLONY AND PROTECTORATE OF KENYA
RETURN OF DISEASES (In-Patients)
For the Year 1931

DISEASES	EUROPEAN OFFICIALS				EUROPEAN GENERAL POPULATION (Non-Official)				NON-EUROPEAN OFFICIALS (including ASIATICS)				NATIVE GENERAL POPULATION (including ASIATICS)			
	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	
I.—EPIDEMIC, ENDEMIC AND INFECTIOUS DISEASES.																
1. Enteric Group—																
(a) Typhoid Fever	..	2	2	2	..	1	4	..	5	1	..	92	18	97	5	
(b) Paratyphoid A.	..	3	..	3	..	..	2	..	2	..	..	4	..	4	..	
(c) Paratyphoid B.	..	2	..	2	..	..	..	..	..	..	..	2	..	2	..	
(d) Type not defined	..	..	..	..	..	1	1	..	2	..	..	6	2	6	1	
2. Typhus ..	1	6	..	7	..	3	8	..	11	..	..	1	1	1	..	
3. Relapsing Fever ..	..	..	..	..	..	..	1	..	1	..	..	60	1	63	4	
4. Undulant Fever ..	..	1	..	1	..	..	1	..	1	..	1	12	2	13	1	
5. Malaria—Cerebral	..	..	..	..	..	..	1	..	1	..	..	6	6	6	..	
(a) Tertian ..	..	23	..	23	..	..	25	..	25	..	3	184	6	187	1	
(b) Quartan ..	..	2	..	2	..	..	5	..	5	..	1	202	2	203	3	
(c) Aestivo-autumnal	4	83	..	87	..	2	126	..	128	..	2	1,604	25	1,632	22	
(d) Undifferentiated	1	150	..	151	2	1	129	2	130	2	4	1,803	17	1,849	28	
(e) Cachexia ..	..	2	..	2	..	..	4	..	4	..	1	33	6	34	3	
(f) Blackwater ..	..	..	..	..	..	..	8	2	8	..	2	12	6	14	..	
(g) Cerebral	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
6. Smallpox ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
7. Measles ..	..	..	..	..	..	..	13	..	13	..	4	174	3	178	..	
8. Scarlet Fever ..	..	..	..	..	..	..	3	..	3	..	..	29	1	30	3	
9. Whooping Cough	..	..	..	..	..	..	2	..	2	..	..	4	..	4	..	
10. Diphtheria ..	..	187	..	193	3	..	70	..	70	..	23	729	1	752	18	
11. Influenza ..	6	..	..	..	..	..	..	..	..	..	10	79	..	89	1	
12. Military Fever	..	4	..	4	..	..	..	..	..	..	..	5	..	5	..	
13. Mumps ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
14. Cholera ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
15. Epidemic Diarrhoea	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
16. Dysentery—	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
(a) Amoebic ..	..	7	..	7	..	..	9	1	9	..	..	225	10	225	3	
(b) Bacillary ..	..	1	..	1	..	..	1	..	1	..	8	121	3	129	..	
(c) Undefined or due to other causes ..	..	11	..	11	..	..	12	..	12	..	1	254	0	262	2	

RETURN OF DISEASES—IN-PATIENTS—(Contd.).

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MED

DISEASES	EUROPEAN OFFICIALS					EUROPEAN GENERAL POPULATION (Non-Official)					NON-EUROPEAN OFFICIALS (including ASIATICS)					NATIVE GENERAL POPULATION (including ASIATICS)					
	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year		
I.—EPIDEMIC, ENDEMIC AND INFECTIOUS DISEASES—(Contd.).																					
17. Plague—																					
(a) Bubonic ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	97	66	8	109	1
(b) Pneumonic ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8	8	8	8	..
(c) Septicemic ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	2	4	4	..
(d) Undefined ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	1	..
18. Yellow Fever ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19. Spirochaetosis ictero-hemorrhagica ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20. Leprosy ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
21. Erysipelas ..	..	..	..	..	..	..	2	..	2	..	..	..	..	..	..	..	92	7	324	33	..
22. Acute Poliomyelitis ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	1	..
23. Encephalitis Lethargica ..	..	..	..	..	..	..	1	1	1	..	..	..	..	..	..	..	4	..	4	4	..
24. Epidemic Cerebro-spinal Fever ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	35	16	41	41	2
25. Other Epidemic Diseases—																					
(a) Rubella (German Measles)	..	1	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..
(b) Varicella (Chicken-pox) ..	..	1	..	1	..	..	8	..	8	..	..	..	..	..	..	..	417	..	424	9	..
(c) Kala-azar ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
(d) Phlebotomus Fever ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
(e) Dengue ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
(f) Epidemic Dropsy ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
(g) Yaws ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	823	9	890	41	..
(h) Trypanosomiasis ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	3	7	2	..
26. Glanders ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
27. Anthrax ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	72	11	75	1	..
28. Rabies ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	26	20	26	1	..
29. Tetanus ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	5	1	..
30. Mycosis ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
31. Tuberculosis, Pulmonary and Laryngeal ..	..	..	..	..	..	..	9	1	9	1	..	..	..	..	..	..	428	111	473	34	..
32. Tuberculosis of the Meninges or Central Nervous System ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	4	5	..	..
33. Tuberculosis of the Intestines or Peritoneum ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	13	4	14	1	..

RETURN OF DISEASES—IN-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS				EUROPEAN GENERAL POPULATION (Non-Official)				NON-EUROPEAN OFFICIALS (including ASIATICS)				NATIVE GENERAL POPULATION (including ASIATICS)			
	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion
I.—EPIDEMIC, ENDEMIC AND INFECTIOUS DISEASES—(Contd.).																
34. Tuberculosis of the Vertebral Column	1	..	..	1	..	..	..	..	..	..	3	15	3	18	2	..
35. Tuberculosis of Bones and Joints	..	..	..	..	..	..	..	..	..	..	5	47	5	52	5	..
36. Tuberculosis of other Organs— (a) Skin or Subcutaneous Tissue	..	..	..	..	..	..	..	..	..	..	..	6	6	6	..	1
(b) Bones	..	..	..	..	..	..	..	..	..	..	..	6	6	6	..	4
(c) Lymphatic System	..	..	..	..	..	..	..	..	..	..	4	46	..	50	..	..
(d) Genito-urinary	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..
(e) Other Organs	..	..	..	..	..	..	..	..	..	..	..	15	2	15	..	..
37. Tuberculosis disseminated— (a) Acute	..	..	..	..	..	..	..	..	1	..	..	6	4	6	..	..
(b) Chronic	..	..	..	..	..	..	..	..	..	..	1	1	1	1	..	..
38. Syphilis—Vaginitis	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..
(a) Primary	..	..	..	..	..	..	..	..	..	..	..	730	5	784	..	75
(b) Secondary	..	..	..	1	..	..	1	..	..	..	..	318	3	352	..	21
(c) Tertiary	..	..	..	..	..	..	..	..	..	..	..	102	1	109	..	2
(d) Hereditary	..	..	..	..	..	..	..	..	..	..	..	53	8	61	..	5
(e) Period not indicated	..	..	..	..	..	..	..	..	..	..	..	41	..	48	..	1
39. Soft Chancre	..	..	..	..	..	..	2	..	1	..	..	14	..	14	..	2
40. A.—Gonorrhoea and its compli- cations	2	..	..	2	..	..	3	..	2	..	43	643	..	686	..	51
B.—Gonorrhoeal Ophthalmia	..	..	..	..	..	..	1	..	..	..	..	17	..	17	..	..
C.—Gonorrhoeal Arthritis	..	..	..	1	1	..	1	..	..	..	..	12	..	12	..	..
D.—Granuloma Venereum	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..
41. Septicemia	..	..	..	..	..	..	..	..	..	..	..	36	34	39	..	..
42. Other Infectious Diseases	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..
Phagedena Vulva	..	..	..	..	..	..	..	..	..	..	..	1	1	1	..	..
Septic Icterus Neonatorum	..	..	..	..	..	..	..	..	..	..	..	1	1	1	..	..
II.—GENERAL DISEASES NOT MENTIONED ABOVE.																
43. Cancer or other Malignant Tu- mours of the Buccal Cavity	..	..	..	1	..	..	1	..	..	..	1	7	2	8	..	..
44. Cancer or other Malignant Tu- mours of the Stomach or Liver	..	..	1	1	..	..	1	1	1	..	10	6	10	..	..	..

RETURN OF DISEASES—IN-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS				EUROPEAN GENERAL POPULATION (NON-OFFICIAL)				NON-EUROPEAN OFFICIALS (including ASIATICS)				NATIVE GENERAL POPULATION (including ASIATICS)			
	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	
II.—GENERAL DISEASES NOT MENTIONED ABOVE—(Contd.).																
Madura Foot	..	..	..	..	..	..	..	..	..	..	..	2	..	2	..	
Cysts	..	..	..	..	..	..	..	..	..	..	..	5	..	5	..	
45. Cancer or other Malignant Tu- mours of the Peritoneum In- testines, Rectum	..	..	..	..	..	..	..	..	..	..	1	7	2	8	2	
46. Cancer or other Malignant Tu- mours of the Female Genital Organs	..	..	..	..	..	..	1	..	..	..	..	3	1	3	..	
47. Cancer or other Malignant Tu- mours of the Breast	..	..	..	..	..	..	3	..	..	..	2	3	..	5	..	
48. Cancer or other Malignant Tu- mours of the Skin	..	..	..	..	..	..	..	..	..	..	2	11	1	13	..	
49. Cancer or other Malignant Tu- mours of Organs not specified	..	1	..	1	..	..	..	..	..	..	3	40	15	43	..	
50. Tumours, Non-malignant	..	2	..	2	..	..	6	..	..	..	10	171	2	181	9	
51. Acute Rheumatism	..	11	..	11	1	..	4	..	25	..	5	133	..	138	5	
52. Chronic Rheumatism	..	3	..	3	..	..	51	..	51	1	11	241	3	252	4	
Myalgia	..	1	..	1	..	..	..	..	5	..	..	28	..	28	..	
53. Scurvy (including Barlow's Dis- ease)	..	..	..	..	..	..	..	..	..	..	..	12	1	12	..	
54. Pellagra	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
55. Beri-beri	..	..	..	..	..	..	..	..	..	..	1	3	2	4	..	
56. Rickets	..	..	..	..	..	..	..	..	..	..	..	2	..	2	..	
57. Diabetes (not including Insipidus)	1	..	..	1	..	..	3	..	1	2	1	10	3	11	3	
58. Anæmia— (a) Pernicious (b) Other Anæmias and Chlor- osis	..	..	..	..	..	..	1	..	1	1	1	8	2	9	2	
59. Diseases of the Pituitary Body	6	..	..	6	..	..	9	1	5	..	2	39	2	41	2	
60. Diseases of the Thyroid Gland— (a) Exophthalmic Goitre (b) Other Diseases of the Thy- roid Gland, Myxœdema	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
61. Diseases of the Para-thyroid Glands	..	..	..	..	..	..	..	..	..	..	..	4	..	4	1	
62. Diseases of the Thymus	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	
	..	..	..	..	..	..	..	..	..	..	..	2	..	2	..	
	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	

RETURN OF DISEASES—IN-PATIENTS—(Contd.)

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DISEASES	EUROPEAN OFFICIALS					EUROPEAN GENERAL POPULATION (Non-Official)					NON-EUROPEAN OFFICIALS (including ASIATICS)					NATIVE GENERAL POPULATION (including ASIATICS)				
	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	
V.—AFFECTIONS OF THE RESPIRATORY SYSTEM—(Contd.).																				
98. Affections of the Larynx— Laryngitis	..	1	..	1	..	..	2	..	2	..	..	1	3	..	1	12	1	13	..	
99. Bronchitis— (a) Acute	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
(b) Chronic	2	52	..	54	..	..	51	..	51	..	1	144	..	145	36	1,336	4	1,372	23	
100. Broncho-pneumonia	..	..	..	..	..	..	3	..	3	..	..	4	..	4	..	87	1	87	1	
101. Pneumonia— (a) Lobar	..	1	1	1	..	..	4	2	4	..	..	8	1	8	41	1,182	264	1,223	39	
(b) Unclassified	..	2	1	2	..	1	4	1	5	..	..	5	..	5	6	183	25	189	2	
102. Pleurisy, Empyema	1	9	..	10	..	1	3	..	4	..	1	7	..	8	2	53	12	55	2	
103. Congestion of the Lungs	..	1	..	1	..	..	3	..	3	..	..	..	..	..	..	15	1	15	..	
104. Gangrene of the Lungs	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	2	..	
105. Asthma	..	5	..	5	..	..	9	1	9	..	..	30	..	30	..	35	..	35	..	
106. Pulmonary Emphysema	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
107. Other affections of the Lungs	..	1	..	1	..	..	4	1	4	..	..	..	..	..	..	20	8	20	..	
Pulmonary Spirochaetosis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Emphysema	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Pleurodynia	..	..	..	..	..	..	..	..	..	..	..	9	..	..	..	19	..	19	1	
VI.—DISEASES OF THE DIGESTIVE SYSTEM.																				
108. A.—Diseases of Teeth or Gums— Caries	..	5	..	5	..	..	3	..	3	..	..	3	..	3	..	8	2	8	..	
Pyorrhoea	..	7	..	7	..	..	2	..	2	..	..	23	..	23	1	41	..	42	..	
B.—Other affections of the Mouth	..	1	..	1	..	..	1	..	1	..	..	10	..	10	..	12	..	12	1	
Stomatitis	..	1	..	1	..	..	3	..	3	..	..	2	..	2	..	8	1	8	..	
Glossitis	..	1	..	1	..	..	1	..	1	..	..	3	..	3	1	37	1	38	..	
109. Affections of the Pharynx or Tonsils— Tonsillitis	..	49	..	49	1	..	102	..	103	..	..	1	..	1	..	6	1	6	3	
Pharyngitis	1	11	..	12	..	..	11	..	11	..	..	54	..	54	7	140	..	147	..	
Quinsy	..	3	..	3	..	..	..	..	..	..	..	16	..	16	..	73	..	73	4	

RETURN OF DISEASES—IN-PATIENTS—(Contd.)

DISEASES	EUROPEAN OFFICIALS				EUROPEAN GENERAL POPULATION (NON-OFFICIAL)				NON-EUROPEAN OFFICIALS (including ASIATICS)				NATIVE GENERAL POPULATION (including ASIATICS)			
	Cases remaining in Hospital from previous year	Total Admission	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admission	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admission	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	
VI.—DISEASES OF THE DIGESTIVE SYSTEM—(Contd.).																
1110. Affections of the Oesophagus ..																
1111. A.—Ulcer of the Stomach ..	1	10		11	1		14	1	14	2				1		
B.—Ulcer of the Duodenum ..		5		5			5							4		
1112. Other affections of the Stomach—														1		
Gastritis ..		6		6			4		4					3		1
Dyspepsia ..		40		40			27		27					37		3
Colic ..	1	7		7		1	3		4					55		3
		2		3										38		1
1113. Diarrhoea and Enteritis—																
Under two years ..		7		7			6		6					127	19	8
1114. Diarrhoea and Enteritis—																
Two years and over ..		41		41			43		43					246	11	9
Colitis ..		7		7			12		12					179		
Ulceration ..		2		2										2		
1114A. Sprue ..														3		
1115. Ankylostomiasis ..							2		2					368	11	4
1116. Diseases due to Intestinal Parasites																
(a) Cestoda (Taenia) ..																
(b) Trematoda (Flukes) ..																
(c) Nematoda (other than Ankylostoma) ..																
Ascariis ..		1		1												
Trichocephalus dispar. ..																
Trichina ..																
Dracunculus ..																
Strongylus ..																
Oxyuris ..																
(d) Coccidia ..		3		3			3									
(e) Other Parasites ..																
(f) Unclassified ..	1	17		18		2	59		59	2						
1117. Appendicitis ..		1		1												
1118. Hernia ..		1		1			11		13							
1119. A.—Affections of the Anus		2		2			2		2							
Fistula ..		2		2			4		4							

[illegible]

RETURN OF DISEASES—IN-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS				EUROPEAN GENERAL POPULATION (Non-Official)				Non-EUROPEAN OFFICIALS (including ASIATICS)				NATIVE GENERAL POPULATION (including ASIATICS)					
	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year
VII.—DISEASES OF THE GENITO-URINARY SYSTEM (NON-VENEREAL) —(Contd.).																		
134. Diseases of the Urethra— (a) Stricture (b) Other							2 .. .	2 .. .	2 .. .	1 .. .	.. .. .	.. .. .	.. .. .	.. .. .	20 .. .	1 .. .	22 .. .	.. .. .
135. Diseases of the Prostate— Hypertrophy Prostatitis															5 .. .	.. .. .	5 .. .	1 .. .
136. Diseases (Non-venereal) of the Genital Organs of Man Epididymitis Orchitis Hydrocele Ulcer of Penis Phymosis							5 .. .	.. .. .	5 .. .	1 .. .	.. .. .	.. .. .	.. .. .	.. .. .	10 .. .	1 .. .	12 .. .	.. .. .
137. Cysts or other Non-malignant Tumours of the Ovaries		1 .. .	.. .. .	1 .. .	.. .. .	.. .. .	1 .. .	.. .. .	1 .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	9 .. .	.. .. .	9 .. .	.. .. .
138. Salpingitis— Abscess of the Pelvis							1 .. .	.. .. .	1 .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	52 .. .	.. .. .	54 .. .	2 .. .
139. Uterine Tumours (Non-malignant)							1 .. .	.. .. .	1 .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	93 .. .	1 .. .	94 .. .	12 .. .
140. Uterine Haemorrhage (Non- puerperal)															32 .. .	.. .. .	32 .. .	3 .. .
141. A.—Metritis B.—Other affections of the Female Genital Organs Displacement of Uterus Amnorrhoea Leucorrhoea Dysmenorrhoea Ovaritis															47 .. .	.. .. .	47 .. .	.. .. .
142. Diseases of the Breast (Non- puerperal)— Mastitis Abscess of Breast Vulvo Vaginitis Hydatiform Mole															18 .. .	2 .. .	18 .. .	1 .. .
															10 .. .	.. .. .	10 .. .	.. .. .
															24 .. .	.. .. .	25 .. .	1 .. .
															16 .. .	3 .. .	18 .. .	1 .. .
		1 .. .	.. .. .	1 .. .	.. .. .	.. .. .	11 .. .	.. .. .	11 .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	8 .. .	.. .. .	9 .. .	.. .. .
							13 .. .	.. .. .	13 .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	12 .. .	.. .. .	12 .. .	.. .. .
		2 .. .	.. .. .	2 .. .	.. .. .	.. .. .	11 .. .	.. .. .	12 .. .	1 .. .	.. .. .	.. .. .	.. .. .	.. .. .	22 .. .	1 .. .	22 .. .	2 .. .
							11 .. .	.. .. .	13 .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	50 .. .	.. .. .	54 .. .	3 .. .
		1 .. .	.. .. .	1 .. .	.. .. .	.. .. .	4 .. .	.. .. .	4 .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	8 .. .	.. .. .	8 .. .	.. .. .
															5 .. .	.. .. .	5 .. .	.. .. .
							1 .. .	.. .. .	1 .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	6 .. .	.. .. .	6 .. .	.. .. .
																		
															5 .. .	.. .. .	5 .. .	.. .. .
		1 .. .	.. .. .	1 .. .	.. .. .	.. .. .	3 .. .	.. .. .	3 .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	29 .. .	.. .. .	30 .. .	.. .. .
							1 .. .	.. .. .	1 .. .	.. .. .	.. .. .	.. .. .	.. .. .	.. .. .	10 .. .	.. .. .	11 .. .	1 .. .
																		

RETURN OF DISEASES—IN-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS				EUROPEAN GENERAL POPULATION (NON-OFFICIAL)				NON-EUROPEAN OFFICIALS (including ASIATICS)				NATIVE GENERAL POPULATION (including ASIATICS)			
	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	
X.—DISEASES OF BONES AND ORGANS OF LOCOMOTION (OTHER THAN TUBERCULOUS).																
156. Diseases of Bones—																
Osteitis ..	..	..	..	..	..	..	5	..	5	..	..	27	2	39	2	
Osteomyelitis ..	..	..	..	..	..	..	1	..	1	..	..	61	1	61	7	
Anchum ..	..	..	..	..	..	..	..	..	..	..	..	26	..	26	1	
157. Diseases of Joints—																
Arthritis ..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	
Synovitis ..	..	10	..	10	2	..	1	..	1	..	..	209	3	224	12	
158. Other Diseases of Bones or Organs of Locomotion ..	..	7	7	7	..	..	2	..	2	..	..	134	1	139	4	
Ganglion ..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	
Lumbar ..	..	4	..	4	..	..	2	..	2	..	..	350	2	362	10	
Ankylosis ..	..	..	..	..	..	..	..	..	..	..	..	7	..	7	1	
	..	..	..	..	..	..	..	..	..	..	..	9	1	9	1	
XI.—MALFORMATIONS.																
159. Malformations ..	..	..	..	..	..	..	..	..	..	..	..	3	..	3	..	
Hydrocephalus ..	..	..	..	..	..	..	..	..	..	..	1	1	1	2	..	
Hypspadias ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Spina Bifida ..	..	..	..	..	..	..	..	..	..	..	..	3	2	3	..	
XII.—DISEASES OF INFANCY.																
160. Congenital Debility ..	..	..	..	..	..	..	..	..	..	..	..	3	1	3	..	
161. Premature Birth ..	..	..	..	..	..	..	..	..	..	..	..	4	3	4	1	
162. Other affections of Infancy ..	..	..	..	..	..	..	4	..	4	..	..	13	5	14	..	
Malnutrition ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
163. Infant neglect (infants of three months or over) ..	..	..	..	..	..	..	1	..	1	..	..	3	3	4	..	
XIII.—AFFECTIONS OF OLD AGE.																
164. Senility—	..	..	..	..	..	..	1	..	1	..	..	14	11	14	1	
Senile Dementia ..	..	..	..	..	..	..	..	..	..	..	..	4	2	7	..	

RETURN OF DISEASES—IN-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS					EUROPEAN GENERAL POPULATION (Non-Official)					NON-EUROPEAN OFFICIALS (including ASIATICS)					NATIVE GENERAL POPULATION (including ASIATICS)				
	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year
XIV.—AFFECTIONS PRODUCED BY EXTERNAL CAUSES.																				
165. Suicide by Poisoning ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1	..
166. Corrosive Poisoning (intentional) ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
167. Suicide by Gas Poisoning ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
168. Suicide by Hanging or Strangulation ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
169. Suicide by Drowning ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
170. Suicide by Firearms ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1	..
171. Suicide by Cutting or Stabbing Instruments ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	2	..
172. Suicide by jumping from a height ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
173. Suicide by Crushing ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
174. Other Suicides ..	..	2	..	2	..	..	5	..	5	..	..	..	..	..	..	..	..	..	..	..
175. Food Poisoning ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	20	..	20	..
176. Botulism ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	..	4	..
176. Attacks of Poisonous Animals ..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	1	35	1	36	1
Snake Bite ..	..	..	..	..	..	..	2	..	2	..	..	3	..	3	..	1	8	..	9	..
Insect Bite ..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	1	10	..	10	..
177. Other Accidental Poisonings ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	196	34	225	18
178. Burns (by Fire) ..	..	2	..	2	..	..	5	..	5	..	..	11	..	11	..	29	83	5	91	4
179. Burns (other than by Fire) ..	..	2	..	2	..	..	4	..	4	..	..	6	..	6	..	8	..	..	..	..
180. Suffocation (Accidental) ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
181. Poisoning by Gas (Accidental) ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
182. Drowning (Accidental) ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
183. Wounds (by Firearms, War ex- cepted) ..	..	1	..	1	..	..	3	..	3	1	..	..	..	..	..	7	34	1	41	2
184. Wounds (by Cutting or Stabbing Instruments) ..	2	..	..	2	..	..	..	..	..	..	..	6	..	6	..	58	717	12	775	30
185. Wounds (by Fall) ..	..	7	1	7	..	..	3	..	3	..	1	13	..	14	..	6	201	4	207	9
186. Wounds (in Mines or Quarries) ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9	28	1	37	..

RETURN OF DISEASES—IN-PATIENTS—(Contd.).

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MED

DISEASES	EUROPEAN OFFICIALS					EUROPEAN GENERAL POPULATION (NON-OFFICIAL)					NON-EUROPEAN OFFICIALS (including ASIATICS)					NATIVE GENERAL POPULATION (including ASIATICS)				
	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year	Cases remaining in Hospital from previous year	Total Admis- sion	Total Deaths	Total Cases Treated	Remaining in Hospital at end of year
XV.—ILL. DEFINED DISEASES.																				
204. Sudden Death (cause unknown)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
205. A.—Diseases not already specified or ill-defined	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ascites	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Oedema	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Asthenia	..	2	..	2	..	..	4	..	4	..	..	..	..	..	..	..	11	..	11	..
Shock	..	2	..	2	..	..	..	..	..	..	..	14	9	14	..	..	14	9	14	..
Hyperpyrexia	..	2	..	2	..	..	2	..	2	..	..	1	..	1	..	..	1	..	1	..
N.Y.D.	..	..	..	..	..	..	1	..	1	1	..	32	..	..	..	1	32	..	33	2
Debility	..	3	..	3	..	..	4	..	4	..	..	..	..	..	..	..	25	3	25	1
P.U.O.	..	5	..	5	..	..	4	..	4	..	..	5	..	5	..	..	5	1	5	..
Marasmus	..	..	..	..	..	..	..	..	..	..	..	20	11	20	1	..	20	11	20	1
Amyloid Diseases	..	..	..	..	..	..	..	..	..	..	..	1	1	1	..	..	1	1	1	..
Septic Vaccination	..	..	..	..	..	..	..	..	..	..	..	3	..	3	..	..	3	..	3	..
Food Deficiency Diseases	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Torticollis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
B.—Malingering	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
XVI.—DISEASES, THE TOTAL OF WHICH HAVE NOT CAUSED 10 DEATHS.																				
GRAND TOTAL	31	1,175	5	1,206	13	30	1,390	26	1,410	27	43	3,668	7	3,711	30	1,750	30,092	1,400	31,840	1,486
SURGICAL OPERATIONS—																				
Under General Anaesthesia	99	..	..	..	..	299	..	..	..	..	11	..	..	..	..	2,725	..	..	..	..
Others	19	..	..	..	..	20	..	..	..	..	3	..	..	..	..	316	..	..	..	..

TABLE VI.
COLONY AND PROTECTORATE OF KENYA.
RETURN OF DISEASES (Out-Patients).
NUMBERS TREATED DURING THE YEAR 1931.

DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			NON-EUROPEAN OFFICIALS (INCLUDING ASIATICS)			NATIVE GENERAL POPULATION (INCLUDING ASIATICS)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
1.—EPIDEMIC, ENDEMIC AND INFECTIOUS DISEASES.												
1. Enteric Group—												
(a) Typhoid Fever ..	..	..	..	..	..	..	..	..	..	1	..	1
(b) Paratyphoid A. ..	..	..	..	..	..	..	..	..	..	..	..	..
(c) Paratyphoid B. ..	..	..	..	..	..	..	..	..	..	..	..	..
(d) Type not defined ..	..	..	..	..	..	..	..	..	..	..	..	..
2. Typhus ..	..	..	..	..	..	..	..	..	..	..	..	..
3. Relapsing Fever ..	1	..	1	..	..	..	..	..	..	10	2	12
4. Undulant Fever ..	1	..	1	..	..	..	..	..	..	36	1	37
5. Malaria—												
(a) Tertian ..	17	6	23	..	..	..	94	..	..	644	77	721
(b) Quartan ..	..	..	..	3	..	3	30	..	..	233	60	293
(c) Aestivo-autumnal ..	4	2	6	13	3	16	36	..	..	1,441	627	2,068
(d) Undifferentiated ..	16	1	17	31	16	47	557	..	..	14,890	3,500	18,390
(e) Cachexia ..	2	2	4	5	2	7	13	..	..	471	89	560
(f) Blackwater ..	1	..	1	..	..	..	..	..	..	13	..	13
6. Smallpox ..	..	..	..	..	..	..	..	..	..	..	..	..
7. Measles ..	..	..	..	..	..	..	..	..	..	..	..	..
8. Scarlet Fever ..	1	..	1	1	..	1	..	..	..	47	13	60
9. Whooping Cough ..	..	..	..	..	..	..	..	..	..	..	..	..
10. Diphtheria ..	..	..	..	..	..	..	..	..	..	102	80	182
11. Influenza ..	..	..	..	15	5	20	224	..	..	4,821	465	5,286
12. Military Fever ..	16	..	16	..	..	..	..	..	..	..	..	..
13. Mumps ..	..	..	..	..	..	..	2	..	..	165	31	196
14. Cholera ..	..	..	..	..	..	..	..	..	..	..	..	..
15. Epidemic Diarrhoea ..	..	..	..	..	..	..	..	..	..	60	7	67
16. Dysentery—												
(a) Amoebic ..	2	..	2	2	..	2	..	..	..	84	29	113
(b) Bacillary ..	2	..	2	..	..	..	..	..	..	27	17	44
(c) Undefined or due to other causes ..	2	..	2	..	..	..	21	..	..	280	64	344

RETURN OF DISEASES—OUT-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			NON-EUROPEAN OFFICIALS (including ASIATICS)			NATIVE GENERAL POPULATION (including ASIATICS)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
II.—GENERAL DISEASES NOT MENTIONED ABOVE—(Contd.).												
66. Alcoholism	..	..	..	1	..	1	..	..	..	1	..	1
67. Chronic poisoning by mineral substances (Lead, Mercury, etc.) ..	..	..	..	..	..	..	..	..	..	..	..	..
68. Chronic poisoning by organic substances (Morphia, Cocaine, etc.)	..	..	..	..	..	..	..	..	..	..	..	..
69. Other General Diseases—												
Auto-intoxication	..	..	..	..	..	..	..	..	..	1	..	1
Purpura Haemorrhagica	..	..	..	..	..	..	..	..	..	..	..	..
Haemophilia	..	..	..	..	..	..	..	..	..	1	..	1
Diabetes Insipidus	..	..	..	..	..	..	..	..	..	..	..	..
Diabetes Mellitus	1	..	1	..	..	..	..	..	..	..	..	..
III.—AFFECTIONS OF THE NERVOUS SYSTEM AND ORGANS OF THE SENSES.												
70. Encephalitis (not including Encephalitis Lethargica)	..	..	..	..	..	..	..	..	..	..	..	..
71. Meningitis (not including Tuberculous Meningitis or Cerebro-spinal Meningitis)	..	..	..	..	..	..	..	..	..	1	2	3
72. Locomotor Ataxia	..	..	..	..	..	..	..	..	..	..	..	..
73. Other affections of the Spinal Cord	..	..	..	..	..	..	..	..	..	..	..	..
74. Apoplexy—												
(a) Haemorrhage	..	..	..	..	..	..	..	..	..	1	..	1
(b) Embolism	..	..	..	..	..	..	..	..	..	..	..	..
(c) Thrombosis	..	..	..	..	..	..	..	..	..	..	1	1
75. Paralysis—												
(a) Hemiplegia	1	..	1	..	..	..	..	..	..	3	1	4
(b) Other Paralysis	..	..	..	..	..	..	1	..	1	20	6	26
76. General Paralysis of the Insane ..	..	..	..	..	..	..	..	..	..	2	2	4
77. Other forms of Mental Alienation ..	..	..	..	1	..	1	8	..	8	77	5	82
78. Epilepsy	..	..	..	..	..	..	..	..	..	35	15	50
79. Eclampsia Convulsions (non- puerperal) 5 years or over	..	..	..	..	..	..	..	..	..	..	..	..
80. Infantile Convulsions	..	..	..	1	..	1	..	..	..	9	6	15
81. Chorea	..	..	..	..	..	..	..	..	..	..	1	1
Neuralgia	4	..	4	2	1	3	36	..	36	338	938	1,028

RETURN OF DISEASES—OUT-PATIENTS—(Contd.)

DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			NON-EUROPEAN OFFICIALS (including ASIATICS)			NATIVE GENERAL POPULATION (including ASIATICS)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
VI.—DISEASES OF THE DIGESTIVE SYSTEM.												
108. A.—Diseases of Teeth or Gums—												
Caries	26	1	27	3	1	4	2	..	2	154	40	194
Pyorrhea	1	..	1	27	12	39	140	..	140	5,06	1,573	6,679
B.—Other affections of the Mouth												
Stomatitis	..	..	..	2	..	2	25	..	25	516	105	621
Glossitis	4	..	4	..	..	..	44	..	44	19	..	19
109. Affections of the Pharynx or												
Tonsils	1	..	1	..	..	..	3	..	3	469	150	619
Tonsillitis	..	..	..	..	..	..	..	..	..	36	1	37
Sore Throat	23	..	23	..	1	1	3	..	3	..	3	3
Pharyngitis	7	..	7	9	7	16	85	..	85	1,080	284	1,364
110. Affections of the Oesophagus												
111. A.—Ulcer of the Stomach												
B.—Ulcer of the Duodenum	..	..	..	6	7	13	65	..	65	3,126	257	3,383
112. Other affections of the Stomach..	..	..	..	1	..	1	25	..	25	1	..	1
Gastritis	..	..	..	..	..	..	..	..	..	2	..	2
Dyspepsia	..	..	..	..	..	..	..	..	..	1	..	1
Colic	7	2	9	7	7	14	..	..	..	6	3	9
113. Diarrhoea and Enteritis—												
Under two years	24	1	25	14	22	36	118	..	118	3,0	63	413
114. Diarrhoea and Enteritis—												
Two years and over	2	..	2	6	4	10	9	..	9	1,626	618	2,244
Colitis	10	1	11	13	3	16	135	..	135	474	127	601
Ulceration	..	..	..	3	1	4	39	..	39	798	257	1,055
Colic	..	..	..	..	..	..	..	..	..	1,796	516	2,312
114A. Sprue	..	..	..	..	..	..	..	..	..	373	92	465
115. Ankylostomiasis	..	..	..	..	..	..	..	..	..	1	..	1
116. Diseases due to Intestinal Para-												
sites—												
(a) Cestoda (Tenia)	1	..	1	..	..	..	144	..	144	12,317	2,705	15,022
(b) Trematoda (Flukes)	..	..	..	..	..	..	..	..	..	92	3	95
(c) Nematoda (other than —												
Ankylostoma)	..	..	..	1	1	2	3	..	3	34	9	43
Ascariis	..	..	..	..	..	..	..	..	..	4,426	2,888	7,314
Trichocephalus dispar.	..	..	..	..	..	..	..	..	..	7	1	8
Trichina	..	..	..	..	..	..	..	..	..	106	50	156
Dracunculus	..	..	..	..	..	..	..	..	..	2	..	2
Strongylus	..	..	..	..	..	..	..	..	..	33	3	36
Oxyuris	..	..	..	..	1	1	..	..	..	23	8	31
(d) Coccidia	..	..	..	..	..	..	..	..	..	..	..	..
(e) Other Parasites	..	..	..	..	..	..	..	..	..	99	27	126
(f) Unclassified	..	..	..	..	..	..	5	..	5	939	156	1,095

RETURN OF DISEASES—OUT-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			NON-EUROPEAN OFFICIALS (INCLUDING ASIATICS)			NATIVE GENERAL POPULATION (INCLUDING ASIATICS)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
VI.—DISEASES OF THE DIGESTIVE SYSTEM—(Contd.).												
117. Appendicitis	..	..	..	3	1	4	..	..	..	12	1	13
118. Hernia	..	..	..	1	..	1	..	..	..	22	3	25
119. A.—Affections of the Anus	1	..	1	3	..	3	..	..	..	12	5	17
Fistula	1	..	1	..	..	..	..	..	..	18	1	19
B.—Other affections of the Intestines—	..	..	..	3	..	3	..	..	..	1	1	2
Enteroptosis	..	..	..	..	..	..	..	..	..	..	2	2
Constipation	42	..	42	6	2	8	615	..	615	10,520	3,035	13,555
120. Acute Yellow Atrophy of the Liver	..	..	..	..	..	..	..	..	..	..	..	..
121. Hydatid of the Liver	..	..	..	..	..	..	..	..	..	..	..	..
122. Cirrhosis of the Liver—	..	..	..	..	..	..	..	..	..	..	..	..
(a) Alcoholic	..	..	..	..	..	..	..	..	..	..	..	..
(b) Other forms	..	..	..	1	..	1	..	..	..	1	..	1
123. Biliary Calculus	..	..	..	..	..	..	1	..	1	2	1	3
124. Other affections of the Liver—	..	..	..	..	..	..	..	..	..	..	..	..
Abscess	..	..	..	..	..	..	..	..	..	..	..	..
Hepatitis	1	..	1	..	..	..	4	..	4	106	18	124
Cholecystitis	..	..	..	..	..	..	..	..	..	7	3	10
Jaundice	1	1	2	..	..	..	1	..	1	29	4	33
Schistosomiasis Mansonii	..	..	..	..	..	..	..	..	..	..	..	..
125. Diseases of the Pancreas	..	..	..	..	..	..	..	..	..	..	..	..
126. Peritonitis (of unknown cause)	..	..	..	..	..	..	..	..	..	1	..	1
127. Other affections of the Digestive System	25	..	25	1	2	3	69	..	69	374	55	429
VII.—DISEASES OF THE GENITO-URINARY SYSTEM (NON-VENEREAL).												
128. Acute Nephritis	..	..	..	1	..	1	2	..	2	14	9	23
129. Chronic Nephritis	..	..	..	..	..	..	1	..	1	8	..	8
130. A.—Albuminuria	..	..	..	..	..	..	..	..	..	1	..	1
B.—Schistosomiasis	..	..	..	2	..	2	..	..	..	68	3	71
131. Other affections of the Kidneys—	1	..	1	..	..	..	..	..	..	34	1	35
Pyelitis	..	..	..	..	1	1	..	..	..	1	4	5
Renal Colic	..	..	..	..	..	..	..	..	..	..	..	..
132. Urinary Calculus	1	..	1	1	..	1	1	..	1	..	1	1
133. Diseases of the Bladder—	..	..	..	..	..	..	..	..	..	52	15	67
Cystitis	1	..	1	5	1	6	1	..	1	..	..	..

RETURN OF DISEASES—OUT-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			NON-EUROPEAN OFFICIALS (including ASIATICS)			NATIVE GENERAL POPULATION (including ASIATICS)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
XIV.—AFFECTIONS PRODUCED BY EXTERNAL CAUSES.												
165. Suicide by Poisoning	..	..	..	..	..	..	..	..	..	1	..	1
166. Corrosive Poisoning (intentional) ..	..	..	..	..	..	..	..	..	..	..	..	..
167. Suicide by Gas Poisoning	..	..	..	..	..	..	..	..	..	..	..	..
168. Suicide by Hanging or Strangulation	..	..	..	..	..	..	..	..	..	2	..	2
169. Suicide by Drowning	..	..	..	..	..	..	..	..	..	..	..	..
170. Suicide by Firearms	..	..	..	..	..	..	..	..	..	..	..	..
171. Suicide by Cutting or Stabbing Instruments	..	..	..	..	..	..	..	..	..	..	..	..
172. Suicide by jumping from a height	..	..	..	..	..	..	..	..	..	..	..	..
173. Suicide by Crushing	..	..	..	..	..	..	..	..	..	..	..	..
174. Other Suicides	..	..	..	..	..	..	..	..	..	..	..	..
175. Food Poisoning—	..	..	..	1	..	1	..	..	..	22	..	22
Botulism	..	..	..	..	..	..	..	..	..	1	..	1
176. Attacks of Poisonous Animals—	..	..	..	..	..	..	..	..	..	4	1	5
Snake Bite	..	..	..	..	..	..	..	..	..	28	11	39
Insect Bite	3	..	3	1	2	3	17	..	..	114	11	125
177. Other Accidental Poisonings ..	..	..	..	..	..	..	3	..	..	2	1	3
178. Burns (by Fire)	9	..	9	2	..	2	80	..	..	1,155	429	1,584
179. Burns (other than by Fire) ..	2	..	2	1	2	3	9	..	..	264	92	356
180. Suffocation (Accidental)	..	..	..	..	..	..	..	..	..	..	..	..
181. Poisoning by Gas (Accidental) ..	..	..	..	..	..	..	..	..	..	..	..	..
182. Drowning (Accidental)	..	..	..	..	..	..	..	..	..	..	..	..
183. Wounds (by Firearms, War accepted)	..	..	..	1	..	1	..	..	..	2	..	2
184. Wounds (by Cutting or Stabbing Instruments)	2	..	2	2	1	3	16	..	..	3,629	617	4,446
185. Wounds (by Fall)	3	..	3	..	..	..	12	..	..	1,701	198	1,899
186. Wounds (in Mines or Quarries) ..	..	..	..	..	..	..	11	..	..	81	..	81
187. Wounds (by Machinery)	..	..	..	..	..	..	2	..	..	97	..	97
188. Wounds (Crushing, e.g., Railway Accidents, etc.)	..	..	..	..	..	..	49	..	..	23	2	25
189. Injuries inflicted by Animals, Bites, Kicks, etc.	..	1	1	1	..	..	132	..	..	411	67	478

RETURN OF DISEASES—OUT-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			NON-EUROPEAN OFFICIALS (including ASIATICS)			NATIVE GENERAL POPULATION (including ASIATICS)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
XVI.—DISEASES, THE TOTAL OF WHICH HAVE NOT CAUSED 10 DEATHS.	..	..	..	..	..	..	..	..	..	..	..	..
GRAND TOTAL	825	53	878	569	330	899	6,275	..	6,275	193,506	52,829	246,335
SURGICAL OPERATIONS—												
Under General Anesthesia	1	..	1	..	3	3	1	..	1	44	4	48
Others	2	..	2	8	1	9	59	..	59	763	211	974

MEDICAL RESEARCH LABORATORY
ANNUAL REPORT, 1931

BY

W. H. KAUNTZE, M.D., D.P.H.

Deputy Director of Laboratory Services.

MEDICAL RESEARCH LABORATORY
ANNUAL REPORT, 1930

BY
W. H. KENNEDY, JR.
CHIEF, MEDICAL RESEARCH LABORATORY

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**ANNUAL REPORT OF THE MEDICAL RESEARCH
LABORATORY, KENYA COLONY AND
PROTECTORATE, FOR 1931.**

STAFF, 1931.

DEPUTY DIRECTOR OF LABORATORY SERVICES :

W. H. Kauntze.

SENIOR BACTERIOLOGIST :

R. P. Cornack.

ASSISTANT BACTERIOLOGISTS :

F. P. G. de Smidt.

H. D. Tonking.

F. W. Vint.

MALARIA RESEARCH OFFICER :

P. C. C. Garnham (seconded from Medical Division)

GOVERNMENT ANALYST :

M. H. Fox.

BIOCHEMIST :

D. Harvey.

MEDICAL ENTOMOLOGISTS :

C. B. Symes.

J. I. Roberts.

LABORATORY SUPERINTENDENT :

F. A. Bailey.

LABORATORY ASSISTANTS, SENIOR GRADE :

H. M. Nefdt.

W. L. Titman.

J. P. McMahon.

A. H. Daws.

W. A. Doust.

E. C. Young.

C. E. J. Lamperd (until December, 1931).

LABORATORY ASSISTANTS, JUNIOR GRADE :

W. E. Grainger.

T. Jones.

L. Burton.

G. Beverly (until 31st January, 1931).

LABORATORY ASSISTANTS, NON-EUROPEAN :

Ramji Das.

W. Pema.

J. St. A. M. de Souza.

N. V. Nair (until 15th November, 1931).

O. S. de Souza (until 30th September, 1931).

Elisha Nyalondo.

Gideon Otieno.

MALARIAL FIELD OVERSEERS :

J. O. Harper.

J. Nimmo (until 15th October, 1931).

LIBRARIAN AND STENOGRAPHER :

Miss J. M. C. Millett.

CLERK :

Miss J. Webster (until 20th October, 1931).

STOREKEEPERS :

Max de Souza.

C. F. de Souza.

A.—ADMINISTRATION.**1.—Changes in Staff.**

- Mr. G. Beverly, Laboratory Assistant (Junior Grade), terminated his appointment on 31st January, 1931.
- Mr. C. F. de Souza, Clerk, posted to the Laboratory on 17th September, 1931, to relieve Mr. Max de Souza.
- Mr. O. S. de Souza, Laboratory Assistant (Non-European), terminated his appointment on 30th September, 1931.
- Mr. J. Nimmo, Malarial Field Overseer, terminated his appointment on 15th October, 1931.
- Miss J. Webster, Clerk, terminated her appointment on 20th October, 1931.
- Mr. N. V. Nair, Laboratory Assistant (Non-European), terminated his appointment on 15th November, 1931.
- Mr. C. E. J. Lamperd, Laboratory Assistant (Senior Grade), terminated his appointment in December, 1931.

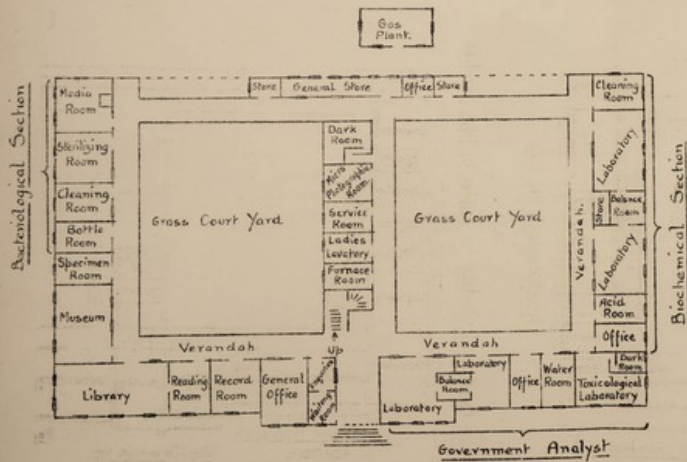
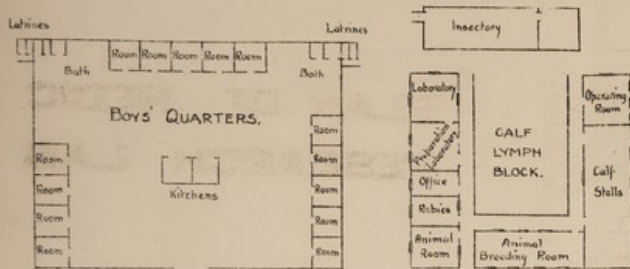
2.—Leave.

- Mr. C. B. Symes returned from leave on 13th February, 1931.
- Mr. M. H. Fox proceeded on leave on 10th April, and returned on 23rd October, 1931.
- Mr. J. O. Harper proceeded on leave on 10th April, 1931.
- Dr. P. C. C. Garnham proceeded on leave on 8th May and returned on 18th December, 1931.
- Dr. H. D. Tonking returned from leave on 18th May, 1931.
- Dr. W. H. Kauntze proceeded on leave on 13th June, and returned on 28th November, 1931.
- Mr. C. E. J. Lamperd proceeded on leave on termination of appointment on 28th August, 1931.

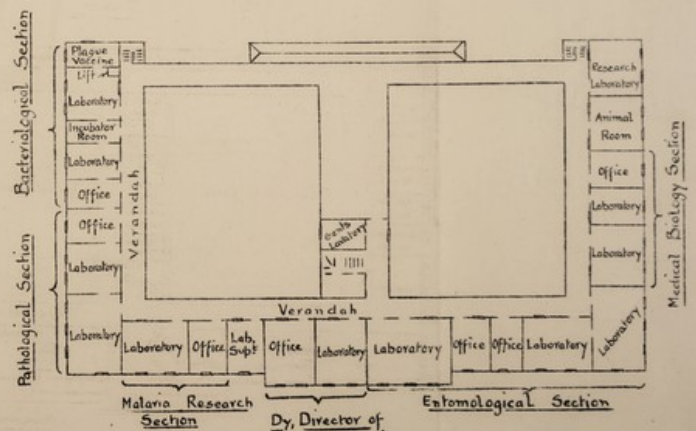
3.—Staff.

The changes which have taken place this year with one exception have been due to the unfortunate necessity of reducing expenditure. For the same reason the third post of Medical Entomologist, which has been in the Estimates since 1930, remained unfilled. Retrenchment was particularly regrettable, as it meant the loss of the services of people who were thoroughly efficient, and it was with the greatest reluctance that this step had to be taken. It was not the European and Asiatic staff only who were affected, but also the African laboratory assistants, as, although no boys were actually discharged on the grounds of economy, all vacancies which occurred remained unfilled, and as a result sufficient relief staff could not be maintained to enable boys on duty in out-station hospitals to be relieved for refresher courses at the Laboratory in Nairobi. It was anticipated at the end of the previous year that the Medical Training Depot would supply recruits in future for the African laboratory assistant staff; under the circumstances detailed above, no demand has been made upon the Depot, but experience has taught us that it is impossible for a boy with a poor education to become a highly trained assistant. Furthermore, the contrast between the present laboratory assistant staff and boys in their second year of training at the Medical Depot in regard to personal cleanliness, tidiness and discipline, makes one realize the value of the methods of training in force at the Depot. Constant demands from out-stations have been made during the year for African laboratory assistants, demands which we have been quite unable to comply with on account of lack of funds to employ an increased staff. In certain hospitals there are now two medical officers, and as one of these is usually on tour in the district, it is almost essential that he should be accompanied by a laboratory assistant, while a second is required to carry out the work of the hospital. It has therefore been suggested in one or two cases that one of the hospital dressers should receive some training in laboratory work, sufficient to enable him to cope with the routine examinations of the hospital, while the regular African laboratory assistant is absent with the medical officer. Whether this scheme will be successful or not remains to be seen in 1932.

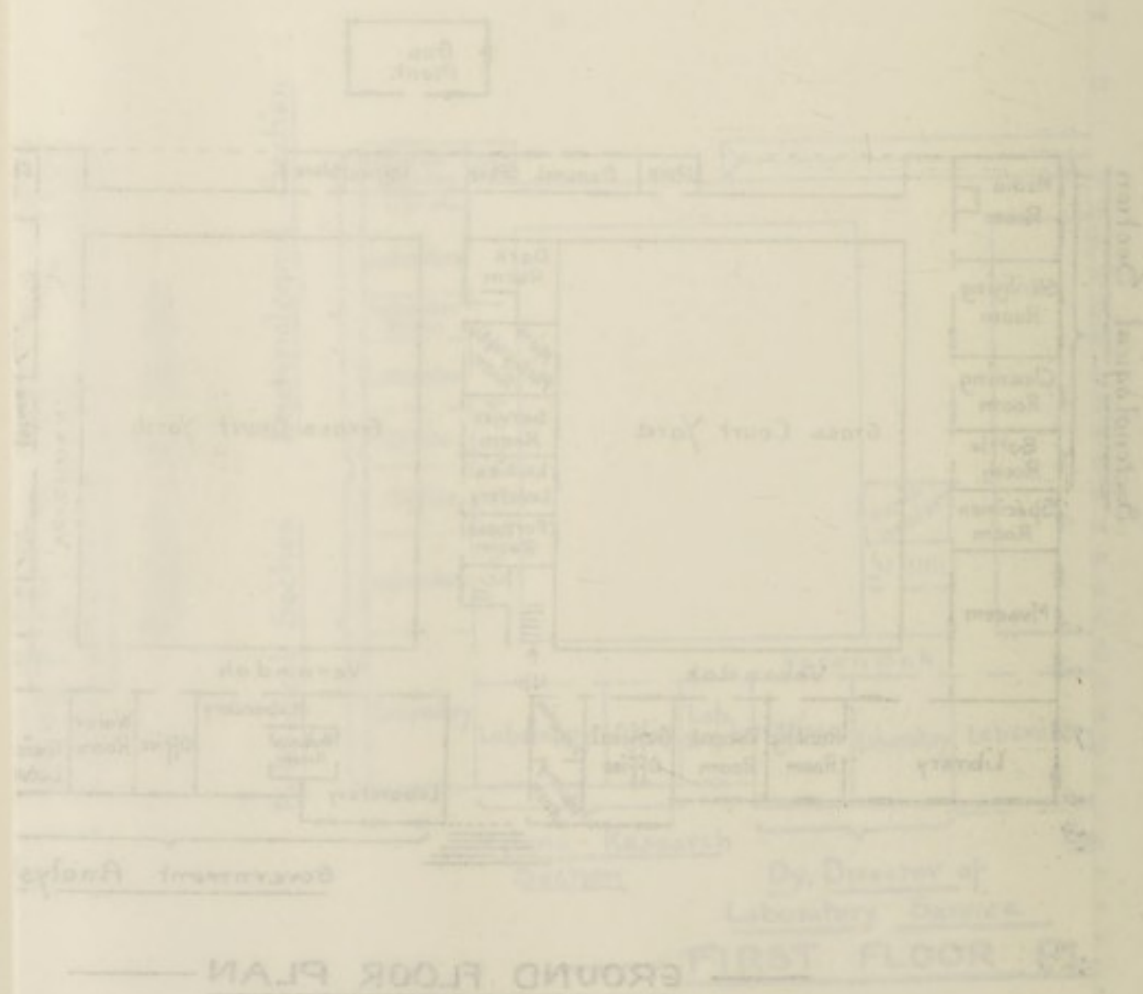
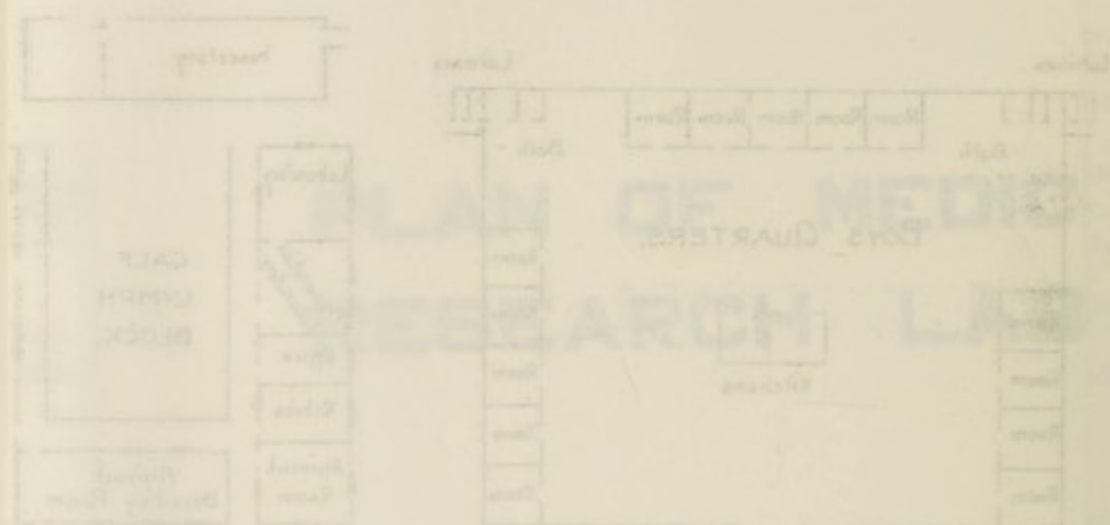
PLAN OF MEDICAL RESEARCH LABORATORY.



GROUND FLOOR PLAN



FIRST FLOOR PLAN



No account has been taken of the immense amount of ordinary diagnostic work carried out on behalf of Government departments, the value of this from a commercial point of view being many thousands of pounds. In addition, there must not be overlooked the research work which has been and is being carried out into the causes and methods of prevention of disease in the country.

7.—General Survey of Routine Work.

The following figures for the past three years, showing routine examinations carried out and preparation made in the Laboratory, indicate that the members of the staff have more than sufficient routine work to occupy their official hours of duty. Were it not that many of them give up much of their off-duty time, it would be impossible for any research work to be done at all.

	1929	1930	1931
Serological Section	2,327	3,146	3,282
Pathological Section	454	384	458
Bacteriological Section	2,210	2,120	3,163
Section of Medical Biology	25,222	17,639	15,827
Malaria Section	3,319	14,000	8,000
Biochemical Section	773	950	1,517
Analytical Section	317	361	201
Clinical Laboratory, Native Hospital, Mombasa ..	14,922	15,304	11,388
Number of doses of calf lymph manufactured ..	262,800	488,700	231,315
Number of doses of plague vaccine manufactured ..	195,000	410,000	290,000
Number of doses of T.A.B. vaccine manufactured ..	8,000	14,000	8,000

The Kahn test has remained the standard reaction for the examination of sera for syphilis and yaws. In a number of cases the Wassermann test has been carried out in addition to the Kahn, as a check on the accuracy of the technique and of the results. The correspondence obtained with the two reactions indicates that the Kahn test is sufficiently reliable to be used alone when a very large number of specimens are submitted for examination. It will be noted that four cases of agglutination with *Br. melitensis* were found this year in the non-European group. Paratyphoid infections have again been notably rare.

Calf lymph has been manufactured on identical lines with those of previous years. The demand for it has been considerably less, owing to the absence of any vaccination campaign in the districts, and the fact that no smallpox epidemic occurred during the year. As a result, the number of doses produced considerably exceeded that of the issues, so that the reserve supply of calf lymph was increased to over 300,000 doses. This is considered to be adequate to meet any emergency in view of the fact that, should there be a sudden call for a large quantity of calf lymph, by sterilizing newly made lymph with chloroform the manufacture can be accelerated to meet any demand within three weeks. It will be noted that there is a slight reduction in the cost of production of lymph, which is attributable to the slight increase in yield of pulp per calf, and also to the fact that fewer calves died in the Laboratory during the year than in previous seasons.

Inquiries have been received from the Medical Department in Uganda as to the possibility of supplying that territory with calf lymph. The price quoted should enable the yearly requirements of Uganda to be met at a cost of £500, which would mean a considerable saving in expenditure to that Government.

The number of post-mortem examinations has increased slightly over last year, and this has also been the case with the histological examinations of tissues obtained at operation, which show an increase in specimens from Europeans and Asiatics, but a slight decrease in those submitted from Africans. There was a much larger increase in material taken at post-mortems for histological examination and also in animal tissues which have been submitted for diagnosis.

In the Bacteriological Section, the number of specimens received for microscopical examination has almost doubled, while those received for cultural tests number just the same as in 1930. No change has been made in the method of preparation of plague vaccine, but, in addition to supplying Uganda with a certain number of doses at the close of the year, inquiries have been received from that territory as to the possibility of their obtaining the whole of their vaccine from Nairobi.

In these days, when every possible economy is being made in administration, it is worth considering whether it would not be a financial advantage to use the Medical Research Laboratory at Nairobi as the central factory for such products as calf lymph, plague vaccine, anti-rabic vaccine, etc. The new building has been so planned and staffed as to enable all these products to be produced at a very low figure, and the doubling or trebling of the amount required by the Colony itself would not add appreciably to the total cost of manufacture, and would not entail any increase in staff. It seems commonsense therefore to centralize production rather than duplicate staffs in the various colonies. It might even be possible to extend the distribution beyond the confines of the northern group of the East African territories, as with the new air mail service calf lymph, for example, can be landed in Broken Hill in Northern Rhodesia within thirty hours of leaving Nairobi.

A certain demand has been made for anti-rabic vaccine during the year, owing to a number of cases of canine rabies occurring in the Kisii district. A standard vaccine has now been worked out, using the "fixed" virus strain which was obtained from the Haffkine Institute in Bombay in 1929, but it is hoped that as soon as the virus which has been isolated from a case of canine rabies at Kisii has become "fixed" by animal passage, this will take the place of the Indian strain.

The Section of Medical Biology has carried out the routine examinations of blood and faeces as in previous years. On the removal of the main Laboratory to the new building in March, the branch laboratory at the Native Hospital, Nairobi, was closed down, and its staff absorbed in this section. An interesting case was reported during the year of infection with *Schistosoma mansoni*. Specimens of faeces were sent in from the European Hospital, Nairobi, from a patient who was very seriously ill with pyrexia, and showed all the symptoms of acute toxæmia, with special involvement of the heart. The faeces, though negative at first, eventually contained large numbers of schistosome eggs. The history of the case was that, in the company of three other persons, the patient had been on *safari* in the Northern Frontier district, and on one occasion had bathed in a rock pool at the base of a small waterfall, the only time indeed that bathing was possible, owing to shortage of water. The water was crystal-clear, but all the party complained of intense pricking sensations after being in the water, and in one case this was so intense as to induce faintness. A rash accompanied the skin irritation in some of the bathers. It is interesting to note that the other three members of this party also showed evidence of infection shortly after the first case.

The routine work of the Entomological Section has followed the lines of previous years. Malaria investigations have been carried out at various places, mainly by African assistants who have conducted the searches for mosquitoes and larvæ, the specimens obtained being forwarded to Nairobi for identification. Further investigations have been made on the lake shore in Central Kavirondo into tsetse fly infestation, and measures of control based on the findings have been suggested. Although the reduction of staff for reasons of economy has resulted in the discontinuance of a considerable amount of routine collection, it has been possible to maintain a certain number of posts where fleas have been investigated in relation to plague.

The Biochemical Section shows an increase in the amount of routine work recorded, in spite of the absence of a laboratory assistant from the section during September and October. The amount of metallic bismuth prepared exceeded that of the previous year by forty per cent, and in addition some ten thousand doses of bismuth oxide were also made and issued.

8.—Research.

GENERAL.

A considerable amount of research work is carried on in conjunction with routine observations; indeed, it might almost be said that most of the research work arises from observations which have been made in the course of routine examination of specimens. Besides this, there is always in progress constant investigation of new methods required either for examination of material submitted for report, or for improvement in the preparation of vaccines, and although it might not be considered that such should be classified as research, it does indeed demand as much thought and ability as are required by larger problems more popularly associated with that term. This year there have been certain specific subjects which have engaged the attention of the Laboratory staff, and these will be considered under separate headings.

(a) *The Macroscopic and Microscopic Anatomy of the Brain of the African.*

Last year, as a result of some superficial observations on the mentality of the inmates of the Kabete Reformatory by the Deputy Director of Laboratory Services, Dr. Gordon became interested in the matter, and he undertook an examination of the mental standard of these people. In consequence of his findings, it was determined that the anatomy of the brain of the East African native required further examination, as European standards were obviously inapplicable to these undeveloped people. Dr. Vint started an investigation on these lines on his return from leave. It has already entailed an immense amount of work to determine the best technique to employ, but a start has been made with measurements of the cerebral cortex and its layers in the pre-frontal region. It has been a laborious proceeding, but the results so far obtained indicate that the cellular development of the brain of an adult African of the labouring class type approximates only to that seen in the average European child of seven years old, and this result is supported by the lower average weight of the African brain as compared with the European. This is but a preliminary step in the investigation, but the results are so important in their bearing upon the problem of African education that we feel that they should be confirmed by some independent authority. The results will be published early in 1932 in a paper in the *East African Medical Journal*, after it has been read and discussed at a meeting of the local branch of the British Medical Association.

(b) *Dysentery.*

Research on dysentery has been carried on throughout the year, and particularly in regard to those cases of the disease which are due to *Shigella A* and *Shigella B*. The details as regards cultural reactions and serological tests will be found in that part of the report devoted to the Bacteriological Section, where their importance in Kenya is indicated. Representations are now being made to have *Shigella B*. anti-serum included in the therapeutic anti-dysenteric serum supplied to the Colony, as this organism has proved to be the cause of a large number of serious cases of dysentery. Infections due to *Shigella A* usually clear up by the simple exhibition of magnesium or sodium sulphate.

(c) *Plague.*

Investigations have continued upon the same lines as in previous years, and as a result intraperitoneal inoculation has been adopted for rat passage instead of subcutaneous injections. A modification of Gram's stain has been devised which shows the characteristic bipolar staining of plague bacilli equally as well as Leishman stain. As a result, it is hoped that medical officers will cease to rely on methylene blue for the diagnosis of plague bacilli, a practice leading inevitably to errors owing to the absence of information in regard to Gram staining, and that the new technique will come into use as the standard diagnostic method for plague throughout the Colony. Investigation has also been continued into the best methods of sterilizing plague vaccine so as to retain the maximum amount of antigenic value.

The staff of the Entomological Section has carried out some experiments during the year on the transmitting powers of various species of fleas, and it was found that *X. brasiliensis* was the most efficient transmitter of plague from rat to rat, and in the outbreak which occurred in Nairobi at the end of 1930 and the beginning of 1931 this flea seemed to be the only one involved. Incidentally, it was also proved that *Ctenophthalmus cabirus* can transmit plague.

(d) *Pneumonia.*

This subject has taken up a very considerable amount of the time of the officer in charge of the Bacteriological Section, although the results when seen on paper seem to be very scanty. It has now been established that more than ninety-two per cent of the pneumococci which have been isolated belong to Group IV, and by cross-agglutination tests six different sub-types have been distinguished, though even then these only comprise sixty-three per cent of the Group IV pneumococci which have been collected. Details are given in that part of the report which deals with the Bacteriological Section as to the technique used for the preparation of type sera for the agglutination and for the bile solubility tests.

(e) *Malaria.*

As the officer seconded from the Medical Division for the investigation of malaria went on leave in May, the amount of research carried out in this disease was not very great. A considerable part of his time was spent in the study of the local variety of sub-tertian parasite, while an investigation was carried out, with negative results, into the influence of immune bodies possibly present in the serum of convalescent malaria cases on cultures of *P. falciparum*. It may also be noted here that, with the co-operation of the staff of the Veterinary Research Laboratory, a case of chronic malaria was inoculated with the virus of Rift Valley fever, the intention being to confirm a report that this latter disease leads to the cure of chronic malaria when acquired naturally. Unfortunately, the single experimental case did not bear this out.

(f) *Tropical Typhus.*

This disease has become very much more prevalent during the past twelve months, and some attempt has been made to work out the etiology of the infection. It was definitely established during the year that the causative organisms belonged to the *Rickettsia* group, as was always believed but never before determined. Following on this, the vector of the infection was sought, and as there always seems to be a close association between cases of the disease and long grass or bush, wild rodents have been examined as well as ordinary house rats. This investigation has involved the examination of a large number of mites, and difficulty has been found in placing them in their proper genera. In addition, serological tests are being carried out to determine if possible whether wild rodents show any agglutination in their blood for the members of the *Proteus* group. This work is still in progress.

(g) *Disinfestation of Railway Coaches.*

A series of experiments was carried out with various materials in an attempt to establish a satisfactory and speedy method of ridding the railway coaches belonging to the Kenya and Uganda Railways of vermin. The experiments showed that Zyklon, which is a cyanide preparation, is the most satisfactory material available at the moment. Its use is also being extended to the treatment of native housing in townships, while the similar preparation, cyanogas, has also been shown to be effective in ridding native huts of rats and fleas in plague areas.

(h) *Calf Lymph.*

A review of the published work on the cultivation of vaccinia virus in tissue culture which was made during 1931, suggested that the technique has now been worked out sufficiently to make the prospect of preparing vaccine lymph from tissue cultures a feasible one, and, on the return of the Deputy Director of Laboratory Services from leave, experiments were commenced with a view to its preparation on a scale sufficient to replace the ordinary methods of calf lymph production. It is anticipated that if this proves successful it may be possible by the end of 1932 to abandon the use of calves in vaccine lymph preparation in favour of the more sterile procedure carried out in flasks.

(i) *Biochemical Investigations.*

Owing to the changes in staff and the loss of the services of the laboratory assistant (Mr. C. Lamperd), the investigational work of the Biochemical Section has been much interrupted. A certain amount of work has been done on the composition of the blood of East African natives, and later in the year an analysis of a series of samples of maize meal and wheat was started. Furthermore, a feeding experiment with white rats was carried out, using a mixture of maize meal and wheat. This was in extension of previous experiments carried out at the Nairobi Prison with a view to the improvement of native rations.

(j) *Trypanosomiasis.*

Dr. McLean carried out further investigations into trypanosomiasis on the Lake shore during the year. In February, the Deputy Director of Laboratory Services visited the sleeping sickness area in Central Kavirondo in company with the Acting Deputy Director of Sanitary Service. Dr. McLean's report was not available at the end of the year, and comment on its findings must therefore be reserved till later.

The following book and articles have been published by members of the Laboratory staff in 1931:—

N. P. Jewell and W. H. Kauntze :

" Handbook of Tropical Fevers " (Baillière, Tindall and Cox, 1931).

P. C. C. Garnham :

" Observations on *Plasmodium falciparum* with Special Reference to the Production of Crescents " (*Kenya and East African Medical Journal*, Vol. VIII, April 1931, p. 2).

R. P. Cormack :

" On Laboratory Aids to the Diagnosis of Syphilis " (*Kenya and East African Medical Journal*, Vol. VIII, May 1931, p. 45).

P. C. C. Garnham :

" The Staining of Malaria Parasites " (*Kenya and East African Medical Journal*, Vol. VIII, May 1931, p. 56).

C. B. Symes :

" Report on Anophelines and Malaria in the Trans Nzoia District " (*Kenya and East African Medical Journal*, Vol. VIII, June 1931, p. 64).

F. W. Vint :

" Notes on the Pathology of Syphilis " (*Kenya and East African Medical Journal*, Vol. VIII, July 1931, p. 94).

C. B. Symes :

" Report on Anophelines and Malaria in the Trans Nzoia District " (*Kenya and East African Medical Journal*, Vol. VIII, July 1931, p. 108).

P. C. C. Garnham and F. P. G. de Smidt :

" A Preliminary Note on Pneumonia in Nairobi with particular reference to Type-Incidence of Pneumococcus " (*Kenya and East African Medical Journal*, Vol. VIII, September 1931, p. 150).

D. Harvey and F. W. Vint :

" A Note on the Post-mortem Calcium Content of the Blood Serum and Cerebro-spinal Fluid of the East African Native " (*Kenya and East African Medical Journal*, Vol. VIII, December 1931, p. 240).

C. B. Symes :

" Observations on Anophelines and Malaria in Kitale, with Notes on Experimental Control with Paris Green " (*Kenya and East African Medical Journal*, Vol. VIII, December 1931, p. 256).

D. Harvey and C. B. Symes :

" Oxygen Absorption of Natural Waters in Nairobi, with Reference to Anopheline Mosquitoes " (*Bulletin of Entomological Research*, Vol. XXII, Pt. I, March 1931, p. 59).

R. Daubney and J. R. Hudson, with a Note by P. C. Garnham :

" Enzootic Hepatitis or Rift Valley Fever " (*Journal of Pathology and Bacteriology*, Vol. XXXIV, July 1931, p. 545).

B.—SEROLOGICAL SECTION.

1.—Staff.

The duties of this section were carried out by the staff of the Medical Biological Section.

2.—Immunity Tests for Syphilis and Yaws.

The total number of specimens received was three thousand and fifty-eight, of which seventy-four were unsuitable owing to contamination, hæmolysis, etc.

The following table summarizes the results of the year's work :—

Kahn reactions on blood sera	2,811
Wassermann reactions on blood sera	126
Wassermann reactions on cerebro-spinal fluid ...	37
Sigma reactions on blood sera	1
Sigma reactions on cerebro-spinal fluid	9
	2,984
Unsuitable ...	74
Total ...	3,058

In addition, one hundred and thirty-six cross checks were carried out, using both the Wassermann and Sigma reactions,

3.—Agglutination Reaction.

Widal's test was carried out on two hundred and twenty-four samples of serum. The results are as follows, taking as positive standard agglutination in a dilution of 1 in 50 or higher, using Dreyer's technique :—

Europeans.

Negative	...	...	...	...	...	54
<i>B. typhosus</i> alone	...	...	...	...	...	8
<i>B. paratyphosus A</i> alone	...	...	...	...	...	2
<i>B. paratyphosus B</i> alone	...	...	...	...	...	2
Group T.A.B.C.	...	...	...	...	...	17
<i>Br. melitensis</i> alone	...	...	...	...	...	2
Group T.A.B.C. and <i>melitensis</i>	...	...	...	...	...	1

Non-Europeans (Asiatics and Africans).

Negative	...	...	...	...	...	96
<i>B. typhosus</i> alone	...	...	...	...	...	31
<i>B. paratyphosus A</i> alone	...	...	...	...	...	2
<i>B. paratyphosus B</i> alone	...	...	...	...	...	1
Group T.A.B.C.	...	...	...	...	...	4
<i>Br. melitensis</i>	...	...	...	...	...	4
Total ...						224

All the sera received to be tested for Weil Felix reaction were sent to the Bacteriological Section, as the use of live cultures made it advisable that the test should be performed in that section.

Some research work on the causative organism of so-called tropical typhus was carried out during the latter part of the year, and, using guinea pigs as experimental animals, it was established beyond doubt that the disease was due to a member of the *Rickettsia* group, a fact that has long been presumed but never before demonstrated in this Colony. A report of this work will be published elsewhere in due course.

C.—CALF LYMPH SECTION.

1.—Staff.

Calf lymph production for the year was supervised by the Senior Bacteriologist until May, and from then to the close of the year by Dr. H. D. Tonking.

The section was transferred to the control of the Bacteriological Section at the end of the year, to facilitate the distribution of lymph, and for greater convenience in making cultural tests.

Mr. Ramji Das was the Asiatic laboratory assistant in charge for the first half of 1931; he was then relieved by Mr. Pema on the latter's return from leave in August.

2.—Production of Calf Lymph.

The demand for calf lymph during the year has been very small, only 158,450 doses being issued, as against 515,442 doses in 1930. This was due to the absence of any serious epidemic of smallpox during 1931.

Calves were again difficult to obtain, and hand feeding with lucerne was resorted to largely.

Experiments with a method of growing the virus *in vitro* are being carried out, and if successful will solve the difficulties inevitably associated with the hiring of calves.

3.—Quality of Lymph.

In only five cases was pulp rejected after vaccination, the lymph vesicles being too scaly. The average yield of lymph per calf showed a slight increase over the 1930 amount. The results of vaccination with the lymph appear to have been consistently good.

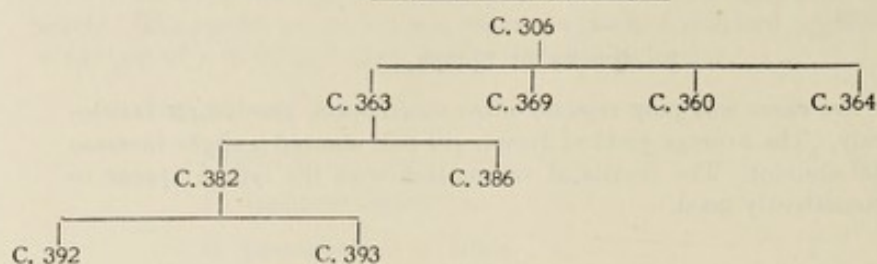
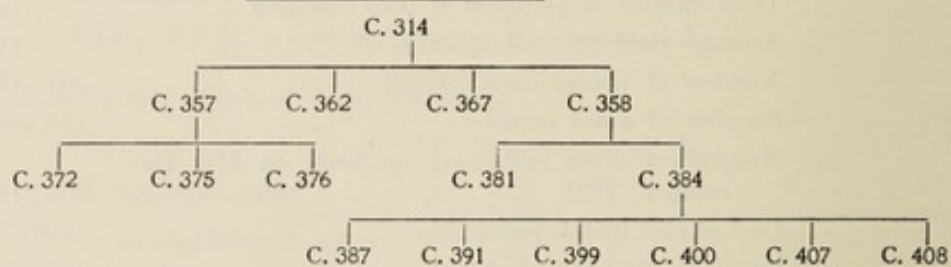
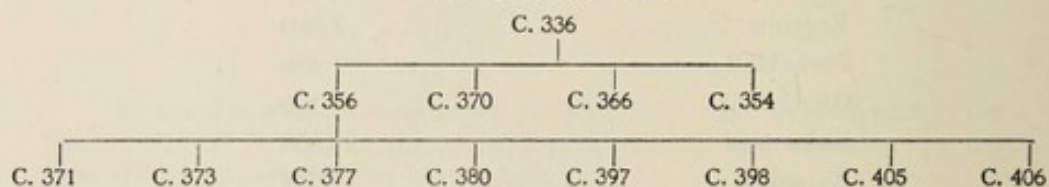
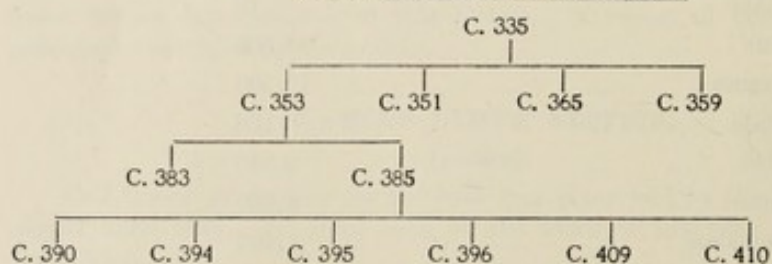
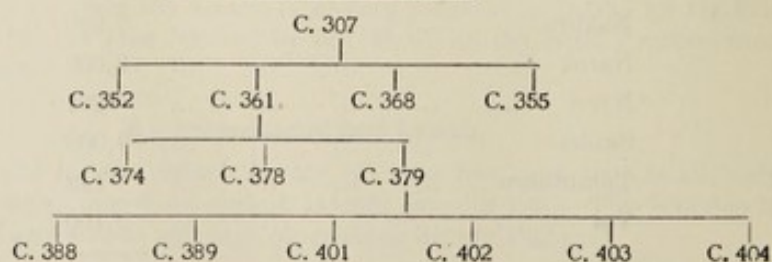
4.—Production of Calf Lymph during 1931 (Summary).

Total number of calves received	...	...	...	60
Total number of calves from which lymph collected	...	...	...	55
Total number of grammes of pulp collected	...	...	...	771.05
Average yield per calf (grammes)	...	...	...	14.02
Number of doses manufactured	...	...	...	231,315
Number of doses issued	...	...	...	158,450
Number of doses remaining on hand on 31st December, 1931	...	...	...	308,315
Cost of calf lymph production	...	...	...	£291-1-0
Cost per dose manufactured	...	...	...	0.302 pence

The following is a list of stations, with the amounts of lymph supplied to each :—

Eldoret	...	...	...	824
Entebbe	...	...	...	1,000
Fort Hall	...	...	...	480
Gilgil	...	...	...	100
Kakamega	...	...	...	26,000
Kapsabet	...	...	...	724
Kajiado	...	...	...	7,000
Kericho	...	...	...	600
Kiambu	...	...	...	9
Kijabe	...	...	...	18
Kisii	...	...	...	45,600
Kisumu	...	...	...	12,500
Kitale	...	...	...	168
Kitui	...	...	...	2,340
Lamu	...	...	...	2,400
Machakos	...	...	...	1,403
Malindi	...	...	...	600
Miscellaneous	...	...	...	591
Mombasa	...	...	...	27,000
Nairobi	...	...	...	2,991
Nakuru	...	...	...	7,629
Narok	...	...	...	6,000
Nyeri	...	...	...	261
Simba	...	...	...	7,000
Tumutumu	...	...	...	112
Voi	...	...	...	5,100

Total ... 158,450

BELGAUM STRAIN—1931BOEDANG STRAIN—1931PARIS STRAIN—1931SOUTH AFRICAN STRAIN—1931ZANZIBAR STRAIN—1931

N.B.—Vaccinated all on calves.

VACCINATION RETURN, 1931

RESIDENCE	No. of persons Vaccinated	SEX		PRIMARY VACCINATIONS				RE-VACCINATIONS				PREVIOUS VACCINAL CONDITION UNKNOWN			
		Male	Female	Unknown	Total	Successful	Failed	Unknown	Total	Successful	Failed	Unknown	Successful	Failed	Unknown
Eldoret ..	469	402	67	..	463	325	18	120	6	3	..	3	..	..	..
Fort Hall ..	135	134	1	..	135	34	101	..	..	..	..	..	..	..	..
Kakamega ..	2,646	2,640	6	..	625	237	3	385	2,021	133	303	1,585	..	..	..
Kapsabet ..	209	120	89	..	209	209	..	..	..	..	..	..	..	..	..
Kericho ..	125	124	1	..	118	90	5	23	7	..	7	..	..	..	..
Kisii ..	21,095	21,095	..	..	818	..	..	818	617	..	..	617	..	..	19,660
Kisumu ..	6,718	6,708	10	..	3,003	5	..	3,003	661	279	110	272	..	..	3,049
Kitui ..	764	764	..	..	571	7	..	564	193	26	5	162	..	..	120
Lamu ..	383	329	54	..	208	23	..	185	55	..	..	55	..	..	..
Machakos ..	293	260	33	..	135	..	..	135	189	..	..	158	..	..	..
Malindi ..	73	72	1	..	73	42	8	23	..	..	..	..	..	..	..
Meru ..	34	25	9	..	34	28	6	..	..	..	..	..	..	..	..
Miscellaneous ..	16	..	..	16	16	16	..	..	..	..	..	..	..	..	..
Mombasa ..	6	2	4	..	6	5	..	1	..	..	..	..	..	..	..
Nairobi ..	675	631	36	8	626	615	9	2	49	49	..	..	..	..	..
Nakuru ..	184	184	..	..	143	92	26	25	41	25	3	13	..	..	..
Narok ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nyeri ..	211	211	..	..	30	25	5	..	181	84	97	..	..	..	..
Voi ..	10	6	4	..	10	10	..	..	..	..	..	..	..	..	..
GRAND TOTAL ..	34,046	33,707	315	24	7,228	1,763	181	5,284	3,989	599	525	2,865	22,829	..	22,829

D.—PATHOLOGICAL SECTION.

1.—Post-mortem Examinations.

One hundred and sixty post-mortem examinations were carried out during the year. The causes of death were as follows :—

Convulsion—Hyperplasia of the lymphoid tissue of the body	1	
Drowning	1	
Dysentery—Amoebic	1	5
Bacillary	4	
Gastro-enteritis	2	
Haemothorax	1	
Intestinal obstruction	2	
Malaria	1	4
Malaria—Cerebral	3	
Malta fever	1	
Myocarditis—Rheumatic	1	7
Syphilitic	5	
Unknown origin	1	
Nephritis—Interstitial	1	3
Parenchymatous	2	
Plague	6	
Pneumonia—Broncho—, and congenital syphilis	1	54
Lobar	42	
Lobar, and abscess formation	2	
Lobar, and Pericarditis	2	
Lobar, and Meningitis	7	
Poisoning	1	
Respiratory paralysis (anaesthetic)	1	
Septicaemia	14	20
„ due to anthrax	1	
„ from endometritis	1	
„ from meningitis	1	
„ from osteomyelitis	2	
„ from subphrenic abscess	1	
Tetanus	1	
Tuberculosis—Pulmonary	2	18
Intestinal	2	
Tuberculosis and Meningitis	7	
Tuberculosis, and Pericarditis	4	
Tuberculosis, Pericarditis and Meningitis	3	
Tumours—Carcinoma of alimentary tract	2	3
Bladder	1	
Typhoid Fever	5	6
Typhoid Fever with perforation	1	
Violence—Fracture of the skull	13	23
Electrocution	1	
General	9	
TOTAL	160	

Amongst the many interesting conditions found on the post-mortem table during the year, the following merit special mention :—

1. A septic embolus lodging in a small vessel in the mucous membrane of the large intestine caused a fatal intestinal hæmorrhage in a case of lobar pneumonia.
2. Perforation of the large intestine in a case of amoebic dysentery.
3. Intestinal obstruction caused by a loop of jejunum becoming coiled round the root of the mesentery of practically the whole of the small intestine.
4. A healed duodenal ulcer.

It must not be assumed from the above figures that the incidence of tuberculosis is 11.25 per cent, as amongst the cases where death was due to causes other than tuberculosis, fifteen cases were found with tuberculous lesions in some organ of the body. All of these were active lesions.

No case of pneumonic plague was found on the post-mortem table.

2.—Histological Examinations.

Two hundred and ninety-eight specimens were examined during the year. Of these, fifty-five were from Europeans, seven from Asians, one hundred and thirty-eight from Africans, seventy-eight from post-mortem examinations (Africans), and twenty from animals. The details are as follows :—

(i) EUROPEANS—

Tumours—Benign	..	..	..	..	19	}	33
Malignant	..	..	..	..	14		
Curettage—Non-malignant	..	..	..	..	8	}	10
Malignant	..	..	..	..	2		
Inflammatory lesions	..	..	..	..	12		
Total	..				55		

(ii) ASIANS—

Tumours—Benign	..	..	..	..	3	}	5
Malignant	..	..	..	..	2		
Inflammatory	..	..	..	..	2		
Total	..				7		

(iii) AFRICANS—

Tumours—Benign—							
Adenoma	..	..	..	..	1		
Cysts	..	..	..	..	4		
Eosinophil tumour	..	..	..	..	1		
Fibroma	..	..	..	..	9		
Foetal remains	..	..	..	..	1		
Hydatid mole	..	..	..	..	1		
Lipoma	..	..	..	..	1		
Myxoma	..	..	..	..	2		
Polypi	..	..	..	..	2		
Supra-renal Rest in Ovary	..	..	..	..	1		
						—	23
Tumours—Malignant—							
Carcinoma	..	..	..	..	6		
Epithelioma	..	..	..	..	10		
Melanoma	..	..	..	..	10		
Myeloma	..	..	..	..	1		
Mixed tumour, Parotid	..	..	..	..	1		
Sarcoma	..	..	..	..	15		
							43
Inflammatory							
Tuberculous lesions	..	..	..	..	12		
Leprosy	..	..	..	..	2		
Other lesions	..	..	..	..	51		
						—	65
Blood clot	..	..	..	..	..		2
Normal tissues	..	..	..	..	..		6
Total	..						139

3.—Post-mortem Specimens for Histological Examination.

Tumours—						
	Glioma	..	..	..	..	1
	Carcinoma	..	..	..	..	5
	Sarcoma	..	..	..	..	1
						—
						7
	Malarial tissues	..	..	..	..	23
	Plague	..	..	..	..	2
	Tuberculosis	..	..	..	..	1
	Leprosy—negative	..	..	..	..	1
	Other inflammatory lesions	..	..	..	..	5
	Normal tissue:	..	..	..	..	14
Heart—						
	Brown atrophy	..	..	..	..	1
	Cloudy swelling	..	..	..	..	1
	Fibrotic	..	..	..	..	1
						—
						3
Lungs—						
	Congestion	..	..	..	..	2
	Grey hepatisation	..	..	..	..	1
	Unresolved pneumonia	..	..	..	..	1
						—
						4
Liver—						
	Cirrhosis	..	..	..	..	8
	Fatty degeneration	..	..	..	..	2
	Necrosis	..	..	..	..	1
						—
						11
Kidneys—						
	Interstitial nephritis	..	..	..	..	1
	Parenchymatous nephritis	..	..	..	..	2
						—
						3
Brain—						
	Fibrotic	..	..	..	..	1
	Rabies—negative	..	..	..	..	1
						—
						2
Intestines—						
	Duodenal ulcer	..	..	..	..	1
	Bacillary dysentery	..	..	..	..	1
						—
						2
						—
						78
	Total	..				78
(ii) ANIMAL TISSUES—						
	Brain, Rabies—negative	..	..	..	..	5
	Inflammatory lesions	..	..	..	..	10
	Lipoma	..	..	..	..	1
	Leprosy (rat.)	..	..	..	..	2
	Sarcoma (rat.)	..	..	..	..	1
	Tuberculosis	..	..	..	..	1
						—
	Total	..				20

E.—BACTERIOLOGICAL SECTION.

1.—Routine Examinations.

Specimens received for microscopical examination: 2,185.

Specimens received for cultural examinations: 978.

SUMMARY OF ROUTINE EXAMINATIONS.

- (a) *Actinomycoses*.—These have not been met with during the year.
- (b) *Anthrax*.—No case of anthrax has been recorded during the year.
- (c) *Gonorrhoea*.—Gonococci were found present in forty-seven specimens of urethral, vaginal, and prostatic exudate; and in four cases of conjunctivitis, as the sole infection present.
- (d) *Acute Meningitis*.—Meningococci were found in four specimens of cerebro-spinal fluid; in three specimens of fluid, pneumococci were the infective agents.
- (e) *Pneumonia*.—A series of pneumonia cases has been examined; details appear below under the heading of research.

A type of the "Pneumobacillus" of Friedlander has been recovered from two cases of lobar pneumonia of more than commonly toxæmic character, one of which clinically suggested pneumonic plague.

(f) *Undulant Fevers*.—*B. melitensis* in one case, and *B. abortus* in another, have been recovered by blood-culture.

(g) *Plague*.—*Human cases*.—*Pasteurella pestis* has been found in one out of four direct blood-films examined; in twelve out of twenty-nine specimens of aspirated gland; and in one out of eleven specimens of sputum suspected of plague.

Rats.—Plague infection has been demonstrated in thirty-nine out of one hundred and sixty-two rats, all *R. rattus*, which were found dead in Nairobi and district. This comparatively small proportion of positives may have been attributable to the wide use of rat poison.

Trapped Rats.—A total of 2,750 rats, nearly all field rodents, of the three commonest species, *R. coucha*, *Arvicanthus*, and *Otomys*, have been examined with negative results. But it was not here practicable in dealing with such numbers in a short time to make a sufficiently thorough examination of each rat; post-mortem signs only were relied upon for the most part, with microscopical examinations of those cases which appeared to show suspicious signs.

(h) Tubercle bacilli have been found in one specimen of abdominal exudate, and in 234 out of 952 specimens of sputum examined.

(i) *Diphtheria*.—Seven out of 110 throat swabs examined were found to be positive.

(j) *Enteric Infections*.—*B. typhosus* has developed in four out of eight blood-cultures received. Eleven specimens of stool received for this special examination yielded negative cultures; specimens of faeces are not commonly sent for culture at the most favourable period of the disease.

Paratyphoid bacilli were not received in a single case.

Salmonella enteritidis was recovered in one case of blood-culture, and from one specimen of stool.

S. ærtrycke was isolated from one specimen of stool.

(k) *Dysentery*.—Types of the Flexner group, all W, X, or Y, were recovered from eighteen specimens of dysenteric stool.

The dysentery bacillus of Sonne was found in five cases.

Shigella dysenteriae (Shiga's bacillus) was not met with.

The unclassified but presumed dysenteric bacilli here designated provisionally as *Shigella* type A and *Shigella* type B were isolated from six and from thirteen specimens of dysenteric stool respectively, as the sole probable causative organism; further notes relating to these organisms appear below under the heading of research.

(l) *Conjunctivitis*.—Gonococci were found alone in four cases.

Koch-Weeks bacilli were found alone in twenty-two cases.

Morax-Axenfeld bacilli were found alone in twenty-nine cases.

Morax-Axenfeld bacilli together with gonococci were found in two cases.

Morax-Axenfeld bacilli together with Koch-Weeks bacilli were found in fifteen cases.

Koch-Weeks bacilli together with gonococci were found in four cases.

In one case, all three of the above-named bacteria of conjunctivitis were found present together.

These results were mainly derived from specimens collected in a medical survey of the Masai by Dr. Philip. In a few cases an additional organism occurred; this was intermediate in size between *Hemophilus conjunctivitis* (Koch-Weeks) and *H. lacunatus* (Morax-Axenfeld), and morphologically relegable to the same group.

(m) *Leprosy*.—*M. lepræ* was found in thirty-six specimens of nasal exudate, and in one specimen from a tissue scraping.

(n) *Hemophilus influenza*.—This was found in one specimen of cerebro-spinal fluid together with pneumococcus, also in a few sputa of lobar pneumonia associated with pneumococci.

(o) *Typhus*.—Weil-Felix tests were done to the number of twelve, but with only two positive results, which were both obtained with the indol-producing strains *Proteus* X 19 and Warsaw.

(p) *Water Analyses*.—Twenty-six bacteriological analyses of water were carried out, many of which were of samples collected and brought through the first stage of the process of analysis at the Branch Laboratory at Mombasa.

(q) *Bacteriological Analyses of Foods*.—Sixteen samples of canned food-stuffs were examined at the instance of medical officers of health.

(r) *Rabies*.—A specimen of a puppy's brain was received from Kisii, and gave a positive result when inoculated into a rabbit. The primary incubation period of this virus was fourteen days.

2.—Vaccine Manufacture.

(a) *T.A.B. Prophylactic*.—Eight thousand doses were made by the procedure described in the Report for 1930; and 3,245 doses were issued.

(b) *Plague Prophylactic*.—Two hundred and ninety thousand doses of vaccine of Haffkine type were prepared by the process detailed in the Report for 1930; and 103,607 doses were issued, mainly to Kenya Colony, but including some 20,000 doses which were purchased by Uganda and Tanganyika Medical Departments. The production of plague vaccine is below normal, owing to its having been discontinued for three months in anticipation of the move into the new Laboratories, and to the required electrical incubator power fittings being incomplete for some while after the move was effected.

(c) *Anti-Rabic Vaccine*.—Carbolized anti-rabic vaccine has been made bi-monthly in volumes of about 500 c.c. at a time, with the fixed virus strains imported from the Haffkine Institute, Bombay, in 1929. This will be replaced by the "street" virus reported above as having been obtained from Kisii, as soon as this has become "fixed"; and it is expected that within a reasonable time it will be possible to include several strains of East African virus in the vaccine.

Anti-rabic vaccine is now issued to the local treatment centre which has been recently established at Kisumu for the Kavirondo area, where rabies has been reported to be prevalent.

(d) *Other Vaccines*.—Stocks of polyvalent vaccines, comprising staphylococcal, streptococcal, pneumococcal, anti-catarhal, acne, and gonococcal vaccines, have been maintained, although difficulty has been experienced in keeping up a sufficient supply of the last named.

3.—Preparation of Vaccines for Individual Persons.

Autogenous vaccines to the number of 122 have been prepared for individual patients, and fifty-four patients have received vaccine treatment for various complaints at the Laboratory. Many vaccines of the "agglutinating coliform" type have been made for rheumatic cases, and excellent results have been obtained by this method with numerous patients treated at the Laboratory.

4.—Research Work.

(a) *Plague*.—Little experimental work was completed in plague, research on the bacteriology of pneumonia and dysentery having taken up most of the time available for research.

Rat-passage of plague culture to maintain virulence for vaccine purposes has been continued with the same originally mixed culture of Nairobi strains almost without interruption from the beginning of the year, the chain of passage with the same virus having been commenced at the beginning of the year 1930. As mentioned in the Report for 1930 (page 20), interruptions of continuity of passage were frequent when subcutaneous inoculations were depended on with the white rats used. Since intraperitoneal inoculation was adopted as a routine measure, breakages of the chain have been experienced only very infrequently in the year, two of these having been due to accidental inoculation of contaminating organisms of types which happened to be pathogenic to white rat (pneumococcus, and a coliform bacillus, unidentified); and one interruption having been enforced by the move to the new Laboratories. Breakages in the chain are repaired by inoculation intraperitoneally with a suspension of the most recent of the agar cultures which are made from the spleen of every passage rat on its death.

Death of the white rats inoculated intraperitoneally occurs almost invariably between thirty and forty hours later, but occasionally may occur sooner, or in rare instances is still further delayed. It should be noted that the dose given is a heavy one, consisting of 0.5 c.c. of an emulsion made by crushing about one-eighth to a quarter of spleen in 5.0 c.c. of saline, the amount of spleen used for the emulsion depending upon the degree of abundance of plague bacilli as seen in smears stained by Gram. But the time of death appears scarcely to be affected by these variations in the dose of virus; the only effect of injecting fewer bacilli in 0.5 c.c. seems to be that fewer bacilli are microscopically evident in smears of the resulting spleen; but cultures on agar made by means of a needle point inserted into the cut surface of spleen invariably show degrees of growth varying from more or less crowded separate colonies to confluence. The aim is to secure cultures consisting of isolated colonies, which not only lend themselves to study of colony form, but also render obvious any contaminating organism.

Spleens of passage rats in every case are examined microscopically by smears stained by the modified Gram method detailed below; this is used exclusively also for routine microscopical examination of plague material:—

- I. Crystal Violet, 1.0 gramme.
Absolute alcohol, 10.0 c.c.
Distilled water, 300.0 c.c.
- II. Ordinary Grams' Iodine solution.
- III. Acetone.
- IV. Neutral red, 1.0 per cent in water.

The above are conveniently kept and used in extra wide-mouthed glass stoppered bottles. The slide is washed in water after staining in the crystal violet, and also, of course, after decolourising in the acetone, and after the final counter-staining in solution IV. The final washing is prolonged to about fifteen seconds. A few seconds exposure to each solution is sufficient, the whole process requiring about one minute without haste. Fixing of preparations for examination for plague bacilli is to be done by allowing the smear to dry naturally in the air, and then covering for some seconds with methylated spirit or absolute alcohol; the slide is then drained and placed direct into the alcoholic solution of crystal violet. The avoidance of any heat in fixing is essential. Plague bacilli in smears from tissues so treated exhibit their characteristic bipolar staining and morphology as well as though stained by Leishman's stain. This method is used for all Gram staining in the Laboratory

Effect of Heating on Plague Vaccine.—In continuance of the experiments on this point detailed in the Report for 1930 (page 22), the following induced immunity test was done, with white rats of uniform size in three groups A, B and C, of twelve animals each. Rats A were vaccinated subcutaneously with a sample of vaccine which had been carbolized in the cold in the ordinary way to sterilize; rats B with the same sample of vaccine which had been withdrawn from the flask of vaccine culture before the latter was carbolized, but then heated to a constant temperature of 80° C. for one hour. Rats C were non-vaccinated controls. Results were as in the table attached.

Rats	Vaccine Dose	Vaccine Deaths	Plague Deaths	Survival
			<i>Per cent</i>	<i>Per cent</i>
A. ..	0.3 c.c.	Nil	16.6	83.3
B. ..	0.3 c.c.	Nil	58.4	41.6
C. ..	Nil	..	100.0	Nil

The Presence of "O" Antigen in Plague Bacilli.—Several attempts made to prepare alcoholized "O" suspension from culture of selected "smooth" and virulent colonies failed in each case because of the rapid flocculation of "auto-agglutination" of the suspension when prepared, so that they quickly sedimented to leave an almost perfectly clear top fluid.

Rate of Penetration of Plague Bacilli in Rodents.—Preliminary observations on this point were made by taking blood-films from the tails of two field rodents, of a species (East African Gerbille) highly susceptible to plague, at intervals after inoculation subcutaneously, compared with films made from heart's-blood and spleen after death. Results were as follows:—

Gerbille A.—6th hour: bacilli nil. 24th hour: 1 in 6 fields. 30th hour: 6 bacilli per field, about 1 to every hundred red corpuscles. Found dead at 41st hour: spleen smear—bacilli in great abundance; heart-blood, bacilli about 1 to every 5 red corpuscles.

Gerbille B.—6th hour: bacilli not seen. 24th hour: 1 in 8 fields. 30th hour: 1 in 40 fields. 48th hour: 1 in 6 fields. 54th hour: 1 in 16 fields. 72nd hour: animal appears to be sick, 1 bacillus to every 100 red corpuscles. 74½ hours: death; bacilli very abundant in spleen smear, heart's-blood shows 1 bacillus to every 3 red corpuscles.

(b) *Pneumonia.*—Out of a total of 135 cases of pneumonia, mainly of lobar type, and mainly among African patients, bacteriological examination yielded pneumococci in 119 cases; these were serologically typed as follows:—

Type I.	Type II.	Type III.	Group IV.
5.04 per cent.	1.68 per cent.	0.84 per cent.	92.44 per cent.

Twelve cases of the series yielded pure growth of bile-insoluble streptococci; and four cases yielded "*Pneumobacillus* of Friedlander," perhaps better specified as *B. mucosus capsulatus*, which, like those previously recovered from pneumonia, was of a non-dulcitate fermenting type.

One case of pneumonia, examined bacteriologically on the sixth day of the disease, in a Goan patient, yielded plague bacilli together with Group IV pneumococci.

Serological Analysis of Group IV Pneumococci.—This was commenced in June after removal to the new Laboratories. Six serological types only have so far been separated, designated as types: K.W.A., K.W.B., K.W.C., K.W.D., K.W.E., and K.W.F. The proportionate incidence of these was: K.W.A. —20.1 per cent; —B, 5.2 per cent; —C, 12.1 per cent; —D, 16.6 per cent; —E, 4 per cent; and K.W.F. —5 per cent; these figures being based on agglutination tests with the corresponding sera on a small collection of cultures varying in number from twenty to fifty-four. Type K.W.A. is of interest in that it appears to be a derivative of Type I: some strains which agglutinated markedly to K.W.A. serum also agglutinated slowly and feebly with Type I serum, while other K.W.A. strains failed to respond to Type I serum. Moreover, two definite Type I strains, originally agglutinating to the full titre of Type I serum, after months of frequent subculture on agar have lost completely in one case, and to a great extent in the other case, their Type I characters and have then been found to be strongly agglutinable by K.W.A. serum. It is noteworthy that the type K.W.A. has been recovered from post-mortem lung and also from sputum of lobar cases, of which at least two were of fulminant severity.

The results up to the present suggest that the number of distinct types of Group IV pneumococci causing pneumonia in Nairobi district is fairly large, since all six types so far separated only embrace 63 per cent of the pneumococci which have been collected.

Procedure for Preparing Typing Sera.—The scheme adopted rather empirically is to inoculate a rabbit with a series of seven consecutive daily intravenous injections of a suspension in 0.5 per cent carbol-saline of a culture made on blood agar, the suspension being of strength varying from 0.5 to 0.8 mgm. per c.c. killed by heat at 60° C. for thirty minutes, and given in doses of 1.0 c.c. at a time. The animal is bled into agar-lined tubes six days after the last injection; the titre of sera so made has varied from 1/20 to 1/100, usually being about 1/50.

Agglutination Tests; and Bile-Solubility Tests.—Cultures obtained by mouse inoculation with sputum or post-mortem lung have been used in every case, subculture being made from the mouse's heart-blood. The agglutination tests are performed with saline suspensions of blood agar cultures, filtered

through paper, of such strength as to be definitely cloudy to the eye. Using round-bottomed agglutination tubes one drop of diluted serum plus four drops of suspension are placed in a tube by means of a straight Wright's pipette; the control tube contains four drops of suspension plus one of saline to replace the serum. The tests are incubated in a water-bath at 37° C. and observed hourly up to four hours.

For *bile-solubility tests*, the suspensions must be of such strength as to be reasonably opaque, otherwise results are apt to be indefinite. In one of two round-bottomed agglutination tubes, four drops of suspension plus one drop of a 1.0 per cent solution of *sodium desoxycholate* in normal saline are placed, in the second tube four drops of suspension plus one drop of saline for control. Given a pure, well-grown culture of pneumococcus, the result is beautifully definite within a minute or so at room temperature.

(c) *Dysentery*.—Work has been continued by the bacteriological assistant, Mr. St. J. de Souza, on the various organisms recovered from cases of bacillary dysentery, especially in regard to the types designated provisionally as "*Shigella A*" and "*Shigella B*." *Shigella* type *A* (non-motile, acid in glucose only, indol positive, but a late fermenter of glycerine) has been thought to be either cognate or identical with *S. ambigua* (dysentery bacillus of Schmitz, *B. ambiguus* of Andrewes), and has been recovered usually from mild dysenteries, but on one occasion from an extremely severe case in an Indian patient when it appeared as the preponderating organism in the culture of the faeces. *Shigella* type *B* is non-motile and ferments glucose, mannite, and sorbite, these reactions being constant without exception for all the strains collected; it also invariably produces a strong indol test, thus being distinguished to a marked degree from the Flexner types and strains which have been collected, and which are variable in the production of indol at all, and in no case produce it strongly. Culturally, *Shigella B* resembles Shiga's bacillus rather than Flexner cultures in its delicacy of growth, and it has been found more difficult to maintain in culture than a Shiga strain received from the National Type Collection. *Shigella B* has been recovered in more or less pure growth from dysenteries which have been more severe than any which yielded Flexner group organisms, and has also been isolated in a few instances from post-mortem dysenteric bowel. Agglutination tests with patients' serum against homologous *Shigella B* culture, as also against foreign strains, have been positive in a satisfactory proportion of cases, the highest titre being 1/500.

Serological Tests to Determine Type :—

Shigella A.—By immunising rabbits, a homologous serum of titre 1/2,000 was prepared. Standard Schmitz serum and corresponding Schmitz culture obtained from the Enteric Laboratory, Kasauli, India, were the other materials used.

Results :—

- (a) *Shigella A* culture fails to respond to standard Schmitz serum in a dilution of 1/25 and upwards.
- (b) Kasauli Schmitz culture agglutinates with *Shigella A* serum to full titre of 1/2,000.
- (c) *Shigella A* serum absorbed with Schmitz suspension loses 90 per cent of its agglutinin for homologous culture.

Conclusion.—*Shigella A* is homologous with, or possibly a slight variant from, the Kasauli *B. dysenteriae* of Schmitz. The cross agglutination results given above are an interesting example of the vagaries met with in serological work with the dysentery group.

Shigella B.—Materials used :—

- (a) *Shigella B* rabbit serum "758," titre 1/2,000;
- (b) Homologous *Shigella B* culture, type strain "758";
- (c) Natural homologous serum "Musebe" (African patient), titre 1/500;

- (d) Standard Flexner types sera V. W. X, Y. Z, from the Enteric Laboratory, Kasauli;
- (e) Corresponding living Flexner type cultures, and also cultures of aberrant types " 8," " 103," and " 170 " (Boyd, Jour. Royal Army Medical Corps, No. 3, 1931), from Kasauli.

Results :—

- (a) "Musebe" serum agglutinates all Flexner types to 1/250;
- (b) "Musebe" culture *Shigella B* absorbs all Flexner and homologous agglutinins from his serum;
- (c) "Musebe" serum absorbed with each of the Flexner type cultures loses in each case 40 per cent of agglutinin for homologous culture;
- (d) Serum "758" agglutinates all Flexner types, except V, to titre varying from 1/50 to 1/250, and agglutinates strain " 170 " to 1/250, but strains " 88 " and " 103 " only feebly;
- (e) *Shigella B*.—"758" and other strains, agglutinate to Flexner type X serum in 1/50 to 1/100, and also more feebly to the other Flexner type sera; one *Shigella B* culture, homologous to " 758 " serum, failed to respond to Flexner group serum;
- (f) Flexner type sera V—Z absorbed with " 758 " culture in each case lose 40 per cent of agglutinin for homologous Flexner culture;
- (g) " 758 " serum absorbed with each of the Flexner type cultures is deprived of 40 per cent of its homologous agglutinin by each of the Flexner types including " 88," " 103 " and " 170," but loses 70 per cent of homologous agglutinin when absorbed by Flexner X, as compared with loss of 92 per cent of agglutinin when absorbed by homologous culture "758" for control test.

Most of the *Shigella B* strains collected and provisionally categorized by their very distinctive biochemical and other characters, have been found to be agglutinable by the various type rabbit sera prepared. Culturally, the colonies are all smooth in primary culture, small with surface cut into distinct polished facets which are produced into a low central apex; on litmus lactose agar plates in primary culture they are always readily distinguishable from Flexner primary colonies by a degree of opacity, especially about the centre, which imparts a tint in contrast to the clear blue of the Flexner colony.

Conclusions.—These are difficult to form in the absence of further serological tests with a series of strains of the organism. But if it should finally prove not to be a distinct type of the dysenteric group, or at least of the Flexner group, "*Shigella B*" certainly seems to be sufficiently marked by its biological characters and by its etiological prominence, to warrant its inclusion in therapeutic anti-sera for use in Kenya.

Flexner Group.—Those types of Flexner which have been collected in Nairobi have all been classed as W. X or Y, or the dual WX type.

Fermentation of maltose has not been found to be of dependable value in helping to differentiate Y strains.

F.—SECTION OF MEDICAL BIOLOGY.

1.—Staff.

The section was under the charge of Captain R. P. Cormack during the year, except between the months of May and November, when he was relieved by Dr. H. D. Tonking.

Mr. E. C. Young, during the whole year, and Mr. T. Jones, for part of the year, did duty as laboratory assistants in the section.

2.—Blood Examinations.

Slides examined for malarial parasites :—

(a) Negative	...	...	...	...	8,251
(b) <i>P. falciparum</i> , including 68 crescents	...	...	...	...	1,145
(c) <i>P. malarice</i> alone	...	...	...	...	32
(d) <i>P. vivax</i> alone	...	...	...	...	41
(e) Mixed infections	...	...	...	...	27

Other parasites :—

(a) <i>S. rossi</i>	...	...	...	...	6
(b) Microfilaria—unsheathed	...	...	...	...	47
(c) Microfilaria—sheathed	...	...	...	...	2
(d) Trypanosomes	...	...	...	...	1

Other examinations :—

(a) Total counts	...	...	...	...	60
(b) Differential counts	...	...	...	...	1,052
(c) Arnoth counts	...	...	...	...	5
(d) Blood grouping	...	...	...	...	5

Total ... 10,674

3.—Faeces Examinations.

Four thousand nine hundred and sixty-one specimens of stools were examined for helminths or protozoa. Of these, one thousand nine hundred and thirty-two were negative, and three thousand five hundred and sixty-nine showed infection with one or other or both.

There were three cases of infection with five helminths and one protozoon, two cases of four helminths and four protozoa, four cases of four helminths and three protozoa, and one case of five helminths and two protozoa.

The number of times the various helminths and protozoa were encountered is as follows :—

<i>Chilomastix mesnili</i>	...	...	...	32
<i>Endolimax nana</i>	...	...	...	2
<i>Iodamæba butschlii</i>	...	...	...	350
<i>Giardia intestinalis</i>	...	...	...	189
<i>Entamæba coli</i>	...	...	...	1,143
<i>Entamæba histolytica</i>	...	...	...	36
<i>Trichomonas hominis</i>	...	...	...	3
<i>Isospora hominis</i>	...	...	...	19
Unidentified flagellate cysts	...	...	...	1,340
<i>Ancylostoma duodenale</i>	...	...	...	877
<i>Ascaris lumbricoides</i>	...	...	...	468
<i>Taenia</i>	...	...	...	755
<i>Hymenolepis nana</i>	...	...	...	7
<i>Strongyloides stercoralis</i>	...	...	...	161
<i>Strongyloides larvæ</i>	...	...	...	276
<i>Trichuris trichiura</i>	...	...	...	630
<i>Schistosoma mansoni</i>	...	...	...	159
<i>Schistosoma hæmatobium</i>	...	...	...	1
<i>Enterobius vermicularis</i>	...	...	...	55

4.—Other Examinations.

(a) Cell counts	...	...	...	...	39
(b) Miscellaneous	...	...	...	...	153

Total ... 192

A large increase in the number of *E. histolytica* infections is to be noted.

5.—Remarks.

Included in the foregoing examinations are the findings of the laboratory at the Native Hospital, Nairobi. This laboratory was closed down in March, and absorbed by the Medical Biological Section when this was transferred to the new building.

G.—MALARIA SECTION.

1.—Staff.

The section remained under the care of Dr. P. C. C. Garnham until 8th May, when he went on leave. Charge of the section was resumed by him on 18th December on return from leave.

2.—Examination of Blood Slides.

Number of negative slides	...	...	...	...	4,941
Number of positive slides—					
<i>P. falciparum</i>	...	...	...	...	3,132
<i>P. malariae</i>	...	...	...	...	209
<i>P. vivax</i>	...	...	...	...	24

Double infections were common, so much so that quartan and benign parasites were rarely found alone, but usually in association with *P. falciparum* rings or crescents.

The bulk of the slides was obtained monthly from Kitale and from South Kavirondo dispensaries (though the taking of blood slides from the latter district was discontinued in July), and in the two extensive surveys of the Machakos district and Masai Province. (Detailed analyses of the results of these surveys will be found in the reports of the medical officers in charge of the respective areas.) A number of slides were examined from North Kavirondo, Kaniadoto, Taveta, and from children living in the K.A.R. lines, Nairobi. A separate report is being made on the Kitale results.

3.—Sub-species of *Plasmodium falciparum*.

Typical examples of the local sub-tertian parasite were taken to Europe, and were shown to Professors J. G. Thomson, Swellengrebel and Brumpt, and to Colonel J. A. Sinton. Our local variety appeared to correspond closely in morphology to other African and Indian forms in the possession of these authorities, although there remained a few points of difference, e.g. colour of pigment. Nevertheless, all these parasites fail to agree with the classical descriptions of the *P. falciparum* of the original workers who named it, and it seems possible that the tropical forms should all be designated *P. tenue* (Stephens), irrespective of whether they exhibit the distinctive *tenue* feature or not, as, although this phase is but a rare accident in the life-history of the parasite, it gave the name originally to the tropical variety, but by mistake to a small proportion only (the rare tenuiform proportion) of it. A description of the Kenya forms will be published in 1932.

4.—Immune Bodies in Malaria.

The supposition that malarial cultures would not grow in the presence of anti-bodies contained in sera of convalescent cases of the disease was not confirmed by experiment, as the following results show:—

P. falciparum in erythrocytes plus convalescent sera : 19 cases.

P. falciparum in erythrocytes plus normal sera (i.e. control) : 16 cases.

Result : Both groups were cultured aerobically at 37° C. with 0.2 c. cm. of 50 per cent glucose. Both grew well for approximately forty-eight hours and then died out. No difference was observed in the rate of growth, in the size and number of merozoites in the schizonts, or in the development of the second generation.

The experiment presented various technical difficulties; leucocytes had to be removed by centrifugalization of the infected defibrinated blood, and a sufficient quantity of red blood cells transferred by pipette to the normal and convalescent sera; these sera had to be chosen beforehand to ensure that they corresponded to the correct blood group; and throughout these and subsequent operations the most rigid asepsis had to be observed. It was felt that the short

life-time of the cultures did not allow of proper comparison being made, so eventually a procedure was devised by means of which sub-culture of the top parasite-growing layer was made on to the top of a column of red cells in (a) the convalescent, and (b) the normal sera, and this was performed every twenty-four hours. Growth in this way was prolonged up to ninety-one hours, but, in the seven cases in which it was done, again no differences could be observed.

Cultures were made in two instances in which the serum was submitted to a preliminary heating to 60° C. for fifteen minutes to ascertain if inhibitory anti-bodies were killed thereby, but development proceeded in the normal manner.

5. An experiment was made in January and February to test the supposed stimulatory effect of the virus of Rift Valley fever on the reticulo-endothelial system, and thus cure a case of chronic malaria, the seat of natural cure being supposed to be in cells of this system. The experiment proved negative, but was of value in allowing detailed observations to be made of the resultant attack of Rift Valley fever. These have been published in the *Journal of Pathology and Bacteriology*.

6. A ward in the Native Hospital, Nairobi, was again available for the first half of the year for the study of malaria cases, during which time observations were made on forty cases.

7. The statistical study of malaria has been combined with the similar work of the Medical Entomologist, to eliminate reduplication.

H.—SECTION OF MEDICAL ENTOMOLOGY.

1.—Organization and Staff.

Mr. C. B. Symes returned from leave on 25th February, 1931.

The appointments of Mr. J. Nimmo, Field Assistant, and Mr. N. V. Nair, Laboratory Assistant, were terminated in October and November respectively.

Several of the African staff have had to be dispensed with during the year, and their places have not been filled.

Mr. J. O. Harper, Field Assistant, and Mr. W. Grainger, Laboratory Assistant, proceeded on leave in April and November respectively.

With the loss of two assistants and absence on leave of two others, work has been considerably curtailed during the last quarter of the year.

2.—Mosquitoes and Malaria.

Investigations and collections have been made in the following places: Taveta, Voi, Kakamega and district, Eldoret, Machakos and Akamba Reserve, Lambwe Valley (South Kavirondo), Kisumu, Mombasa, Digo, Northern Frontier district, Nakuru, and Kitui.

(a) In Nairobi, the routine collecting has been continued, and daily reports of breeding forwarded to the Medical Officer of Health.

(b) At Taveta, investigations were continued until August, when the staff returned to Nairobi. It is hoped to resume observations here early in 1932.

(c) Routine work at Kakamega, Kitui, and Kisumu has been carried on, much useful work being done by the trained Africans appointed to these places. At the latter place routine searches for mosquitoes and other insects in Imperial Airways machines arriving from Egypt have been initiated. It is hoped by this means to gauge the possibilities of transference by air of disease vectors, and to check the efficacy of disinfestation measures adopted in sanitary air ports.

(d) At the end of the year a beginning was made in investigating the changes in the natural mosquito fauna resulting from the opening of certain areas of North Kavirondo as alluvial gold workings. This work is being continued.

(e) Work in Mombasa and the coast northwards has had to be discontinued. A survey was started in the Digo Reserve.

(f) One trained African assistant accompanied the Medical Officer, Northern Frontier District, for some months, and we were able to record *A. pretoriensis*, *A. rhodesiensis* and *A. nili* from various districts near the Abyssinian border.

(g) Considerable attention has been devoted to microscopic examination of the glands of captured anophelines, and to the determination of their blood meals by means of the precipitin test. We have failed to gather evidence of malarial infection in any species but *A. costalis* and *A. funestus*, nor have we found any other species in constant close association with man.

(h) *A. mauritanus* var. *tenebrosus* has been recorded in large numbers from Digo district.

(i) Illustrated descriptions of anopheline larvæ of Kenya have been prepared during the year, together with brief summaries of our knowledge of the habits of adults. This work is now in the press.

(j) A series of laboratory and field tests on various oil mixtures was started during the rainy season. It is hoped to complete this work in the next active mosquito season, and to arrive at an effective and cheap mixture to substitute for the present variety of doubtfully effective oils used in the territory. The average oiling is notoriously either wasteful or ineffective.

(k) The results of the paris green experiment at Kitale have been analysed and a report submitted. Though the control was by no means perfect, it was certainly a great advance on the previous very imperfect oiling, at a cost of rather less than half that of the oiling.

3.—Tsetse Fly and Sleeping Sickness.

A survey was made in August of a focus of sleeping sickness in Kadimu, Central Kavirondo, and a special report, including suggestions for control, has been submitted. Briefly, the infection in this area, as in most other districts investigated, results from visits to the infested lake-shore bush by men, women and children in their daily domestic tasks of wood-gathering, water-carrying, fishing and stock-grazing. Measures recommended for the control of infection include :—

- (a) The clearing of certain small areas of shore bush as an immediate protective measure.
- (b) The planting of trees in chosen areas to provide an uninfested source of wood and poles, and as an important step in the general development of the district.
- (c) The improvement of stock-farming methods, so that the prolonged grazing of cattle in infected shore bush be rendered unnecessary.
- (d) The gradual extension of work indicated in paragraph (a), designed to attack the breeding places of *G. palpalis*, and to reclaim sections of shore lands previously unoccupied.

Tsetse Traps.

Permission was obtained to test the Harris tsetse-fly trap. Two were put into operation against *G. palpalis* and *G. pallidipes* respectively. More exhaustive tests must be made before any definite conclusion as to their value in Kenya can be drawn.

G. pallidipes.

The Lambwe Valley harbours numbers of game of many species, including a herd of elephant some hundreds strong. An attempt by the Game Department to drive out this herd, because of their depredations in the neighbouring native gardens, prompted a small investigation into the relationship between *G. pallidipes* and elephant. So far we have merely attempted to discover to what extent the fly definitely feeds on elephant, and the result of our first series of precipitin tests indicates that it does so extremely rarely, if at all; though the large numbers of *Tabanus* spp. found in the valley exhibit a distinct preference for elephant blood. These inquiries will continue as opportunities permit.

4.—Tropical Typhus.

Preliminary work has begun on the investigation of this disease and its local vector. The histories of most cases which have occurred point to a close association with long grass or bush just prior to infection.

Surveys of small rodents and their ecto-parasites have been made during some six months in an area from which the majority of patients have been derived. The common rats, *R. coucha*, *A. abyssinicus*, *Otomys angoniensis* and *Rhabdomys pumilio*, have been recorded, with the usual fleas, *X. cheopis*, *X. brasiliensis* (both in relatively small numbers), *D. typhus*, *D. longifrons*, and *C. cabirus* (in much larger numbers). Small numbers of ticks, mostly *R. simus*, and many mites, including the *Dermanyssus* and *Trombicula* groups, also occur. Though there are data suggesting that the disease is not uncommon in certain field rats, it is too early to suggest or even to hint at a probable vector.

5.—Rats, Fleas and Plague.

Rat and flea studies have been continued in Nairobi township and district, with additional catches at Kiambu, Thika, Naivasha, Keruguya, Fort Hall, Kisii, Taveta, and Maseno.

Owing to reduction and consequent re-arrangement of staff, it has been necessary to discontinue many centres of study where further research is essential to determine the differences existing between plague and non-plague areas. It is interesting to record that in a non-plague area such as Machakos the percentage infestation of rats by all species of fleas over a period of six months was only 29 per cent, whereas in plague areas the infestation has been over 50 per cent.

Experiments have been conducted during the year on the transmitting powers of various species of fleas. In the early part of 1931 the cages designed by the Indian Plague Commission were used, but later a new technique was evolved, which considerably increased the number of experiments that could be carried out at one time permitting the use of various species of rats and fleas. *X. brasiliensis* was found to be the most efficient transmitter of plague from rat to rat, and a new record was established of the ability of *Ctenophthalmus cabirus* to transmit the disease.

Field evidence was obtained that *X. brasiliensis* was solely associated with an outbreak of human plague in the Kiambu area. In the Nairobi Hill outbreak of December, 1930, which continued throughout January, this flea was the only one found on trapped rats immediately prior to the outbreak, and the incidence of plague lessened gradually with the reduction in numbers of *X. brasiliensis* and the steady increase of *X. cheopis*. *X. brasiliensis* has almost invariably been associated with the deaths of rats in Nairobi.

In the last report from this Laboratory, and again in a preceding section of the present report, attention has been drawn to the inability to recover plague bacilli from subcutaneously inoculated white rats, even though death has been obviously due to plague. An instance occurred in which three *Arvicanthus* spp. received a dose of plague culture and remained healthy for over two months without trace of bacilli or signs of infection in the organs, though the same dose killed a white rat in thirty-six hours. Have these field rats acquired an immunity, which may perhaps even be seasonal, and does this break down during periods of stress resulting from certain climatic changes, food shortage, or some such factors? There is some support for this suggestion in the fact that, with a standard technique, experimental transmissions of plague are successful in one month and not in others. It is obviously important to discover whether field rats are tolerant to plague, and, if so, to what extent and when, since no sound anti-plague measures can be undertaken without such information.

Coincident with the outbreak of plague in the Hill area of Nairobi in January and February, an epidemic of unknown cause occurred among field rats, particularly *Otomys* spp. Field rats were observed to wander about during the daytime in a lethargic state, and could be easily captured by hand, whilst large numbers were destroyed by natives armed with sticks. The macroscopic signs were heavily necrosed areas in the liver, slight enlargement of the spleen, and congested suprarenal glands.

In conjunction with the Veterinary Research Division, an inquiry was instituted into the cause of death of large numbers of field rats during 1930 and 1931 in the Naivasha district. Records of this Laboratory show no plague-positive rats as having been received during 1930 or 1931 from that district, though there was a considerable mortality among rodents at the same period as the epidemic of enzootic hepatitis amongst sheep. No confirmation is as yet forthcoming to prove that rats and sheep suffered from the same disease.

The causes of an epidemic disease amongst rats, which is sometimes associated with a high mortality, remain obscure. A study of such diseases is of prime importance, as man and his domestic animals are in daily contact, directly or indirectly, with rats, more especially as it offers a possibility of tracing the reservoir hosts of some of the diseases of unknown etiology which are found in Kenya. Indeed, the importance of rats as a possible reservoir host for animal diseases has already been demonstrated. *Rhipicephalus simus*, a vector of East Coast fever to cattle, has been recorded during one survey from forty nests of *Arvicanthus* spp. out of a total of sixty-one (sixty-five per cent), and from sixty-one (forty-four per cent) in a total of one hundred and thirty-seven surface nests of various species of field rats.

6.—Fumigation.

A series of experiments were carried out to test the efficacy of various fumigants for the control of vermin in coaching stock of the Kenya and Uganda Railways. The main consideration, apart from lethal properties of the fumigant, was the speeding up of operations to allow regular fumigations to be carried out at stated intervals at a reduced expenditure.

Satisfactory results were obtained with Zyklon (a cyanide preparation), which fulfilled most of the requirements demanded. The older method of fumigation with sulphur machines cost the Railway Administration during 1930 about Sh. 22/50 per coach fumigated. The employment of Zyklon has reduced this figure to about Sh. 6 per coach. Fumigation with Zyklon was therefore established during the year on the Kenya and Uganda Railways under tuition and surveillance from this section. The change-over resulted in greater efficiency and about a two-thirds reduction in costs.

The work on cyanogas as a control for rats and fleas in native huts was completed. Sufficient testimony to the efficacy of the treatment was afforded by the numerous requests for fumigation received from natives after seeing the experimental work. Cyanogas, on account of the amount of man labour required, has the serious drawback of being expensive. Endeavours are being made to reduce the man labour to a minimum.

Experiments were also conducted on the de-verminization of native quarters in townships. Zyklon, on account of its rapid output of hydrocyanic acid gas and ease of handling, has proved the most effective substance.

7.—Myiasis.

It is to be regretted that material for this interesting and important subject is almost unobtainable. A preliminary list of myiasis-producing insects recorded at the Laboratory, with an appeal for more material, has been prepared for publication.

Three interesting records were made during the year. *Lucilia sericata*, Mg., was obtained on two occasions from human beings, once from an old ulcer in the groin, and once from a nasal discharge following a head wound. *Chrysomya bezziana*, Vill., was obtained from an ulcer on the foot of a native.

8.—Mosquito Spray Fluid.

Ready-prepared liquid extract of pyrethrum flowers was experimented with, and found satisfactory as an insecticide for mosquitoes. The employment of this extract will result in considerable saving to large consumers such as the Kenya and Uganda Railways, who have adopted our recommendations. The ready-prepared extract costs Sh. 3/05 per gallon to make up, as compared with Sh. 4/50 for home-made paraffin-pyrethrum extract, and the almost prohibitive cost of the common proprietary fluids.

9.—General.

Co-operation with the Veterinary Research officers has been maintained in their search for an insect vector of Rift Valley sheep disease.

Acknowledgments.

We desire to express our gratitude to Sir Guy Marshall, Director, Imperial Institute of Entomology, and his staff; to Mr. F. W. Edwards, of the British Museum, and Professor W. S. Patton and Miss Evans, of the Liverpool School of Tropical Medicine, for help in a variety of subjects during the year.

I.—BIOCHEMICAL SECTION.

1.—Staff.

The staff has consisted of the Biochemist, an Indian laboratory assistant, and a native attendant. From 1st January until 11th April, and from 8th November until 31st December, Mr. H. M. Nefdt, B.Sc., laboratory assistant, was attached to the section, and Mr. C. E. J. Lamperd, laboratory assistant, worked in the section from 15th June until 28th August, the date of his departure on retrenchment from the Colonial Service.

2.—Routine Work.

Quarters in the new Medical Research Laboratory were occupied at the beginning of May.

For the fifth year in succession, an increase in the amount of routine work has to be recorded. The number and nature of the biochemical examinations made during the year are shown in the following table :—

(a) *Urines.*

General examination, i.e. reaction, specific gravity, albumin, sugar, and microscopic examination of deposit	1,187
Sugar—quantitative and qualitative	92
Albumin—quantitative and qualitative	39
Albumin and sugar—qualitative	26
Albumin and deposit	10
Deposit	9
Bence-Jones protein	2
Indican	1
Uric acid—quantitative	1
Urea concentration tests (McLean)	10

(b) *Fæces.*

Occult blood	32
Fat content	7

(c) *Blood.*

Glucose tolerance tests	9
Sugar and non-protein nitrogen	8
Sugar	6
Non-protein nitrogen	7
Van den Bergh test	5
Calcium	3
Lævulose tolerance test	1
Urea	1

(d) *Cerebro-spinal Fluid.*

Lange gold curves	11
Protein excess and sugar	2
Protein excess	1

(e) *Miscellaneous.*

Fractional test meals	39
Human milk	8

Total number of examinations ... 1,517

The total number of examinations in 1930 was 950.

Preparations of metallic bismuth and bismuth oxide have been made for issue to medical officers throughout the Colony. Here again, increases over the 1930 figures have to be reported, the totals being 124,767 and 10,315 doses respectively, against 85,901 doses of metallic bismuth and no bismuth oxide in the previous year.

3.—Research Work.

Investigational work has been restricted by the increase in routine work, and by the changes which have taken place in the staff of the section.

After removal to the new buildings attention was turned to an extension of previously reported work on the composition of the blood of East African natives. With the co-operation of Dr. H. C. Trowell, on the staff of the Native Hospital, Nairobi, in the obtaining of samples, estimations were made of non-protein nitrogen, urea, albumin, globulin, fibrin, sugar, calcium, inorganic phosphate, chloride and cholesterol contents. The loss by retrenchment of the laboratory assistant, Mr. C. E. J. Lamperd, caused the abandonment of the investigation.

Towards the end of the year the analysis of a series of samples of maize meal and two wheat products was started, and was still in progress at the close of 1931. The samples were submitted by the Kenya Farmers' Association, which, in addition, generously provided quantities of maize meal and specially ground wheat flour for a feeding experiment with white rats, designed to find an improved ration for native labour.

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List of Samples Examined.

Milks—

Public health control	...	...	...	16
Condensed	...	...	...	2
Miscellaneous	...	...	...	5

Waters—

Domestic supplies	...	...	...	47
Industrial	...	...	...	5
Oils, fats and waxes	...	...	...	14
Minerals	...	...	...	59
Toxicological	...	...	...	16
Forensic chemistry	...	...	...	1
Foods	...	...	...	10
Liquors	...	...	...	22
Drugs	...	...	...	4

REMARKS.

The exceedingly small number of milk samples (two batches of eight) submitted is surprising, in view of the history of Nairobi's milk supply during the last twenty years.

APPENDIX.

RESUME OF WORK CARRIED OUT AT THE CLINICAL LABORATORY
ATTACHED TO THE NATIVE HOSPITAL, MOMBASA,
DURING THE YEAR 1931.

During the year 1931, eleven thousand three hundred and eighty-eight specimens were received and dealt with in the Laboratory, a decrease of three thousand nine hundred and sixteen compared with the total of the previous year. This is attributable to the decision to discontinue the daily examination of large numbers of rat smears, and also to the closing down of several dispensaries in the interests of economy. An examination of the faeces from pupils from the various schools in Mombasa was not carried out as hitherto, owing to economies in staff, and the absence of a school medical officer, whose influence in the obtaining of specimens has always been necessary. An actual attempt to maintain this service was made, but met with no success, the pupils refusing to comply with the request to bring samples of faeces.

Of the specimens examined during the year, 5,266 were blood, 2,984 faeces, 477 represented smears from rats for the presence of plague; the remaining 2,661 specimens were divided up between serological and bacteriological examinations, particulars of which are given in the following detailed account.

The sum of £45/10/0 was collected on account of examinations performed for medical practitioners engaged in private practice.

The following is a detailed summary of the work carried out during the year :—

BLOOD (HUMAN) : 5,266 EXAMINATIONS.

Differential leucocyte count only	297
Total blood counts	71
Total white cell counts only	9
Arneth counts	34
Negative specimens	3,696
<i>P. falciparum</i>	1,006
<i>P. malariae</i>	80
<i>P. vivax</i>	33
<i>S. rossi</i>	4
Sheathed microfilariae	3
Unsheathed microfilariae	31
Coagulation time	1
Fragility test	1
	5,266

FÆCES : 2,984 EXAMINATIONS.

The following table shows the number of occasions on which each individual helminth and protozoon appeared in the total faecal examinations made during the year :—

Negative specimens	66
<i>Taenia saginata</i>	502
<i>Ascaris lumbricoides</i>	691
<i>Ancylostoma duodenale</i>	1,358
<i>Trichuris trichiura</i>	1,073
<i>Strongyloides stercoralis</i>	152
<i>Schistosoma mansoni</i>	81
<i>Oxyuris vermicularis</i>	14
<i>Hymenolepis nana</i>	2
<i>Schistosoma hæmatobium</i>	1
<i>Entamæba coli</i>	334
<i>Iodamæba butschlii</i>	23
Flagellates (undifferentiated)	136
<i>Giardia intestinalis</i>	55
<i>Entamæba histolytica</i>	26
<i>Entamæba nana</i>	15

Specimens containing :—

1 helminth	...	...	...	...	840
2 helminths	...	...	...	...	660
3 helminths	...	...	...	...	269
4 helminths	...	...	...	...	58
1 protozoon	...	...	...	...	142
2 protozoa	...	...	...	...	9
3 protozoa	...	...	...	...	2
1 helminth and 1 protozoon	...	...	...	...	159
2 helminths and 1 protozoon	...	...	...	...	146
3 helminths and 1 protozoon	...	...	...	...	40
4 helminths and 1 protozoon	...	...	...	...	11
1 helminth and 2 protozoa	...	...	...	...	16
2 helminths and 2 protozoa	...	...	...	...	11
3 helminths and 3 protozoa	...	...	...	...	1
5 helminths and 1 protozoon	...	...	...	...	1
1 helminth and 3 protozoa	...	...	...	...	2
2 helminths and 3 protozoa	...	...	...	...	2
3 helminths and 2 protozoa	...	...	...	...	1

SEROLOGICAL EXAMINATIONS : 155.

One hundred and fifty-five agglutination tests were performed during the year for *B. typhosus*, *B. paratyphosus A*, and *B. paratyphosus B*. The following are the results obtained :—

Single Culture Agglutinated.

<i>B. typhosus</i>	...	...	...	...	26
<i>B. paratyphosus A</i>	...	...	...	...	3
<i>B. paratyphosus B</i>	...	...	...	...	2
					31

Two Cultures Agglutinated.

<i>B. typhosus</i> and <i>B. paratyphosus A</i>	...	...	...	...	6
<i>B. typhosus</i> and <i>B. paratyphosus B</i>	...	...	...	...	2
<i>B. paratyphosus A</i> and <i>B.</i>	...	...	...	...	3
					11

Three Cultures Agglutinated.

<i>B. typhosus</i> , <i>B. paratyphosus A</i> , and <i>B.</i>	...	...	...	...	1

Positive sera	...	...	...	...	43
Negative sera	...	...	...	...	112
					155

Note.—Included in the negative specimens are five negative agglutination tests against the Malta fever group.

BACTERIOLOGICAL EXAMINATIONS.

Sixty-seven specimens requiring cultural examination were received. These were dealt with, and forwarded, if necessary, to Nairobi for further investigation or vaccine preparation. The following are the particulars :—

Blood cultures	...	...	...	...	10
Urine cultures	...	...	...	...	26
Fæces cultures	...	...	...	...	11
Boil cultures	...	...	...	...	2
Pleural effusion cultures	...	...	...	...	3
Throat swabs	...	...	...	...	10
Nasal material	...	...	...	...	1
Pustule on face	...	...	...	...	2
Sputum	...	...	...	...	1
Cervical swab	...	...	...	...	1

SPECIMENS RECEIVED REQUIRING MICROSCOPICAL EXAMINATION.

Gonorrhoea.—One hundred and twenty-two specimens of urethral exudate were examined, and *Neisseria gonorrhoeæ* was identified microscopically in sixty-six.

Leprosy.—Nasal scrapings were sent from twelve lepers in the Infectious Diseases Hospital, Mombasa, and three showed the presence of *M. lepræ*.

Cerebro-spinal Fluid Examinations.—Eighteen specimens of cerebro-spinal fluid were received for examination, two of which showed the presence of *N. meningitidis*.

Two specimens were sent to be examined for tubercle bacilli, both of which were negative. Six cell counts were carried out.

Sputa.—Four hundred and forty-four specimens of sputa were received and examined with the following results:—

Sputa positive for tubercle bacilli	...	109
Sputa negative for tubercle bacilli	...	325
Gram stain only	... ..	10
		444

(Included in the negative specimens are four anti-formin concentration tests for tubercle bacilli.)

Miscellaneous Smears.—Sixty-four smears from various sources were examined microscopically.

Plague.—Four hundred and seventy-seven smears from rats either trapped or found dead were examined for the presence of *P. pestis*, all of which proved to be negative. Two rats were sent for post-mortem examination. Both were negative for plague.

Anthrax.—Two specimens were examined, both of which were negative.

Urines, 1,777.—One thousand, seven hundred and seventy-seven urines were received and examined as follows:—

General examination	...	1,742
Sugar content	...	24
Albumin content	...	11
		1,777

Two urines were examined for tubercle bacilli; both were negative. Gonococci were found in eight specimens. *Schistosoma hæmatobium* was found in fifty-eight specimens.

Fæces.—Tubercle bacilli were identified in one specimen of fæces.

WATER ANALYSIS.

Eight bacteriological examinations of water were performed, seven of the Mombasa water supply and one from a well.

The preliminary tests were carried out in Mombasa, and subcultures forwarded to Nairobi, where the examinations were completed.

SERA FOR KAHN TEST.

Two hundred and seventy-eight specimens of blood were taken, and the sera removed after clotting, and forwarded to Nairobi for the Kahn test.

PATHOLOGICAL SPECIMENS.

Thirty-seven specimens were forwarded to Nairobi.

POST-MORTEM.

Seven post-mortem examinations were performed.

