Annual report of the Department of Public Health / Union of South Africa.

UNION OF SOUTH AFRICA

ANNUAL REPORT

OF THE

Department of Public Health

YEAR ENDED 30th JUNE, 1938

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DEPARTMENT OF PUBLIC HEALTH.

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Part I. THE HEALTH OF THE UNION.

Part II. HEALTH ADMINISTRATION.

DEPARTMENT OF PUBLIC HEALTH.

Report for the Year ended 30th June, 1938.

THE HONOURABLE THE MINISTER OF PUBLIC HEALTH,
PRETORIA.

I have the honour to submit the Report of the Department of Public Health for the year ended 30th June, 1938.

The report is presented in two parts. In Part I an account is given of the health of the population of the Union. In Part II the health administrative machinery of the Union is described.

E. H. CLUVER,
Secretary for Public Health.

Pretoria,
10th January, 1939.

PART I.

THE HEALTH OF THE UNION.

I.—GENERAL INDICES OF HEALTH.

1.—VITAL STATISTICS.

The total population of the Union at 30th June, 1937, as estimated by the Director of Census and Statistics was 9,797,200, consisting of 2,043,700 Europeans and 7,753,500 non-Europeans. The non-European population may be further divided into 6,744,300 Bantu, 224,000 Asiatic and 785,200 Mixed or other Coloured.

The population phenomena of this country are of fundamental importance to its future social development. The social system of the country depends upon a European supremacy, which will be threatened if the European population declines to any extent. That such a decline of a major type, is within the realms of possibility, can be deduced on the analogy of trends in the populations of Europe. The growing proportions of elders in these countries with a diminishing birth rate implies a rapidly approaching state where existing slowly increasing or stationary populations such as those of France, Germany, England, Scandinavia and the Netherlands will rapidly fall off in number.

This phenomenon of a diminishing fertility of European stock is also largely true of South Africa and deserves the earnest consideration of all concerned in the well-being and advancement of the country. Many vital statisticians in America and Europe have drawn attention to such problems and their work should not be neglected by us in South Africa, even though as yet the local birth rate is relatively high. The danger signals are to be seen not merely in the birth rate, which is the sole index noted by many who decry the alarmist prophecies of the population experts, but are to be descerned rather in the altering age constitution providing larger proportions of women in the older age groups of the population. Once these proportions become large the fertility rates tend to decline precipitously, and are then almost past reversing. As this presents a major problem to South Africans it is necessary to emphasise the importance of an intelligent interest in vital statistics. Some knowledge of the European vital statistical events is available, though usually dismissed by all but a few students and experts as of no practical moment. Knowledge of the non-European population trends is, however, negligible; with the existing relationship of European and non-European it is nevertheless extremely important. It is to be hoped therefore that the examination of the proposals of the interdepartmental committee for a vital registration system for non-Europeans will be expedited, and an effort made as early as possible to establish the system.

The Census of May, 1936, is providing much food for thought. The first volume recently issued is of profound importance to all concerned in state questions, to health administrators as much as any. Thus the changing nature of the European population from rural to urban in type has social and health repercussions of direct concern to this Department as to others. Nearly two-thirds of this population is now urban in nature, creating urgent problems of housing, sanitation, and disease control very different from those existing a quarter of a century ago. However, if the population as a whole is considered, then only 31 per cent. is urban dwelling, implying that the vast majority of the Natives is rural dwellers. The Native population of 6½ million has an interesting and important distribution. Approximately 750,000 reside in urban areas and urban locations. Over 2 million—a significant fact—are on European farms, while nearly 3 million occupy Native areas proper. With the bulk of the Native population living under primitive rural conditions extraordinary difficult problems of providing medical and nursing services, of organising sanitary and health supervision are encountered. These are rendered more complex by the facts of distribution of Natives in European and Native areas already referred to.

Table 1 gives a summary of the chief vital statistics of the European population for the last eighteen years.

TABLE 1.—UNION OF SOUTH AFRICA: SUMMARY OF VITAL STATISTICS OF EUROPEAN POPULATION, 1920-1937.

Calendar Year.	European Population (estimated).	Birth Rate per 1,000 of Population.	Death Rate per 1,000 of Population.		Death Rate per 100,000 of Population from				Percentage of Total Deaths, the Cause of which was Medically Certified.	Infantile Mortality Rate (Deaths of Infants under One Year per 1,000 Live Births Registered).	Maternal Mortality Rate (Deaths of Mothers in connection with Pregnancy or Childbirth per 1,000 Live Births Registered).	Survival Rate or Rate of Natural Increase (Excess of Births over Deaths per 1,000 of Population).
			Actual or Crude.	Standardized.*	Diseases of Heart and Circulatory System.	Pneumonia and Bronchitis.	Cancer.	Tuberculosis (all forms).§				
1920.....	1,499,911	28·97	11·09	12·15	95·67†	113·87†	58·94†	46·00†	79·78	90·07	4·10†	17·88
1921.....	1,519,488‡	28·44	10·41	11·43	102·91	136·15	69·09	58·26	80·76	77·09	4·94	18·03
1922.....	1,556,241	27·52	9·48	10·41	97·99	127·24	70·88	47·74	82·96	72·91	5·21	18·04
1923.....	1,579,733	26·70	9·77	10·65	108·50	120·72	78·94	46·46	82·77	74·42	5·22	16·93
1924.....	1,610,774	26·29	9·62	10·44	123·92	123·79	76·36	51·59	84·74	73·73	4·75	16·67
1925.....	1,637,472	26·51	9·39	10·15	128·86	97·04	72·86	52·70	86·45	68 39	5·62	17·12
1926.....	1,676,660‡	26·16	9·59	10·28	127·21	113·44	71·18	53·41	87·76	64·82	4·56	16·57
1927.....	1,708,955	25·95	9·73	10·34	122·76	110·42	73·20	50·50	89·93	70·62	4·80	16·22
1928.....	1,738,937	25·77	10·15	10·69	133·53	127·72	77·52	50·95	89·93	70·49	4·98	15·62
1929.....	1,767,719	26·15	9·51	9.98	127·11	104·04	77·44	45·37	90·19	64·22	5·26	16·64
1930.....	1,797,900	26·44	9·69	10·08	132·33	112·87	82·62	46·76	91·15	66·84	5·26	16·75
1931.....	1,829,300	25·38	9·37	9·56	131·53	103·75	85·55	44·22	90·46	63·07	4·70	16·01
1932.....	1,859,400	24·17	9·97	9·98	137·52	113·75	89·06	42.33	90·84	68·57	5·31	14·20
1933.....	1,890,300	23·55	9·35	9·27	142·52	100·30	95·33	40·68	91·45	61·01	4·81	14·20
1934.....	1,914,700	23·44	9·68	9·55	156·21	94·53	92·39	39·54	91·91	60·79	5·99	13·76
1935.....	,973,700	24·18	10·45	10·28	169·58	131·98	95·76	40·44	92·55	62·81	4·73	13·72
1936.....	2,008,700	24·21	9·57	9·50	154·38	106·19	97·28	34·40	92·88	59·06	5·10	14·64
1937.....	2,043,700	24·90	10·08	**	172·97	113.62	106·57	36·40	93·17	56·57	4·38	14·81

* The rate which would have obtained had the age and sex distribution of the population been the same as that of England and Wales at the 1901 census, the standard usually taken for international comparisons.

† Medically certified deaths only. Rates for subsequent years calculated on total deaths registered.

‡ Actual (per census).

§ Includes Miners' Phthisis combined with Pulmonary Tuberculosis.

** Not yet available.

There have been slight but relatively insignificant rises in the birth and crude death rates for 1937.

The rate of natural increase among Europeans is given in Table 2.

TABLE 2.— SURVIVAL RATE OR RATE OF NATURAL INCREASE AMONG EUROPEANS IN THE UNION, PER 1,000 OF THE POPULATION.

Year.	Birth-rate.	Death-rate.	Natural Increase.
1911	32·2	10·4	21·8
1912	32·2	10·3	21·9
1913	31·7	10·3	21·4
1914	30·2	9·5	20·7
1915	29·3	10·3	19·0
1916	29·3	10·2	19·1
1917	29·0	10·3	18·7
1918	28·6	17·2	11·4
1919	26·9	11·9	15·0
1920	29·0	11·1	17·9
1921	28·4	10·4	18·0
1922	27·5	9·5	18·0
1923	26·7	9·8	16·9
1924	26·3	9·6	16·7
1925	26·5	9·4	17·1
1926	26·2	9·6	16 6
1927	25·9	9·7	16·2
1928	25·8	10·2	15·6
1929	26·1	9·5	16·6
1930	26·4	9·7	16·7
1931	25·4	9·4	16·0
1932	24·2	10·0	14·2
1933	23·5	9·3	14·2
1934	23·4	9·7	13·7
1935	24·2	10·5	13·7
1936	24·2	9·6	14·6
1937	24·9	10·1	14.8

This table shows a slight, but also relatively insignificant, rise in the natural increase rate which was 14·8 for 1937 as against 14·6 for 1936. This rate as demonstrated in Table 3 remains surprisingly high in comparison with countries of a European civilization.

TABLE 3.—COMPARISON OF BIRTH, DEATH AND NATURAL INCREASE RATES AMONG EUROPEANS IN THE UNION WITH OTHER COUNTRIES. AVERAGE RATES FOR THREE-YEARLY PERIODS (BASED ON LATEST AVAILABLE INFORMATION).

	Birth-rate.	Death-rate.	Natural Increase.
Union of South Africa	24·4	10·0	14·4
Holland	20·3	8·6	11·7
Portugal	28·3	16·7	11·6
Canada	20·2	9·5	10·07
Italy	23·0	13·6	9·4
New Zealand	16·4	8·3	8·1
Australia	16·7	9·4	7·3
United States of America	16·9	11·1	5·8
Germany	18·6	11·5	7·1
England and Wales	14·8	11·9	2·9
France	15·4	15·4	—

Causes of Death.—The latest available report from the Office of Census and Statistics is that giving the vital statistics for 1936, which, to repeat, refers to Europeans only in the absence of non-European data. An analysis made in this report for the period 1927-1934 gives the predominant causes of deaths among Europeans as—heart disease, pneumonia, cancer, violence and tuberculosis. The European death rate from heart disease per 100,000 of the population for 1936 was 123·0. If influenzal pneumonias are included pneumonia for 1936 caused numerically more deaths than cancer. The placing of violence as the fourth most important cause of European deaths is arresting, and justifies the wide interest in safety-first education and campaigns.

2.—CHILD MORBIDITY AND MORTALITY.

The infantile mortality rate for European children as shown in Table 4 reveals a further drop to 56·57 per 1,000. This is the lowest rate yet recorded in the Union.

TABLE 4.—EUROPEAN INFANTS: BIRTHS AND DEATHS UNDER ONE YEAR REGISTERED AND INFANTILE MORTALITY RATE, I.E. DEATH RATE PER 1,000 BIRTHS, 1919-1937.

Year.	Cape.			Natal.			Transvaal.			Orange Free State.			Union.		
	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.
1919	16,749	1,351	80·66	2,910	191	65·64	15,338	1,326	86·45	4,727	382	80·81	39,724	3,250	81·81
1920	18,425	1,654	89·77	3,256	235	72·17	16,768	1,576	93·99	4,996	448	89·67	43,445	3,913	90·07
1921	18,062	1,382	76·51	3,370	203	60·24	16,582	1,374	82·86	5,288	379	71·67	43,302	3,338	77·09
1922	18,248	1,294	70·91	3,294	180	54·64	16,370	1,292	78·92	4,920	357	72·56	42,832	3,123	72·91
1923	18,296	1,353	73·95	3,229	197	61·01	15,619	1,261	80·74	5,037	328	65·12	42,181	3,139	74·42
1924	18,730	1,296	69·19	3,410	273	80·06	15,287	1,171	76·60	4,919	382	77·66	42,346	3,122	73·73
1925	18,366	1,343	73·12	3,509	206	58·71	16,348	1,059	64·78	5,188	361	69·58	43,411	2,969	68·39
1926	18,675	1,196	64·04	3,588	189	52·68	16,304	1,186	72·74	5,309	273	51·42	43,876	2,844	64·82
1927	18,537	1,293	69·75	3,435	166	48·32	17,050	1,359	79·71	5,325	314	58·97	44,347	3,132	70·63
1928	18,032	1,240	68·77	3,514	184	52·36	17,949	1,370	76·33	5,318	365	68·63	44,813	3,159	70·49
1929	19,008	1,169	61·50	3,650	177	48·49	18,227	1,342	73·63	5,334	280	52·49	46,219	2,968	64·22
1930	19,468	1,332	68·37	3,641	159	43·65	19,108	1,386	72·54	5,317	300	56·42	47,534	3,177	66·84
1931	19,180	1,182	61·63	3,538	162	45·79	18,733	1,267	67·65	4,975	317	63·72	46,423	2,928	63·07
1932	18,284	1,205	65·90	3,373	204	60·48	18,376	1,402	76·30	4,911	271	55·18	44,944	3,082	68·57
1933	17,931	995	54·49	3,441	166	48·24	18,452	1,266	68·61	4,695	299	63·68	44,519	2,716	61·01
1934	17,642	1,022	57·93	3,310	157	47·43	19,327	1,279	66·18	4,599	270	58·71	44,878	2,728	60·79
1935	18,242	1,016	55·70	3,441	167	48·53	21,109	1,537	72·81	4,925	277	56·24	47,717	2,997	62·81
1936	18,162	980	53·96	3,606	189	52·41	22,192	1,454	65·52	4,670	249	53·32	48,630	2,872	59·06
1937	18,404	1,012	54·99	3,766	175	46·47	23,814	1,439	60·43	4,894	252	51·49	50,878	2,878	56·57

In the Cape Province a very slight rise in the mortality rate is shown; but there has been a big fall in Natal and moderate falls in the Transvaal and the Orange Free State. The Transvaal, however, still records the highest rate and Natal the lowest with 60·43 and 46·47 respectively. There has been an increase in the birth rate from 24·2 for 1936 to 24·9 for 1937.

A comparison of infantile mortality rates is given in Table 5.

TABLE 5.—INFANTILE MORTALITY RATES: EUROPEANS IN THE UNION COMPARED WITH OTHER COUNTRIES. AVERAGE RATES FOR THREE-YEARLY PERIODS (BASED ON LATEST AVAILABLE INFORMATION).

New Zealand	32
Australia	42
Holland	41
England and Wales	58
Union of South Africa	59
Canada	70
France	68
Germany	67
Belgium	84
Italy	100
Lithuania	139
Portugal	147

Figures for the non-European population in the country as a whole are still not available. For the towns they are extremely high. It can be safely assumed that the present campaign in the cause of child welfare is producing results. The results are, however, one-sided because they do not affect the non-European. Throughout the country the same story is told by district surgeons and medical officers of health of the appalling toll of non-European infant lives taken by preventable diseases such as infantile diarrhoea, bronchitis and pneumonia. This is equally true of Native reserves and urban locations. That such dramatic evidence of the neglect of non-European communities living under the control of European local authorities as afforded by high infantile death rates exists is a serious indictment of the apathy of the average European towards these people. The work done by the larger municipal health departments with regard to infant welfare is excellent. It is unsubsidised except for the salaries of qualified health visitors. More and more of the smaller municipalities are now appointing health visitors. Where this has not yet been done a well qualified district nurse combines in her person the posts of local health visitor, district nurse and district midwife. She is not always sufficiently well qualified to undertake all this work, and it is for that reason that the Department has in certain instances had to discourage the opening of maternal and infant welfare clinics. One of the greatest difficulties in small urban areas is to get a local doctor to attend the infant welfare or pre-natal clinics, even for one hour a week. Usually local doctors are helpful; but for various reasons they are not willing to devote a regular time to clinic work, although they are willing to see cases sent from the clinic.

The danger in not having some medical officer attached to a clinic is that a nurse or health visitor may in consequence undertake work which she should not do, or that children who should be receiving medical attention are seen and " treated " at the clinic. This is not the object of an infant welfare clinic, which should be purely advisory and preventive in character.

The National Council for Child Welfare has printed stocks of standardised clinic cards for minor ailments, for infant and maternal welfare, and for dental clinics, and also home visiting and family history cards, clinic registers and midwifery registers. All of these are very useful as standard systems of record keeping throughout the country. The cards have been kept as simple as possible, so that there should be no break in continuity when changes of staff take place.

The Department is making an attempt to standardise the type of work done in these clinics, and to give assistance in the form of practical advice to places embarking on clinic work for the first time, by drawing up plans of (1) a welfare clinic in its simplest and cheapest form and (2) a more elaborate building which will serve the dual purpose of a clinic and a small nursing home with quarters for a resident district nurse.

Non-European infant welfare work is still much neglected and only carried out by the big municipalities and by various charitable and mission organisations. Schemes for giving out free milk or dairy products also do not extend to the non-European child. Those who live beyond infancy in spite of such dietetic neglect do so on the principle of the " survival of the fittest ".

The subject of infant and child health has been somewhat neglected in this country as in others. It is still not generally recognised that many of the defects, physical and mental, so obvious in adolescence and adult life,

have their origins in the earliest years of life. It is almost certainly true that no other period of life will produce such tangible results in prevention as the early years if adequate supervision is undertaken. Dental, eye, ear and postural defects and diseases offer, at these ages, the greatest hope of correction and control. The unfortunate multiplicity of health authorities prevents a continuous, uninterrupted and uniform control being exerted over the individual at birth, as an infant, pre-school child, school child and adolescent. Now that more positive interests are included in a national health programme and a national health department can legitimately look beyond sanitation and environment in securing national health and well-being, infant and child welfare probaby offer the most promising of all fields. It behoves all local health authorities therefore to survey the incidence of child morbidity and mortality within their areas, and to foster any effort likely to reduce these.

3.—Maternal Morbidity and Mortality.

The problem of maternal mortality and morbidity has been a subject of much discussion in certain European countries in recent years. In the United Kingdom especially efforts to provide improved midwifery services are now being made in an attempt to lower yet further the morbidity and mortality rates. Many of those who criticise the apparently high maternal mortality rates place too much reliance on comparisons of published figures. Unless very complete knowledge of the accuracy, completeness and definition of such statistical indices as the maternal mortality rate is available, comparisons of the rates of one country with those of another must be made with great caution. Such differences in definition, quite apart from completeness of returns, render the rates of the two countries incomparable. Hence those critics who have on occasions made comparisons of this country's maternal mortality rate with other countries to the disadvantage of the Union have usually thereby revealed a limited knowledge of the pitfalls of vital statistics.

The South African maternal mortality rate for 1937, as shown in Table 6 was 4·38. This represents an appreciable decrease on the 1936 figure which was 5·10. As any rate undergoes certain fluctuations due to chance, it cannot be claimed that this drop is entirely indicative of improved conditions. As, however, it is the lowest figure for over 10 years it is decidedly encouraging.

Table 6.—Maternal Mortality: Europeans.

Year.	Live Births Registered.	Deaths due to Puerperal Causes.				
		Number.		Rates per 1,000 Live Births.		
		Puerperal Sepsis.	Other Puerperal Causes.	Puerperal Sepsis.	Other Puerperal Causes.	Total Puerperal Mortality.
1926.....	43,876	88	112	2·06	2·50	4·56
1927.....	44,347	101	112	2·28	2·53	4·81
1928.....	44,809	102	121	2·28	2·70	4·98
1929.....	46,219	140	103	3·03	2·23	5·25
1930.....	47,536	119	131	2·50	2·76	5·26
1931.....	46,423	116	102	2·50	2·20	4·70
1932.....	44,944	126	113	2·80	2·51	5·31
1933.....	44,519	113	101	2·54	2·27	4·81
1934.....	44,878	121	148	2·69	3·30	5·99
1935.....	47,717	119	107	2·49	2·24	4·73
1936.....	48,630	116	132	2·39	2·71	5·10
1937.....	50,878	99	124	1·94	2·44	4·38

The Council of Public Health has urged that more statistical information should be collected on the subject of maternal mortality and morbidity with relation to parity, and with this end in view a slight change in the form B.M.D. 2 was instituted requiring that the death certificate should state whether a death of a mother associated with childbirth followed a first birth. The figures so far reported are too small to lead to any useful conclusions as only the following numbers are available:—

Europeans	39
Natives	24
Asiatics	3
Mixed	34

The highest group in all is that of puerperal sepsis. That this particular cause of mortality and morbidity is alarmingly high in the Union is well known. This is confirmed by consulting Table 7.

TABLE 7.—EUROPEAN DEATHS FROM PUERPERAL CAUSES BY AGE GROUPS.

Causes.	1936. All Ages.	15–19.	20–24.	25–29.	30–34.	35–39.	40–44.	45 and Over.	1937. All Ages.	15–19.	20–24.	25–29.	30–34.	35–39.	40–44.	45 and Over.
Post Abortive Sepsis	27	—	6	10	6	4	1	—	21	2	4	2	2	6	4	1
Abortion—not returned as Septic	8	—	2	2	2	1	1	—	8	—	1	2	4	1	—	—
Ectopic Gestation	13	1	1	4	4	3	—	—	7	—	2	1	2	2	—	—
Other Accidents of Pregnancy	3	—	—	1	1	—	1	—	1	—	1	—	—	—	—	—
Puerperal Haemorrhage	30	1	5	9	4	5	5	1	31	2	6	6	8	7	2	—
Puerperal Sepsis	89	9	24	22	15	11	7	1	78	7	16	18	17	12	7	1
Puerperal Albuminuria and Convulsions	32	1	9	8	8	2	4	—	24	3	4	2	6	7	1	1
Other Toxaemias of Pregnancy	5	—	2	1	2	—	—	—	3	1	—	2	—	—	—	—
Puerperal Phlegmasia—Alba Dolens, Embolism and Sudden Death	10	2	—	3	3	2	—	—	15	—	4	4	4	1	1	1
Other Accidents of Childbirth	28	—	8	5	8	5	2	—	29	—	7	5	6	7	3	1
Other or Unspecified conditions of the Puerperal State	2	—	1	—	1	—	—	—	4	1	1	1	1	—	—	—
Puerperal Diseases of the Breast	1	—	—	1	—	—	—	—	2	—	1	—	—	—	1	—
TOTAL	248	14	58	66	54	33	21	2	223	16	47	43	50	43	19	5

It is to be feared that it will remain high so long as a vast proportion of the midwifery work of the country is done by ignorant, dirty and totally untrained women. Even among the European population a great deal of the work is done by untrained women, both in urban and rural areas; among the Natives and Coloured only the merest fraction is done by trained midwives.

The district nursing service has gone a long way towards ameliorating conditions; but it is impossible, at present and will be for some years to come, to dispense entirely with the services of the untrained midwives. There is at present no option but to select the best of the untrained women and use their services, controlling them as much as possible.

When the question of " control " is considered, it assumes vast proportions and presents great difficulties. A law, if it is to be effective, must be reasonably capable of application. It is for this reason that the present regulations regarding persons practising midwifery are only applied to urban areas and to certain rural areas where the local authorities have specially requested to have them applied. Few rural areas have the necessary machinery at hand to enforce the law, but it is to the credit of one rural local authority—Clanwilliam Divisional Council—that it has taken the initiative in having the regulations applied to its area in securing control over this work. It is to be hoped that other rural areas will follow suit, at least in the Cape Province, where a divisional council offers some hope of successful control.

The whole policy of the Public Health Act rests on the basic principle of local control, but it is most disappointing to note that a large number of urban local authorities in matters as important as maternal and child welfare is extremely apathetic. Though powers are available to them to improve conditions too many make no attempt to operate the law, to assist the Department in its local efforts, or to secure progress towards cleanly, hygienic and modern midwifery practice.

The immediate control of persons practising midwifery is vested in the local authority; it is for the local authority to decide who shall be allowed to practise and who shall be prohibited from practising. Too often no interest whatever is taken in this part of the work, and in a few regrettable cases the local authority has refused to take the Department's advice as to who should not be retained on its list.

It is not too much to state that in the carrying out of the intentions and provisions of the regulations regarding midwifery, nursing and maternity homes, many medical practitioners, even some holding positions as part-time medical officers of health, have by obstruction or lack of co-operation not had the true interests of local health at heart. In such important fields as these it is to be expected that medical officers should be strongly in favour of removing undesirable features and achieving reform.

Where a district nursing service is not proving as successful as it should and too many maternity cases are still in the hands of the untrained women, the cause can be sought either in the failure of the district nurse by reason of her personality or the quality of her work to make a success of it, or in opposition of incompetent untrained women, which if not actually encouraged, is at least passively allowed by many local authorities and medical practitioners. More co-operation also is required from medical men in the notification and following up of cases of puerperal sepsis, which are still too often, it is suspected, camouflaged as " influenza " and " pneumonia ". Even when correctly notified, it is still difficult to obtain information as to the conduct of the case.

4. Non-European Health Conditions.

With a national, agricultural and industrial economy based on cheap Native labour the health conditions of the non-European have become of paramount interest to the European. Further, the fact has often been stressed that disease recognises no colour bar, and the European community is continually paying the penalty for tolerating reservoirs of infection among the Bantu population. In spite of such utilitarian arguments widespread apathy or even opposition to efforts to provide for the fundamental public health requirements of the Native are still encountered. It is only in the last year or two that serious thought has been given to the non-European health problem as a whole. This revealed immediately the deplorable lack of knowledge of the Natives' health and social conditions. The incidence of venereal diseases, tuberculosis and malnutrition is only vaguely known. Several investigations are, however, in progress in different parts of the Union. These will go some way towards remedying this defect; if the vital registration system for non-Europeans is launched a most promising and essential step in collecting data will have been taken.

Perhaps the most noteworthy departmental investigation is that being prosecuted by Dr. Dormer attached to the office of the Deputy Chief Health

Officer at Durban. Dr. Dormer initiated surveys to secure an index of the incidence of tuberculosis in the Natal Native. This method of using Native health assistants in the collection of data proved so successful that it has been extended to cover other medical and health fields. The success of the surveys is further proof of the usefulness of the Native health assistants, who have now for many years been used by Dr. Park Ross of this Department in malarial control work.

The scheme eventually adopted may be briefly outlined. A Native malaria assistant was trained in tuberculosis work from the clinical and public health aspects. He was taught to collect, stain and examine sputum for tubercle bacilli. He was then placed for a time in a previously defined area of a Native reserve. There he visited each kraal and made a list of suspected cases of tuberculosis. At the same time he made a survey of the huts, reporting on the type, condition, ventilation, walls and floor; the presence or absence of cattle was enquired into because of the bearing of this on milk, and also the available food supplies of other kinds. After all the individuals in the defined area had been seen and the suspects warned to present themselves for examination at a central point on a given day, Dr. Dormer personally investigated each suspicious case and ascertained if it were one of tuberculosis or not.

The questionnaire used included the following items:—

Kraal Conditions:

Type of hut:

(*a*) Beehive hut.
(*b*) Pondo type hut.
(*c*) Semi-European dwelling.

Condition

(*a*) Satisfactory.
(*b*) Unsatisfactory.

Ventilation:

(*a*) Good.
(*b*) Fair.
(*c*) Poor.
(*d*) Bad.

Cattle:

(*a*) Presence of cattle.
(*b*) Absence of cattle.

Food:

(*a*) Plenty of milk, meat, vegetables and cereals.
(*b*) Plenty of cereals, little meat, milk and vegetables.
(*c*) Practically no milk, meat or vegetables and not sufficient cereals.
(*d*) Lack of food so that people are starving.

Symptoms and Signs:

1. Appearance: A. Looks well; B. Looks ill.
2. Cough.
3. Spit.
4. Wasting.
5. Blood stained sputum.
6. Night sweats.
7. Shortness of breath.
8. Clubbing of fingers.
9. Painful swelling of joints.
10. Painful swelling of glands.
11. Pleurisy.
12. Fever.
13. Lassitude.

A trial of the method was made at the Adam's Mission Reserve on the South Coast of Natal and some 1,600 persons were seen by the Native assistant. Suspect cases of tuberculosis numbered 2 per cent. of this total and the Medical Officer spent some days examining them. He arrived at a figure of ·6 per cent. of active tuberculosis (clinical and bacteriological examiniation only).

The scheme having proved to be a practicable one, a fuller investigation was carried out at the Sacred Heart Mission Station at Umzumbi, situated in the Umzinto Magistracy which has a Native population of 84,000.

The area delimited was a portion of locations 3 and 4, extending from the Sacred Heart Mission to the sea, and containing a population of roughly 4,000 persons.

The results of the survey were as follows:—

Persons seen	2,777
Number of suspect cases of tuberculosis	87
Percentage of population suspect	2·3
Active cases of tuberculosis in this suspect group	25
Percentage of cases with tuberculosis in the population investigated	·66

Of the 25 cases of tuberculosis, 17 cases had a positive sputum, 5 cases were clinically pulmonary tuberculosis but had a negative sputum, 3 cases were extra-pulmonary tuberculosis—neck glands, wrist and neck glands and *Lupus vulgaris*.

One hundred and seventy children attending the Mission School were examined, some boarders and some from the surrounding districts; no case of clinically active tuberculosis was discovered among this number.

It was decided also to do a tuberculin test of 100 of these children whose ages ranged from 5 years to 18 years. A Mantoux test was performed with 1/500 Kochs old tuberculin. Of the 100 cases, 50 per cent. gave positive reactions. One interesting fact arose from the examination of school children: it was discovered that malnourishment was common in day scholars and extremely uncommon in boarders at the school. The boarders were fed by the nuns on typically Native food, but all had a ration of milk and green vegetables, whereas members of the other group often lacked these items in their daily ration.

The next area chosen was the Groutville Mission Reserve, which is a semi-urbanized Native area situated near Stanger. This offered a contrast to the preceding area (Umzumbi) which is an untouched Native area. This reserve (Groutville) has a population of 4,000 persons the majority of whom lives in semi-European types of dwellings. The kraals in this reserve were closer to one another than in a purely Native area, and the persons comprising the kraal population were more overcrowded than was usually found to be the case in the previous survey. The likelihood of tuberculosis spreading from individual to individual was distinctly greater than under purely tribal conditions.

The results obtained were as follows:—

Persons seen	1,013
Cases of tuberculosis	10
Positive sputum	7
Clinical tuberculosis	3
No cases of non-pulmonary tuberculosis were seen	—
Active cases of tuberculosis	·98%

As the method of survey was of so much value in the investigation of tuberculosis, it was decided to increase the scope of the work performed by the Native assistants and to include general public health matters (such as water supply and sanitation), other diseases (such as malaria and enteric fevers, venereal disease, leprosy), and a more intensive study of Native diet. A Native health assistant was, therefore, given a preliminary training in such matters and an investigation of an urbanised Native area, namely Edendale, situated some six miles from the city of Pietermaritzburg was commenced.

The following are the results obtained:—

1. *Number of persons seen*	2,799
2. *Type of hut*—	
(*a*) Beehive hut	1
(*b*) Pondo hut	—
(*c*) Semi-European dwelling	541
3. *Condition of hut*—	
(*a*) Satisfactory	99
(*b*) Unsatisfactory	443
4. *Ventilation*—	
(*a*) Good	5
(*b*) Fair	517
(*c*) Poor (*d*) Bad	20
5. *Cattle*—	
(*a*) Presence of cattle	75
(*b*) Absence of cattle	467

6. *Food*—
   (*a*) Good—plenty of milk, meat, vegetables and cereals 81
   (*b*) Plenty of cereals, little meat, milk and vegetables 352
   (*c*) Practically no milk, meat or vegetables and not sufficient cereals 107
   (*d*) Lack of food so that people are starving ... 2
7. *Enteric* 3
8. *Leprosy* 3
9. *Venereal disease* 22
10. *Bilharzia* 7

All dwellings were of a semi-European type. The condition of the dwellings was unsatisfactory in 80 per cent.

Ventilation was good in 1 per cent., fair in 95 per cent. and bad in 4 per cent.

Most of the population had no regular fresh milk supply; cattle were absent in 86 per cent.

Food was good in only 11 per cent. It was almost completely lacking in protective foodstuffs in 24 per cent.

An intensive dietetic survey was made of the food of 40 Native families living in Edendale. Twenty of these families were in the suspect group (tuberculosis) and 20 were taken as a random sample from the remaining kraals under survey.

The object of the dietetic investigation was—

(1) to ascertain the type and amount of food eaten by the semi-urban native;

(2) to decide whether the presence of tuberculosis in a family, usually of the chief wage earner, caused a significant drop in the standard of living and thus rendered the rest of the family more prone to the disease because of malnutrition;

(3) to ascertain what amounts were expended per week by the average Native family on food;

(4) to train the Native health assistant in dietetic work, as this is a vital factor in the future of the race, and it is felt that the sooner the Native assistants learn the rudiments of dietetics, the sooner they will be in a position to guide their people.

The diets showed a preponderance of carbohydrates and a lack of protective foodstuffs. Only very exceptionally were the Natives found to be eating fruit or raw vegetables.

A fair number of the patients examined, both children and adults, showed signs of deficiency disease. Infants showed definite signs of rickets; both children and adults signs of early scurvy and there was an abnormal number of cases of bronchitis and pneumonia in children.

A comparison of deaths in families containing a case of tuberculosis with families containing no individual with this disease was made. Although the numbers are too small for any dogmatic statement to be made, the figures showed almost 100 per cent. higher rate in families in which there was a case of tuberculosis. If this type of investigation is developed, it may prove the contention previously made, that tuberculosis in Natives tends to spread in the family and burn itself out, rather than infect neighbouring kraals in a wholesale manner.

The impressions gathered as to the major causes of death in Natives in this area were:—

Infants and Children—

(*a*) Gastro-enteritis in infants and young children (gross contamination of food and water).

(*b*) Respiratory infection (non-tuberculous), broncho-pneumonia, bronchitis, etc. (vitamin deficiency).

(*c*) Congenital syphilis.

(*d*) Tuberculosis, usually generalised.

Adults—

(*a*) Respiratory infection (non-tuberculous) (vitamin deficiency).

(*b*) Tuberculosis. A rapidly fatal disease in young adults, and a more chronic one in older people.

(*c*) Gastro-intestinal disease—typhoid, dysentery (due to gross contamination of food and water).

The Department took the very important step during the year of appointing an officer to be stationed at Umtata in the Transkeian Territories. Dr. A. L. Ferguson assumed duty there in March and has been occupied in studying local conditions and organisations. The available data suffers from that inaccuracy and incompleteness which is inevitably associated with primitive populations. There are said to be approximately 1,600 certifiable mental cases, 5,000 blind and 2,220 permanent cripples amongst the 1,306,770 Bantus living in the Transkei. During the year the district surgeons of the area treated over 3,000 syphilitics and notified over 2,000 cases of tuberculosis though obviously neither figure represents the total prevalence of the disease. Typhus and typhoid are notoriously endemic in the region, while enteritis, dysentery and pulmonary conditions play havoc amongst the infant life.

The nutritional surveys and the tuberculosis survey now being conducted are important efforts to gain more accurate information as to health and medical conditions in Native areas. From the reports of district surgeons, medical missionaries and such distinguished investigators as Dr. Fox of the South African Institute for Medical Research it becomes only too evident that the Native—in the Territories, in the urban locations and on European farms—is living a most depressed social and economic life. The outcome of this, unless conditions are counteracted, will be serious for the whole country both economically and in producing diseases threatening the European population. Reservoirs of such diseases as typhus, tuberculosis, leprosy, worm infections and venereal diseases have been and are being produced.

The Cape Coloured Population.—An important contribution to the study of non-European social and health conditions is the report of the Commission of Inquiry regarding the Cape Coloured population of the Union. Outside the Cape Peninsula, the European community is apt to overlook the importance of the Coloured population of the country. This population is important if only on account of its size; it represents nearly 10 per cent. of the total population. It is extremely important too because of the very perplexing social problems associated with it.

The health conditions of these people are described in the report and as they are of considerable moment to the country as a whole, require brief comment here. The absence of reliable vital statistical facts is a serious obstacle in the study of the health of the Coloured as in the case of the Bantu and the institution of a sound system of vital registration is urgently needed.

Generally the Coloured communities, owing to their depressed social and economic circumstances, live in insanitary and overcrowded conditions throughout the Union. Malnutrition is widespread among them. The Commission confirmed this by observing the prevalence of subnormal growth and weight, poor musculature, poor teeth and inability to withstand physical strain. It was also confirmed that the Coloured person possesses a lower resistance to disease than the European. The general Coloured death and infantile mortality rates are higher. As Dr. J. P. de Villiers was the medical Member of this Commission it is interesting to refer to his report as Medical Officer of Health to the Cape Divisional Council, where he is confronted with especially complex problems amongst the Coloured section of the population. His statistics for the year 1937 show the scourge that tuberculosis is amongst the Coloureds. There were 6 deaths of Europeans as compared with 121 deaths of non-Europeans from this disease among populations approximately equal in size. Epidemic diseases too have a higher incidence in the Coloureds. In a very comprehensive scheme to meet these conditions Dr. de Villiers has developed a system of clinics throughout the area. These clinics are especially designed to deal with venereal diseases and tuberculosis, but all conditions are treated in them.

5. Physical Defects.

One of the unfortunate results of the constitutional obstacles to the unification of health services under one control is the responsibility of departments other than the Public Health Department for the provision of medical attendance to paupers, the medical inspection of school children, and the supervision of mental and physical defectives. It is deplorable that the general conception of the functions of a national health department in South Africa is still largely restricted to sanitary improvement and combating infectious disease. In this respect we lag far behind American and European states whose health departments practise a much wider series of functions. Modern public health in them connotes an interest in all physical and mental activities and faculties of man. The modern health administrator in protecting and enhancing the well-being of the community is not merely satisfied with removing nuisances, ensuring pure water and food, and eliminating infectious conditions. He must study the whole environment including housing, town-planning, occupational pursuits the physical

standard with the incidence of physical defects in the population, social and economic conditions and their influence on mental and physical fitness, and any other factor which opposes a complete achievement of health.

The incidence, distribution and causation of physical defects and their inter-relationship with other health problems are of direct interest to the Department of Public Health though they do not form a direct responsibility. Through the efforts of such government officers as Dr. L. van Schalkwyk of the Department of Social Welfare and of various voluntary organisations, information is being collected as to the magnitude of the problems of physical defect in the Union, and certain voluntary and official actions have followed in alleviating the plight of those affected.

Visual Defects, including partial and complete blindness, when scientifically assessed are seen to constitute in any country a most comprehensive and complicated medical and public health problem. This is illustrated by scrutinising the tables of the first groups of Europeans and Coloureds registered under the Blind Persons Act issued by the South African National Council for the Blind. The criteria of blindness laid down in regulations made under the Act are as follows:—

> " A person shall, for the purposes of registration as a blind person under section *two* of the Act, be regarded as blind if his acuity of vision is so restricted that he is unable by reason of such restriction to perform any work for which eyesight is essential. In general a person with visual acuity below 3/60 Snellen may be regarded as blind.
>
> A person with visual acuity of 3/60 but less than 6/60 Snellen (i) may be regarded as blind if the field of vision is reduced to fifty per cent. of the normal field of vision, with the central portion of the field of vision unimpaired, but (ii) should not be regarded as blind if the visual defect is of long standing and is unaccompanied by any material contraction of vision, for example, in cases of congenital nystagmus, albinism, myopia, etc."

On the basis of these criteria particulars are available of 1,000 Europeans and 700 Coloureds registered under the Blind Persons Act. These particulars are of such interest as to justify their presentation.

CAUSES OF BLINDNESS OF 1,000 EUROPEANS AND 700 COLOURED REGISTERED UNDER BLIND PERSONS ACT.

Causes.	Europeans.	Coloureds.
1. Syphilis	150	144
2. Cataract	147	100
3. Congenital defects	134	31
4. Accidental injuries	105	72
5. Retinitis figmentosa	95	6
6. Ophthalmia neonatorum	86	42
7. Glaucoma	71	78
8. Trachoma	58	92
9. Local infection	47	71
10. Infectious diseases	34	16
11. Optic atrophy	26	9
12. Other conditions	47	39
TOTAL	1,000	700

The above table confirms the statement that visual defects constitute an involved problem. Preventable blindness looms large in the table including those cases due to syphilis, injury, ophthalmia neonatorum, infections and certain other conditions. Any programme to prevent and treat blindness is thus seen to be dependent to a large extent on co-ordination with the general health and medical organisation of the country. For instance, to prevent a child being born with syphilis or contracting gonorrhoea during birth great care is necessary to have every syphilitic mother-to-be adequately treated, and to ensure that the newly-born baby's eyes are protected from infection. This emphasises the importance of ante-natal clinic work and of training doctors, nurses and the public in the need of expert care and supervision of mothers and infants. Though venereal diseases loom so large in the causes of blindness early in life, they are also important later in life. The venereal disease organisation, therefore, through its nation-wide system of clinics for both Europeans and non-Europeans is an important unit in preventing eye-disease. Other health organisations intimately concerned in this question are the school medical inspectorates, the district nursing and midwifery service and the district surgeoncy system.

A landmark in the history of care of the blind in the Union is the Blind Persons Act, 1936, which reached the Statute Book largely through the efforts of the National Council for the Blind. This Act is administered not by the Department of Public Health but by the Department of Social Welfare. It provides for the payment of pensions to European and Coloured blind and of grants-in-aid for the promotion of the welfare of such persons.

The Act does not include Natives; this section of the community will receive consideration under a scheme being administered by the Native Affairs Department. This Department recently attempted to estimate the number of blind Natives. From figures furnished by magistrates, Native commissioners and other district officers the number of blind adult Natives in need of assistance in the Union is assessed at approximately 3,000. The scheme sponsored by the Native Affairs Department is intended to provide relief to all blind Natives of and over the age of 18 years.

The holding of the Census in May, 1936, gave an opportunity for the collection of data regarding the incidence of physical and mental defects. A report on " Statistics of Afflicted Persons ", followed in 1937, giving an analysis of the census material (*Union Gazette* No. 16 of 1937). According to these returns, which naturally are not based on the definite criteria governing the registration of persons under the Blind Persons Act, there were in 1936 the following numbers of blind persons:—

Europeans	1,447
Asiatics	79
Coloureds	925

Data concerning Natives (Bantus) were not collected.

Deafness.—The Chief Medical Officer to the Board of Education of England and Wales has in one of his reports stated that of school children afflicted with defects of hearing 56 per cent. were born deaf, 35 per cent. acquired deafness and 9 per cent. were of unknown origin. He pointed out the more important fact that in approximately 40 per cent. of deaf children the condition was attributable to preventable causes such as syphilis, injuries and certain infectious diseases.

The statistical report on afflicted persons mentioned above gives the following records regarding deafness (totally deaf) in the Union:—

Europeans	1,289
Asiatics	21
Coloureds	229

Again no data concerning Natives (Bantus) were collected.

Practically the only other data available are those to be found in the annual reports of the chief medical inspectors of schools for each province. These reports relate to Europeans only, so that we have no indication of ear disabilities among the non-European population. The following table has been compiled from the sources mentioned:—

Year.	Province.	Number of children examined.	Number with ear conditions.
1937	Cape	11,350	139
1935	Natal	13,449	69
1936	Orange Free State	2,563	174
1936	Transvaal	12,238	68

In spite of the inexplicable variations in incidence of ear defects, the table suggests that these conditions are probably sufficiently numerous to constitute a definite problem requiring further investigation. The only intensive study of defective hearing yet undertaken seems to be that done in Pretoria schools through co-operation of the school medical inspectors with the National Council for the Deaf. An audiometer survey of 3,795 Pretoria children showed 239 with some weakness of the hearing sense. These 239 children were carefully examined by a medical officer and it was decided that only 7 suffered sufficiently from the disability to warrant special instruction in lip reading. The Principal of the School for Deaf at Worcester has recorded that of the school children about 50 per cent. are afflicted with deafness after birth, and that fully 80 per cent. of these post-natal cases suffer from conditions which are largely preventable, such as scarlet fever and cerebro-spinal meningitis. He states that of 600 persons examined the majority had acquired the condition before the fifth year of life. These findings are in complete accord with overseas experience and are equally true of other acquired defects such as eye and dental conditions, namely, that by school age the damage is done. The causes of disease and defect of this group must be investigated during infancy and early childhood. The methods of prevention and amelioration must be applied at this stage.

Dental Conditions.—Dental conditions will not be discussed in the present report as they are shortly to receive special attention following the appointment of the Dental Health Officer referred to in another section. The conditions form a problem of some magnitude and complexity with certain extraordinary geographical variations. The high incidence of dental caries in the Langekloof Mountain Valleys and certain other districts of the

south-western Cape is well known. The index given by school medical inspections is distressing, as is seen in the following figures extracted from the annual reports of school medical inspectors for the years indicated:—

Year.	Province.	Numbers examined.	Dental defects.
1937	Cape	11,350	2,476
1935	Natal	13,449	912
1936	Orange Free State	2,563	1,085
1936	Transvaal	12,238	3,737

As in most civilised countries, these figures indicate that dental defects in South Africa, at any rate among Europeans, are serious. The move to improve dental services as reflected in the recent appointment of a Dental Health Officer is therefore an essential and important one.

Cripples.—The Nuffield gift has led to considerable interest in the problem of crippled persons in South Africa. Professor Girdlestone of Oxford was deputed by Lord Nuffield to visit this country and report on the use to which his gift of £100,000 should be put. In one of the memoranda prepared to assist Professor Girdlestone figures of the incidence of crippling amongst children in the Union were presented. These represent only an approximation. They were obtained by general enquiry through child-welfare societies, Afrikaans-speaking women's associations and women's agricultural unions. The figures as at September, 1936, were:—

	Cape.	Natal.	Orange Free State.	Transvaal.	Union.
Europeans	110	26	29	194	359
Non-Europeans	388	28	17	11	444

Bone- and joint-tuberculosis accounted for 332 Native admissions to the Victoria Hospital, Lovedale, for the period 1927-1935. However complete the European figures may be the ratio of non-Europeans to Europeans is indicative of the incompleteness of the non-European returns.

II.—ENVIRONMENTAL CONDITIONS.

6.—Industrial Hygiene.

South Africa leads the world in one section of industrial hygiene, that concerned with deep rock mining in silica strata. The Miners' Phthisis Acts, the Mines and Works Act, and the organisation operating under them, including the Miners' Phthisis Medical Bureau, with the very efficient co-operation of the great gold mining industry have produced revolutionary changes in the health conditions on the Mines including the removal or material reduction of such hazards as tuberculosis, silicosis, heat stroke and injury. This magnificent work needs no discussion as it is universally known, but the time is opportune for some remarks on other aspects of the industrial situation.

Though the commercial world is well aware of the recent changes which have occurred in the industrialisation of the country, the evolution has been so rapid that its full implications have not perhaps been generally recognised.

South Africa, in spite of its vast distances and sparse population, is for the European section already an industrial country. That it is rapidly becoming more so is demonstrated by recent census figures. This natural movement has important implications for future social, health and economic development for which little preparation has as yet been made because probably of a general belief that it will be possible for the rural populations migrating to our towns to return to the countryside. Though the deeper implications of industrialisation or the possibility of delaying or reversing the process are perhaps outside the concern of public health students, yet the existing tendencies require assessing in regard to their influence on communal and personal health. These tendencies are not entirely described by the term " urbanisation ", as particular industries and occupations produce special hazards and health problems. Until the recent financial boom, such industrial health hazards, with the all-important exception of those concerned with gold mining, were few and unimportant;

but now secondary industries and new crafts and trades are rapidly expanding. In them too there are likely to appear specific industrial risks as well as general industrial health problems such as those associated with ventilation, light, sanitation, noise and psychology of workers. The Factories Act gives general powers in connection with most of these matters and the Workmen's Compensation Acts list three scheduled diseases in cyanide rash, lead poisoning and mercury poisoning. These Acts are, however, not administered by this Department. This has resulted in the new aspects of industrial hygiene being somewhat neglected by public health authorities. Thus many processes such as those associated with printing works, motor-car factories, fruit factories and mills have not as yet in this country been examined from the medical point of view. The probable existence of many such problems is, however, realised by this Department which will initiate investigations in this field as soon as circumstances allow.

During the year six cases of lead poisoning were reported, one in an employee of a battery factory and the other five in employees of a motor assembly plant. Cases of trade dermatitis are known to occur in motor assembly plants and factories handling fruit and citrus, but no reliable data are yet available. From the above discussion it will be evident that these few cases cannot be the sum total of industrial disease appearing in the country. There are probably many conditions of a frank clinical nature, which if studied by industrial hygienists could be prevented; and there are probably also less specific conditions due to an industrial environment, the true aetiological origins of which are not detected.

Though industrial hygiene has yet to come into its own in this country, the activities of the South African Railways and Harbours Administration in this field are important. The Assistant Health Officer, Dr. Booker, in charge of the staff concerned has given much attention to the sanitary conditions and general hygiene of railway workshops. These are regularly inspected and during the last year certain specific industrial hazards were investigated, such as dust hazards in certain tool shops and grain elevators, dust and fume hazards to which welders are exposed in mechanical shops and a case of arsenical poisoning at one of the " sleepers " depôts. The depôts are also being investigated with a view to improving lighting, ventilation, general sanitation, provision of washing accommodation and reduction of accidents.

7.—Sanitary and Health Conditions of Rural Areas.

The Union of South Africa has many resemblances to the United States of America in its public health conditions. Both are vast countries with the non-industrialised areas only sparsely populated, and the country towns generally suffering from many sanitary defects. In both it is in rural communities where the absence of hygienic standards is most evident, especially so, in this country, in the vast Native areas. The Bantu section of the population which forms approximately 80 per cent. of the whole is largely the victim of circumstances following its contact with modern civilisation. Factors of disease, ignorance, poverty, and social disintegration, are involved in the existence of poor sanitary and health conditions in the Native communities, whether in the rural Native reserves or in the urban locations. Rural conditions have received some attention during the past year. They continue to present a most thorny problem.

In the Cape, inspections of several of the smaller country towns and districts were undertaken. The conditions found in that province differ considerably but almost invariably have this in common that they are unsatisfactory. In many cases there is a complete absence of the essential public health requirements. Water supplies which are above suspicion are the exception even in the country town, while in the real rural areas the water used is frequently contaminated. The housing of the majority of the Coloured people and also that of some of the Europeans is extremely poor, while sanitary services are frequently grossly inadequate and in many cases altogether absent. Poverty is rife in most rural areas; this reacts very unfavourably on living conditions and especially on diet with consequent deterioration in general health. This in turn exposes the communities to the ravages of diseases of various kinds and especially to tuberculosis. Public health recommendations involving additional expenditure are generally not well received. Admittedly the rate-paying power of many of these small towns and villages in the Cape is low. Expenditure is, however, sometimes incurred or approval is sought for the raising of loans for such amenities as electric light and the improvement of streets when essential public health services are inadequate or altogether lacking. The fault does not always lie with the members of the municipal council or village management board. It is sometimes the less enlightened ratepayers who refuse to sanction expenditure on essential services although this may be within the financial resources of the local authority. Only a gradual process of education will overcome this ignorant attitude.

In the majority of the smaller Cape urban local authorities the water supplies are unsafe. In many cases the source of the supply is liable to pollution from human sources either through people actually living on the catchment area, sometimes without sanitation, or from springs, which are exposed to pollution from human excrement. In other cases the water, although pure at its source, is later exposed to contamination. Sometimes water is led in open furrows through places such as farm lands frequented by both human beings and animals before entering the service reservoir. In the worst cases drinking water is led in open furrows running along the sides of the streets and constantly exposed to gross pollution of every sort by man and animals. In the villages where this occurs many of the European inhabitants have their own boreholes or depend largely on rain water tanks; but the Coloureds, poorer Europeans and irresponsible individuals such as children drink water direct from the furrow. In the irrigated areas along the lower Orange River there are thousands of people, both European and Coloured, whose only source of drinking water is the dilute mud of the river or of the furrows leading out of it. As these people in many cases have little or no sanitary provision the water is highly polluted; this is especially the case during droughts when the flow is low and the pollution is not diluted to the same extent as in wet periods. The fact that the water is more highly contaminated at such times is well recognised by these people who express it by saying that the water is dangerous when it is clear, i.e. when the flow is low and the silt has had time to settle. Many of them boil it at these times. The water is, of course, grossly polluted and unsafe for drinking at all times unless previously boiled.

Where a catchment area or an open furrow is accessible to human beings and where along such furrow there is suitable cover, it is common practice for irresponsible persons to defaecate close to the furrow. It is then only necessary for a shower of rain to wash the excreta into the furrow for the water to become contaminated. When one considers that typhoid carriers are not uncommon among our non-European population the chances of exposed water supplies becoming dangerously contaminated is evident. Where no purification is carried out the population is constantly exposed to the risk of a widespread epidemic. Such water-borne epidemics occur from time to time and one probably caused in the manner indicated occurred in a Karroo village early this year. It is not only typhoid fever which is carried in this way; acute outbreaks of gastro-enteritis are frequently attributable to contaminated water supplies.

Housing conditions in the smaller towns and villages vary greatly. In most of our urban communities the bulk of the European population is reasonably well housed, but the conditions under which the majority of the Coloured people and the poorer Europeans live are deplorable especially in the rural areas. In some of the older towns of the Western Province, Coloured people are found living in rooms and houses in communal yards in the town itself. These places are generally very old and insanitary and often badly overcrowded.

Overcrowding is rife in the non-European locations in such areas. This is especially marked in the poorer dwellings. Such overcrowding leads to moral and physical degeneration and favours the spread of infectious diseases. There is seldom any attempt to demarcate the various plots of ground from each other and as sanitation and refuse disposal is often conspicuous by its absence the ground between the shacks is sometimes indescribably filthy. It is impossible under such circumstances to allocate the responsibility for this to any particular individual. It is remarkable how frequently essential services are found to be entirely lacking in these locations. The town or village may have a satisfactory water supply and an adequate nightsoil and refuse removal system, but these are often not extended to the location housing its non-European population. The water supply of the latter is often obtained from an entirely different and altogether unsatisfactory source. Sanitation of locations at its best usually consists of a few communal latrines which in many cases are so far removed from some of the houses that they are frequently not made use of by children or even by adults at night. The condition of the ground surrounding the huts makes this only too evident. Supervision of the location is generally so poor that the ground surrounding the communal latrines is freely covered with excreta. In many cases no sanitation whatever is provided.

In general it may be said that there is a definite shortage of satisfactory housing both for non-Europeans and the poorer class of Europeans throughout country districts in the Cape. A number of local authorities have borrowed money under the Housing Act for individual economic housing loans to Europeans. Although this is providing for a definite demand the greatest need is for subeconomic housing of non-Europeans.

The sanitary arrangements in many places are very primitive, and favours the spread of bowel infections. Where pit or pail privies are

provided they are generally badly constructed and the contents are freely exposed to flies. Owing to bad housing conditions and overcrowding in the locations food is nearly always exposed. As flies are numerous the danger of the spread of bowel infections by this means is very great. This danger is reflected in the high incidence of bowel infections. Summer diarrhoea is common among the children in the locations and fly-borne outbreaks of typhoid occur occasionally. One such outbreak took place in the location at Rivier Zonder End last December. Among the Europeans in the villages themselves conditions are considerably better, but even there the danger of the spread of bowel infections from pail contents by the medium of flies is often very great, as little or no attempt is made at fly-proofing the pails.

The method of disposal of nightsoil in most cases leaves a great deal to be desired. Water supplies may be polluted by pathogenic bacteria such as typhoid bacilli. Unless the material is satisfactorily buried the ova of tape-worms may be ingested by cattle and pigs, causing " measles ", which when the meat is subsequently eaten undercooked by humans complete the life cycle. It has been shown that the ova of round worms can live in the soil for a considerable time. There is a high incidence of worm infestation in those areas, such as the George and Knysna Districts where sanitation has been backward and where, in some places, burial of nightsoil on small plots was practised until recently and is still done in the peri-urban areas round Knysna. The method of disposal by a great many local authorities is to empty the nightsoil into an open pit on the commonage while in certain instances the nightsoil wagon is simply emptied on to the veld. These methods are dangerous as flies bred out in this material may easily enter the town either on vehicles or animals or by other means and may thus spread disease. The shallow trenching method as recommended by this Department is the most satisfactory means of disposal of pail contents. It is, however, a little more costly than the other methods and probably for this reason it is the exception rather than the rule to find that it is properly carried out.

With few exceptions all the larger country towns have municipal abattoirs. These vary considerably in suitability, from the new and up-to-date abattoir at De Aar to the somewhat primitive buildings in some of the smaller centres. They are, however, in all cases a great deal more hygienic than the primitive and insanitary private slaughter poles encountered in the smaller villages. Apart from the filthy conditions under which meat is handled at the private slaughter poles, there is, of course, no provision for meat inspection and the elimination of unsound or diseased carcasses which is one of the principal functions of a municipal abattoir. Butchers' shops also vary tremendously in different towns. While in general the better shops are to be found in the larger places, this is not always the case. At Knysna, for instance, the butchers' shops are better than in many much bigger towns. A great deal depends on the efficiency of the sanitary inspector and even more depends on the amount of backing which he gets from his council.

Dairying conditions are in general very primitive. Here and there, as at Caledon, the Strand and at George, are to be found one large, properly equipped and well run dairy and these fortunately generally capture the bulk of the trade. In the great majority of cases, however, structural conditions are very poor. Dairies are frequently conducted in back yards often in the centre of the town. The cows are housed in old and dilapidated stables usually with rough floors which are badly drained. Fortunately in the majority of cases the cow stables are open and freely exposed to the sun; but occasionally one finds cows housed in old cobbled stables which are badly lighted and ventilated and which were obviously originally intended for horses. One saving factor about rural dairying conditions in certain places is that a considerable proportion of dairymen keeps its animals outside at night. This should be encouraged wherever possible. Not only is it healthier for the animals, but it also keeps both the cows and the sheds cleaner. Conducting a dairy in the centre of a town is incompatible with modern standards of hygiene and all local authorities should endeavour as far as possible to move their dairies to the outskirts. Where a business has been long established this is obviously a difficulty; but where definite nuisance arises drastic action is necessary. The conduct of the dairy and the handling of the utensils and the milk itself depend almost entirely on the individual dairyman. Sterilization of utensils is hardly ever carried out and milk coolers are seldom used. Both these factors affect the bacterial content of milk very markedly and they should be insisted upon. Standard milk bottles are in general use except in the most backward places. The main difficulty is that in most places instead of a few properly equipped dairies there is a large number of small ones which are generally run as a sideline. The business done by these small dairies is usually too limited to warrant expenditure on proper equipment.

The supervision of other foodstuffs such as those in bakeries, general dealers' stores and fruit and vegetable shops and the control of mineral water factories varies very considerably in the different towns depending entirely

on the efficiency of the sanitary inspector. Adequate control can only be expected where a properly trained and efficient man is employed. Fruit and vegetable shops and the storerooms of general dealers are frequently heavily infested with rodents. Small mineral water factories are often very primitive in structure and sometimes a danger to the public health.

In many of the country towns animals are kept throughout the residential areas. The chief animals found are cows, while in the north-western Cape goats are common, especially at Britstown. Apart from the cows kept for dairying purposes there is a large number of private cow-keepers in most of the smaller towns. As these people are not registered dairymen the control of their premises is rendered very difficult. Owing to the advent of the motor-car, horses are fortunately rapidly becoming less common and frequently only one or two horse stables are found in a whole village. Where horses or mules are found they are generally stabled in old, dark cobbled stables deep in manure and breeding large numbers of flies. Other animals frequently found are pigs and these are almost invariably kept under most insanitary conditions. The prevalence of flies in any place is usually proportionate to the number of animals kept, for wherever animals are found there is bound to be material suitable for fly breeding.

Where animals cannot be eliminated from a town every effort should be made to see that the conditions under which they are kept are satisfactory. The difficulty is that so many people keep animals and the individual councillors shrink from offending their friends and relations. The result is that the disposal of manure is generally very irregular and unsatisfactory. The people in these small towns have always been used to allow the manure to accumulate for use in their gardens. Any suggestion that this is offensive or causes fly breeding is liable to be taken as a personal affront. Unless the sanitary inspector gets the whole-hearted support of his council in this matter he is powerless to stop fly breeding which often occurs on such a scale as to be a definite menace to the health of the community.

Many of our smaller towns are rodent infested. In most of the older towns in the Cape Province there are numerous old buildings which were constructed without any regard to rodent proofing and as these are in many cases in a bad state of repair they are often heavily infested. Most local authorities insist upon new food stores being made rodent proof as required by the regulations; but as the proportion of new stores is very small this has little effect on the rodent population. Only a very small number of local authorities carries out reasonably effective anti-rodent measures. The cost of this work is not excessive, but the majority of sanitary inspectors has not the necessary training and experience to do it effectively, nor to see that property owners keep their premises free from rodents. All local authorities should endeavour as far as possible to have their inspectors properly trained for this work. The danger of the spread of rodent plague to a badly infested village cannot be too greatly stressed.

Washing of clothes is generally carried out under primitive conditions where proper cleanliness is impossible. Pollution of streams and furrows is also often caused in this way. Furthermore, the clothes, after washing, are usually taken for ironing to the washerwoman's house, where they are kept on the bed or floor. The whole process is unhygienic and the possibility of vermin, such as bugs or even lice, being conveyed from the location to the village must be borne in mind. Some of the larger country towns, notably the Strand, De Aar and Somerset East have built satisfactory wash houses and at the two latter places suitable provision is made for ironing and storage of clothes. At Somerset East suitable regulations regarding washing and ironing are enforced. These municipalities are, however, the exception and more attention should be given to this matter.

The control of infectious diseases is delegated under the Public Health Act to the various local authorities; yet very few of them have made any proper provision for the accommodation and isolation of infectious cases. Many rural towns have lazarettos in their locations. These are generally intended for the isolation of cases of venereal disease and sometimes tuberculosis among Coloured people. In a few instances these lazarettos serve a useful purpose. More often they are neglected and in most cases totally unsuited to the purpose for which they are intended. These diseases are much better treated in blocks built in close proximity to, and run in conjunction with, an ordinary infectious diseases hospital. It is, of course, not necessary or possible for every small local authority to have its own infectious diseases hospital; but by suitable combinations of local authorities in different areas it should be possible to establish these hospitals at centrally situated points. In this way much of the difficulty which now constantly arises in connection with the hospitalization of infectious diseases in the country would be obviated.

Clinics for the treatment of venereal disease are held by most district surgeons, generally in their own surgeries. No provision is, however, usually made for tuberculosis clinics in the rural areas, and these are badly needed in many of the larger country towns.

A large number of towns has recently installed or is considering the installation of electric light. While electric light is a desirable amenity in the country, it should be remembered that its introduction is much less urgently required than the essential health services, such as a pure water supply and satisfactory sanitation. Yet many towns in which sanitation leaves much to be desired have installed electricity plants. No local authority should contemplate embarking on an electric light scheme until its essential health services are established on a satisfactory basis.

Many of the smaller local authorities still employ uncertificated sanitary inspectors. Some of these men are temperamentally suited to the work, keen, energetic and within their limits, efficient. In some cases their long experience and intimate knowledge of local conditions have made them valuable employees. They are, however, always at a certain disadvantage. A sanitary inspector in a small town has a difficult task in that if he is conscientious there are always people who take offence and consider that they are being persecuted or unfairly treated. Councillors are often offenders against the public health regulations and a sanitary inspector who is keen is liable to fall foul of his employers. Aqualified inspector is protected under the Public Health Act and is able to carry out his duties without fear or favour. An unqualified man, however, although legally enjoying the same protection does not usually feel so secure and is therefore often timid and afraid to take any drastic action for fear of losing his position. Although some of the unqualified sanitary inspectors are competent, others are weak, ignorant or in other ways totally unsuited for the work. It is not always realized by local authorities that the salary of a certificated sanitary inspector approved by the Minister is part-refundable to the extent of one-third. One reason frequently given for the employment of unqualified men is that they are useful in other respects, such as the supervision of road gangs, as commonage rangers, etc., which fall outside the scope of a sanitary inspector's duties. The employment of an unqualified man is, however, usually detrimental to public health condtions.

This general account of health matters in rural areas is, as already mentioned, the result of a large number of inspections carried out during the year in the Cape. It is, however, equally descriptive of the other provinces. Certain other aspects of rural health not emerging from the Cape reports should be mentioned to complete the picture.

The conditions under which Natives live on many farms was referred to in the last Annual Report of the Department. It is now possible to describe certain areas which are almost certainly representative of many districts throughout the Union. In the areas which were inspected it was found that the majority of Natives was housed under extremely insanitary and overcrowded conditions. The huts are frequently on most unsuitable sites, remote from water supplies and are rarely provided with any latrines. The result is that domestic water from heavily polluted rivers, spruits and dams is used. The pollution results from promiscuous defaecation with consequent spreading of such preventable diseases as infantile and summer diarrohoea, typhoid fever, dysentery, gastro-enteritis, and worm infections of which measles in cattle and pigs is important. Overcrowding is common in such huts—usually 8 to 10 persons congregating in an ill-ventilated ram-shackle hovel. It is little wonder that typhus, pulmonary complaints and plague frequently attack such communities. Further reference to these conditions is made in the section on Native health.

In the Transkeian Territories, where the Native lives his own tribal life, sanitary conditions are extremely primitive. The huts, ill-ventilated and lighted, are made for the most part of semi-dried sods with thatch roof. The floor is of earth and no chimney is provided. As the result of inadequate ventilation and overcrowding air-borne diseases such as pneumonia and tuberculosis are easily contracted. Latrines do not exist; defaecation takes place around the kraals and animals such as pigs and dogs are the only scavenging system in existence. Water supplies too are only now receiving attention and measures are being taken to protect as many as possible from pollution.

In Natal the housing conditions of non-Europeans in rural areas where sugar-planting and other industries exist are kept under supervision by the staff attached to the Durban office of the Department. Since 1935 it has been possible with the additional staff provided for anti-malarial control in Natal to supervise industrial housing for non-Europeans more carefully. Non-European housing improvement and malaria control are inseparably linked in Natal. Departmental field inspectors in charge of anti-malaria measures handle non-European housing at the same time, but are able to give this work particular attention during the winter. This ensures control of both malaria and housing activities all the year round, and supervision of siting and structure of buildings which are extremely important factors in the control of the house-haunting *A. gambiae* and *A. funestus*.

Building materials now almost universally used for non-European industrial housing in Natal are burnt brick, cement brick, or hollow block and concrete. Since September, 1936, building in wood and iron has required special permission from the Minister other than in the case of temporary buildings as defined by Regulations. The nature of the accommodation to be provided falls into three classes—single quarters (Natives mostly), married quarters (Indians mostly) and cottages (Sirdars and Coloured artisans). Single quarters are of the compound type; married quarters usually consist of one room and a kitchen, but in many instances, Indians with larger families are provided with two rooms and a kitchen. Married quarters may be built in rows of 10-12, with attached or detached kitchens, or as single or semi-detached cottages. Sirdars' cottages usually consist of at least four rooms.

The cost of non-European industrial housing varies with the type of labour. Native labour is the cheapest to house, since the numbers of Native dependants for whom provision has to be made are very small, the labourer usually being single. The average cost would appear to be approximately £7. 10s. per boy. Sirdar housing, though fairly costly to the individual owner, is not a heavy burden on industry; cottages cost between £100 and £150. The housing of Indians is the most costly to both the sugar and wattle industries. The majority of these Indians is married: where they are not, they continue to live with their parents. Indians notoriously have large families and large numbers of dependants, as shown in the tables below. The present cost of housing them varies from £25 to £35 per family. This means that the industries concerned could house, for the same money, at least four times as many adult Native labourers as Indians. Of whatever advantage the Indian labourer may be, his housing costs at least four times as much as does the housing of similar Native labour. This was early realised. In consequence the majority of large employers of labour (particularly of Indian labour) has committed itself to building programmes extending over periods of five years. In the case of one large company, this five-year building programme is completed, and it is of considerable interest to note the details. These are given below:—

Building Period.	New Houses.	Renovated Houses.	Native Labourers.	Indian Labourers.	Dependents.	Total Costs.
1933–38.....	1,177	100	472	1,085	5,262	£41,959

It should be borne in mind that housing includes the provision of safe and sufficient domestic water supplies and of proper, adequate and sanitary latrine accommodation. In the case of the above estate, married and single labourers are housed at an average cost of £35 per set of quarters. This and all other similar housing of non-Europeans in rural areas have been built entirely by private enterprise, and without any financial assistance whatsoever from the Government. This is a matter for very considerable congratulation to all concerned.

The progress made is summarized in the following tables:—

Number Estates systematically inspected and reported upon in detail	403
Number Estates visited at Owner's request	91
Number of coal mines inspected	4
TOTAL	498

Year.	Estates Inspected.	Estates Visited.	Plans Approved.	Notices Served.	Prosecutions.
1935–38.....	403	91	320 Estates	16	3

New Houses built.	Houses Improved.	Houses Demolished.	Persons affected.		Dependents.	Total.
			Natives.	Indians.		
3,364	990	1,942	11,654	2,730	11,586	25,970

The total number of quarters now fit for human habitatoin is 4,354, housing approximately 26,000 persons.

Reasonably safe water supplies are provided on 349 estates, including 30 treated (filtered and/or chlorinated) supplies.

Unprotected or not reasonably safe supplies number 145. Number of latrines provided is 911 of which the majority is pit privies of patterns approved by the Department. A number of estates is going in for water borne sewerage. A few still have the pail system. More than half of the above number of latrines were laid down during the period 1937-38.

In the last Annual Report the difficulties of dealing with semi-urbanised communities, such as those in the peri-urban Reef areas, Pretoria, Bloemfontein, Durban, Maritzburg, Hennenman and the Natal coalfields were mentioned. The difficulties are partly lack of legislation and partly lack of local health machinery. The former difficulty it was hoped to overcome during the last year by the promulgation of rural sanitary regulations. Such regulations were intended to be an alternative and more expeditious means of dealing with nuisances than those provided by the Public Health Acts. They were also visualised as being preventive as opposed to the present nuisance legislation which only operates after the causes of nuisances have come into being. Unfortunately the drafting of suitable sanitary regulations has given this Department considerable trouble. The conditions to be met are so complex and varied, and so many diverse interests are involved that the regulations are still the subject of much negotiation and discussion. However, it is expected that they will soon be promulgated.

An extremely important development in connection with the problem of semi-urbanised areas is the decision of the Government to appoint a committee to investigate the position.

The reports of the Feetham Commission on the Johannesburg and Germiston boundaries are extremely important documents. The recommendations made therein are under consideration by the Provincial Administration, which has implemented many of them already. The extensions of the boundaries of both Municipalities to include many of the adjacent townships, brickfields and other haphazard communities provide an efficient solution of the problem of sanitation in these areas. Such areas have for years been a menace by reason of the increasing degree of casual disposal of waste products, the neglect of housing supervision, the lack of control over dairies and butcheries and other unhealthy and insanitary features. The areas of the Reef not brought within the discussion of the Feetham Commission will no doubt receive the attention of the new Committee.

8.—The Solar Radiation Survey.

The sunlight survey made possible by the munificence of Dr. Hans Merensky was reported on in June by an interdepartmental committee presided over by Sir Spencer Lister of the South African Institute for Medical Research; it included members of the Department of Agriculture, the University of the Witwatersrand and this Department. This committee strongly urged the continuation of the survey because of the important bearing of the findings on human health and agricultural problems. The Committee had before it a report by Miss Riemerschmid of the Jena Institute of Physical Therapeutics under whose direction the work had been carried out.

The work done during the year included a survey of the total amount of sun and sky radiation, its intensity, duration and quality, at six stations of the Union, and a survey of the climatic conditions obtained by measuring the " cooling temperature " of the Union. The observations were carried out by self-recording instruments at six stations:—

1. Johannesburg (Rietfontein Hospital).
2. Bloemfontein (Tempe Isolation Hospital).
3. Nelspoort Sanatorium.
4. Capetown (Royal Observatory).
5. Port Elizabeth.
6. Durban (Aerodrome).

When the data have been analysed it will be possible to compare the intensity of the solar radiation in various parts of the country with, for instance, European conditions. The report will give the total amount of light intensity (impinging on a horizontal surface) per hour, per day, per month and per annum for the six above-mentioned stations. It must be realised, however, that these results are certainly influenced by the abnormalities of the meteorological conditions of the particular year, for instance, by abnormally early rains in the Cape in March, 1938, or an exceptional amount of cloudiness during December, 1937, in Johannesburg; hence the importance of continued observations for many years.

The report will make it possible to compare the light conditions of the various places at certain hours of the day, which is of importance for all questions concerning exposure to solar radiation at a given time. The amount

of light intensity on cloudless days in various parts of the Union will be compared. The monthly average intensity will show the seasonal change and the influence of the rainy seasons for the various places. Apart from the readings of the light intensity, the " cooling temperature " for each hour of each day will give some idea of the influence which the climate has on human beings, plants and animals.

In addition to these observations the amount of red, yellow, visible and ultra-violet rays in our sunlight was measured at—

(1) Stellenbosch, Physics Department of the University (all year round);
(2) Durban University College, since October, 1937;
(3) Rietfontein Hospital, Union Observatory, Johannesburg, since October, 1937;
(4) Nelspoort Sanatorium, since March, 1938.
(5) Bloemfontein, Boyden Station Observatory, since December, 1937.
(6) Onderstepoort Laboratories, since November, 1937.

The readings of the direct sunlight will be of value for detailed investigations on the South African climate. The content of red, yellow, visible and ultra-violet rays, worked out in percentage of the total intensity, will give information about the influence of humidity, smoke and industrial disturbances in the atmosphere.

In addition to the survey of the solar radiation and the " cooling temperature " throughout the country, the study of problems connected with the solar radiation has been taken up in collaboration with various institutions in the Union. The results of these will be of particular practical value.

Mr. S. J. Richards, B.Sc.(Hons.), who has been awarded an Erleigh Scholarship and is working under the supervision of Professor Paine, Department of Physics of the Witwatersrand University, is taking measurements of the extreme ultra-violet solar radiation in Johannesburg. These readings are taken on clear days in order to study the relations between the intensities of the ultra-violet and the total solar radiation, and their dependence on meteorological conditions and seasonal changes.

The results which may be expected from these observations will give some information on the content of ultra-violet rays in the radiation received. These observations are of particular interest from a medical and physiological point of view. The instrument used reacts only to rays which are known to cause biological reactions such, for instance, as the changing of ergosterol in the human skin into vitamin D.

Intensity of the ultra-violet solar radiation was measured for the control of solarium treatment, at the Hope Convalescent Home for Children and the Transvaal Memorial Hospital for Children. The readings were taken at the time when the children were exposed to solar radiation. Concurrently clinical observations were taken in an effort to establish the optimum dosage for each type of case, particularly in the early stage of sun treatment. As yet only comparatively few cases have been treated. Hence it is impossible to forecast results either with regard to dosage or beneficial influence on the patients. But a full record of a large number of cases, observed as far as possible under controlled conditions, will make a valuable contribution to the determination of the right dosage of solar radiation. Only the knowledge of the exact amount of insolation makes it possible to use the vast experiences of solar treatment in Davos and other places and to compare results.

Measurements of the temperature of the skin after exposure to solar radiation would be an important addition to the study of the effects of ultra-violet rays on the human skin, but the taking of such readings has not yet been possible.

Miss Margaret Mathison, B.Sc.(Hons.), of the Witwatersrand University is taking readings of the total amount of sun and sky radiation in the open and under a grass cover. At the same time the temperature of the soil at different depths is measured to study the influence of a grass cover on soil temperature.

Information will thus be provided regarding the light intensities under grass cover of different regions. Such information has direct biological value in respect of plant competition, germination and establishment of regeneration of grasses and other constituent plants of the veld, and the ecology of certain smaller animals associated with the plants. Information of much value in respect of photosynthetic and growth problems presented by certain important veld grasses will also become available.

The interdepartmental committee came to the unanimous conclusion that these various observations had a direct bearing upon national problems, connected with human health, public welfare, animal husbandry, veterinary service, agriculture and forestry. It felt that too little was known of the

environment in which human, animal and plant life has to function in South Africa. While other factors have been investigated to some extent, little or no study has been made of a master factor—radiation in its various forms.

The important bearing of solar radiation on human physiology is generally recognised. It has important effects on the development of the skeleton, teeth and other tissues. Insufficiency of rays from the violet end of the sun's spectrum interferes with and retards growth of such tissues. On the other hand there is accumulating evidence that excess may have very damaging effects, promoting early senility and even malignant growths. There is statistical evidence suggesting that Nordic types will tend to die out in countries excessively insolated unless the population is specially protected.

These matters cannot be scientifically investigated unless detailed analysis of the solar factors is made. Qualitative and quantitative examinations of the radiation reaching the surface of South Africa are necessary before this can be connected up with the physiological factors referred to.

Exact knowledge of intensities of various wave-lengths is also needed before these can be applied therapeutically, e.g. in the treatment of tuberculosis.

The bactericidal value of rays at the violet end of the sun's spectrum also cannot be satisfactorily applied without more exact quantitative and qualitative knowledge of these radiations.

Further this survey has a very important bearing on the investigations being carried out regarding veld rodent plague. Firstly the climate in the burrows of rodents controls the survival and rate of breeding of the fleas responsible for the transmission of plague. The results of studies on soil temperature and its relation to radiation and the conditions near and at the surface of the soil will be of interest in relation to the burrow climate. It is possible that a direct relation may be shown to exist. Secondly the effect of climate upon pasture and vegetation growth in general is of direct interest, for rodents depend upon grasses and other plants for their food supply. Factors influencing the food supply affect the rate of increase of rodent populations, a subject of extreme importance in the epidemiology of plague.

It is to be pointed out that hitherto no attempt had been made in South Africa except for Osborn's work on " Ultra-violet Radiation " and the work of Wood on " Sunlight Intensities " to undertake a systematic and continuous study of the quality and intensity of our sunlight. This was the more surprising because it has long been known that this country is subjected throughout the year to a degree of solar insolation far in excess of anything experienced in most of the other civilised countries. Apart from its influence on plant life in its relation to nutrition of animals, the direct effect of sunlight upon the animal had to be considered. By far the greater number of animals in South Africa is continually exposed to the sun on the open veld. The effects of this exposure, beneficial or harmful, remain totally unknown, except that in certain cases degeneration and disease have made their appearance in animals in certain regions in South Africa, and it is believed that some of these defects may be attributed to sunlight. Such a disease is that known as " geeldikkop " of sheep. This is sometimes widespread in the Karroo and is responsible for very severe losses. Preliminary results obtained by the investigations of Miss Riemerschmid have shown that solar radiation in the Karroo is more intense than in any of the other localities investigated. What relation variation in radiation and its intensity may bear to the periodic outbreaks of the disease can only be ascertained by a continued series of observations. Only by a close study of the sunlight and other meteorological data could one hope to arrive at a clearer understanding of the conditions responsible for the appearance of the disease.

What influence sunlight exerts on control of body temperature, especially in the case of an animal, such as the Merino sheep clothed with a thick pack of wool, is not known, and its relation to such vital activities as growth, metabolism, sexual functions, presents problems urgently in need of investigation. The problem of degeneration occurring in the well-planned experiments carried out at Armoedsvlakte for a period of 17 years, in various breeds may be referred to. The Armoedsvlakte environment has brought about, in certain imported breeds, degeneration of various degrees, whereas the indigenous breeds like the Afrikander are not affected. Studies at Armoedsvlakte aim at analysing the prevailing environment complex and to ascertain the influence of the constituent factors upon the growth, development, production and reproduction of breeds, both of indigenous and exogenous origin. Meteorological data have been collected here for 18 years. Already it is evident that the low rainfall and the very low atmospheric humidity are two very serious limiting factors on plant growth as well as on animal development. It is essential that studies in relation to

solar radiation should also be undertaken in order that this environment producing such a condition in exogenous breeds can be fuly analysed. These investigations at Armoedsvlakte may lead to results of great comparative interest and importance.

Certain important problems in competition in plant communities—natural and man-created—cannot be solved until we know more about the total radiation and the radiation as reduced, in quantity and in quality, by the cover of vegetation—whether this be the lowly cover of grass or crop herbage or the taller and dénser canopy of forest and plantation of trees.

Fundamental physiological changes take place in plants in response to environmental changes and seasonal cycles; some of these changes link up with important nutritional and pathological phenomena in domesticated stock. It is indicated that in some instances, at all events, radiation plays an important rôle in conditioning the plant and the animal physiological responses.

Experimental work in America and elsewhere suggests that radiation plays a far-reaching rôle in connection with date and abundance of flowering, date and vigour of foliar shooting, date of ripening and quality of fruit. The obvious economic importance of this, in connection with horticulture, agronomy and floriculture needs no stressing. Genetical and breeding work must be appreciably assisted when the geneticist and the breeder know more of the radiation intensity and quality, season by season, in South Africa.

The survey will probably throw some light on the peculiar physiological conditions of wilted plants, particularly on Tribulus, which are poisonous at certain times under certain meteorological conditions and are valuable fodder plants at other times. It is thought that even the occurrence of the poisonous principle might be associated with light factors of which we know practically nothing.

Full consideration of all these aspects of the work initiated by Miss Riemerschmid decided the committee to recommend its continuation for at least five years. Its direct bearing on problems of human health were apparent. The value to agriculture is also indirectly important to health authorities. The latter are concerned with the inadequate supply of protective foods in the Union; any measures calculated to improve agriculture will also therefore have the effect of improving human health.

9.—Water Supplies.

The problem of providing pure water supplies is most difficult in the smaller local authorities. In the north-western Cape districts and in the Karroo especially, there are many village management boards and small town councils faced with extreme difficulties in securing a satisfactory supply. An adequate water supply either from water-courses, catchment areas or wells is frequently unobtainable in these areas, while in many instances, what water there is, is unpleasant owing to a brackish taste and a high saline content.

Many urban communities do not have a satisfactory water supply because of inherent topographical or financial obstacles. Many others have no such insuperable difficulties, but are content to continue with inadequate and often polluted supplies, from wells, tanks and dams. This apathy is particularly reprehensible where such communities, though suffering from such water borne diseases as typhoid and gastro-enteritis, show a surprising energy and expedition in securing either a town hall or an electric light scheme. In an endeavour to impress on all such local authorities the extreme importance of giving priority to water and other health schemes over luxury demands, this Department usually co-operates with the provincial administrations in scrutinising requests for loans on such projects.

Many a local authority will provide a reticulated system for its European township but leaves its non-European location community to be satisfied with one or two stand-pipes. Water is essential for cleanliness and cleanliness is essential for health. It is expecting too much of poor non-European peoples to avoid lousiness and hence typhus, contaminated food and hence typhoid, fleas and hence plague, if adequate water is not accessible to them.

Emphasis is always given in the inspection reports by departmental officers to the necessity of instituting satisfactory water supplies. In recent years the more progressive local authorities have followed this advice. The smaller local authorities and the peri-urban communities of the Reef

are especially fortunate in having ready access to the Rand Water Board supplies. Otherwise a situation of some difficulty and danger would have existed.

The Railway Administration is a major water organisation. Throughout the Union it is responsible for 2,232 supplies of varying importance and character. Their protection is given full consideration by the health staff, which has recently secured the installation of small automatic chlorinators at seven stations. In many instances, too, open iron tanks at wayside stations have been replaced with underground concrete tanks of an approved type. All railway supplies are now being brought under laboratory control, samples being taken once monthly from railway camps, and at irregular periods in other cases.

The water supplies to dining cars and rolling stock received special attention during the year. The system of systematic sampling introduced last year in which routes rather than dining cars were checked, proved definitely that while dining car water supplies were in themselves satisfactory the methods of handling were not entirely satisfactory. This coupled with irregular and therefore largely ineffective chlorination by chief stewards, made it urgently necessary to review and reorganise the whole system of watering trains. This has been done by separating watering of trains from cleaning procedures, by the appointment of responsible persons to each system to supervise train watering, by an intensive instruction to the personnel in hygienic control of the procedures, by the chlorination of dining car and underframe drinking water supplies by the filling staff, the exclusion of possible "carriers" from the work and the reduction of the available number of watering stations for dining cars and the filling of all cars at mixed points. A marked improvement in the supplies has already been achieved. In the case of corridor drinking water supplies three methods were investigated:— supply from overhead tanks in saloons, bottled water supplies and the existing method of water filters. At present the Railway Administration has decided to concentrate on the existing method and to secure a better hygienic control of filters.

Unsatisfactory Water Position at a Coastal Resort.—The water position at Margate, Natal, has been the subject of comment by the Department's officers since the inception of the township. Its inadequacy was emphasised in a systematic report by the Assistant Health Officer in November, 1934. No useful action was taken by the local authority. The inadequacy of the water supply was again set out in a detailed and extensive report made in February, 1937, the Department being very apprehensive as to the adequacy of supply and its quality. Specific recommendations were again made and no action taken. In June, 1937, at the urgent request of representatives of the Margate Health Committee, a medical officer went down to inspect the position and advise, as the local authority was much alarmed at the position which threatened to eventuate. He reported that there was an acute shortage of domestic water, that a big influx of visitors was expected and that there was no municipal water supply. The residents relied on:—

Rainwater tanks supplying 175 premises.
Shallow wells supplying 20 premises.
Deep wells supplying 5 premises.
South Eastern Power and Water Company supplying 50 premises (including 23 out of a total of 25 hotels and boarding houses).

Due to the prevailing drought the majority of the rain water tanks was either empty or nearly so and water was being collected from sources open to gross pollution. The South Eastern Company which supplied most of the hotels and boarding houses not only derived its supplies from a stream which was subject to gross pollution, but its storage capacity was quite insufficient to meet the needs of the community. In view of the serious state of affairs locally the Margate Health Committee instituted an emergency water supply and recommended that all drinking water should be boiled before use. The South Eastern Company claimed that it had the sole rights to supply the community with water and that the action of the Health Committee was an infringement of its legal rights. The Company further threatened legal proceedings if the Health Committee did not remove its plant and piping.

Owing to the critical state of affairs this Department advised the Minister of Public Health to request the Provincial Administration to order a public enquiry into the Margate water supply. A committee consisting of Messrs. A. E. Charter, W. O. Roberts, Dr. G. H. Gunn, with Mr. H. Britten as Chairman was appointed by the Administrator under the provisions of Provincial Notice No. 65 of 1938, to consider and report on the water supply and to furnish recommendations and indicate the steps which should be taken to ensure for the inhabitants of Margate a proper and adequate water supply.

The Committee held sittings at Margate on the 2nd and 3rd March, 1938, and various officers of the Department gave evidence. In the report of the Committe which was published on the 12th March, 1938, the following recommendations were made:—

"(*a*) (i) Your Committee commends for favourable consideration those provisions of the Private Draft Ordinance prepared by the Health Committee of Margate which deal with water supply. It is, however, recommended that provision be made for acquisition by expropriation of the existing water supply, should it become necessary.

(ii) Your Committee recommends that the Health Committee of Margate be granted the necessary powers to enable it to provide and control the water supply which is required for its inhabitants. (Paragraphs 19 and 36.)

(*b*) Your Committee considers that 25 gallons of water per head of population per diem will meet health and domestic requirements at Margate. (Paragraph 27.)

(*c*) Your Committee is of the opinion that the flow of water in the Nkongweni Stream during a dry period would be insufficient to meet the requirements of Margate, and recommends that investigation should be made as soon as possible with the view to augmenting the present supply. In this connection the possibilities of supply from the Uvongo River and other streams in the near vicinity should be carefully considered. (Paragraphs 29 and 31.)

(*d*) Your Committee recommends that if any doubts exist as to the right of the inhabitants of Margate to use water from the Nkongweni Stream, such right be established by agreement or by order of a water court. (Paragraph 30.)

(*e*) Your Committee considers that the existing pressure filter is unsatisfactory and the method of purification faulty and that, in view of the danger of pollution steps should be taken to make the supply reasonably safe, until such time as a more reliable plant is installed.

In this connection your Committee recommends—

(i) that immediate steps should be taken to instal a chlorinator feeding chlorine gas (not chloride of lime solution) direct into the filtered supply;

(ii) that the so-called settling tank at the pumping station should be covered;

(iii) that the existing service reservoirs should be properly fenced against any intrusion and also frequently cleansed, and that in any future scheme all such reservoirs should be covered. (paragraphs 32 and 33.)

Fluorosis.—Dr. D. G. Steyn of the Onderstepoort Laboratories has during the past year conducted investigations into the chemical nature of various waters found in the north-western Cape. These investigations followed numerous complaints by veterinary officers and others of the detrimental effects of bore hole and well water of this region upon stock. Dr. Steyn states that from information collected by himself and other officers there is no doubt that the underground water of numerous farms in the north-western Cape is not only unsuitable for human and animal consumption, but is also poisonous. Such waters are also frequently encountered in the southern and western parts of South West Africa and other arid and semi-arid regions of South Africa. The unsuitability for consumption and the toxicity of the water is manifested by mottled teeth, nausea, indigestion, urinary calculi and diarrhoea in man; by sudden death, hoven, diarrhoea, loss in condition, urinary calculi and retarded growth in animals.

The substances of the greatest importance in harmful and poisonous waters are nitrates, sulphates, chlorides, carbonates and bicarbonates (alkalinity), fluorine, calcium, magnesium and potassium. Dr. Steyn states that as far as the human being is concerned the problem of highly saline waters and fluorine-containing waters can be solved or alleviated in the following ways:—

(i) by storing rain water in galvanised iron tanks;

(ii) by more assistance in the sinking of bore holes and in building of dams being provided. In many cases wholesome water can be found on some farms provided sufficient funds are available for the sinking of a number of bore holes or wells;

(iii) by erecting small filters in the homes. Filters containing magnesium oxide remove a considerable proportion of the fluorine present in the water. Such a home-made filter would cost very little and the cost of removing fluorine from 100 gallons of drinking water would amount to approximately 1s.;

(iv) by passing the water through zoolite or permutite filters. This type of filter is probably preferable to the magnesium oxide filter as the former also softens the water by removing calcium;

(v) by filtering fluorine-containing waters through calcium phosphate appreciable quantities of fluorine are also removed.

Fluorosis, the most characteristic sign in human beings being mottled teeth, has interested investigators in many parts of the world and has recently been studied in South Africa by various workers. Dr. Staz in a recent memoir published in the *South African Journal of Medical Sciences*, May, 1938, found mottled teeth in both European and Bantu from various districts in the north-west Cape and the Waterberg district of the Transvaal. Extreme degrees of fluorosis such as have been recently reported from India in the *Indian Journal of Medical Research* by Short and others involving curious bony changes, have not yet been seen in South Africa.

III.—INFECTIOUS AND PREVENTABLE DISEASES.

10.—Bilharziasis or Schistomiasis.

Some interesting surveys of school children were undertaken during the year in each of the endemic areas. In the Eastern Cape, Dr. E. M. Reitz, Medical Inspector of Schools, examined a group of 124 children in the Knysna district and also searched the neighbouring streams for evidence of the vector snails. The children were found to be entirely free from bilharzial infestation; in only one stream, the Klipriver, were specimens of *Limnaea natalensis* (three in number) discovered.

In the Nelspruit and White River districts of the Transvaal investigations revealed the following results:—

	Number of children examined.	*Number infested.*
Nelspruit (Europeans)	280	44
White River (Europeans) ...	270	90
Non-Europeans	144	128

In Natal extremely important survey work is being carried out by the Department. Using four malaria assistants Native school children were examined from each river valley lying between the Tugela and Umkomaas Rivers. The area surveyed extended to a distance of about 25 miles inland. Each child was questioned concerning the passing of blood in the urine. Two groups emerged. In the first group the children had haematuria at the time of examination. They were asked to submit urinary specimens. Those of the second group had had haematuria in the past, but at the time of questioning were not passing blood.

Microscopic examination of the urines from the first group was made, while a certain number of children suffering from blood in faeces was also investigated. In all 4,489 school children were examined in the various schools covered by the survey. Using the grouping mentioned above 470 children or 10·47 per cent. were diagnosed as suffering from active bilharziasis and a further 250 reported past haematuria, while 96 had blood in their faeces. The significance of bilharziasis and intestinal parasites in the Native schools of this area is great. These infestations play an important factor in the incidence of ill-health and malnutrition in this area as almost certainly in the majority of Native areas in Natal.

In Europeans in Natal bilharziasis is not as serious as in Natives as the following figures from a survey carried out by the Natal school medical inspectors indicate. Of 20,741 European children examined, 249 or 1·2 per cent. were found to be infested. Of these 148 had received treatment. The cases were chiefly found in the schools around Durban and along the coast.

The work of the Transvaal Bilharzia Committee in addition to continuing on the lines given in previous reports has been extended recently to include an active campaign amongst Natives in the Eastern Transvaal. This work arose out of an agreement between the Committee and this Department whereby district surgeons in the Nelspruit and Komatipoort districts were to organise district clinics. A most satisfactory commencement of this scheme has been made in the Nelspruit area where in co-operation with the staff under the Department's Medical Inspector, Dr. Annecke, certain district clinics are being held thrice weekly. The Natives in these districts are heavily infected, as the following figures from a survey made by a departmental health inspector indicate:—

	Total Examined.	*Number Infested.*
Nelspruit	1,016	290
White River	391	195
Karino	460	223

It is intended to extend this work as soon as possible and also to undertake very necessary educative work in these communities.

11. Enteric or Typhoid Fever.

It will be seen from Table 8 that with the exception of the year 1934, when there was an unusual prevalence and the year 1930 when the incidence was distinctly lower than usual, the number of notifications has shown only a slight tendency to decrease. The amount of typhoid in a community is to a large extent an indication of the general sanitary condition. The fact that the decrease in the number of cases is so small indicates that whatever may have been done to improve sanitary conditions in the larger towns the general standard throughout the country is still far from satisfactory. Attention must again be drawn to the fact that these figures do not give a true reflection of the number of cases of the disease as notification is very incomplete. This applies particularly to the non-European population in rural areas.

Table 8.—Enteric or Typhoid Fever: Number of Cases Notified during Past Ten Years.

1929	4,963	cases.
1930	3,775	,,
1931	4,793	,,
1932	4,505	,,
1933	4,389	,,
1934	8,267	,,
1935	4,377	,,
1936	4,384	,,
1937	4,205	,,
1938	4,103	,,

Table 9 shows the distribution of the cases reported during the year:—

Table 9.—Enteric or Typhoid Fever: Distribution of Cases Reported during the Year Ended 30th June, 1938.

	European.	Non-European.
Cape Province (excluding Transkei)	606	840
Transkei	22	180
Natal	86	365
Orange Free State	132	497
Transvaal	419	956
Total	1,265	2,838

Typhoid is becoming increasingly rural in its distribution. Reference to the incidence in the areas of certain local authorities—Table 10—shows that it is mainly in the smaller towns and villages that the incidence is high. Where the population is not well protected by satisfactory essential services, outbreaks are liable to occur. Water-borne epidemics which may be of considerable magnitude are a constant menace to our rural population; badly controlled milk supplies and general insanitary conditions leading to prevalence of flies and accessibility of faecal matter are also liable to cause outbreaks. The past year has seen sharp outbreaks of typhoid caused in each of these ways in different parts of the country.

TABLE 10.—ENTERIC OR TYPHOID FEVER—NOTIFICATIONS AND INCIDENCE IN CERTAIN LOCAL AUTHORITY AREAS DURING THE YEAR ENDED 30TH JUNE, 1938 (ARRANGED IN ORDER OF INCIDENCE RATE)—EXCLUDING CASES RETURNED AS "IMPORTED":—

Local Authority.	Notifications.			Incidence per 1,000 of Population.		
	European.	Non-European.	Total.	European.	Non-European.	All Races.
Rivier Zonder End...V.M.Bd.	—	27	27	—	148·35	45·38
Tweeling.....V.M.Bd.	—	45	45	—	78·26	43·86
Bultfontein.....M.	—	19	19	—	26·55	13·12
Idutywa.....M.	9	1	10	23·75	1·96	11·26
Kroonstad.....M.	15	105	120	2·81	13·05	8·97
Alice.....M.	—	25	25	—	11·28	8·43
Lindley.....M.	4	14	18	3·85	11·79	8·08
Dannhauser.....Tn. Bd.	—	10	10	—	9·68	7·48
Warden.....M.	1	11	12	1·14	14·29	7·29
Pearston.....M.	8	3	11	15·12	3·02	7·22
Winburg.....M.	10	16	26	6·74	7·15	6·98
Matatiele.....M.	6	12	18	5·57	7·59	6·77
Beaufort West.....M.	25	27	52	7·05	6·11	6·53
Burghersdorp.....M.	9	18	27	4·37	6·44	5·56
Umtata.....M.	1	29	30	·43	9·09	5·41
Bethlehem.....M.	12	35	47	2·39	6·52	4·53
Heilbron.....M.	4	11	15	2·59	4·48	3·75
Alexandra.....H.C.	—	51	51	—	3·05	3·05
Springs.....M.	27	200	227	1·46	2·92	2·61
Heidelberg.....M.	2	13	15	·86	3·72	2·58
Cradock.....M.	7	15	22	1·90	2·69	2·38
Aliwal North.....M.	2	13	15	·78	2·56	1·96
Uitenhage.....M.	11	27	38	1·17	2·42	1·85
Nigel.....M.	2	33	35	·49	1·87	1·61
Stellenbosch.....M.	3	9	12	·60	2·38	1·37
Germiston.....M.	27	66	93	1·05	1·56	1·36
Harrismith.....M.	11	1	12	3·51	·16	1·30
Boksburg.....M.	19	45	64	1·19	1·32	1·28
Klerksdorp.....M.	11	—	11	2·41	—	1·23
Oudtshoorn.....M.	12	3	15	1·84	·45	1·13
Queenstown.....M.	4	15	19	·59	1·30	1·04
Roodepoort-Maraisburg...M.	9	34	43	·84	1·10	1·03
Krugersdorp.....M.	11	42	53	·61	1·14	·97
Paarl.....M.	9	9	18	1·02	·92	·97
Hercules.....M.	1	14	15	·18	1·31	·93
Graaff-Reinet.....M.	8	3	11	1·80	·40	·92
Bloemfontein.....M.	15	32	47	·62	1·11	·89
Benoni.....M.	14	43	57	·66	·76	·73
Randfontein.....M.	—	21	21	—	·89	·73
Durban.....M.	28	128	156	·32	·85	·65
Brakpan.....M.	11	21	32	·63	·56	·58
Johannesburg.....M.	129	141	270	·51	·63	·57
Port Elizabeth.....M.	23	29	52	·47	·58	·53
Capetown.....M.	72	65	137	·47	·45	·46
Pretoria.....M.	29	17	46	·42	·43	·42
East London.....M.	17	1	18	·78	·04	·39
Pietermaritzburg.....M.	7	7	14	·32	·27	·30

M.= Municipality. Tn. Bd.= Town Board. H.C.= Health Committee.
V.M.B.=Village Management Board.

A large number of cases of typhoid occurred along the course of the Berg River in the Cape both on farms and in villages and there was a sharp outbreak at Velddrift which obtains its drinking water from this river. Investigation of the upper reaches of the river and its tributaries revealed a very unsatisfactory state of affairs. It was found that the head-waters were being grossly contaminated owing to lack of sanitation in villages and to the washing of clothes in streams. The banks of the river are frequented by large numbers of people who go there to picnic and camp during the summer and a number of these people developed typhoid. There is no doubt that additional contamination of the river was caused by these campers; although practically every camping site has sanitary conveniences these are not always used nor is there always proper disposal of excreta. Samples of water taken from the Berg River at different points showed varying degrees of pollution. This was particularly marked in the Dwars River which is one of the upper tributaries of the Berg River. It was found that this river was being seriously polluted from the village of Pniel. At Velddrift, a village near the mouth of the Berg River, the water supply is obtained from the river direct, or after it has entered a small reservoir or by means of seepage pits. An extensive outbreak started at this settlement during November, 1937. Owing largely to the complete lack of sanitation, it continued until May, 1938.

During the period 1st July, 1937 to 7th May, 1938, 111 cases of typhoid occurred in the Divisional Council area of Piquetberg in which Velddrift is situated. More effective control is urgently required along this river. The Department is at present in negotiation with the Provincial Administration and the local authorities concerned with a view to securing such control as rapidly as possible. These conditions along the Berg River have been described as an example of what may happen along the course of any of the rivers which in rural areas are sometimes used, without purification, as the source of domestic water supply.

At Great Brak River there was a sharp but limited milk-borne outbreak. This started with the illness of three boys, two Coloured and one European, living in close contact with each other who were presumably infected from a common but unknown source. The Coloured boys were employed by a European woman who kept cows and supplied milk to a few people in the neighbourhood. The boys were nursed by this woman in her living room and their excretra were thrown into a kraal where the cows were milked. The woman continued to milk the cows herself. Milk from this kraal was distributed to seven families in the neighbourhood and in each of these households typhoid occurred, in some of them several cases. These milk-infected cases began to occur 14 days after the onset of the first cases and within the next 20 days 16 cases had occurred including the woman who had nursed the boys. Of these 16 cases all except one used milk from this source. This exception was a man who was probably infected by water, as he used water from a furrow in which the original patients' clothes and bedding had been washed, until this practice was discovered and stopped. After this flare-up there was an interval of 8 days before the next case and then there were 4 more cases at longer intervals. Of these at least 3 were secondary csaes, possibly fly-borne, as they did not get milk from this source. As soon as the nature of the disease was recognised adequate steps were taken to prevent further spread. The outbreak illustrates the dangers of milk supplies which are not properly supervised.

Attention is being given to the danger of the spread of typhoid by milk by some of the larger local authorities who carry out routine investigation of dairy employees with a view to discovering typhoid "carriers". The Pretoria Municipal by-laws provide for the sale of "typhoid-tested" milk; a large number of dairies, which have complied with all the Council's requirements in this respect, have been given permits allowing them to so label their milk. This constitutes a definite advance in the control of milk supplies.

An interesting example of the spread of typhoid by flies and direct contact occurred at the small and isolated location at Rivier Zonder End. Here pail privies were in use. They were, however, close to the houses and were badly constructed, so that the contents were freely accessible to flies. The first patient became ill at the beginning of December, though the disease was not at first recognised. The source could not be traced; but about the time when infection must have occurred there had been a social function in the location which attracted a number of Coloured people from the surrounding country. A second case in a house next door but one became ill about December 17th. The diagnosis of typhoid was not definitely established until 28th. By this time the infection had spread. The house in which the second case occurred was badly overcrowded and on the 29th, three more persons became ill in this household. Adequate measures for stopping the spread of infection were taken as soon as the nature of the disease was recognised; but in the meantime considerable damage had been done and by the 31st December 18 cases had occurred in 8 houses. A feature of the outbreak was the multiple infections in households and the way that the first cases occurred at one end of the location and the infection spread out from that focus. Investigations showed that water and milk supplies were not the cause. The outbreak occurred at a time of year when flies were very prevalent, and these together with direct contact were the means of spread. When suitable precautionary measures were taken the spread was rapidly checked, but not before 27 cases had occurred. This outbreak serves to show what may happen in any place where flies are prevalent and excreta are not properly protected from them. In our locations food is generally freely exposed to flies; this is especially the case in the poorer houses where overcrowding is most marked.

A general improvement in sanitation and public health conditions is clearly necessary to reduce typhoid incidence. The installation of a water-borne system of sewage disposal where this is practicable is one of the most important single measures. For financial reasons, however, this is only practicable in the larger municipalities, but in the rural and semi-urban areas a great improvement could be effected by more careful disposal of nightsoil. In addition, general measures for the better sanitation of villages directed particularly towards the control of fly-breeding are of the utmost importance and the careful and constant supervision of water and milk

supplies cannot be too strongly urged. The use of vaccines is of great benefit under certain conditions when a group of people such as an army in the field is particularly exposed to infection. In ordinary civilian life, however, resort should only be had to this measure in the face of an outbreak. Its use must be looked upon as in the nature of an admission that the ordinary methods of control by proper sanitation have failed.

12.—Leprosy.

The year under review has not been marked by any outstanding feature as regards the position of leprosy either in South Africa or abroad.

As is the case in many other infectious diseases, it is mostly the undernourished, ignorant and backward races and individuals who are affected. There is nothing spectacular about the slow spread and low immediate mortality of the disease. All things connected with leprosy must be measured in terms of decades and generations and the public consequently remains mostly ignorant of, or uninterested in its insidious encroachment.

It presents a world-wide problem, each country having its own peculiar difficulties; but many factors are common to all. A solution if found would resolve itself into the mode of application locally. Many organisations exist in various parts of the world to carry out special investigations. Such are the British Empire Leprosy Relief Association, the American Leprosy Foundation (Leonard Wood Memorial Foundation) and the Committee of Hygiene of the League of Nations. In order to co-ordinate the work of these, and many other organisations in the field of leprosy, the International Leprosy Association, with its own journal was formed in 1931, largely as the outcome of the Leonard Wood Memorial Conference in Manilla at which the Union Government was represented by the Secretary for Public Health, the late Dr. J. A. Mitchell.

Although previous international conferences on leprosy have been held from time to time, the first Congress of the International Leprosy Association was held in Cairo during March, 1938. Leading leprologists from all parts of the world attended. The exchange of views and critical discussions should benefit all countries which have to deal, as a routine public health measure, with the problem of leprosy. The next congress will be held in Paris in 1943. Guiding principles as regards classification, epidemiological investigation, the control and treatment of leprosy were agreed upon. Control and treatment, the immediate concern of the Public Health Department in South Africa, may be briefly reviewed in the light of resolutions taken at the International Congress.

Scrutinising, for instance, the report on treatment, it is found that the Committee has arrived at the same principles as have already been alid down for the routine treatment throughout all the leprosy institutions of the Union, namely that: " Hydnocarpus oil and its esters administered intramuscularly, subcutaneously and intradermally remain, so far as our present knowledge goes, the most efficacious drugs for the special treatment of leprosy ". For the improvement and maintenance of general health of the patient it is of very real importance that the diet should be liberal, well-balanced and rich in vitamins; healthy, moderate exercise in the form of occupational therapy and outdoor exercise is of value; and it is important to eliminate intercurrent diseases. Because of the danger of relapse, particularly in cases of nodular leprosy, a prolonged after-treatment is advised. The selective affinity of the aniline dyes for leprotic lesions, held out strong hopes for a new line of treatment; but after several years of trial and experimentation it can only be stated that these hopes have not been fulfilled.

Because of the disastrous results which sometimes occur with potassium iodine, the use of this substance is discouraged for the purposes of diagnosis, treatment or as a test of recovery unless in very skilled and experienced hands. The Committee also reports that no form of treatment can be regarded as wholly satisfactory. It stresses the importance of further therapeutic research and urges that interested bodies devote further funds for this purpose.

In regard to control it is recognised that in countries with large leprosy populations, compulsory isolation of infectious cases such as obtains in South Africa is out of the question because the expense would be out of all proportion to the financial resources. Bearing in mind what are believed to be the more important principles governing the control of leprosy these must be applied according to local conditions, stress being laid on the following:— the methods adopted for the early discovery of cases; prevention of spread; education and propaganda.

The policy of compulsory segregation which has been developed by our government is both humane and efficient. The increased opportunities now available to medical students and district surgeons for instruction in leprosy

have resulted in earlier detection of cases. Other measures include the periodic examination of contacts and provisionally discharged cases and the extension of education and propaganda on public health and hygiene. Of prime importance are also the cognate factors of housing, nutrition, hygiene and sanitation of the population. The intense drive now carried out in these directions will in time show its effect in rural areas and Native territories. These measures are the only ones from which ultimate success in the eradication of leprosy from the country can be hoped. Until the social level of the people among whom the disease at present occurs is raised improvement must necessarily be very slow.

The number of lepers in the five institutions remains approximately the same as last year. These are shown in Table 11.

TABLE 11.—LEPER INSTITUTIONS: PATIENTS THEREIN ON 30TH JUNE, 1938.

Institution.	Europeans.		Native.		Mixed Coloured.		Asiatic.		Total.		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Persons.
Pretoria	64	31	455	226	57	32	3	4	579	293	872
Mkambati	—	—	117	85	—	—	—	—	117	85	202
Emjanyana	—	—	349	316	—	—	—	—	349	316	665
Amatikulu	—	—	281	167	—	—	—	—	281	167	448
Bochem	—	—	45	32	—	1	—	—	45	33	78
TOTAL	64	31	1,247	826	57	33	3	4	1,371	894	2,265

Table 12 shows the number of new admissions, corrections having been made for transfers to and from the various institutions; the number of patients discharged as arrested and the number of deaths.

TABLE 12.—LEPROSY: FIRST ADMISSIONS, RECRUDESCED CASES, DISCHARGES AND DEATHS, YEAR ENDED 30TH JUNE, 1938.

Institution.	Admissions for first time.	Recrudesced.	Discharged.	Died.
Pretoria	215	18	131	97
Mkambati	44	11	66	24
Emjanyana	255	12	172	84
Amatikulu	93	26	35	41
Bochem	19	4	11	11
TOTAL	626	71	415	257

Table 13, which shows the number of patients in institutions as at 31st January, 1918, is included for comparison with the present position.

TABLE 13.—LEPROSY: PATIENTS IN INSTITUTIONS ON 31ST JANUARY, 1918.

Institution.	European.		Native.		Coloured.		Indian.		Total.
	M.	F.	M.	F.	M.	F.	M.	F.	
Emjanyana	—	—	442	340	—	—	—	—	782
Amatikulu	—	—	95	81	—	—	1	1	178
Robben Island	58	29	115	29	173	109	2	—	515
Pretoria	66	35	419	295	7	7	—	—	829
Bochem	—	—	42	28	—	—	—	—	70
TOTAL	124	64	1,113	773	180	116	3	1	2,374

This table shows that the number of lepers in the various institutions in 1918 was 2,374. In 1938, 20 years later, the number is 2,265. Though the number of lepers in our institutions does not therefore appear to have decreased greatly, it can be stated with a considerable degree of certainty that the number of lepers at large has decreased very greatly during this period.

The amount on the estimates for leprosy in 1918 was £118,000 and in 1938 £122,000, thus over £2,000,000 has been spent on leprosy in the last 20 years only, leaving out of account what had been spent previously. This seems a staggering amount especially as a reference to the above table shows that only in the European population has there been a noticeable diminution of cases in institutions. There is reason to believe, however, as

already mentioned, that in 1918 there were many lepers in the Native territories undetected, and that the numbers certified and in institutions did not reflect the true position as regards the number of lepers actually in the country. With the extension of the district surgeons' services many more have since been certified, thus gradually depleting these hidden leprosy foci. Even now, it is recognised that many lepers are still at large and will only be discovered as medical services extend in the Native territories.

TABLE 14.—LEPROSY CASES REMAINING IN THEIR OWN HOMES ON 30TH JUNE, 1938.

	Certified and Awaiting Removal to Leper Institution.	Home Segregated.	Probationally Discharged from Leper Institutions.		Total.
			Still under Surveillance.	Released from Surveillance.	
Cape Province (including Transkei)	—	2	158	475	635
Transkei	14	3	630	842	1,489
Transvaal	3	1	590	692	1,286
Natal	19	—	286	564	869
Orange Free State	—	—	100	165	265
UNION	36	6	1,764	2,738	4,544

Although it may be questioned whether full value is being obtained for the money spent on leprosy, it must be remembered that the number of discharged lepers, either still under observation by the district surgeons or otherwise, is growing yearly. Taking into consideration the fact that many of these receive government allowances, either on account of mutilation, disability or destitution, the amount of money required for leprosy has not increased excessively.

It is true that there are many instances on record where leprosy previously prevalent in a country, has spontaneously disappeared with the improvement of housing, personal hygiene, diet and sanitation and the general raising of the economic level of the population. It is also true that the moneys now devoted directly to leprosy control and treatment could probably be more profitably applied to social betterment which though acting indirectly has much more lasting effects in combating the disease. We have, however, difficult climatic and racial factors to contend with. Discontinuation of the direct attack on the disease would not be justified under present conditions. Bearing in mind the low economic level of the vast majority of the Native populations and many of the Europeans, it becomes evident that it would take a very long time before standards of nutrition, hygiene and housing, could be attained which would check the spread of leprosy. Meanwhile the spread of the disease might become unmanageable with an always present menace to the whole of the European population.

Under present conditions, therefore, our policy of early diagnosis and segregation during the infectious stage of the disease is clearly the correct one for South Africa.

13.—MALARIA.

A. *Natal and Zululand.*—Climatic conditions during the year under review varied greatly throughout the Province. The winter, spring and early summer were marked by a prolonged drought over sections of the coast and the Natal Midlands which was most severe in the catchment areas of the Umgeni, Umvoti and Tugela Rivers. In the northern districts of Natal where malaria had been prevalent during last season, and in the southern districts of Natal light to normal rains fell during spring. In the drought affected areas extensive pool formation was created along the river basins, the countryside was largely denuded of vegetation and local streams on the coastal belt had become stagnant. The first general rains fell over the drought stricken areas at the beginning of December, three to four months later than usual, and for the first time in seven months the larger rivers draining the hinterland were flushed from bank to bank. The rainfall during the late summer and autumn was intermittent and interspersed with spells of high humidity and hot weather which continued later than usual into June or early winter.

Until the onset of rains the pool breeding vector *A. gambiae* was confined almost entirely to stream and river-bed pools which provide the chief breeding foci in which this species maintains itself during the off-season. The stream breeding vector *A. funestus* over the same period was located in larger numbers than usual in the more permanent streams on the Zululand coast north of the Tugela River. The climatic conditions existing during the early summer no doubt afforded *A. gambiae* an opportunity to become more

firmly established in these streams and river pools, and to breed in larger numbers than would be possible when these foci are made unsuitable due to the flushing effect of early rains and the consequent steady flow of water. These conditions were clearly evident in the Tugela valley where, prior to the rains in December, active *gambiae* breeding had been located up to an altitude of 1,100 feet in the Kranskop and Nkandhla districts in the midlands. This represents a distance of approximately 80 miles of river-bed from the coast.

Following the onset of rains and with the optimum climatic conditions for breeding of *A. gambiae* then prevailing a gradual outward spread of this vector occurred and by the end of March it had been located over a wider area of this province than during the preceding four years. The fact that *A. gambiae* appeared on most of the coastal areas north of Durban, all of which are under statutory control, and from some of which no findings of this vector had been reported during the preceding three years is of more than passing interest. The present year's findings when compared with past records show that all breeding foci located are in proximity to areas in which prolific breeding occurred during the epidemic years of 1931 to 1933. The widespread and isolated nature of these breeding foci rule out the possibility of this species having been imported into the areas concerned and serve to confirm the view that *A. gambiae* is indigenous throughout the coastal area. The prevalence, however, depends on climatic conditions and the efficacy of control exercised on known potential foci.

What has been said regarding the breeding of *A. gambiae* may be applied in reference to the incidence of malaria in this province. Fresh locally infected cases were reported from the coastal belt from the Umgeni River northwards and from the inland river valleys of the Umgeni, Umvoti, Tugela, Buffalo, Umfolosi and Pongola up to an altitude of approximately 2,500 feet. The incidence of malaria was most severe in the Tugela valley bordering the midland districts of Kranskop and Nkandhla, the Umvoti valley in the coastal district of Lower Tugela, the Lower Umfolosi district of Zululand and the Hlabisa district bordering on the hyperendemic areas of Northern Zululand.

In the statutory controlled areas the disease was restricted to small localised outbreaks which on investigation were in the majority of cases found to be the result of neglect or oversight on the part of those responsible for carrying out the measures recommended.

On the Zululand coast, north of the areas under statutory control and adjoining these, malaria was particularly severe and few of the European settlers escaped, while one death from blackwater occurred.

In the Native areas controlled by the departmental staff the incidence among Natives on the coastal reserves was confined to sporadic cases. The position in the Tugela valley in the inland areas was less satisfactory and a marked increase in fresh infections in the Natives occurred. Here climatic conditions were very similar to those preceding the epidemic of 1932. As has already been stated, hut infestation by *A. gambiae* along the river banks was general in November prior to the rains and anti-adult control in huts over a distance of some 15 miles was commenced. The first cases of fever did not occur until March when, due to storms, roads or tracks into the area became impassable and the greatest difficulty was experienced in getting supplies of material to the affected areas. In some cases it was necessary to transport supplies by Native carriers for distances of 10 to 12 miles.

Until better roads are provided into this, and many other inaccessible Native inhabited river valley areas, the Department can do little more than allay alarm among the local population, and thus restrain an exodus of infected Natives to the upland areas. These infected Natives act as parasite carriers and facilitate the spread of the disease wherever the vector exists. This actually occurred during the epidemic years 1931-1933.

The experience gained since the inception of organised control of malaria in this province increasingly emphasises the importance of local knowledge and the necessity for perennial supervision over all sections known to favour vector breeding. Loss of contact with an area for any length of time, or the changing of personnel employed on searching for breeding places particularly during the summer months, is detrimental to the efficiency of control. The essentials required of a malaria inspector or vector " spotter " may be summed up in a few phrases: (1) a thorough knowledge of the area, (2) familiarity with the habits of the vector, (3) close supervision of all places in which breeding has occurred or is likely to occur.

This knowledge, together with the conscientious application of the necessary control measures when indicated, is an assured safeguard against the risk of malaria again becoming the economic burden it has proved to be in the past on the north coastal areas of this province.

Organisation.—The various units comprising the malaria control organisation and an approximation of the staff employed is summarised hereunder:—

Unit.	Staff Employed.		
	Trained.		Untrained.
	European.	Native or Indian.	Native or Indian.
Urban Local Authorities (40)	54	38	140
Statutory Malaria Committees (18)	22	12	600
Voluntary Groups (10)	3	10	6
S.A. Railways	8	—	36
Union Health Department	9	54	112
	96	114	894

The measures employed to control malaria in this province have become more or less standardised. Larvicides and insecticides are employed in most areas, but insecticides alone are often employed in pastoral areas and in areas where the disease is endemic.

Local authorities employ their own executive staff and undertake all anti-larval control in their areas. Anti-adult (i.e. insecticidal) measures devolve upon the individual until cases of fever occur when the authority concerned carries out disinfestation of dwellings over the affected section.

In the statutory malaria committee areas in which for the most part rural conditions obtain, the onus of control falls entirely on the individual owner or occupier. The Committee's inspector is responsible for checking over the work, locating any new breeding places, and directing the attention of the owner of the farm or property to any defects.

The intervals between application of larvicides or insecticides may vary from a week to a fortnight in the former and up to three times weekly in the case of the latter depending on the season of the year and the prevalence of vectors in the area.

Authority to prescribe the measures to be applied and the intervals between application is vested in the Committee.

Many sugar-mills and larger estates within the malaria committee areas employ a European to supervise control measures on their properties. This does not absolve the committee's inspector who is still responsible for seeing that the work is effective and in conformity with measures prescribed.

Voluntary malaria committees or groups cover collections of dwellings, or smallholdings or several contiguous farms. These rely on departmental inspectors for advice as to the best means of control which are based on the prevailing local conditions. The South African Railways executive staff carries out anti-larval and anti-adult control measures wherever the Railway system traverses malaria areas.

The inspectorate staff of the Union Health Department undertakes executive control of malaria throughout the Native areas of Natal and Zululand. In the Native reserves adjoining statutory controlled areas, anti-larval and anti-adult measures are prosecuted, while in the inland river valleys anti-adult control by weekly spraying is undertaken. This policy is dictated largely by force of circumstances. Effective anti-larval measures in river-beds such as the Tugela, even if all sections were accessible, would be economically impossible. Larval control around the confluence of tributaries, where *A. gambiae* breeding invariably occurs, is gradually being extended with a view to minimising local breeding and as a means of retarding or preventing the outward spread to higher and more densely populated sections.

Control in the Native areas during the past season entailed the use of approximately 5,000 gallons of anti-malaria oil, and 10,000 gallons of insecticide. While the larvicide was used chiefly in the accessible coastal reserves, the insecticide was used in some 52 different sections extending from the Umkomanzi River in the south to the Hluhluwe River in the north, and in the Umgeni, Umvoti, Tugela, Buffalo and Pongola River valleys from north of Pietermaritzburg to Paulpietersburg, representing an area of roughly 9,000 square miles or approximately half the area of the province.

In April and May, 25,000 huts housing approximately 65,000 Natives were regularly sprayed once a week. In addition free issues of insecticides were supplied to over 2,000 Natives who had purchased their own pumps.

Eight hundred and fifty pumps have been sold during the year. The policy of planting gum trees (*Eucalyptus saligna*) as a permanent malaria control measure to deal with flat waterlogged sections of the coastal Native reserves has been continued by the Department of Native Affairs under guidance of this Department. Since the inception of these measures four years ago over 400 acres have been established in areas where vector breeding had previously been very prolific.

Throughout the year the closest co-operation has been maintained between the various units comprising the organisation.

All identification of anopheles mosquitoes larvae and adults, is centralised in Durban and vector findings and breeding centres circulated at fortnightly intervals during the season to all concerned in control work.

The very gratifying results achieved in the control of malaria in this province during the past five years justify confidence in the ability of the present control organisation to prevent the recurrence of the disease in epidemic form.

The following table compiled from reports submitted by staff of Native malarial assistants operating in the Native areas gives an indication of the reduction in the incidence of malaria since the introduction of organised control measures.

Season.	Natives visited.	Sick.	Deaths.
1931–1932	152,937	38,889	3,677
1932–33	185,600	28,651	1,000
1933–34	281,985	31,270	1,003
1934–35	268,260	10,863	119
1935–36	257,860	3,171	72
1936–37	206,896	2,571	115
1937–38	298,243	1,912	46

Not overlooking the factor of cyclical variations the evidence of this table is strongly suggestive of the influence of these measures on malaria prevalence.

B. *Transvaal.*—As in previous years malaria control and research have been under the supervision of the Medical Inspector who has his headquarters at the Tzaneen Field Station.

The staff under this officer has, with the exception of the Native assistants added in connection with the new extension of work in Native reserves, undergone few changes during the year. The personnel consisted of the Medical Inspector, five health inspectors, four lady health visitors, two technical assistants and six Native spotters with subsidiary workers. The Medical Inspector Dr. H. S. Annecke, and his assistants are headquartered at Tzaneen with a health inspector in each of the following areas, Lydenburg, Nelspruit and Piet Retief. The north and north-western Transvaal are supervised by two health inspectors operating from Tzaneen. Two other inspectors will operate in the Waterberg and Zoutpansberg districts respectively. The lady health visitors are operating in Pietersburg, Koedoesrand, Zoutpansberg and Tzaneen areas. The Native malarial assistants go from kraal to kraal, and from school to school in the Native locations and reserves giving talks and demonstrations. Particularly helpful in such propaganda campaigns are the obvious results following hut-spraying of a group of selected huts.

During the past year malaria was not prevalent and even at the height of the rainy season neither new cases nor relapses were frequent. This diminution of the disease was reflected in the laboratory turn-over which consisted of only 938 blood smear examinations with 262 positive cases as against 1,698 smears with 1,001 positives for the previous year. Malignant tertian infection has continued to be the predominant type.

The work of the Tzaneen Field Unit has continued to expand. Two major developments have been the arrangements to provide equipment for European families in the rural areas, and the adoption in the Transvaal of the system of employing Native malarial assistants which has proved so successful in Natal.

A not inconsiderable obstacle to securing malarial preventive measures in European rural communities has been their poverty. As the result of negotiations with the Transvaal Provincial Administration an arrangement was made last year whereby equipment for insecticidal destruction could be provided either free or at minimal cost. Actual distribution is undertaken by the health inspectors attached to the unit. In this way large numbers of spray pumps and quantities of insecticide were distributed throughout the districts of the Northern and Eastern Transvaal. Another relief scheme which has continued is that of rural housing sponsored by the Department of Social Welfare. Where grants are applied for for premises in malarial districts the advice of the malaria staff is sought in securing effective mosquito-proofing of the dwelling-houses.

The long required extension of anti-malarial measures to Native communities in the Transvaal was secured this year following protracted negotiations. Through co-operative effort on the part of the Transvaal Provincial Administration, the Native Affairs Department and this Department, 48 Native malarial spotters have been trained and allotted to work in the Native reserves. These workers are now engaged in survey work involving the collection of blood smears and adult and larval mosquito specimens. They play an important part in education and propaganda amongst the primitive Native communities and in actual malarial prevention, including demonstrations and the distribution of pumps and insecticides. Their activities are also certain to undermine considerably the influence of the witchdoctor, as the efficacy of quinine therapy in treatment becomes known. This work is extremely important as the Native populations form the great reservoir of malarial infection for European and Native alike. It is hoped to extend it to the Natives living on farm and company lands.

In addition to these two new developments routine work has continued. Because of the small amount of infection during the year it was possible for more attention than usual to be paid to propaganda work by both the health inspectorate and lady health visitors. Lectures, demonstrations and film shows have been conducted throughout the European rural areas of the malarial districts of the Transvaal. The malarial classes at Tzaneen for European teachers and health inspectors and staffs, and at Bethesda for corresponding Native groups have been successfully repeated this year.

The routine control of the Pongola Settlement and the supervision of anti-malarial work in the Kruger National Park, and in the towns of Louis Trichardt, Pietersburg and Potgietersrust have been continued by the Tzaneen Unit. It is largely if not wholly due to the work of this Unit too that the township of Tzaneen has been converted from an intensely malarious locality into an exceptionally healthy low veld locality. The percentage of new infection in Tzaneen during the past six years is as follows:—

	Per Cent.
1933	15·0
1934	8·9
1935	3·0
1936	4·7
1937	7·0
1938	0·75

The measures adopted in these urban communities consist of drainage or filling in of breeding places, or planting them with trees; destruction of larvae by oiling and of adult vectors by various means; and the early treatment of patients.

The treatment of cases continues on the lines given in previous reports. A system has now been established whereby all district surgeons resident in the malaria districts of the Transvaal can obtain supplies of atebrin and plasmoquine for distribution amongst the population. Treatment of Natives in the reserves in the very early stage of the disease which is proving effective among Europeans does not yet appear practicable. Whether such an aim is desirable is extremely doubtful in view of the disturbances in infection which follow the removal or diminution of processes of natural immunity. Nevertheless the treatment being given to Natives is reducing morbidity and mortality, the really desirable results.

That the malarial campaign in the Transvaal is achieving success may be deduced legitimately from the remarkable change in the incidence of blackwater. Where previously blackwater has been a common occurrence it has now practically disappeared; even the widespread and intense epidemic last year was not associated with any outbreak of blackwater. The cases of blackwater during recent years for the Transvaal have been:—

	Cases.
1932	22
1933	17
1934	22
1935	9
1936	17
1937	5
1938	1

The laboratory at Tzaneen has undertaken the usual routine blood smear examinations and larval and adult vector identifications. The extension of the work both in area and to include the Native reserves has largely prevented the furtherance of the research programme. Vector surveys, collection of data on the organism and observance of the flight powers of the mosquito have, however, been continued.

C. *Railway Areas.*—It is perhaps opportune to give a résumé of the work done in railway areas up to the year under review to show what progress has been made in regard to co-operation with outside bodies.

From the beginning the Union Health Department and the Railway health staff endeavoured to get local authorities to co-operate with the Railway Administration. For that purpose personal contact was made with all the bodies concerned. On the whole the response was satisfactory and the health boards and committees which entered into the scheme soon realised its value. In time other government departments, the larger land-owners and private individuals also fell into line. At many centres success was only possible with the co-operation of enterprises adjoining railways. As an example, Letaba, which had always been a hotbed of malaria has been comparatively free for the last five years. The extensive work undertaken there could not have been done by the Administration economically without the co-operation of the Department of Native Affairs. In Natal an extensive system of malaria committees has been organised by the Department of Public Health. In all, eighteen such committees have been established along the coast from the Umfolozi River to Port Shepstone, a distance of some 240 miles. These committees have inspectors to supervise malaria control; they in turn are supervised by the Union Health Department. The Railway Administration's health staff works in very close collaboration with these inspectors and attend their monthly meetings arranged by committees in order to discuss joint issues. In this way the respective field staffs are kept well informed of conditions prevailing on each other's terrain. In addition to these malaria committees various other local authorities work in very close conjunction with Railways. The progressive success of the measures obtained in Natal, can to a very great extent, be attributed to this co-operation outside Railway boundaries.

North of Mtubatuba, where committees have not been organised the Railway Administration is practically alone in undertaking malaria control and the little insecticidal work done by isolated farmers and store-keepers hardly affects the Railway position. It is, therefore, not surprising that this section shows the greatest prevalence of mosquitoes and the highest incidence of malaria. The weakness in the lack of co-operation was very noticeable in the Eastern Transvaal during the 1936-37 season: the overflow of infected mosquitoes from uncontrolled areas was great, due to the unprecedented meteorological conditions, and little impression was made on the malaria incidence in spite of the extra work undertaken by the Administration's field

staff. This matter was taken up with this Department, and much of this season's success can be attributed to the wider co-operation of contiguous local authorities and land-owners. Further, it was agreed that in future representatives of the Union Health Department and the Administration should meet yearly in order to discuss joint action. The need for fuller co-operative measures in the vicinity of Railway stations and labour forces is apparent. This need becomes urgent when it is realised that conditions which can seriously disorganise the railway service still prevail in some areas. As an example, at Godwan River, where no malaria has occurred among the staff for the last six years a serious outbreak of malaria occurred on three farms adjoining railway property. One hundred and two cases, of which eleven proved fatal, were reported. The Administration was not affected, but it might have been a catastrophe if a large relaying gang had been present.

The policy of fuller co-operation between the Railway health staff and other bodies in the Transvaal has been carried out in the case of Nelspruit, Hectorspruit, Pretoria and certain other areas. Komatipoort deserves special mention. This station is situated in one of the most intensive malarial areas in South Africa and if control of the disease could be satisfactorily achieved there is no doubt that approximately 75 per cent. of the incidence of malaria in the railway staff would be eliminated. In spite of earlier efforts the reduction in malarial infections was not considered entirely satisfactory and it became evident that results could only be secured by extending preventive measures over a wider area. By co-operation with local organisations some 600 huts within a two-mile radius of the lines are being dealt with, using anti-adult mosquito method. Spraying is done thrice weekly in non-European and twice weekly in European dwellings. Anti-larval work has also been extended along the Komati River, while special precautionary measures are in use for the protection of Railway employees on night duty.

In the past lack of staff prevented the regular patrol of the Breyten-Piet Retief, Pretoria-Zoekamakaar and Lydenburg-Steelpoort railway sections. The practice of drafting all the available men to endemic areas during the season resulted in neglect of sections where epidemic conditions warranted closer attention. The Eastern Transvaal was reorganised and two additional men were appointed during the year. All sections are now regularly patrolled and not a single case of malaria occurred during the season on the sections mentioned.

Towards the end of March the prevalence of mosquitoes on the section north of Empangeni assumed such proportions that a foreman from a non-malarious section was drafted to that terrain. Three additional Natives were also appointed. With the two foremen and extra Native labour it was possible to spray out all habitations at tri-weekly intervals. These intensified activities were maintained up to the end of April, and were no doubt responsible for averting conditions which might easily have led to serious outbreaks among the staff.

Breeding of *A. gambiae* was confined only to the terrain north of Newark on the North Coast. The main line and South Coast were altogether free from *A. gambiae* breeding. Before the commencement of the season certain defectively screened quarters were brought up to a good standard.

Owing to a rising appreciation of its general value in the campaign conducted by the Railways insecticidal work has been greatly increased. In the past it was the practice to depend to a large extent on residents for spraying out quarters. Experience has proved this procedure to be unreliable. To-day it is discouraged and the health foreman undertakes the spraying of houses as often as necessary, depending on the field findings. This phase of the work will no doubt be still further increased at certain places, because certain experiments that were carried out showed that the range of flight of mosquitoes was much greater than was formerly believed. For economic reasons it would be impracticable to extend larval control and therefore more reliance must be placed on insecticidal work.

During the season 20,333 gallons of anti-malaria mixture were used in the Transvaal and 10,728 gallons in Natal by the Railway Administration. Following the usual practice, permanent anti-malaria measures were undertaken by the health staff during the malaria off-season.

In the Transvaal two health foremen, with permanent gangs of 12 Natives each did the work on the northern and eastern railway sections. The health foremen at Komatipoort and Waterval Boven railway camps undertook the work necessary at their respective centres. In Natal this work was done by one health foreman with a gang of 20 regular Native oilers.

The following table shows the malaria incidence in Natal, Transvaal and South West Africa among Railway employees from January, 1932, to May, 1938:—

MALARIA INCIDENCE AMONG RAILWAY EMPLOYEES IN NATAL, TRANSVAAL AND SOUTH WEST AFRICA, DURING THE PERIOD JANUARY, 1932, TO MAY, 1938.

Year.	Month.	Number on North Coast.	Number on South Coast.	Number in Natal Inland.	Number in Transvaal.	Number in South West Africa.	Total Number.
1932	Jan.	4	11	3	24	—	42
	Feb.	10	4	1	22	—	37
	Mar.	9	6	1	21	—	37
	Apr.	41	14	11	40	—	106
	May	109	45	41	31	—	226
	June	86	52	45	21	—	204
	July	66	24	14	7	—	111
	Aug.	23	6	11	3	—	43
	Sept.	10	7	13	4	—	34
	Oct.	27	8	19	2	—	56
	Nov.	13	9	10	21	—	53
	Dec.	13	37	19	3	—	72
		411	223	188	199	—	1,021
1933	Jan.	2	4	13	6	—	25
	Feb.	5	2	22	7	—	36
	Mar.	10	1	32	18	2	63
	Apr.	7	—	25	6	—	38
	May	3	1	15	8	—	27
	June	3	2	19	5	—	29
	July	—	—	5	3	—	8
	Aug.	—	—	16	1	—	17
	Sept.	—	—	8	2	—	10
	Oct.	4	—	7	—	—	11
	Nov.	—	—	8	—	1	9
	Dec.	7	—	4	8	—	19
		41	10	174	64	3	292
1934	Jan.	1	—	7	13	—	21
	Feb.	3	—	6	19	1	29
	Mar.	6	—	8	14	—	28
	Apr.	9	—	17	8	—	34
	May	5	—	26	5	8	44
	June	9	—	20	2	24	55
	July	5	—	22	6	14	47
	Aug.	3	—	4	3	5	15
	Sept.	—	—	5	2	—	7
	Oct.	1	—	4	1	1	7
	Nov.	—	—	4	2	5	11
	Dec.	2	—	4	5	1	13
		44	—	127	80	59	311
1935	Jan.	1	—	5	5	—	11
	Feb.	2	—	4	8	2	16
	Mar.	1	1	2	11	4	19
	Apr.	1	—	2	8	11	22
	May	—	—	3	1	—	4
	June	—	—	1	4	1	6
	July	2	—	—	4	4	10
	Aug.	1	—	—	—	3	4
	Sept.	1	—	1	1	2	5
	Oct.	1	—	2	1	2	6
	Nov.	2	—	3	3	4	12
	Dec.	1	—	—	1	3	5
		13	1	23	47	36	120
1936	Jan.	1	—	2	1	2	6
	Feb.	2	—	4	7	3	16
	Mar.	1	—	2	11	2	16
	Apr.	2	—	5	23	2	32
	May	6	—	3	21	4	34
	June	—	—	2	11	7	20
	July	—	—	4	3	2	9
	Aug.	—	—	—	1	2	3
	Sept.	—	—	—	—	3	3
	Oct.	—	—	—	2	5	7
	Nov.	1	—	—	2	4	7
	Dec.	—	—	—	4	1	5
		13	—	22	86	37	158
1937	Jan.	—	—	—	9	1	10
	Feb.	1	—	1	12	1	15
	Mar.	—	—	—	18	—	18
	Apr.	—	—	—	65	1	66
	May	1	—	4	94	1	100
	June	1	—	3	26	2	32
	July	1	—	—	7	1	9
	Aug.	—	—	—	3	2	5
	Sept.	—	—	—	2	—	2
	Oct.	—	—	—	1	1	2
	Nov.	—	—	1	4	2	7
	Dec.	—	—	—	5	—	5
		4	—	9	246	12	271
1938	Jan.	1	—	1	7	—	9
	Feb.	—	—	—	6	3	9
	Mar.	2	—	1	5	3	11
	Apr.	2	—	1	7	3	13
	May	1	—	4	9	1	15
		6	—	7	34	10	57

14.—Plague.

The numbers of cases and deaths from plague during the year are shown in Table 15. It will be seen that the incidence of plague was relatively low, with a total of 70 cases, one of which was a European. Table 16 shows the distribution of the cases by districts. The two provinces of the Cape and the Orange Free State only were affected. Outbreaks occurred in 10 districts in the Cape and in 3 in the Orange Free State. This is a complete reversal of the position last year when the greater proportion of outbreaks occurred in the Orange Free State.

Table 15.—Plague Cases and Deaths in the Union during the Year ended 30th June, 1938.

Province.	Number of Districts in which Outbreaks Occurred.	European.		Coloured or Native.		Total.	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cape	10	1	—	54	45	55	43
Natal	—	—	—	—	—	—	—
Transvaal	—	—	—	—	—	—	—
Orange Free State	3	—	—	15	13	15	13
Union	13	1	—	69	58	70	56

Table 16.—Distribution of Human Plague among the Districts of the Two Affected Provinces.

Province.	European.		Non-European.	
	Cases.	Deaths.	Cases.	Deaths.
Cape Province.				
Albert	—	—	2	2
Aliwal North	—	—	5	3
Glen Grey	—	—	5	5
Kingwilliamstown	—	—	1	1
Kuruman	—	—	1	1
Lady Grey	—	—	1	1
Port Elizabeth	—	—	23	16
St. Marks	—	—	3	3
Uitenhage	1	—	1	1
Wodehouse	—	—	12	12
10 Districts	1	—	54	45
Orange Free State Province.				
Kroonstad	—	—	2	2
Thaba 'Nchu	—	—	7	6
Vredefort	—	—	6	5
3 Districts	—	—	15	13

Compared with the previous year, 1936-37, there was about half the number of outbreaks; but the number of cases was greater. This was due to the bubonic outbreaks in the Korsten area of Port Elizabeth with 23 cases and 16 deaths, and to a serious pneumonic outbreak on a farm near Dordrecht originating on a farm in the Albert District, where 14 fatal cases occurred. These two outbreaks accounted for a little over half of the total number of cases.

Table 17 shows the number of cases and deaths from plague for each year since 1922. In can be seen that there are three periods when the number of cases was unusually high, namely, during 1924 and 1925, 1930, and 1935 and 1936. The intervening years show relatively fewer cases. High incidence of plague in man is directly correlated with high density (and consequent mortality from plague) in veld rodents. The widespread mortality in rodents in 1935 and 1936 greatly reduced the rodent population. During the last two years the rodent density has gradually been increasing and will reach a high level in the course of the next two or possibly three years. A sudden increase in the incidence of human plague is, therefore, to be expected during the next 2 or 3 years. However, the increasingly important part played by domestic rodents as a source of infection may bring about an earlier increase in human cases. This question of the increasing importance of domestic rodents will be referred to later.

TABLE 17.—HUMAN PLAGUE CASES AND DEATHS REPORTED DURING THE PAST 17 YEARS.

Year ended 30th June.	Number of Cases.	Number of Deaths.
1922	42	23
1923	2	1
1924	372	235
1925	112	68
1926	71	46
1927	75	56
1928	39	31
1929	65	42
1930	145	89
1931	71	44
1932	22	16
1933	31	16
1934	39	29
1935	290	184
1936	253	165
1937	52	17
1938	70	58

The Port Elizabeth Outbreak.—The outbreak at Port Elizabeth caused considerable concern to the Department as it was many years since an urban area had been infected. Because of the importance of the matter the Department from the commencement kept in close touch with the situation. Besides sending its Chief Rodent Officer to the scene the late Secretary, Sir Edward Thornton, himself twice visited the area and in consultation with the Medical Officer of Health, Dr. Ferguson, and the Assistant Health Officer (Railways), Dr. Booker, arranged for full co-operation in preventing extension of the infection and in protecting the port and railway areas. Later the Senior Assistant Health Officer from Johannesburg, Dr. Fourie, was sent down to keep in touch with the position. Briefly the history of the outbreak is as follows:—

On Wednesday afternoon, 23rd March, a Native woman, from Korsten, was discovered at the Provincial Hospital to be suffering from bubonic plague. She was transferred immediately to the Isolation Hospital for Formidable Epidemic Diseases. Subsequently, from the 6th April onwards, further cases were reported, from Korsten, Walmer Location, New Brighton Location and from the North End of the city. A total of 22 cases wtih 16 deaths was dealt with, the last case having occurred on the 14th July. All the patients suffered from bubonic plague.

The cases which occurred in Korsten were confined almost entirely to an area of roughly 700 by 200 yards. With regard to the cases from Walmer and New Brighton it is highly probably that they also had contracted the disease in Korsten as inspection failed to reveal any evidence of mortality among rodents in those areas. The outbreak was caused by an epizootic among domestic rats. The existence of plague infection among these rodents in Korsten was definitely established by the local branch of the South Africa Institute for Medical Research in a rat which was trapped on the 8th April. Since then infection has been proved to be present among the rodents in the City. With exception of a few dozen *R. norvegicus*, all the rats examined belonged to the species *R. rattus alexandrinus* and *R. rattus frugivorus*; all the mice were *M. musculus*.

Owing to the wide distribution of rodent plague in the Union, it is not possible to arrive at any definite conclusion as to the source from which infection was introduced into the Port Elizabeth area. The possibility of a spread from the harbour can, without any doubt, be ruled out completely. Every precaution has in the past been taken and is still being taken by the Port Health staff against both the introduction of infection from abroad and its conveyance from the shore to ships calling at the port. All the sheds and other permanent buildings are rat-proof and entirely free from these rodents and the few temporary structures which remain are kept under constant observation. The so-called "black" rat and allied species (*alexandrinus* and *frugivorus*) are not met with; the brown rat (*R. norvegicus*) is localised to the stonework of the north wall of the Charl Malan Quay and to the rubble underneath the old No. 1 Jetty and in certain places where reclamation work is still in progress. It is, however, being kept under rigid control and is present only in relatively small numbers. A very important fact is that this rat has not shown any disposition to enter the sheds and other buildings in the port area.

An active anti-rodent campaign has also been carried on continuously on the railway premises adjoining the harbour with the result that rats have been kept down in numbers.

Finally, plague has not been found among the rats forwarded from these areas for examination. The conclusion that the harbour is still free from infection is further supported by the fact that no signs of undue mortality or other evidence of rodent plague have been met in South End which lies immediately to the west and from which hundreds of rodents were sent for examination.

An extension into the urban area of a pre-existing epizootic among the wild rodents of the surrounding district is most unlikely to have taken place. For reasons which are well known, the risk to urban areas from such epizootics is so small as to be negligible and, besides, the local distribution of the multimammate mouse, the only species which is likely to participate in it, is sparse and irregular. Further, at Korsten it was not found in the area which adjoins the original focus of infection and in the City the only evidence of any extension of the disease from the periphery inwards towards the centre was met with in the direction of Korsten.

The question as to whether an epizootic among domestic rats (*Rattus* sp.) may have extended into Port Elizabeth from the neighbouring districts is one to which owing to the lack of time, it was not possible to devote any attention. In this connection it should be borne in mind that, against an invasion of this nature, the rodent-free belt around the town would have afforded no protection as the anti-rodent measures have been concentrated on the wild rodent and the rat-infested premises, situated within the belt, have largely been left untouched. This also applies to the only other alternative which needs to be considered, namely, the introduction of infected rats either in produce, crated goods, etc., or in motor cars from more distant foci in the inland districts.

Until the results of the intensive anti-rodent campaign, which has been launched recently become available, it seems reasonable to conclude that the epizootic in Korsten originated, in all probability, from infection introduced from one or other of the sources discussed in the preceding paragraph and that it subsequently led to a spread of the disease to the rodents in the City.

The following is a résumé of the measures which were adopted for combating the spread of the disease.

1. Search for and removal of patients and contacts to the Isolation Hospital.
2. Devermininsation of plague-infected buildings and their contents and of other rat-infested premises in Korsten and certain parts of the city and a general cleaning up of such premises by the removal of refuse and junk which afforded harbourage for rodents.
3. Supervision of plague-infected premises and of the movements of persons and goods from Korsten by the posting of guards, etc.
4. Free vaccination of the inhabitants of Korsten and of others who desired it.
5. Rehousing of contacts and their families, on discharge from isolation in new houses at New Brighton.
6. The programme of slum elimination has been accelerated in the infected portion of Korsten and elsewhere.

In Korsten the conditions of overcrowding, poverty and squalor under which the residents had been living for years and the hostile and unhelpful reaction to the measures which were being taken in their interests are stated to have added enormously to the difficulties with which the Department was confronted at the time.

It was considered that the only permanent solution to the plague problem in Korsten and certain quarters of the city and New Brighton was to be found in the improvement of housing conditions, a requirement which is equally necessary in the majority of the urban areas of the Union.

With regard to the steps already taken and contemplated by the Port Elizabeth Council in connection with the housing problem, the following information has been supplied:—

" The Health Department of Port Elizabeth has found the million and a half pounds slum elimination scheme of inestimable value in helping to minimise the spread of the disease. All contacts on being liberated from the quarantine camp at New Brighton have been rehoused in new premises constructed under the slums elimination scheme; personal effects and furniture being fumigated before removal in a fumigation van specially built for the purpose.

At least 75 per cent. of the premises in the highly infected area have been dealt with by the slum elimination committee of the City Council and it is anticipated that in about two months only houses of good structural condition will be left standing in this area. In about four years most of

the houses in this area will have been dealt with under the Council's slum elimination scheme. The splitting up of the area into compact blocks interspaced with open areas has as its objects—

(1) the elimination of close contact and covered runways for rodents between each block of buildings, and

(2) to facilitate the work of the Council in permitting concentration of anti-plague measures in a more compact area should plague occur in any of the subdivided blocks."

The drop in the incidence of human plague during the last month or two is liable to give rise to the impression that the disease has burnt itself out and may thus lead to a false sense of security. But, judging by the course taken by recent events before and since the outbreak, it is quite inconceivable that the epizootic among rats should have come to so abrupt a termination. Given favourable climatic conditions there is no reason why further outbreaks should not occur seeing that in Korsten, New Brighton and in the poorer quarters of the town conditions will for some time continue to remain favourable to the reinfestation of premises with rats.

During the past ten years sporadic outbreaks of human plague have occurred from time to time in the Uitenhage district. Although these were generally associated with mortality among multimammate mice it would not be surprising if further investigation should show that the disease has been prevalent and smouldering for some years among domestic rats in the rural areas of Port Elizabeth and Uitenhage. The action taken by the City Council, should, therefore, be supplemented by appropriate measures on the part of neighbouring rural local authorities.

With the object of expediting the campaign against rodents as much as possible Dr. Fourie arranged to undertake the training of the personnel required for the measures recommended by him. This was done during a period of 4 weeks in South End; the results are very promising.

Other Outbreaks.—The outbreak of pneumonic plague on the farm Rust-Myn-Ziel, Dordrecht, during April and May was investigated by Dr. A. L. Ferguson, Medical Inspector for the Transkeian Territories. Notification of the outbreak was only received in the middle of May. Dr. Ferguson was sent immediately and he was able to check the outbreak which showed signs of reaching alarming proportions. Dr. James Gear of the South African Institute for Medical Research was in the neighbourhood and assisted in securing an early diagnosis of the disease. The outbreak was diagnosed as pneumonic plague and was traced to the farm Magdalena, near Burghersdorp in the Albert district. It was discovered that the Native woman, who subsequently died on the farm Rust-Myn-Ziel on her way to the Glen Grey district, had been nursing a child on Magdalena farm who died of what is taken to have been bubonic plague. The woman left the day the child died, was taken ill on the way and sought shelter at Rust-Myn-Ziel. A little over a week after her death there, a series of pneumonic cases occurred.

The Department's Chief Rodent Inspector, Mr. U. B. Chivers, could find no evidence of rodent mortality at Rust-Myn-Ziel. Veld rodents, however, had died at Magdalena and it must be assumed that the child that died there contracted infection from them. Mr. Chivers reported that there was evidence of widespread mortality in Namaqua gerbilles, and multimammate mice (*Mastomys coucha*) generally throughout the northern Cape districts.

There were two smaller outbreaks of pneumonic plague: In February on the farm Tweeling in the Kopjes area, Vredefort district, and in April and May on the farm Pilgrimsrust in the Thaba 'Nchu district. In the Kopjes outbreak the Department's rodent inspector discovered that not only had veld rodents died out, but that house rats (*Rattus rattus*) had died in the outbuildings of the farm, though there was no evidence of mortality in rodents in the Native quarters. Similar evidence of concurrent veld and domestic rodent mortality was found at the outbreak in the Thaba 'Nchu district.

All other outbreaks were of bubonic plague. Most of these gave rise to one and occasionally two cases. There were 5 fatal cases in the Macubeni Native Location, Glen Grey, in February.

Spread by Rodents.—The increasing importance of the part played by domestic rodents in the epidemiology of plague in the Union has already been mentioned and has been referred to repeatedly in previous reports and in papers by Dr. Fourie.*

The general public has become alive to the danger of handling animals found dead in the veld. There is still, however, a lack of appreciation of the necessity for keeping farms, locations, villages and towns free from

* (1936) "Field Work against Plague". Proc. Transvaal Mine Med. Off. Ass. 15: 43-58.

(1938) "The Endemic Focus of Plague". S.A. Med. J. 12: 352-7.

rodents at all times. Rats and mice must be deprived of food, water and especially shelter in habitations. Killing of rodents and half-hearted rat-proofing are not enough. Rat-proofing measures must be more universally adopted. Plague can be stamped out in isolated communities such as farms and locations, but it is a very different matter when plague becomes established in urban areas. There the infection may smoulder and give rise to occasional cases over a long period. Should any of these develop pneumonic symptoms, a disastrous epidemic of pneumonic plague is likely to follow. It is necessary to consider such possibilities in this light to see the potential dangers of the present position.

There has been a further extension southwards of plague infection in wild rodents from the Doornbosch area in the Clanwilliam district. In 1932 plague infection was proved in a gerbille (*Gerbillus paeba*), in the Doornbosch area, when infection was shown to have crossed the Doorn River from the Calvinia side. The infection had not then crossed the valley to the Pakhuis Mountain Pass. Four years later, in 1936, a further epizootic occurred in the Doornbosch area. During April of this year the infection was found to have spread west towards the eastern side of the Pakhuis Mountains into the Kanonvlei Valley and up to the Nardouws Berg Pass, which leads to the Oliphant's River valley. There has been no extension down from the pass to the river.

This extension further menaces the wheat-growing districts of Malmesbury and Piquetberg and hence Capetown; a rodent-free belt has been established from the sea on the west inland to prevent the infection passing southwards from the infected areas in the north and north-east. It has been realised that however valuable the rodent-free belts may be, rodents are numerous south of the belts, though as yet free from infection. Accordingly a rodent inspector is now stationed at Capetown, who undertakes surveys south of the belts, and is available in an advisory capacity to the local authorities of the areas.

The Witwatersrand Plague Committee.—This body was established in 1935 (see Annual Report, 1936). Last year the Committee was dissolved and replaced by the Witwatersrand Epidemic Committee with wider representation and scope. Its object is to ensure co-ordinated action in the event of an outbreak of formidable epidemic disease on the Witwatersrand and to act as a medium for th exchange of information. The Committee is empowered to appoint sub-committees for special purposes (see Government Notice No. 1996, 24th December, 1937).

Anti-Rodent work on the Railways.—The railway health staff again regarded anti-rodent and plague measures as one of its main functions. Besides co-operating with local authorities and this Department in various minor outbreaks in the Cape and Orange Free State it played a prominent part in the organisation developed to deal with the situation at Port Elizabeth. All railway premises between Uitenhage and Port Elizabeth and the adjoining veld were disinfected. Apart from the large scale disinfestation extensive structural changes were required in the railway area of Port Elizabeth. Harbourage in buildings and yards was eliminated and improvements in rat-proofing of railway premises undertaken. All goods accepted for rail or sea at this centre are now disinfected prior to acceptance. The extensive rodent proofing of railway sheds throughout the country has been most beneficial in reducing damage and destruction by rodents. This work in conjunction with rodent destruction is being actively continued. In the Cape Western, Eastern and Northern districts very extensive works have been completed.

Ecological Studies.—An ecologist has been appointed by the Department for a period of three years to collate and analyse the information available on rodents, fleas and plague in South Africa; he will supplement these data by intensive research on rodent population and allied problems in the field. Mr. D. H. S. Davis, the officer appointed, spent four years with Mr. Charles Elton in the Oxford University Bureau of Animal Populations and has recently completed two years study of the domestic rat population of Freetown, Sierra Leone, under the auspices of the Liverpool School of Tropical Medicine. A description of the scope of the investigation and of proposals for research follows:—

Ecology may be defined as the study of natural communities of animals and plants in relation to the environment. In a sense it is natural history studied by the scientific method, for its aim is to collect quantitative, as well as qualitative data on animals and plants and to follow up field observations by experiments in the field and in the laboratory.

Animal ecology seeks to reveal and unravel the complex interrelations of animal communities. It includes, among other things, studies of the relation of predator to prey; the relation of parasite to host; the source and supply of food; feeding habits; social organisation; reproduction and breeding

habits and the incidence and effect of epidemic diseases. At the same time these subjects are studied in relation to each other and to the general environmental factors of climate, soil and vegetation.

The study of animal populations is a branch of animal ecology; it is chiefly concerned with the dynamics of populations, that is to say, it aims at obtaining a complete picture of the structure, organisation, growth and trend of a population. The chief objects of study are the numbers and changes in numbers of animals; the rate and powers of increase of animal populations including investigations of birth rates and mortality rates, length of life, sex- and age-distribution. These " animal " vital statistics form the basis for investigating and measuring the effect of epidemic disease, for example, upon the animal population.

Research on animal population problems is being carried out at an increasing number of centres. In Great Britain, Elton's pioneer work resulted in the establishment of the Oxford University Bureau of Animal Populations. The Bureau acts as a centre for research and as a clearing house for research in other parts of the world. Its work is chiefly with the nature, causes and economic effects of fluctuations in numbers of wild animals. Population research has been much stimulated by the application of mathematical methods to its problems. The theoretical work of Volterra in Italy, Pearl and Lotka in America and Gause in the U.S.S.R. may be mentioned. These workers have shown that there are certain mathematical laws governing the growth of populations.

Mention has been made in these reports and other publications on plague in South Africa of the bearing of Elton's work on rodent cycles upon the epidemology of plague in veld rodents. Elton points out that the periodic increase of an animal population is brought to a sudden end by the outbreak of epidemic disease. He shows further that there is a mass of evidence to support the view that the fluctuations tend to be regular and to occur in cycles, often synchronously over wide areas. Short-tailed field mice in Northern Britain, lemmings in Norway and lemmings as far distant as Labrador and North Canada reach a high density within a year or two of each other in a regular cycle of 3-4 years. This phenomenon can only be explained by assuming the integrating action of some climatic factor which either directly or indirectly affects the rodents. The recent advances in knowledge and technique of research on rodent populations made in Great Britain, America and the U.S.S.R. provide modern methods of attack that should contribute materially to an understanding of the problem of plague in South Africa.

Plague is an animal population problem. The reservoir of plague in Southern Africa is in wild rodents. The chief rodents that act as reservoirs are the widely distributed gerbilles (*Tatera* spp. and *Desmodillus*). Their numbers are known to fluctuate from year to year; there is a body of evidence that suggests that the outbreak of plague is closely associated with a certain " level " of density in the rodent population. The mortality that follows an epizootic drastically reduces this density and in many cases results in human infection.

One of the objects of investigation is to find out at what density and under what conditions epizootics of plague occur and what the mechanism is that enables the plague bacillus to survive during the period when rodent numbers are at a low ebb. A knowledge of the general state of the density of the rodent populations in different parts of the country combined with a full understanding of the factors that determine at what stage of the increase plague is liable to break out, will enable tentative forecasts of epizootics to be made with a greater degree of accuracy than is now possible.

The species of fleas which is responsible for the transmission of plague from rodent to rodent and from rodent to man falls into two classes: those that are associated with veld and domestic rodents respectively. Plague is primarily a disease of rodents, and it is only by accident that man becomes infected. Man is not necessary for the continuance of the disease. It is of first importance, therefore, to have a thorough knowledge of the way in which the plague bacillus reaches and infects domestic rodents, for it is through domestic rodents that the greater proportion of human beings is infected. It has been established that infection from wild rodents reaches domestic rodents through contact with semi-domestic rodents; how this occurs is only broadly understood and needs further intensive research.

At present our knowledge of the distribution of rodent fleas is almost entirely confined to those areas where plague is endemic. It is therefore not possible to compare the flea fauna of infected and non-infected parts of Southern Africa. In order to be able to estimate the chances of further spread of plague a comprehensive survey of the distribution of plague-carrying fleas is to be carried out.

A further line of work is the study of climatic factors in relation to the epidemiology of plague in rodents and in man. Of particular interest are

the climatic conditions in rodent burrows where fleas live and breed. It has long been known that fleas, both as larvae and as adults, can only withstand certain ranges of combinations of temperature and humidity. Fleas cannot tolerate hot dry conditions and for this reason they are found breeding in rodents' nests where the temperature fluctuations are much less and the humidity much higher than the outside air. The seasonal prevalence of fleas is a factor of great importance in the epidemiology of plague and can be explained only when these " microclimatic " conditions are known.

The seasonal prevalence of bubonic plague in India is determined by the climatic conditions. The hot dry weather is the " off plague " season. In the Russian steppes, ground squirrels hibernate during the winter, but infected fleas are able to survive and in the spring, when the climatic conditions become less severe, a wave of infection occurs owing to the increased activity of fleas and rodents.

The problems outlined above will be tackled along three main lines.

It is proposed to establish a field station in an endemic area where continuous observations will be made over a long period. In this way the course of events leading to the outbreak of plague in the gerbille population will be followed and related to the spread from the gerbilles to domestic rodents and to man. Particular attention will be paid to finding out why such widespread infection, as is known to exist among wild rodents, does not give rise to a greater number of cases of plague in man and to use this knowledge in devising scientific control measures.

The first part of the field work will consist in carrying out an intensive survey of the rodents and fleas in a small area. From this preliminary survey, standard methods of studying the changes in the flea and rodent population will be devised. Observations on the rodent density, breeding state and distribution, the flea fauna of the rodents, their nests and burrows will be carried out at fixed intervals in order to build up a picture of the changes that are taking place. The health of the rodents will be periodically investigated to determine the point at which an epizootic of plague breaks out.

As soon as a suitable field technique has been evolved, observations will be started in other areas as a comparison with the results obtained at the main field station.

In addition it is hoped to organise an " intelligence service " of independent observers in different parts of the country who will report at regular intervals on the density of the rodents in the areas with which they are familiar. If this can be organised on a large enough scale it will be possible to show where rodents are on the increase, and hence where epizootics of plague are most likely to occur.

Finally the survey of the distribution of the rodent fleas will be based on a technique of collection and sampling determined by preliminary surveys in different types of country.

The practical measures adopted for the control of plague in man depend upon a thorough knowledge of plague in rodents. This research should provide the basis for devising further measures to reduce the contact between man and plague-infected fleas.

Ecological research is necessarily co-operative. The ecologist, primarily a zoologist, has to take into consideration such a wide range of factors that his knowledge is scattered amongst a large number of subjects and he has to be in a position to refer points to specialists and to enlist their help. The proposed ecological investigation is to have the support and co-operation of the South African Institute for Medical Research and the Onderstepoort Laboratories (through the Zoological Survey) as well as other institutions and organisations.

15.—Rabies or Hydrophobia.

Reports were received of 25 persons who were bitten by rabid animals. There were 4 deaths from the disease. A particularly sad case was that of a little European boy who seeing a sick mongoose on the outskirts of Randfontein teased it and received a bite on the hand. This was ignored by his parents until the urgent symptoms of rabies developed some weeks later. By then treatment was of no avail and the child died. Such a case is a forcible demonstration of two important facts in rabies control—firstly, the danger of molesting or in any way handling small veld animals especially if ill, and secondly, the appalling risk of delaying treatment of any bite received from such animals.

At its February meeting the Council of Public Health gave some consideration to rabies. This subject has continued to be studied at the Onderstepoort Laboratories, especially in regard to the habits, burrow forma-

tions and migration of the meercat family. Methods of destroying the vectors of the disease in their burrows are still being tried, while the work of the zoological survey being carried out under the auspices of the Division of Veterinary Services is giving valuable data on the distribution of the vectors.

Last year, Dr. Rhodes, Government Pathologist, Capetown, while overseas was authorised to investigate treatment with anti-rabic vaccines. A noteworthy advance made by overseas research workers is the cultivation of rabies virus in tyrol solution containing embryonic brain tissues, as well as on the chorion allantoid membrane of the chick. It is anticipated that the possibility of cultivating the virus artificially will soon revolutionise the methods of rabies vaccine preparation. Following the acceptance of Dr. Rhodes's proposals by the Council it has been agreed to increase the strength of the Department's vaccine by issuing a 4 per cent. brain emulsion instead of the 2 per cent. brain emulsion previously in use.

16. Relapsing Fever.

Relapsing fever has been known to exist in Southern Africa, including parts of the Union, for a considerable time, but it is only recently that attention has been drawn to its importance from a public health point of view. The recent prevalence in some of the mine compounds in Griqualand West has drawn attention to the disease and the South African Institute for Medical Research is at present engaged in certain investigations the results of which are awaited with interest. The disease occurs in a number of countries in somewhat different forms. The variety occurring in Southern Africa is carried by the tick *Ornithodorus moubata* and for this reason the disease is sometimes known as " tick fever " but is not to be confused with " tick bite fever " which is an entirely different condition. The habits of this tick are similar to those of the bed-bug; it hides in the daytime in crevices in the walls and floors or in thatched roofs of Native huts and emerges at night to feed on the sleeping inmates. Prevention of infection, therefore, implies avoidance of the tick's natural habitat. In the construction of Native compounds, in areas where the disease occurs, sleeping quarters should as far as possible be so built as not to afford harbourages to the tick; the floors, walls and roof should be of hard material free from cracks. Relapsing fever is known to occur in the northern and north-eastern Transvaal and Griqualand West; but the possibility of its occurring in other parts must not be lost sight of. In those areas where malaria occurs relapsing fever must always be remembered in making a differential diagnosis, as the assumption that all high and intermittent pyrexia in patients living in the lowveld is due to malaria may cause errors in diagnosis with very serious results. The differential diagnosis is, of course, easily made by an examination of the blood.

17.—Smallpox.

The smallpox incidence for the last six years is shown in Table 18:—

Table 18.—Smallpox Cases and Deaths during Past Six Years.

Year ending 30th June.	Cases.	Deaths.
1933	20	—
1934	29	1
1935	29	—
1936	24	6
1937	27	1
1938	653	7

These figures reflect the widespread prevalence of smallpox during the last six years. The cases and deaths for the year are given in Table 19. This table shows several important features.

The disease has been unusually mild, only 7 deaths occurring in over 600 cases; the Transvaal experienced the majority of outbreaks. It affected predominantly Natives; in no single outbreak were serious proportions or anything like an epidemic experienced.

The prevalence dates from June last year when the Additional District Surgeon, Pietersburg, discovered cases of smallpox at Matok's Location. This outbreak seemed to be traceable to earlier cases in the Louis Trichardt District. The next large group of cases occurred in the Pietersburg District in September and since then the Northern Transvaal has reported groups of cases each month from the Louis Trichardt, Letaba and Pietersburg Districts.

The first central Transvaal outbreaks, Witbank in August, 1937, Boksburg in September and Germiston in October gave strong evidence of origin in the Northern Transvaal. The Germiston outbreak and patients arriving from the northern districts were the sources of the cases occurring in Alexandra Township, Brakpan and Queenstown. From these foci infection spread, in many cases through travelling unvaccinated members of the Apostolic Faith, to Pretoria, Standerton and Heidelberg. The cases at Nelspruit, Bethal, Winburg, Bloemfontein and Vrede were probably related to the Alexandra and other Reef cases. The prevalence in the Union thus originated in the north-eastern Transvaal, and from evidence it has become clear that in the rather inaccessible area including the south-eastern portion of Rhodesia, the adjacent region of Portuguese East Africa and the Northern Transvaal cases of smallpox and " Amaas " had been occurring for several months.

In both the first reported outbreaks in the Pietersburg District last year the District Surgeons concerned acted immediately and carried out the following measures: —

(*a*) Isolation of patients;
(*b*) quarantining of close immediate contacts;
(*c*) vaccination of all contacts;
(*d*) vaccination campaigns in neighbouring districts.

When smallpox reached the Reef a certain anxiety was felt as to possible large outbreaks in the locations. However, in each instance, immediate vigorous action on the above lines obviated any disturbing spread. The Reef situation was capable of rapid control largely because of the local health machinery available in each town. In areas outside of local authorities, the magistrates called upon district surgeons to organise their campaigns. The procedure has largely been identical in every outbreak, in most cases advice and instructions being secured from the Department. Cases from Reef and adjacent districts were transported to Rietfontein Hospital; in other areas cases were isolated and treated locally. Guards for this purpose as well as for the supervision of quarantined contacts were authorised. When secondary cases have occurred in some districts, the Department has recommended the employment of searchers to trace suspected cases of illness. There was a certain amount of concealment of illness by Natives, especially of the Apostolic Faith. In the vigorous large scale vaccination campaigns conducted along the Reef, in the Pretoria, Heidelberg, Bethal and Standerton Districts, extra medical assistance for Europeans, and the employment of lay vaccinators for Native vaccination were arranged. Compulsory vaccination was authorised in two instances: in a group of Apostolic Faith Natives in Alexandra Township in which smallpox recurred in unvaccinated people, and in a similar group in the Heidelberg District.

Large groups of people or large areas or farms were not quarantined as such measures would have been practically impossible, and not justified in the existence of an adequate safeguard in vaccination. In those areas where there was not a full-time health staff, the Department usually communicated directly by telephone with the officials concerned, viz., the magistrate and district surgeon to secure satisfactory action.

It is estimated that on the Reef approximately 750,000, in Pretoria and district 200,000 and in the rest of the Transvaal 650,000 vaccinations have been undertaken in the last 12 months, while for the whole country the vaccinations probably exceeded two million. The condition of vaccination of all the persons who contracted smallpox is not known; but that of patients in the Rietfontein Hospital is significant, especially in view of the perennial anti-vaccinational criticism. Of the 9 European cases only 2 were vaccinated, both over 60 years ago; of the 100 Native sufferers not one had previously been vaccinated. The situation at Alexandra Township, Springs and Heidelberg is a striking demonstration too of the dangers to which the unvaccinated are exposed in the face of smallpox. All the secondary cases occurred in the Apostolic Faith group who had avoided vaccination.

The widespread prevalance including occurrence in the urban Reef districts led to considerable public interest throughout the Union. In certain isolated instances actual alarm followed. This was, however, usually short-lived when it became apparent that the various measures prevented epidemic spread. Nevertheless the large number of outbreaks which occurred in March, April and May, demanding the organisation of numerous mass vaccination campaigns, unfortunately coincided with serious outbreaks of plague at Dordrecht and Port Elizabeth, and a public excitement over outbreaks of vulvo-vaginitis at Nylstroom and Pretoria. In spite of this quite exceptional call on the Department's resources no breakdown occurred, the outbreaks were promptly and satisfactorily handled, while the vaccine institute met an unprecedented demand for lymph of which it supplied over five million doses to the Union and adjacent territories.

TABLE 19.—SMALLPOX: CASES AND DEATHS REPORTED DURING THE YEAR ENDED 30TH JUNE, 1938.

Province.	Number of Districts in which Outbreaks Occurred.	European.		Non-European.		Total.	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cape	7	5	—	18	—	23	—
Natal	2	2	—	1	—	3	—
Orange Free State	6	—	—	25	—	25	—
Transvaal	21	19	1	583	6	602	7
UNION	36	26	1	627	6	653	7

Though not at full strength the controlling staff of the Department was able to meet all requests and was most willingly supported by medical officers of health, magistrates and district surgeons in handling outbreaks. A not unexpected but welcome result of the excitement has been the high level of vaccination achieved in the population.

From the above account it is seen that the Government Vaccine Institute at Rosebank, Cape Province, had an unusually heavy period of activity. As it was, by the end of March, 1938, stocks had been depleted down to 60,000 doses; but at June, 1938, stock on hand was 1,600,000. It will have been increased to 2,000,000 doses by the end of the year. The number of tubes manufactured during the year was 3½ million which constitutes a record, the average number of tubes manufactured in any one year being as a rule about a million and a half.

The preparation of vaccine was carried out in two stages; the normal yearly programme during the months of September, October and November when 1½ million doses were made; the emergency supply of over 2 million doses manufactured during the months of April, May and June. It is proposed to make another 2 million doses in the months of August, September, October and November, 1938, so that by the end of the year 1938 we should again have about 3½ million doses on hand. But for the fact that a large amount of the lymph was sent out in ampoules the staff could never have coped with the work.

There is a very serious difficulty in vaccinating calves in the months of April, May and June. This is due to the fact that there is no grazing in the Cape till some two months after the winter rains have started. The calves are then in very poor condition and the yield of lymph from each calf is very low. It is uneconomical to vaccinate at this period, but owing to the acute shortage of lymph it had to be done. The real increased demand began in October when 110,000 doses were issued. In November ½ million doses were issued; in December the demand dropped to 272,000 and in January it again dropped to 6,900; but by February the amount had again gone up to 161,000 and in March it was nearly 700,000. Because of this sudden excessive demand arrangements were made to vaccinate calves in April. In view of this crisis of last year it became necessary to review the matter of the amount of lymph which is kept in cold storage. Previously 3 million doses in cold storage had been considered adequate for any emergency. This, however, has now proved not to be so. The Vaccine Institute is in a position to vaccinate calves at short notice and in future, as soon as stocks get below 2 million, it is proposed to do so irrespective of what time of the year it happens to be.

Chicken Embryo Lymph.—As soon as Dr. Rhodes, Government Pathologist, Capetown, returned from overseas in September the manufacture of chicken embryo lymph was commenced. By the time the sudden great demand for calf lymph had started in November some 300,000 doses had been made. Owing to this rush the whole manufacture of chicken embryo lymph had to be suspended, partly owing to the fact that staff was not available and partly owing to the absence of suitable apparatus for manufacture. Some difficulty has been experienced in the manufacture of chicken embryo lymph. It has been found impossible to grind suitably the lymph in the present calf lymph grinding machines owing to the fact that sterility cannot be maintained, and also owing to the fact that the chicken embryo membrane is a much tougher material than the calf lymph pulp. Altogether some 7 or 8 thousand vaccinations have been done with this lymph with complete success. The whole of the population of the Langa Location at the Cape amounting to about 6,500 people was vaccinated in March with chicken embryo lymph which had been prepared in October and November, so that it certainly keeps for four months in cold storage.

The intradermal method in this country is only used in exceptional cases, mainly on females who do not wish to show the slight scarring resulting from vaccination. The method has this positive disadvantage that it is impossible to see whether a person has ever been vaccinated or not. In this country it is very undesirable not to know by an examination of the arm, whether a person has or has not been vaccinated. Another objection to the intradermal method seems to be the possibility of the increase of encephalitis following vaccination.

A report of the International Office of Public Hygiene for the years 1936-37 points out that only 11 cases of encephalitis had occurred following vaccination in Italy. All of these cases followed vaccination by the intradermal method. Unfortunately, it was not stated what percentage of intradermal vaccinations was done in Italy, but the probability is that the scarification method far outweighs the intradermal method in numbers.

Another point that might be emphasised here is the fact that there are 40 recorded cases of tetanus following vaccination in the United States of America and that in all these cases dressings have been used to cover the vaccination site.

On the 14th December, 1937, the following case was reported:—

> "Coloured female child aged 9, vaccinated on the 29th November at Claremont by the District Surgeon, Wynberg, with calf lymph. Taken ill on the 10th December (incubation period therefore 11 days) with convulsions, vomiting, headache and temperature. Admitted to the City Hospital, Capetown, on the 12th December. At time of admission temperature was 102° and went as high as 103°. The child on admission was quite unconscious, but the only central nervous symptom was slight Kernige reaction. Lumbar puncture showed a slight cell increase and nothing else. When seen the child showed good vaccination marks which had scabbed over, each mark being fully an inch long and ¾ inch in diameter. The child eventually recovered and there seems to be no doubt that this was a case of post vaccinal encephalitis."

At the same time there was a case of post measles encephalitis in the City Hospital.

A similar case was reported from Johannesburg where nervous symptoms followed 10 days after vaccination in a child 14 years old. Vaccination was also done with calf lymph. The child was vaccinated on the 16th October. These are the only two cases of nervous symptoms following vaccination during the year.

Towards the end of December, Dr. Mackintosh, Medico-legal Pathologist, Johannesburg, reported very severe reactions resulting from vaccinations done in the Johannesburg District, particularly at the Alexandra Township. It was first of all contended that the lymph was too potent, but after a further enquiry into the matter it seems to have been agreed that the real cause of the trouble was over-vaccination. Since that date no further complaints have been received from any source.

TABLE 20.—VACCINATION OF INFANTS AND CHILDREN IN THE CLASSES OF THE POPULATION WHICH REGISTER BIRTHS, YEAR ENDED 30TH JUNE, 1938.
(These figures do not include Re-vaccination of the 12-year old Children.)

Particulars.	Cape.		Transvaal.		Natal.			Orange Free State.	Union.
	Cape District.	Remainder of Province.	Rand Area.	Remainder of Province.	Durban.	Pieter-maritzburg.	Remainder of Province.		
Births Entered in Vaccination Register	13,238	34,626	14,547	11,916	2,670	735	1,801	4,916	84,449
Successfully Vaccinated	11,549	5,410	6,224	5,381	1,415	429	1,020	2,718	34,146
Insusceptible to Vaccination	22	15	28	28	58	12	17	33	213
Vaccination Postponed owing to Illness	126	426	649	757	351	99	302	923	3,633
Previously had Smallpox	3	—	—	—	—	—	—	—	3
Deaths of Infants under Two Years Registered	2,891	2,928	814	651	190	61	181	235	7,951
Exempted under Section 10, Act No. 15 of 1928	37	68	136	119	177	14	52	60	663

TABLE 21.—RE-VACCINATION OF TWELVE-YEAR-OLD EUROPEAN CHILDREN IN NATAL, YEAR ENDED 30TH JUNE, 1938.

Particulars.	Durban.	Pieter-maritzburg.	Remainder of Province.	Total.
Registration of twelve-year-old European Children	1,432	475	1,401	3,308
Successfully vaccinated	1,056	348	951	2,355
Insusceptible to vaccination	105	68	134	307
Vaccination postponed owing to illness	43	7	41	91
Previously had smallpox	—	—	—	—
Due for revaccination but previously exempted under Act 15 of 1928	57	13	31	101

18.—TUBERCULOSIS.

In the Annual Report of this Department for 1933 the position up to that date regarding tuberculosis was reviewed and certain proposed extensions of the anti-tuberculosis schemes in force at that date were outlined. All these extensions have either been completed or are under way. At Nelspoort Sanatorium two additional blocks have been built and are now in use bringing the total number of beds at that institution up to 170. Details of the cases dealt with at this institution during the year are given later. At Capetown additional beds for cases of pulmonary tuberculosis have been provided and there are now 84 beds for Europeans and 84 for non-Europeans. The clinic is being reorganised and a full-time tuberculosis officer has been appointed by the Capetown City Council. Apart from accommodation in Capetown for cases of pulmonary tuberculosis there exist approximately 150 beds for cases of surgical tuberculosis. Surgical tuberculosis being regarded as non-infectious is not dealt with by the Department, although in many instances a case of surgical tuberculosis has also pulmonary complication.

The beds for surgical tuberculosis are provided by—

(1) the Cape Hospital Board at the Princess Alice and Lady Michaelis Orthopaedic Homes;

(2) the Invalid Children's Aid Committee provides 50 beds for non-European crippled children in the Maitland Cottage Homes;

(3) the St. Joseph's Home, Philippi, under the Roman Catholic Church provides accommodation for 50 non-European children.

These institutions deal with all forms of crippling in children but many of the cases are of tuberculous origin, and more accommodation is urgently required.

A very useful institution is the Sunshine Home for Children at Bellville where accommodation for 24 European children is provided. These children are mainly contacts of cases of tuberculosis. The children attend school at the Home and the discipline is excellent in a pleasant homelike atmosphere. There is, unfortunately, no similar institution for non-European children.

Excellent work is being done by the Care Committee for Tuberculosis Patients in Capetown. All cases referred to the Committee are carefully and sympathetically investigated and help given where required. The Committee has a small colony for 20 European males at Duinendal where patients on their return from institutional treatment can live until suitable employment is found for them. Work at the colony is also provided in the way of rug-making, carpentry and poultry-keeping.

The City Council proposes to increase the staff of home visitors for tuberculosis cases from 4 to 8. It is also proposed to establish further hospital accommodation at Capetown for 200 more beds. This will necessitate a separate institution. It is hoped that sufficient ground in a suitable area may be secured for further extensions and developments.

The incidence of tuberculosis in Capetown is a cause for considerable anxiety. For the years ended 30th June, 1936 and 1937, the following deaths occurred from this disease:—

Type.	European.		Non-European.		All Races.	
	1936	1937	1936	1937	1936	1937
Pulmonary	103	71	543	512	646	583
Meningitis	12	10	52	46	64	56
Other tuberculous diseases	8	3	34	37	42	40
	123	84	629	595	752	679

This represents a tuberculosis death rate per 1,000 of the population of 0·55 for Europeans and 4·20 for non-Europeans. The need for more hospital accommodation for non-Europeans suffering from tuberculosis is indeed urgent.

It is essential in dealing with tuberculosis that once a case has been discovered the patient should never be lost sight of. This is the basis of all schemes such as the Edinburgh Scheme and the Papworth Scheme. In Capetown, although much yet remains to be done, definite progress has been made towards the establishment of a complete scheme of anti-tuberculosis measures.

The Cape Anti-Tuberculosis Council.—A meeting of interested voluntary bodies was held in Capetown on 23rd June, 1936, to discuss the co-ordination of organisations engaged in preventing and combating tuberculosis in the Cape Province. As a result of discussions the Cape Anti-Tuberculosis Committee was formed. The following bodies are represented on this Council:—

Union Health Department.
Provincial Council.
Cape Divisional Council.
Capetown Municipal Health Department.
Care Committee for Tuberculosis Patients (Capetown).
Sunshine Home for Children (Capetown).
Cape Hospital Board.
Advisory Committee, Nelspoort Sanatorium.
Worcester Tuberculosis Committee.
Ministry League, Port Elizabeth.
Municipality of Mossel Bay.
Health and Social Service Committee, Lovedale.
Knysna and District Health, Social and Child Welfare Society.
Christmas Stamp Fund (Capetown).

The Chairman of the Council is Dr. Karl Bremer, M.P. The Council also administers the funds of the King George V Jubilee Fund allocated for the Cape Province. This fund has been most helpful; it has proved of great value to many sufferers from tuberculosis.

Stellenbosch.—The Infectious Diseases Hospital at Stellenbosch has accommodation for cases of pulmonary tuberculosis; it is serving a very useful purpose in dealing with acute and advanced cases of tuberculosis.

Paarl.—The Paarl Municipal Council is considering the erection of an infectious diseases hospital at Paarl in which cases of tuberculosis can be accommodated. The present lazaretto is not very suitable.

Malmesbury.—There is a small, rather primitive infectious diseases hospital at Malmesbury where cases of tuberculosis can be isolated.

Namaqualand.—A proposal is being considered for the erection of a hospital of some 30 beds at Springbok for cases of tuberculosis.

Port Elizabeth.—A new infectious diseases hospital with accommodation for 75 cases of tuberculosis has been built and is now being equipped. It will be opened shortly.

Lovedale.—The building of a new hospital of 90 beds for tuberculous cases has been commenced at Lovedale in connection with the Victoria Hospital. This new hospital is for cases of tuberculosis in Natives. At the present time many cases of pulmonary tuberculosis are admitted to the Victoria Hospital in which surgical tuberculosis is also treated, in addition to general medical and surgical cases.

Umtata.—Plans have been drawn up for a block of 30 beds for cases of tuberculosis to be attached to the Umtata Hospital.

East London.—The Infectious Diseases Hospital at East London accommodates cases of tuberculosis, but more beds are required.

At the *Nessie Knight Hospital, Sulemkama*, near Qumbu, accommodation is being provided for Natives suffering from tuberculosis, consisting of 20 beds.

Holy Cross Mission, Pondoland.—There is a general hospital at the Holy Cross Mission near Flagstaff, Pondoland, where cases of tuberculosis are admitted.

Natal.—The new tuberculosis hospital at Durban is now being equipped and will be opened early in 1939. In this institution 137 beds are provided and the hospital is equipped with all modern facilities for the treatment of pulmonary tuberculosis.

The Natal Anti-Tuberculosis Association continues its excellent work.

Orange Free State.—The hospital at Tempe under the control of the Municipal Council of Bloemfontein caters for cases of tuberculosis. It is proposed to equip this hospital further with a modern X-ray outfit and to extend the work of the hospital and establish a clinic.

Transvaal.—Beds are provided for Europeans, both male and female, at the Springkell Sanatorium, which is fully equipped and for non-Europeans at Rietfontein Hospital, where there are 52 beds.

Tuberculosis in Country Districts.—Much concern is being felt regarding the occurrence of tuberculosis in country districts. Beaufort West has long had a reputation for its favourable climatic conditions, with the result that many tuberculotics go to that town and often live under very unsatisfactory conditions. Many of them are poor people and when the little money they have is exhausted they become a burden on the local municipality. In other Karroo towns such as Aberdeen tuberculosis is occurring among the local people and often the younger people are victims.

In the coastal areas round George and Knysna, tuberculosis appears to be increasing. The Department has made some preliminary investigations in these areas and it is proposed to call a conference of medical officers of health and tuberculosis workers for the purpose of co-ordinating the different schemes and of ascertaining what is still needed and generally to enable facilities to be used to the best advantage.

General measures for increasing Resistance to Infection.—Many social conditions favour the spread of tuberculosis. The measures being adopted to combat these evils may be briefly summarized.

Housing conditions are in many areas extremely bad. Steps are being taken to improve these bad conditions. During the past two years the Central Housing Board has allocated between *nine and ten million pounds* for slum elimination and sub-economic housing. These are sub-economic schemes which will take from one to four years to complete.

Since the passing of the Housing Act in 1920, the Provincial Housing Loan Funds have advanced nearly 5¼ million pounds for economic housing. The money as it is repaid is available for reissue.

The Housing Loan Funds have been supplemented annually with considerable new moneys voted by parliament.

Nutritional factors are also of considerable importance in the epidemiology of tuberculosis. Any action dealing with malnutrition in the Union especially if directed to improving non-European conditions will be reflected also in a lowered incidence of this disease. Considerable importance therefore attaches to the present interest in the subject of nutrition.

Sanitary conditions generally are also of concern in any tuberculosis campaign. The measures being adopted by the government and local authorities to improve these will have valuable results in connection with tuberculosis as well as other diseases due to insanitation.

Personal hygiene is of fundamental importance in preventing the spread of tuberculosis. The new national campaign of health education launched by the Department may also be expected to produce valuable results in combating the disease.

It will thus be appreciated that tuberculosis, like so many other diseases, presents a medico-social problem, and that its control requires many factors to be tackled.

This was well exemplified by an investigation carried out during the year by Dr. Clark, an Assistant Health Officer of the Department, in certain south-western areas of the Cape Province. He reported that the evidence of all those best qualified to know, such as magistrates, doctors, and municipal and social workefs, revealed that poverty was particularly marked in these regions. This was particularly true of the Knysna division where the proportion of people in receipt of Government grants or aid of one sort or another is particularly high.

The complex economic and social factors leading to this widespread poverty are somewhat beyond the scope of this report, but as the whole subject is so intimately associated with the general health of the community some of the main factors will be briefly discussed. The usual conditions such as sub-division of farms among large families which operate in other parts of the country tending to produce pauperism among our rural population were also found in operation in that region. In addition to these, however, there were certain factors peculiar to this part of the country which have had a marked bearing on the subject. This region was particulary isolated until comparatively recently, when the railway was built from George to Knysna and the line over the Montagu Pass was constructed. The narrow coastal

strip between the sea and the Outeniqua Mountains, which is only about 10-12 miles in width, was cut off almost completely by the mountains to the north, while journeys to the centres of civilization, either to the east or west, were long and difficult. The coastal strip itself is hilly and freely intersected by deep kloofs in which the rivers run. This natural formation coupled with the high rainfall and dense forests which cover large areas of the country tended to make travel more difficult. For these reasons the inhabitants had very little communication with the outside world. They were able to eke out a simple living from the forests. Owing to lack of mental stimulation the general standard of living remained low. As time went on and with the gradual elimination of many of the best trees it became increasingly difficult to make a reasonable living. At the same time owing to lack of communication with the outside world, an ignorant and morose type was evolved and intermarriage was prevalent. Both mental and physical defects appear to be common.

In 1913 the Government decided to take steps to preserve the natural forest. It was considered that the woodcutters who had in many cases worked in the forest for generations had acquired prescriptive rights to the timber. As these rights could not be suddenly withdrawn, it was decided to control the activities of these people and gradually to eliminate them. A list of " registered woodcutters " was drawn up and regulations were framed under the relative Act. A " Woodcutters' Board " was constituted consisting of the three Magistrates of Knysna, George and Humansdorp and three lay members. This Board meets annually to hear complaints against " registered woodcutters " and to put the provisions of the regulations into effect. The regulations lay down the procedure to be followed in the allotment of trees, the method of procedure at Board meetings and a number of other matters.

These provisions have diminished the numbers of woodcutters and whereas in 1913 the original list of " registered woodcutters " numbered about 1,700 there are now less than 300. Those who remain are in most cases past middle life. One provision was obviously intended to help in eliminating the woodcutters more rapidly, but it has had the unfortunate result of discouraging enterprise in other directions. The annual allotment of timber to each woodcutter is strictly limited and each year's quota can be cut and worked in about 3-4 weeks by an active and energetic man. The " registered woodcutter " is therefore faced with the alternative of doing little or nothing for the majority of the year or of being removed from the list if he engages with any degree of success in any other enterprise. The Forestry Department does, however, employ some of these men during the off-season where possible. The inducement to remain on the list would not appear to be very great, as it is understood that the average wodcutter only makes about £40 to £60 a year. The attraction lies, however, in the fact that lots are drawn and the trees vary very considerably in value. A man who is fortunate enough to draw valuable timber may make £120-£150 a year which represents a very large sum to these people. Draws of this sort are very uncommon; but the possibility is sufficiently attractive to the woodcutters to make them want to remain on the register. The system is, however, rapidly dying a natural death. Apart from the people who are directly dependent on woodcutting there is considerable poverty among both European and Coloured people in this region. From a farming point of view the country is poor. At the Wilderness Heights and at Olifantshoek there are large church settlements peopled by poor Europeans. Housing and conditions of sanitation are in general primitive and at neither place is there a satisfactory water supply. In the area known as the " Lakes ", i.e. Rondevlei, Langvlei, etc., along the coast between the Wilderness and Knysna there is a large number of both Europeans and Coloureds living as peasant farmers or casual labourers. That there is a great deal of poverty in these regions is reflected in the bad housing conditions and deficient dietaries of large numbers of the people.

No accurate data could be collected; but sufficient information was obtained by questioning a large number of people to show that the diet of practically all the Coloureds and a large proportion of the poorer Europeans was grossly inadequate. This is undoubtedly an important factor in causing a lack of resistance and in favouring the high incidence of tuberculosis. The staple article of diet of the Coloureds is sweet potatoes. Other common articles are mealie meal and rice. Bread is only used regularly by those who are slightly better off. Meat is usually obtained only at week-ends and does not form a regular article of diet. Milk is a luxury which the majority of Coloureds and poor Europeans buys only occasionally and in small quantities while many never have it at all. It is not a regular item even in the dietary of the children. This undoubtedly has an important effect in lowering the standard of nutrition and resistance to disease. Neither Europeans nor Coloureds seem to grow nearly as many vegetables as would be possible with a little more effort.

At George, housing of Coloureds was very bad in the past; but recently the Municipality has improved matters very considerably by building a large Coloured location at Urbanville and by demolishing the insanitary area known as Barriedale. There is, however, still an urgent need for better housing conditions for a large number of the Coloured people, particularly those at present living on the " Island ".

At Knysna, the great majority of the Coloureds and some of the poorer Europeans live outside the municipal area in the very insanitary areas of Ou Plaas and Salt River. In these areas the houses are unhygienic and in many cases grossly overcrowded, thus favouring the spread of tuberculosis and other infections.

Housing conditions in the forests are variable, but in general, they are poor and in some cases definitely bad. The " registered woodcutters " hire ground from the Forestry Department and put up their own houses. The dwellings are poor, but in general they are better than those of the people living in the private forests near Knysna. Many of the " registered woodcutters " live a long way from their work and they often go into the forests and live in the open, frequently under a couple of sheets of corrugated iron for a week or more at a time, without returning home. For technical reasons the work is carried out in the winter; as the forests are very damp and cold at that time the woodcutters suffer severely from exposure.

The housing of Europeans in Humansdorp is good, but the conditions under which the Coloured people live both in Humansdorp and in the neighbouring village of Jeffrey's Bay and parts of Kruisfontein, notably Graslaagte, are deplorable.

In general it may be said that the housing conditions of the poorer Europeans and of the Coloureds are bad throughout the area and that this factor contributes markedly to the high incidence of tuberculosis.

Other diseases leading to a lowering of general resistance play a part in the spread of tuberculosis. Tape-worms, thread worms and round worms are all very common throughout the area. The high incidence of these parasites is the direct result of the lack of proper sanitation. Venereal diseases, especially syphilis, are common, particularly among the Coloureds. " Rheumatism " of varying degrees of severity is very common among the forest workers. Conditions caused by malnutrition, including rickets, are common in children.

The climate is comparatively wet and rain falls intermittently all the year round. The relative humidity is presumably fairly high. The soil being of a clay type does not drain well and as many of the poorer houses are very badly constructed they are damp. In addition to this the climate is equable without very cold bracing winters as are experienced inland. These factors tend towards lowering of resistance and the spread of tuberculosis infection.

Intermarriage among members of the same family is common among the poorer people in this part, because of the isolation of the district. This has had a deleterious influence both physical and mental.

Incidence of Tuberculosis.—The extent to which tuberculosis occurs in the Union is not accurately known. Notification is still somewhat defective, and figures compiled from this source are liable to give an erroneous impression. The cases notified during the year are set out in Table 22 and are seen to total 12,338 as compared with last year when the number was 10,551 and the year before that, when it was 8,755.

TABLE 22.—TUBERCULOSIS: NOTIFICATIONS DURING THE YEAR ENDED 30TH JUNE, 1938.

Province.	European.	Non-European.	Total.
Cape (excluding Transkei)	596	5,021	5,617
Transkei	3	2,988	2,991
Transvaal	125	1,704	1,829
Natal	122	1,551	1,673
Orange Free State	9	219	228
UNION	855	11,483	12,338

The death rates from tuberculosis for Europeans in the Union from 1912 onwards are shown in Table 23.

TABLE 23.—DEATH RATES FROM TUBERCULOSIS PER 100,000 OF POPULATION—EUROPEANS ONLY.

Year.	CAPE.			NATAL.			TRANSVAAL.			ORANGE FREE STATE.			UNION.		
	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.
1912	70·55	44·83	58·11	85·84	62·66	75·03	55·97	26·97	43·14	29·58	28·09	28·89	61·10	38·32	50·49
1913	70·19	53·93	62·31	81·15	52·19	67·60	57·61	22·43	41·88	29·54	24·13	27·02	61·21	39·67	51·13
1914	60·82	40·27	50·85	83·59	32·85	59·80	57·60	25·42	43·08	28·44	14·31	21·81	57·26	31·39	45·10
1915	56·42	40·43	48·64	69·37	33·52	52·52	60·69	21·73	42·95	19·98	25·92	22·78	54·26	31·76	43·63
1916	42·31	44·91	43·58	75·22	35·95	56·72	72·37	33·91	54·71	27·30	16·30	21·99	53·91	36·77	45·78
1917	64·12	51·27	57·53	66·75	38·21	53·28	70·23	22·42	48·09	37·75	16·12	27·44	63·18	35·55	50·02
1918	52·07	39·25	45·81	64·87	46·97	56·39	76·62	21·28	50·80	37·65	18·20	28·33	60·24	31·06	46·28
1919	41·56	49·23	45·32	57·63	30·66	44·73	82·21	13·39	49·82	43·60	12·37	28·61	57·95	30·55	44·77
1920	52·55	39·07	45·94	73·70	43·50	59·14	72·91	19·73	47·70	45·30	17·79	32·08	60·92	30·07	46·00
1921	36·99	64·06	60·48	74·93	24·00	50·21	102·08	22·70	64·22	54·13	23·12	39·20	74·65	40·87	58·26
1922	61·70	55·91	58·84	35·64	11·54	23·90	75·78	22·41	50·24	20·07	19·52	19·81	59·27	35·56	47·74
1923	55·03	52·43	53·74	41·62	40·45	41·05	74·45	21·12	48·77	19·91	17·17	18·59	56·53	35·91	46·46
1924	67·04	52·82	60·00	50·93	36·38	43·77	84·54	23·41	55·01	14·71	22·25	18·33	65·47	37·08	51·59
1925	65·65	62·14	63·91	73·89	40·51	57·42	74·27	21·84	48·87	30·01	12·59	21·65	65·19	39·68	52·70
1926	58·97	57·36	58·18	49·23	39·85	44·64	95·54	24·41	61·09	24·89	16·22	20·68	67·29	38·90	53·41
1927	61·36	59·87	60·62	71·95	28·73	50·78	78·78	17·87	49·20	24·58	12·98	18·94	64·30	36·10	50·50
1928	60·72	56·51	58·64	54·99	25·55	40·56	85·08	20·74	53·75	31·76	15·74	23·96	65·61	35·69	50·95
1929	57·98	51·63	54·85	44·58	22·56	33·78	72·48	18·08	45·95	22·16	17·47	19·87	57·70	32·54	45·37
1930	62·20	50·58	56·46	51·74	31·51	41·81	73·84	18·96	47·09	23·47	6·87	15·36	61·05	31·96	46·78
1931	55·79	55·75	55·77	54·26	26·34	40·54	64·26	15·05	40·33	24·81	11·92	18·49	55·41	32·62	44·22
1932	51·02	54·55	52·77	58·63	24·66	41·92	59·19	16·40	38·37	20·02	15·83	17·96	51·49	32·84	42·33
1933	57·48	54·40	55·95	46·86	18·64	32·96	52·21	14·58	33·88	22·86	6·90	15·01	50·60	30·44	40·68
1934	50·85	50·23	50·54	50·31	26·97	38·81	52·30	16·50	34·85	19·03	12·77	15·95	47·93	30·88	39·54
1935	50·85	56·52	53·68	43·39	28·72	36·07	49·18	16·83	33·54	14·63	26·16	20·31	45·76	34·93	40·43
1936	46·61	44·72	45·67	45·03	15·69	30·35	45·28	12·57	29·49	18·65	9·08	13·93	43·12	25·40	34·40
1937	47·19	50·17	48·68	44·56	27·78	36·14	42·82	16·39	30·07	13·74	15·14	14·43	41·82	30·82	36·40

Prior to 1921 certified deaths only were included.
M. = Males; F. = Females; P. = Persons.

Nelspoort Sanatorium.—As described in previous reports this institution caters for free, part-paying and full-paying patients. During the past year the average daily number of patients was:—

European	94·1
Coloured	33·9

The average length of stay was 148 days for Europeans and 103 days for Coloureds. The number of patients admitted during the year was 210 Europeans and 98 Coloureds. These patients were admitted in the following stages of the disease:—

TABLE 24.—CONDITIONS OF PATIENTS ADMITTED TO NELSPOORT SANATORIUM, YEAR ENDED 30TH JUNE, 1938.

	Condition of Patients admitted.			
	T.B. Minus Group.	T.B. Plus Group.		
		Stage I.	Stage II.	Stage III.
Europeans	22	4	107	75
Coloureds	15	6	42	34
TOTAL	37	10	149	109
PERCENTAGE	12·1	3·3	48·9	35·7

In Table 25 are shown the numbers of patients admitted to and discharged from the institution and the number of deaths during the year.

TABLE 25.—ADMISSIONS, DISCHARGES AND DEATHS AT NELSPOORT SANATORIUM, YEAR ENDED 30TH JUNE, 1938.

	Total.	European.			Coloured.		
		M.	F.	T.	M.	F.	T.
In Sanatorium on 1.7.37	132	47	50	97	23	12	35
Admitted during year	308	111	99	210*	72	26	98†
Died during year	14	3	7	10	4	—	4
Discharged during year	299	107	92	199	73	27	100
In sanatorium on 30.6.38	127	47	51	98	18	11	29

* Includes 2 readmissions. † Includes 1 readmission.
M. = Male. F. = Female. T. = Total.

During the last year a new block of 32 beds was completed and will be brought into use to relieve the long European waiting list.

19.—TYPHUS.

Tables 26, 27 and 28 give the incidence of typhus in the Union for the last 16 years so far as it is known, while Table 29 gives the distribution of the cases reported during the year. It is to be remembered that in the absence of an efficient notification system not all cases of infectious disease are recorded. The year has been relatively free from infection, the number of cases being the smallest reported since 1927. The same machinery for handling outbreaks has operated, the Department's typhus inspector in the Transkeian Territories having dealt with the majority of outbreaks, being assisted in this area by the trained Native deverminisers who are now to be found in most magisterial districts. Though typhus has not been a major source of alarm for some years its yearly appearance in so many outbreaks is a definite indicator that large sections of our Native populations are

living in most unsatisfactory economic and social conditions. Typhus is a symptom of poverty, dirt and overcrowding, and, in its continued existence in the Union, is a direct challenge to the people of the country. It, too, is one of the most striking examples of the fact that disease knows no colour restrictions. Even the relatively low figures of this year confirm this fact, since 37 European cases with 1 death occurred. Apart therefore from altruistic motives, it is in the interest of the European population, that Native social and economic conditions be improved.

TABLE 26.—TYPHUS FEVER IN THE UNION: CASES AND DEATHS REPORTED SINCE 1923, FOR YEARS ENDING 30TH JUNE.

Year.	Cases.	Deaths.
1923	7,099	755
1924	2,122	382
1925	1,144	163
1926	1,135	146
1927	895	136
1928	1,331	208
1929	1,480	193
1930	1,782	212
1931	1,541	261
1932	1,550	292
1933	2,125	302
1934	5,956	662
1935	6,826	998
1936	1,605	284
1937	1,007	168
1938	982	168

TABLE 27.—REPORTED CASES OF TYPHUS IN THE PROVINCES OF THE UNION SINCE 1923, FOR YEARS ENDING 30TH JUNE.

Year.	Cape.	Natal.	O.F.S.	Transvaal.	Total.
1923	6,118	356	425	200	7,099
1924	1,392	241	286	203	2,122
1925	579	218	220	127	1,144
1926	701	87	272	75	1,135
1927	638	72	168	17	895
1928	1,154	91	68	18	1,331
1929	1,320	65	84	11	1,480
1930	1,564	57	149	12	1,785
1931	869	62	53	557	1,541
1932	1,263	51	40	196	1,550
1933	1,649	208	243	25	2,125
1934	1,905	207	3,636	208	5,956
1935	2,898	224	3,275	429	6,826
1936	835	33	280	457	1,605
1937	694	89	178	46	1,007
1938	822	19	88	53	982

TABLE 28.—TYPHUS NOTIFICATIONS AMONG EUROPEANS IN THE UNION SINCE 1923, FOR YEARS ENDING 30TH JUNE.

Year.	Cape.	Natal.	O.F.S.	Transvaal.	Total.	
					Cases.	Deaths.
1923	39	3	8	6	56	6
1924	26	8	10	2	46	3
1925	13	19	2	3	37	0
1926	22	25	6	2	55	1
1927	13	21	4	1	39	2
1928	18	30	3	1	52	0
1929	27	17	1	0	45	0
1930	34	33	2	5	74	5
1931	26	21	3	3	53	2
1932	25	7	1	0	33	2
1933	43	9	1	1	54	3
1934	23	10	12	0	45	3
1935	38	16	29	14	97	5
1936	20	13	3	4	40	2
1937	27	5	2	2	36	6
1938	20	8	4	5	37	1

TABLE 29.—TYPHUS FEVER: CASES AND DEATHS REPORTED DURING THE YEAR ENDED 30TH JUNE, 1938.

Province.	Number of Districts in which Outbreaks Occurred.	European.		Non-European.		Total.	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cape	39	20	1	802	135	822	136
Natal	6	8	—	11	4	19	4
Orange Free State	19	4	—	84	17	88	17
Transvaal	9	5	—	48	11	53	11
UNION	73	37	1	945	167	982	168

20.—VENEREAL DISEASES.

The Department has continued to encourage local authorities and district surgeons in the extension of their activities for treating venereal disease. Since 1935 expenditure by the Department in the form of issue of drugs, payment for district venereal disease tours, and refunds under section 66 of the Public Health Act for hospital and clinic purposes has increased approximately 50 per cent. Nevertheless funds allotted to specific venereal disease programmes represent but part of the expenditure involved in combating these diseases. The remarks made in recent annual reports in this connection are to be repeated. Venereal diseases are, like so many other public health problems, medico-social rather than purely medical in nature. Therefore progress in combating these conditions is not to be measured solely by the number of patients treated or the number of venereal disease clinics erected. Equally important measures are the general health improvements secured by the appointment of new health, sanitary and nursing staffs, the abolition of slums and their associated degrading influences, the adoption of approved housing and location schemes, and the spread of a knowledge of health and personal hygiene. In fact a complete health programme inevitably assists in an attack on venereal diseases.

The advances to be recorded in these more general fields during the year have been especially noteworthy. The Reef areas as indicated in the last annual report have made great progress. In every town such schemes as polyclinics, nursing services, location services, housing and slum clearance schemes are being actively pursued, and without exception it may be said the various Reef medical officers of health have vigorously developed local organisations for dealing with venereal disease in both European and non-European. The polyclinics being established are important, as in many respects the various results and complications of syphilis and gonorrhoea are best dealt with in such institutions. Prevention of the destructive effects of these diseases in women and children requires adequate facilities in the form of ante-natal and maternal clinics as well as in venereal disease clinics proper. Germiston, Boksburg, Springs and Benoni have each made a very sound beginning with a venereal disease programme. These will shortly be followed by similar developments, e.g. polyclinics and location clinics and services, in Krugersdorp, Brakpan and Roodepoort. It is anticipated also that in the near future, Johannesburg will be considerably extending its existing venereal disease treatment facilities and location services. The appointment of full-time medical officers of health on the Witwatersrand has therefore led to the development of health organisations which in the case of venereal diseases removes the uneasiness existing three years ago that one of the great disseminating foci of these infections in the Union, the goldfields, was largely uncontrolled.

One disappointing feature on the Reef is to be noted in the non-success of the negotiations mentioned last year concerning the assumption of duties of medical examination of male Natives at the Pass Offices. With the exception of Benoni, which readily incorporated these examinations as an integral part of its Native medical and health schemes, the other local authorities refused to take over the functions on the ground that they were government responsibilities and therefore if transferred should be subsidised. The striking success already achieved by Benoni is a proof of the view put forward by the Department last year that the Pass Office provides a valuable means of keeping in touch with the Native health conditions, as well as offering a useful avenue for health propaganda.

In other urban areas extensions to venereal disease schemes or associated organisations have either come into being or will do so in the near future. Durban has a comprehensive programme involving new venereal disease hospital accommodation and further clinic facilities, while the Port Elizabeth and Pretoria municipalities are expanding their services.

Venereal disease in the rural areas is largely a non-European problem; in such communities its control and treatment are even more dependent upon the provision of general medical, nursing and health services than the erection of *ad hoc* venereal disease clinics. Progress therefore in the country districts follows the increase of district surgeoncy, district and location nursing appointments and the success of propaganda campaigns.

It is a fact of considerable importance, reported from an increasing number of districts that European methods of treating venereal diseases are being appreciated by large numbers of Natives. From Pietersburg, Pretoria, Pilgrim's Rest, Sekukuniland and certain other districts accounts have been received that patients now readily complete full courses of treatment where previously only the one or two injections necessary to remove superficial signs were tolerated. If the Natives now recognise the value of anti-syphilitic treatment one of the major requirements for success has been achieved.

In Zululand as yet the co-operation of the people has not been forthcoming to the same degree. This co-operation will have to be sought by more intensive local propaganda to overcome ignorance and prejudice. A beginning on these lines has been made in one magistracy where trained Native health assistants are spreading propaganda inducing cases to come for treatment and urging those under treatment to complete the necessary courses.

Whether venereal diseases are increasing amongst Natives is impossible to say, but all available sample surveys of incidence thus far made refute completely such wild and grotesque statements that from 80 per cent. to 90 per cent. of the Native peoples are infected. An extremely valuable index is that for adult males, the group most likely to reveal high rates of infection, recently given by Drs. Anning and Gale of Benoni. These investigators found that in 8,000 examinations only 0·5 per cent. had infectious syphilis and only 5 per cent. had signs of old infection.

Table 30 gives the work undertaken by hospitals, clinics and district surgeons for the year, which shows substantial increases on the previous year's returns. Again it is to be remarked that the table is not an index of incidence or prevalence, and the increase of figures is therefore not to be interpreted as a measure of spreading disease.

TABLE 30.—VENEREAL DISEASES: CASES TREATED AND ATTENDANCES, YEAR ENDED 30TH JUNE, 1936.

Locality.	In Hospital.						Outdoor.					
	Syphilis.		Gonorrhoea and Other Venereal Diseases.		Total.		Syphilis.		Gonorrhoea and Other Venereal Diseases.		Total.	
	European.	Non-European.	European.	Non-European.	European.	Non-European.	European.	Non-European.	European.	Non-European.	European.	Non-European.
(1) *By District Surgeons.*												
Cape	36	1,307	10	295	46	1,602	544	16,278	327	1,416	871	17,694
Natal	21	747	22	256	43	1,003	96	7,878	56	979	152	8,857
Transvaal	34	2,652	41	193	75	2,845	441	22,229	331	696	772	22,925
Orange Free State	1	11	4	5	5	16	324	6,518	228	1,151	552	7,669
TOTAL	92	4,717	77	749	169	5,466	1,405	52,903	942	4,242	2,347*	57,145*
(2) *At Institutions and Clinics.*												
Aliwal North	—	—	—	—	—	—	21	293	—	6	21	299
Barberton	—	339	—	—	—	339	—	—	—	—	—	—
Benoni	—	—	—	—	—	—	28	1,056	37	7	65	1,063
Bethlehem	—	54	—	5	—	59	8	60	—	4	8	64
Bloemfontein	11	237	39	44	50	281	437	2,941	848	94	1,285	3,035
Bochem	—	918		16	—	934	—	179	—	—	—	179
Boksburg	—	—	—	—	—	—	490	1,024	716	425	1,206	1,449
Capetown	54	340	61	32	115	372	9,235	22,343	7,958	8,004	17,193	30,347
Darling	—	—	—	—	—	—	—	48	—	—	—	48
Durban (Addington)	63	1,191	121	192	184	1,383	1,675	9,178	8,698	7,034	10,373	16,212
East London	—	—	—	—	—	—	337	3,137	318	895	655	4,032
Elim	1	560	1	30	2	590	—	156	—	—	—	156
Gordons Bay	—	—	—	—	—	—	—	300	—	—	—	300
Johannesburg	—	—	—	—	—	—	7,968	—	5,626	—	13,594	—
Kimberley	12	220	—	—	12	220	95	1,748	70	164	165	1,912
King Edward VIII (Durban)	—	62	—	14	—	76	—	387	—	91	—	478
Kingwilliamstown	—	233	1	3	1	236	—	52	—	4	—	56
Kroonstad	—	—	—	—	—	—	—	—	—	—	—	—
Krugersdorp	—	116	—	—	—	116	—	222	—	—	—	222
Kuruman	—	30	—	—	—	30	—	173	—	—	—	173
Mariannhill	—	—	—	—	—	—	—	340	—	17	—	357
Molteno	—	—	—	—	—	—	—	220	—	—	—	220
Olifantshoek	—	—	—	—	—	—	—	410	—	3	—	413
Oudtshoorn	—	—	—	—	—	—	—	282	—	—	—	282
Paarl	—	—	—	—	—	—	13	1,146	—	—	13	1,146
Pietermaritzburg	—	578	—	218	—	796	277	6,266	243	1,912	520	8,178
Pietersburg	—	—	—	—	—	—	—	763	—	—	—	763
Piet Retief	—	100	—	—	—	100	—	165	—	—	—	165
Port Elizabeth	—	—	—	—	—	—	1,105	7,650	1,981	1,704	3,086	9,354
Potchefstroom	—	—	—	—	—	—	18	3,495	—	—	18	3,495
Pretoria	—	—	—	—	—	—	2,240	9,869	6,977	4,409	9,217	14,278
Rietfontein	113	3,777	266	1,360	379	5,137	471	9,826	—	—	471	9,826
Sekukuniland (Jane Furse Memorial)	—	282	—	17	—	299	—	1,042	—	50	—	1,092
Senekal	—	—	—	—	—	—	—	2,888	—	—	—	2,888
Springs	—	—	—	—	—	—	194	5,542	517	2,141	711	7,683
Somerset West	—	—	—	—	—	—	—	—	—	—	—	—
Stellenbosch (Mpty.)	1	24	—	—	1	24	1	528	—	—	1	528
Stellenbosch (D.C.)	—	—	—	—	—	—	—	1,177	—	—	—	1,177
Swellendam	—	—	3	2	3	2	—	—	—	—	—	—
Uitenhage	—	16	—	3	—	19	56	1,951	29	122	85	2,073
Vereeniging	—	—	—	—	—	—	12	471	—	—	12	471
Vryburg	—	125	—	3	—	128	—	354	—	—	—	354
Zeerust	—	8	—	—	—	8	—	281	—	—	—	281
TOTAL	255	9,210	492	1,939	747	11,149	24,681	97,963	34,018	27,086	58,699†	125,049†

* Patients only. † Attendances only.

Following the publicity given by sensational articles in certain newspapers the subject of vulvo-vaginitis attracted some interest during the year. Two outbreaks of gonorrhoeal vulvo-vaginitis occurred in girls' institutions, one in the Nylstroom district and one in Pretoria. The numbers involved were 43 and 32 respectively. Treatment was in both cases provided at the Rietfontein Hospital. In the Nylstroom district vigorous action immediately on discovery of the first cases was taken by this Department in co-operation with the Transvaal Education Department. It was ascertained that infection had been spread about equally at the school and in the homes. The area involved, Alma, is inhabited mainly by extremely poor farmers, whose housing conditions are bad, involving poor sleeping, washing and latrine facilities. The exact mode of spread, as always under such conditions, was difficult to ascertain but such factors as the following were probably involved:—

(i) Poverty and ignorance of the people resulting in limited ablution and sleeping facilities and a low standard of personal hygiene; thus common towels and beds in homes were concerned.

(ii) The exchange of clothing amongst the children.

(iii) Contamination of latrine seats at the school and in the homes.

Generally the administration of the school and hostel premises was found to be efficient.

The Natives of the district were examined, but no gonorrhoeal infection amongst them was discovered.

In the Pretoria outbreak the institution concerned was found to be efficiently administered and it was difficult to determine likely methods of spread.

Vulvo-vaginitis of gonorrhoeal origin is well known in all countries as a condition to which young girls are peculiarly susceptible. An important point to emphasise is that in large outbreaks the infection is usually accidental. Even in institutions most efficiently supervised it is liable to break out and spread; fortunately its ultimate prognosis is extremely good though the disease may pursue an intractable course.

The Transvaal Education Department has investigated conditions generally in its schools and following a medical committee's report is carrying out various measures to eliminate still further the possibility of such infections gaining entrance to schools and hostels. The system of centralised rural schools are now being introduced will materially assist; these institutions being properly conducted provide greater safegaurds against the spread of disease than numerous unsupervised poor types of rural schools.

Vulvo-vaginitis depends for its eradication very largely upon a high sense of personal hygiene. This can be achieved only by persistent and continuous health propaganda. The national campaign of health education foreshadowed in the last report has commenced; already venereal diseases in all their ramifications are receiving keen attention by the various subcommittees appointed by the South African Red Cross Society. Colonel Welsh on behalf of the Society is lecturing at various centres on venereal diseases. Posters, films and exhibits, suitable for all classes and sections of the population urban and rural, European and non-European are being prepared.

It must, however, be emphasised that a comprehensive and complete venereal diseases scheme for the country is difficult of attainment in the legislative and administrative confusion existing between provincial and central departments. Hospitals, poor relief, medical inspection of schools, fall under one group of authorities—the provincial—and social welfare, rural rehabilitation, care of the physically defective are dealt with by another government department. Consequently these two groups of functions, though closely interrelated and dependent upon health factors, are outside the control and direction of the Union Department of Public Health. Under such circumstances efforts to control venereal disease, as is the case with most other operations of the Department, are difficult to co-ordinate and integrate.

21.—Other Infectious Diseases.

Table 31 gives the number of cases of notifiable disease returned by medical practitioners for the year. Many of the diseases there listed have received attention in other sections of this report, so that only a few further general remarks are required here. It is to be remembered that notifications are by no means complete especially for non-Europeans. Diphtheria showed a general increased prevalence throughout the country as compared with the previous year. This was most marked in the Cape Province, where several large outbreaks, especially in Capetown, occurred. The virulence was

generally slight. Health authorities, both urban and rural, were kept busy in several areas in controlling outbreaks by immunising contacts. This prevalence has stimulated a desire for prophylactic immunisation. The cost of the material used for this purpose is now eligible for part-refund. The remarks made last year on the value of diphtheria immunisation should be borne in mind, as this is an efficient and convenient procedure of great public health importance.

Scarlet fever notifications numbered 1,782 compared with 1,998 for the previous year. The disease remained mild in its clinical form.

Cases of cerebro-spinal meningitis increased, but those of poliomyelitis decreased as compared with the returns of the previous year. Several Native outbreaks involving more than one member of a family were reported.

TABLE 31.—NOTIFICATION OF DISEASES BY MEDICAL PRACTITIONERS DURING THE YEARS ENDED 30TH JUNE, 1937, AND 30TH JUNE, 1938.

Disease.	Year Ended 30th June, 1937.	Year Ended 30th June, 1938.										
	Union.	Union.	Cape Province, excluding Transkei.		Transkei.		Natal.		Orange Free State.		Transvaal.	
	Total.		European.	Non-European.	European.	Non-European.	European.	Non-European.	European.	Non-European.	European.	Non-European.
Anthrax	75	110	21	25	—	1	1	13	—	37	4	8
Diphtheria	1,847	2,673	1,191	535	13	10	238	82	95	35	426	48
Encephalitis, Infective	40	44	9	15	—	1	3	1	—	—	8	7
Enteric or Typhoid Fever	4,205	4,103	606	840	22	180	86	365	132	497	419	956
Erysipelas	537	523	87	69	2	6	19	7	15	5	204	109
Lead Poisoning	1	2	2	—	—	—	—	—	—	—	—	—
Leprosy	688	662	4	70	—	221	1	104	4	45	5	208
Malta Fever	4	8	1	—	—	—	—	—	—	—	6	1
Meningitis, Epidemic Cerebro-spinal	677	796	44	110	1	1	14	22	1	12	91	500
Ophthalmia, Gonorrhoeal	72	94	8	45	—	1	1	18	2	5	2	12
Ophthalmia Neonatorum	440	568	38	262	1	11	2	31	2	13	89	119
Plague (for detailed list of cases and deaths, see Table 15)	52	70	1	46	—	8	—	—	—	15	—	—
Poliomyelitis, Acute	82	18	4	2	—	—	—	—	1	2	4	5
Puerperal Fever, including Puerperal Sepsis	462	476	50	123	1	10	6	42	9	13	97	125
Rabies	31	25	1	1	—	—	—	—	4	1	15	3
Scarlatina or Scarlet Fever	1,998	1,782	420	27	4	—	78	1	194	3	1,045	10
Smallpox (for detailed list of cases and deaths, see Table 19)	27	653	5	7	—	11	2	1	—	25	19	583
Trachoma	68	83	13	25	—	—	—	5	—	—	1	39
Tuberculosis	10,551	12,338	596	5,021	3	2,988	122	1,551	9	219	125	1,704
Typhus Fever (for detailed list of cases and deaths, see Table 29)	1,007	982	18	57	2	745	8	11	4	84	5	48
TOTALS	22,864	26,010	3,119	7,280	49	4,194	581	2,254	472	1,011	2,565	4,485

IV.—OTHER DISEASES AND CONDITIONS.

22.—Cancer.

Attention was drawn last year to the striking and alarming increase in the incidence of cancer in the Union. In 1922 the number of deaths attributed to cancer among the European population in the Union was 1,103 or 70·88 per 100,000. Ten years later these figures had increased to 1,565 and 89·06 respectively; four years later in 1936 they were 1,954 and 97·28. This is a startling increase: from 70·88 to 97·28, that is, 26·40 in fourteen years. In our largest city, Johannesburg, the increase is even more startling. In 1922 the number of deaths attributed to cancer in that city was 70; in 1935 it had increased to 229. In five years the number of cancer deaths had increased from 159 (7·8 per cent. of all deaths) to 229 (9·8 per cent. of all deaths). A steadily increasing number of persons dies in Johannesburg each year from cancer.

This Department has not yet made any serious attempt to combat cancer as a public health problem. It has co-operated with the National Cancer Association of South Africa in carrying out very valuable propaganda work. It has assisted that Association by collaboration in the preparation as well as in bearing the cost of printing of the pamphlet "Truth about Cancer" which has been very widely distributed. It also assists by bearing the cost of a quarterly questionnaire which is sent out to all medical practitioners, hospitals and nursing homes with a view to collecting statistics. This Department is represented on the Council of the Association along with other Government and provincial administration representatives.

The National Cancer Association has as its real objective the establishment of a Cancer Institute in which the problem of cancer as it manifests itself in South Africa can be investigated, from which propaganda for the prevention of the disease could emanate, and where sufferers could come for advice in those early stages in which cure is possible. The country has at its disposal the proferred services of an enthusiastic organisation which includes leading medical authorities eager to tackle this problem. This Department could not do better than to assign to the proposed Cancer Institute the tackling of this serious menace to the public health.

A brief account of the development of this important body in the Union is justified. As a result of a conference of medical practitioners and others representative of the Union which was held at Johannesburg in 1931, the National Cancer Association of South Africa was registered under the Companies Act as a non-profit association, its principal objects being to—

(1) make investigations as to the causes and treatment of cancer;
(2) take steps with a view to the prevention, treatment and combating of cancer, particularly by securing the intelligent co-operation of the public and directing its attention to the urgent necessity for the treatment of the disease in its early stages;
(3) establish or aid in the establishment of a National Cancer Institute for the treatment of cancer.

The Association, which is administered by a council of twenty members of whom fifteen are elected annually by its members and the remainder appointed by the Union Government and the provincial administrations of the Union, has since its establishment and with the assistance of the Union Government carried out propaganda for the education of the public as to the necessity of seeking medical advice in the early stages of the disease. The Association has been advised by the Johannesburg Hospital that this propaganda has done considerable good and it has been urged to continue its efforts.

Realising, however, that propaganda without an institute for the treatment and diagnosis of cancer and the follow-up of cancer cases was in a certain measure unsatisfactory, that by common consent South Africa was a long way behind other countries in tackling the disease, and that the establishment of an institute was becoming an urgent necessity, a conference of various bodies was convened by the Association in an attempt to solve by mutual co-operation questions relating to cancer. This conference at which representatives of the Union Government, the Transvaal Provincial Administration, the Johannesburg City Council, the University of the Witwatersrand, the Johannesburg Hospital, the Medical Association of South Africa and the Association were present, was held at Johannesburg in January, 1937, under the chairmanship of the present Secretary for Public Health. At that conference the following resolutions were unanimously adopted:—

(1) That a Cancer Institute be established at the earliest possible date.
(2) That the Institute be established at Johannesburg and erected in close proximity to the Johannesburg General Hospital and under its administration.

(3) That the Institute should make provision for the following:—

(i) A properly equipped and staffed centre for diagnosis.

(ii) A centre for cancer therapy under the most ideal and up-to-date conditions.

(iii) Hospital accommodation in which cancer cases are concentrated in one building and amongst pleasant surroundings.

(iv) Suitable office accommodation and staff for—

(*a*) dealing with all applications for treatment;

(*b*) co-ordination and collection of data in respect of the incidence of cancer in the Union;

(*c*) full information as to the success or otherwise of treatment—follow-up of cases;

(*d*) propaganda;

(*e*) library facilities;

(*f*) post-graduate work for the diagnosis of cancer in its early stages.

(4) That the initial stage should be to provide accommodation for 50 beds with the most modern equipment, including an operating theatre equipped on the most modern lines.

The conference discussed the question of the allocation of financial responsibility for the establishment and maintenance of the Institute between the Union Government, the Transvaal Provincial Administration and the City Council of Johannesburg. This was found to be a matter of considerable difficulty accentuated as it was by the knowledge of the difficulties existing between the Union Government and the Provincial Administration as to their respective responsibility in the matter. The exact method of allocation gave the Association much anxiety and thought. It was about to submit its recommendations in the matter when the question of the establishment of a cancer institute was given great impetus by proposals put forward by the Mayor of Johannesburg that the memory of His late Majesty, King George V, should be commemorated by the establishment of such an institute and that a public appeal for funds should be made.

At a meeting fully representative of Johannesburg convened by the Mayor in October, 1937, the principle at issue was discussed and unanimously adopted. It was then referred to a sub-committee appointed to deal with the matter which prepared a memorandum for submission to the Union Government and the Provincial Administration.

Interviews then took place between the sub-committee, the Union Government and the Transvaal Provincial Administration, and the matter was considered by the Johannesburg Hospital which signified its willingness to undertake the administration of the Institute on certain conditions. As a result of these discussions and the correspondence which has taken place, the position is shortly the following:—

(i) The Hospital has signified its willingness to undertake the administration of the Institute, upon certain conditions.

(ii) The Provincial Administration has stated that it is willing to contribute towards capital expenditure on the basis of £1 for £1 by way of loan. Inasmuch as the Hospital is already very heavily committed in regard to the extensions at present being carried out and, as stated, it is willing to administer the Institute if handed over complete and fully equipped without liability for capital costs, the question of the contribution of capital costs by the Administration is to be ruled out. As to the maintenance costs, however, the Administration has agreed that, if the Institute is handed to the Hospital complete and fully equipped without liability for capital costs, it will then be incumbent upon the Administration to pay the ordinary subsidies towards its maintenance as prescribed by law.

(iii) The attitude adopted by the Union Government in reply to the request that it should contribute a substantial sum on account of capital costs and should bear the cost of maintaining the Institute in so far as it affected matters not falling on the ProvincialAdministration was that as the Institute would only be in the nature of an extension to the Hospital and therefore a matter which would concern the Provincial Administration and that as the duplication of research work presumably as to the *causation* of cancer was unnecessary, it did not, whilst sympathetic towards the movement, see its way clear to make any contribution.

Thereafter the sub-committee interviewed the Acting Minister for Public Health and as a result of the discussions and at his suggestion a further

application was made to the Union Government and was supported by a memorandum stressing the value of the Institute from an educational point of view, which was in the following terms:—

(i) At the present time the treatment of cancer in South Africa is in the hands of specialists whose energies are diffused over a number of conditions. There is no one devoting his whole time to the subject. The head must be one specially trained and specially devoted to the diagnosis and treatment of cancer in all its branches. Such an expert can be obtained only from overseas, and at present those who are interested and intend to devote themselves to the study of cancer must travel overseas and spend a long period there. It is time that facilities for such training should be available in South Africa. The minimum salary that would attract any overseas expert to undertake the work of the Institute cannot be less than £2,000 per annum.

(ii) It is understood that such a head would be welcomed as a member of the University staff and his services would be available for instruction both of under-graduates and post-graduates. This instruction would necessarily make a tremendous difference to the early diagnosis of cancer, which is so valuable in the treatment of the disease.

(iii) The opportunity for *clinical* research which at present exists but which cannot be used because of the other activities in which those engaged in the treatment are concerned, will be readily taken advantage of and all medical people know that great advances have been made by clinical research without the aid of the laboratory.

(iv) The particular aspects of cancer which are so prominent in this country, especially in relation to the Bantu, can readily be investigated, and the Institute might afford facilities for overseas workers to come and carry out investigation here.

(v) The authorities concerned with the appointment of the head of the Cancer Institute would appear to be the Johannesburg General Hospital and the University of the Witwatersrand, the salary for which might be guaranteed by the Union Government by an endowment fund, or annually and directly by the Government or through the University.

A further letter setting out the position was addressed by the Mayor of Johannesburg to the Honourable the Minister, dated 2nd March, 1938, in which it was emphasised that the question of carrying out research work as to the *causation* of cancer was not intended at this stage for the reasons stated, and in which also it was urged that the Government should definitely agree to support the scheme by—

(i) making funds available to safeguard the General Hospital against liability for *maintenance* costs in connection with matters which clearly do not fall on the Provincial Administration. It is impossible at this stage to state what these funds will amount to, but a limit could be placed by the Government on its liability and possibly the matter might be made subject to review at the end of say, five years;

(ii) contributing on account of *capital* costs an amount which would be sufficient to meet the additional expenditure in providing accommodation and equipment in connection with the matters referred to in sub-paragraph (i) hereof. This amount has not yet been determined but there should be no difficulty in estimating an approximate amount to cover the liability in this connection.

It was also urged that the Government should reconsider its attitude and should signify its intention of contributing to the scheme to enable the Committee to proceed with its appeal without delay, for it was felt that unless the Union Government was prepared to subsidise the scheme on the lines stated and to accept responsibility therefor, there was little probability of the appeal succeeding.

23.—Food Production and Malnutrition.

This subject received considerable attention in the last report. During the year much public interest in it developed. Generally the subject of nutrition has become of "news" value, a not undesirable occurrence. Members of parliament, organisations and societies of every description have joined in discussion of all aspects of the subject. There has been much loose thinking, while proposals for solving malnutrition have included the "pushing" of every saleable and unsaleable food product. Many well meaning people would be more helpful in their argumentative approach to nutrition if they appreciated that nutrition is a term implying something

infinitely more complex than starvation or lack of food. A wealthy man eating to repletion may yet exhibit signs of malnutrition, if his diet has lacked balance, his habits of life have been irregular and his sanitary and health environment unsuitable. The study of malnutrition, therefore, requires something more than the mere recognition that certain persons do not get enough to eat. Disease, dietetic, social, occupational, climatic and economic factors are involved, and their unravelling and assessment require prolonged and intensive study. Such studies, following the wise and energetic guidance of the Health Organisation of the League of Nations, are being prosecuted in all the leading countries of the world.

In this country following the adoption by parliament of the motion put before it by Mrs. Malherbe last year, a nutrition survey is also being conducted. Owing to long delays in getting the sets of apparatus from overseas the commencement of the survey was delayed until May of this year. However, through the very willing co-operation of the provincial administrations simple records of approximately one-fifth of the European school children, and large numbers of Asiatic and Coloured children are now being rapidly collected. Arrangements have been competed with the Office of Census and Statistics for the statistical treatment of the enormous mass of data, the analysis of which will be a long and arduous task.

As this section of the survey can only be considered a preliminary estimation of the problem of malnutrition in the country, the Department is proceeding, as recommended by the League of Nations, to plan more intensive studies of certain selected communities with a view to ascertaining the influence of some of the many factors concerned, such as diet, housing and disease.

The problem of malnutrition in the Bantu is more complex and, to judge from certain preliminary observations by various investigators, undoubtedly more serious than in the European. Natives who, in their traditional mode of life, had access to a diet inclusive of essential constituents, are now through poverty, ignorance and imperfect conversion to European civilisation, either unable to secure adequate amounts of proper food, or else are satisfied to exist on one or two European items of food, such as refined mealie-meal and bread. A preliminary survey of Bantu nutrition has been launched by appointing a team of two European investigators with the necessary Native assistants to visit a few representative areas. Later, if funds are forthcoming, it is hoped to conduct the more intensive type of studies in the case of the Bantu as well as in the European.

Meanwhile, it is again necessary to emphasize that the grave degree of malnutrition which is known to exist among a very large section of the population is mainly due to the inadequate consumption of protective foods (dairy products, eggs, vegetables, fruit and meat). This inadequate consumption is in turn due to a number of economic causes. However these are tackled the fact remains that at present quite inadequate amounts of these foods are being produced in the country. Even if all of the foods produced were available for consumption in the country, there would not be enough of them for providing a balanced ration to the whole population. Vastly greater quantities of protective foods will have to be made available in South Africa, if we are to build up a healthy population. The rapidly increasing demand for hospitalisation for tuberculosis and other patients can be directly associated with the gross shortage of available protective foods in South Africa.

24.—Precautions against Infection borne by Aircraft.

A memorandum on yellow fever with special reference to its conveyance by air was prepared by Dr. Park Ross, Deputy Chief Health Officer of the Department, and presented to the Office International d'Hygiene publique at Paris in May of this year.

The exact distribution of yellow fever on the African continent is uncertain. The disease can be readily carried on planes by infected passengers or infected insects to any part of the African continent. Once established among the Native population, either as the classical or the jungle type of yellow fever, its eradication would be practically impossible. Apart from the human risk, the commercial consequences of such an eventuality would be catastrophic.

Besides regular commercial services, Africa is on the eve of a great development in air traffic, private and military. Even now it is not possible effectively to shepherd all planes into a few specified airports. That present control at some of these aerodromes is unreliable, is proved by the fact that mosquitoes and other insects are found alive on planes arriving at Durban. Speed is the essence of all air service, but if the sole responsibility for taking measures to control conveyance of insects continues to be vested in the local authorities along an air route and if these local authorities are to make a 100 per cent. kill of insects on planes, then delays are inevitable.

At Durban, where the precautions are probably the most meticulous along the sea route to Europe, and where no mosquito could possibly leave a plane alive, the egress of passengers from a plane is delayed for at least eight minutes after she arrives. Evacuation of baggage has to wait ten to twenty minutes, because locker doors have to remain shut until all possible mosquitoes lurking within are dealt with. These times may have to be exceeded when planes arrive at night and they will not be lessened when planes tie up to a dock in future, instead of to a buoy as at present.

Early in 1937, Dr. Park Ross proposed to cut down delay at aerodromes, by fitting apparatus to planes which could be operated by the crew, preferably in the air. As an earnest of their interest in this proposition, Imperial Airways invited him to go over the African inland route, and he attended, on behalf of the Department, a conference of health officers held at Nairobi in March, 1937. The conference and Imperial Airways representatives received our earlier proposals with some scepticism, but resolved to recommend research in Durban and London on the lines proposed.

As a result, the Larmuth automatic apparatus was evolved in Durban in collaboration with the South African Fumigation Company. This apparatus is operated by sparklet bulbs. It is cheap, compact, light in weight, and automatic in operation. It can be handled by untrained operators, either in the air or on aerodromes. Its use will not only eliminate delays altogether, but will standardise disinsectisation procedures at or between the several ports.

On the invitation of Imperial Airways, Dr. Park Ross travelled to Europe by flying boat to study conditions, to demonstrate the Larmuth apparatus en route and to consult with them in London on the adaptation of this and other apparatus to planes. The result of this collaboration is set out in an article in the Lancet of 20th August, 1938, by Colonel Mackie and Mr. Crabtree of Imperial Airways; in it details are given of the actual layout of this apparatus and " phantomyst " (experimented with at the same time in London) applied to a flying boat. It will be there noted, that the views of the Company's officers generally bear out those originally put before them and the Office International d'Hygiene publique by Dr. Park Ross. There are divergences of opinion on the choice of insecticides, but the doses of the English product have been very greatly increased since we reported adversely on it. The Lancet article is valuable as an admission by a leading aeroplane company that the proposals embodied in the memorandum are eminently feasible, namely:—

(*a*) That the carriage by planes of living insect vectors of specified diseases should be forbidden under penalty;

(*b*) that, to give effect to the above, planes traversing certain areas should be required to carry with them approved apparatus and insecticide.

It is not proposed that a specific make of apparatus or insecticide should be insisted upon. All that is required is that both should be effective. It may be stated that the chances of getting an infection of yellow fever into the Union may at present be small. The consequences are such, however, that no possible risks can be taken either by this country or by other communities at present unaffected in Africa, specially those on the East Coast. It is felt that these investigations at the very inauguration of trans-continental air services are timely and are aimed at putting matters on a sound basis from the inception of such services. For a full and detailed account of this work, reference should be made to the memorandum entitled " Automatic Emoustication of Aircraft and the Yellow Fever Vector in African Air Travel " presented as mentioned above by Dr. G. Park Ross of this Department to the Office International d'Hygiene publique at Paris.

25.—The Durban Mystery Disease (Tricresyl Phosphate Poisoning).

On 1st September, 1937, a ship, the " City of Mandalay ", put in to Durban from London with a consignment of a certain foodstuff, among other cargo. On 2nd October, 1937, the French motor vessel " Jean LD " left Durban with part of that consignment for use on her return voyage to Dunkirk. Between those two events a local firm had handled the commodity and recanned it.

The full significance of the above statement is only now apparent after months of intensive investigation, which included a great deal of chemical and biological testing. The main burden of search for the cause of the outbreak fell to the Senior Government Pathologist, Dr. B. Sampson, and his assistants of the Durban Pathological Laboratory, although they were given splendid co-operation by the Municipal health officers of Durban. The results of Dr. Sampson's study of this outbreak are set out in full because of their unusual interest and the desirability of this work being on record.

During the last year or two we have been expecting an outbreak in this country of acute poliomyelitis, similar to that which occurred in Australia, and we were prepared for its modern tendency to depart from the text-book picture. Otherwise the normal routine of life continued until the 30th of December, 1937, when there came a telephone call from a shrewd practitioner who was not prepared to make every illness fit the diagnoses that are limited by his own medical horizon. Many doctors might hardly have considered that this case of bilateral paresis of the legs warranted a special report being made about it.

Within a month it was evident that something quite unusual was about, as cases were being reported not only in Durban but from the South Coast. As this outbreak was treated as sensational news it was inevitable that reports of other cases of paralysis subsequently found to be entirely unrelated to the one in question came to the laboratory. One doctor who keeps pigeons as a hobby rang up one morning to say that his birds were all getting weak in the legs and some were quite unable to walk. Women with functional paralysis rang up to say that they had the mystery disease, and would someone come out and examine them. More troublesome still were two cases of actual poliomyelitis and several of scurvy and arsenical paralysis among Natives. It was necessary for the Pathologist to keep his head, and it was here that certain specialists of the town rendered valuable assistance in helping to establish which cases were unrelated to the disease in hand, for they saw the necessity of keeping the clinical picture circumscribed if the cause was ever to be found.

It was by the merest chance that a German living in Durban received a continental paper and saw some remarks in it about the crew of a ship becoming paralysed at sea. He brought it to the notice of the Natal *Daily News*. The editor of this paper was not long in discovering that this ship had actually sailed from Durban and that it was the M.V. " Jean LD ". While officials were waiting for a clinical report from France on these paralysed seamen, a Medical Association meeting was held in Durban to discuss the whole outbreak. The meeting did little to alter the views which had been arrived at, namely that the disease was a toxic peripheral neuritis; or to use a better name, a toxic neuropathy, chiefly affecting motor nerves.

When the report on the cases in the " Jean LD " came to hand it was immediately realised that the disease was identical with the local outbreak. The next step obviously was to get a list of the foodstuffs taken on board the ship at Durban. But the list was formidable and the task of elimination seemed almost impossible, especially as our cases had occurred among all local races (European, Bantu and Indian) and the only foods common to them, as far as could be seen were bread, sugar and water.

Dr. C. English, Assistant Medical Officer of Health of Durban had, however, made the very useful observation that all the cases were peculiarly associated with European kitchens. With this fact in mind when looking at the " Jean LD's " list of foodstuffs taken on at Durban, he examined a certain brand of cooking oil mentioned in the list to ascertain whether any of our locally affected households had used it. Within six hours officials were hot on a scent which seemed at last to be leading to something definite. They found that the cases seemed invariably to have this oil factor in common. But on having the oil tested locally and by the Government Analyst a severe check was received. The oil was reported to be wholesome.

In the meantime it had been established that the disease was clinically identical with the Cincinatti outbreak of Jamaica ginger poisoning that had occurred in the United States of America in 1930. This was a vital discovery and it was made largely through the suggestion of Dr. J. Drummond. This outbreak was eventually proved to have been caused by triorthocresol phosphate, a chemical that had found its way into certain American alcoholic drinks that are flavoured with ginger. There did not, however, appear to be any reason why this chemical should occur as a contaminant of our oil, which was made from soya bean.

However, the association of this particular brand of soya bean oil (called " Bestol ") with the Durban and South Coast cases and the cases on the " Jean LD " seemed to constitute something more than chance. The Government Analyst was therefore asked to approach the matter from another analytical angle, having been informed of the type of contaminant suspected. Owing to the pressure of other work upon him, he was unable to attend to this matter for some time and there was an unavoidable delay resulting in letters to the Press suggesting that an expert be sent out from England to solve the mystery.

Eventually on the 26th April, 1938, the Government Analyst's report was received. He stated that the oil was found to contain tricresols, and that it had not been possible to find that such was present in unsuspected samples of soya bean oil.

Shortly after this we received a report from the London Ministry of Health to the effect that analysis of the oil carried by the " Jean LD " had revealed the presence of tricresyl phosphate. But experiments on rats and monkeys which had been fed with the suspected oil had not produced any signs of paralysis. Reference to the American outbreak and tests showed that they had had the same results with monkeys and rats as we had had, but they had also found that fowls were susceptible. A controlled experiment was, therefore, carried out using white leghorn and bantam cocks. Both lots were crop fed with soya bean oil; but one lot was given oil taken from a household that had contracted with the disease, in other words the suspected brand. At the end of a week one of the latter group of cocks began to exhibit a curious stagger when made to run. The ankle jerks of all this group were found to be absent. A bantam cock in this group died after only 50 c.c. of oil had been administered. At the end of a fortnight the cocks on the suspected oil were all paralysed and quite unable to walk, whereas the control group, that had had the same amount of soya bean oil, but from another source, was perfectly fit with full use of their legs. A cine-photograph was taken of the two groups. The paralysed cocks ultimately died; sections were taken of all their organs including the nerve trunks and the lumbar enlargement of the spinal cord.

These biological tests, however, were not brought to complete finality until the first week of July, 1938, and it is a matter of regret that there occurred a further outbreak of the disease on the 16th June, 1938, at an hotel on the South Coast, where " Bestol " oil was in use. There was much public criticism because the brand of oil was not made known to the public; but it was a clear duty to continue the experiments until such time as scientific finality had been reached. Moreover, only a small portion of one consignment had been contaminated and it did not seem reasonable to put a ban on the whole product until at least our investigations, both as to the cause and its origin, had reached some semblance of finality.

Inspection of the premises of the local firm recanning this oil from the drums of importation, which vary in size from 44 to 49 gallons, did not lead one to suspect that the contaminant gained entry to the oil in Durban.

Emphasis must be given to the fact that a large amount of soya bean oil, both locally produced and imported, is ordinarily used in Durban for cooking purposes and salads. This has been going on for years and the brand " Bestol " is not a new one.

On the face of it, therefore, we could not suppose that there was anything intrinsically wrong with soya bean oil itself. Moreover, it was quite evident that a large quantity of " Bestol " was being consumed with impunity. Yet, because " Bestol." was the only common factor among our heterologous cases, the search for an accidental contamination of a small quantity of that brand had to be sedulously carried out. We found this contamination and found that the quantity of oil involved corresponded roughly to one of the original drums.

Assuming that only one of the large drums of imported soya bean oil (called Bestol) was contaminated, and the evidence generally supports this conclusion, we have an explanation for the limited nature of the outbreak.

There were in all 73 cases, the total being made up as follows:—

Durban	27
South Coast (Natal)	15
M.V. " Jean LD "	31

This includes the later outbreak of 7 cases at Umkomaas. In almost every case the oil had been used solely for frying purposes, which shows that the contaminant (triorthocresyl phosphate) is not broken down by high degrees of temperature.

In the American outbreak in 1930, which appears to have been the first on record, this substance, triorthocresyl phosphate, got into certain alcoholic drinks which were compounded from ginger. The latter had been extracted in Jamaica with crude alcohol containing the contaminant. In the American outbreak these ginger flavoured drinks contained roughly 2 per cent. of triorthocresyl phosphate whereas in our soya bean oil the indications are that the content lay somewhere in the neighbourhood of 0·2 per cent. There, a much larger quantity of the poison must have been directly consumed over a short period, while locally the contaminant was taken indirectly through a cooking oil, over a longer period, and there was the added difference of the high temperature involved in the frying process.

Both outbreaks showed what might be called a double incubation period. The first is cumulative to the point of producing some gastro-intestinal upset (nausea, vomiting, looseness of the bowels). The second is a latent period of 10-14 days following the nausea and/or vomiting, before the onset of the first subjective symptoms in the calves of the legs.

The forerunning stomach upset has already been mentioned. In some cases the vomiting was quite intractable for two or three days. In other cases some transient nausea or looseness of the bowels was all that could be remembered by the patient. Then after ten to fourteen days comes the first complaint of a feeling of painful stiffness or cramp in the calf muscles. This gradually gives place to increasing difficulty in walking, until the movement of the feet either up or down (extension and flexion) and of the toes is lost.

The American writers lay stress on footdrop, on the absence of objective sensory disturbance, and on the fact that the disease is a peripheral neuritis. The question arises whether they have not overlooked the fact that with footdrop there may be just as complete a paresis or paralysis of the flexor muscles of the foot co-existing. This was so in our cases, although footdrop and in consequence, steppage gait, was only too evident. As to sensory loss, the Americans also seem to have disregarded the fact that joint sense is governed by sensory tracts. In our cases joint sense of the paralysed toes was undeniably absent. Moreover, we have also got to revise our ideas as to sensation of touch being unimpaired. The most recent of our cases were specifically and carefully tested as to this point, and it was established that cutaneous sensibility of the paralysed toes and of the adjoining skin of the foot was markedly impaired, if not lost. The test was carried out with cotton wool and pin.

Further, the American view, that the action of the poison on nervous tissue constitutes a " neuritis " is not borne out by sections of the affected nerve trunks and of the lumbar enlargement of the cord of fowls paralysed by feeding the contaminated oil to them. No evidence whatever of any inflammatory reaction could be detected. A degeneration of nerve trunks and chromatolysis of anterior horn cells occurs, but no inflammation. It would seem, therefore, that we require another name for this type of lesion, " peripheral " perhaps but not neuritis.

In the milder cases the feet only are affected as above described and in some of these complete recovery has been made in about six months. In others, a week or so after the feet, the hands have been involved. This usually is first noticed as a weakness of the grip. Articles are dropped, a key cannot be turned. There may be some preceding tingling or numbness. In another week the flexors and extensors of the wrist and fingers, with some or all of the intrinsic muscles of the hand are flaccid and outside the volition.

In a few cases, the most severe, there seems to have been involvement of the thigh muscles, so that the recumbent patient could not draw his knees up. But the disease, for disease it is in the broad sense of the word, must be recognised through its predilection for the nerves supplying the muscles below the knees and elbows, bilaterally; the paralysis is a flaccid one, coming on ten days to a fortnight after a " stomach " upset.

Physical signs which were common to a large number of our cases, were, early loss of the ankle jerks, absence of plantar reflex, loss of joint senses, some loss of cutaneous sense (toes), loss of stereognostic sense (when hands were affected).

In fowls which were paralysed by crop feeding the oil to them (10 c.c. daily for 12 days) loss of the ankle jerks preceded the onset of difficulty in walking by several days. A Cine-Kodak picture of these staggering birds has been taken and shows all stages of the condition very well.

Recovery, especially of the feet, is proving exceeding slow in many of the cases. We are at the time of writing in the ninth month after the onset, and the majority of the sufferers is still unable to get about and earn its living. It remains to be seen just how long it is going to take their affected motor nerves to regenerate. Daily electrical stimulation of affected muscles has not accelerated the rate of regeneration. If any inference could be legitimately drawn, it would be the other way.

PART II.

HEALTH ADMINISTRATION.

V. HEALTH STAFFS.

26.—Staff of the Union Department of Public Health.

The organisation of the Department is shown in the following chart:—

CHART OF DEPARTMENT OF PUBLIC HEALTH *as at 30th June*, 1938.

Minister of Public Health (HON. R. STUTTAFORD).

Minister (Chairman.)
Secretary and Chief Health Officer (Deputy Chairman).
Director of Veterinary Services.
Mrs. S. B. Broers.
Messrs. W. J. O'Brien, M.P., and L. C. Serrurier.
Drs. K. Bremer, M.P., A. J. Orenstein, C. P. Theron, and Sir Spencer Lister.

Council of Public Health — *Central Housing Board.*

Chairman: Mr. R. S. Gordon.
Dr. E. H. Cluver, Messrs. F. Walton Jameson, J. Lockwood Hall G. R. Savage.
Secretary: Mr. J. Sanders.

Secretary and Chief Health Officer (Dr. E. H. Cluver).†

Deputy Chief Health Officer (Dr. H. S. Gear: Acting).

Under Secretary (A. DE V. BRUNT).

Departmental Chief Clerk (A. Stuart).

1 Accountant (L. J. Hatch).

1 Chief Clerk Gr. II. (R. S. Gordon).

3 Principal Clerks. (P. I. Phelan, N. A. G. Reeler and J. Sanders.)

3 Senior Clerks.
54 Clerks, Typists, etc.

Sections.

Detached Officers.	Inspection and Field Staff.	Maternity and Child Welfare.	Pathological and Biological Control Laboratories.	Port Health Officers.	District Surgeons.	Leprosy.	Venereal Diseases Hospitals.	Malaria.	Tuberculosis.	Epidemic and Infectious Diseases (Plague, Typhus, Smallpox, etc.), and Vaccination.	Food and Drugs Adulteration; Habit-forming Drugs.	Local Authorities.	Other Bodies
Capetown: Deputy Chief Health Officer: Dr. P. Allan. Assistant Health Officer: Dr. B. M. Clark. Durban: Deputy Chief Health Officer: Dr. G. A. Park Ross. Assistant Health Officer: Dr. F. W. P. Cluver. Johannesburg: Senior Assistant Health Officer: Dr. L. Fourie. S.A. Railways and Harbours: Assistant Health Officer: Dr. C. G. Booker.	One Senior Assistant Health Officer and Deputy Director of Medical Services, Defence (Dr. A. J. van der Spuy). One Medical Inspector, Cape Native Territories (Dr. A. L. Ferguson). One Ecologist on contract (Mr. D. H. S. Davis). Four Inspectors (3 plague and 1 typhus).	Medical Inspector (Dr. E. Drennan). Nurse Lecturers.	Capetown, and Vaccine Institute, Rosebank: (Drs. W. F. Rhodes, R. Turner, C. A. M. Murray and I. Gordon). Capetown Biological Control Laboratory: (Drs. M. H. Finlayson and H. A. Shapiro). Durban: (Dr. B. Sampson). *South African Institute for Medical Research, Johannesburg.	Capetown: (Dr. J. M. Bosman). Durban: (Dr. G. A. Batchelor). Port Elizabeth: (Dr. H. W. A. Kay). East London: (Dr. R. V. S. Stevenson). Simonstown: (Dr. A. B. Bull). Knysna: (Dr. C. F. M. Marnewecke). Mossel Bay: (Dr. F. T. Waldron). Port St. Johns: (Dr. G. H. Meiring).	17 Whole-time. 7 Whole-time. (jointly). 343 Part-time. 367 Total.	*Leprosy Advisory Committee:* Secretary and Chief Health Officer (Chairman): Sir Spencer Lister. Professor W. H. Crailb and Dr. W. F. Rhodes. Drs. A. Pyper, A. J. Orenstein, K. Bremer, M.P., G. W. Robertson, F. C. Willmot, G. A. Park Ross. *Institutions:* Pretoria: (Drs. J. H. Loots, H. J. F. Wood, P. A. Thornton and H. Pillemer). Emjanyana: (J. A. Macdonald, and Dr. A. R. Davison). Mkambati: (H. C. Bellew and Dr. F. S. Drewe). Amatikulu: (F. J. Roach and Dr. E. L. Riemer. Bochem: (J. H. Franz and Dr. H. C. Franz).	Rietfontein, Johannesburg: (Drs. J. Daneel and J. Meyer). Kingwilliamstown *Bochem. *Elim. *Jane Furse Memorial. Several smaller hospitals.	Transvaal: Medical Inspector: (Dr. D. H. S. Annecke). Inspectors and Assistants. Natal: Medical Inspector: Dr. N. L. Murray). Inspectors.	Nelspoort Sanatorium; (Drs. H. Ackermann and P. Scher). Rietfontein Hospital. King George V Hospital: (Dr. B. A. Dormer). In addition to these Institutions under the direct control of the Department there is a number of other hospitals where accommodation is available.	Field Staff. District Surgeons. Local Authorities. Magistrates, etc.	Inspectors, Customs, Police, etc. Chemical work done in chemical laboratories of Department of Agriculture at Capetown & Johannesburg. Pharmacist.	240 Municipalities. 99 Village Management Boards. 40 Local Boards. 30 Village Councils. 58 Health Committees. 8 Local Administration and Health Boards. 95 Divisional Councils. 1 Health Board. 161 Magistrates. 5 Mining Commissioners. 737 Total.	South African Medical Council South African Pharmacy Board. Rand Water Board.

* Receives Grant-in-Aid. † Is also Director of Medical Services (Defence).

The *Council of Public Health*, constituted under the Public Health Act to advise the Minister and the Department on any matters affecting the public health as prescribed in that Act, met on two occasions during the year. The first was a routine meeting held in February, while the second was a special meeting to discuss the situation arising out of the smallpox prevalence, the plague outbreak at Port Elizabeth and two outbreaks of vulvo-vaginitis.

The *Central Housing Board* as shown in another section passed an extremely busy year following the initiation and development of numerous housing and slum clearance schemes throughout the country.

The *general organisation* of the Department remained largely unaltered during the year though there were important staff changes which will be mentioned later. The *head office* at Pretoria passed through an abnormal year, being faced with an unfortunate coincidence of circumstances in wide-spread smallpox prevalence, two serious plague outbreaks and a certain amount of public hysteria in connection with vulvo-vaginitis. These incidents occurring during a year when tremendous expansion in routine functions was occurring, when changes, absence on leave and sickness had weakened the head office staff, made the year an unusually arduous one.

New developments in the Department's activities as directed from head office were the initiation of a national health propaganda campaign through the South African Red Cross Society, the commencement of a plague research programme, a solar radiation survey, the extension of nursing services in the Transvaal following negotiation with the Provincial Administration, the extension of the tuberculosis schemes as outlined in the last report, the extension of the malarial organisation in the Transvaal and the extension of supervision of the Native Territories by the appointment of a medical inspector at Umtata.

The shortage of staff at head office as well as the abnormal circumstances of the year seriously interfered with routine programmes of local tours of inspections and with hospital inspections.

Active co-operation continues with other government departments especially the Division of Veterinary Services, the Departments of Social Welfare, Labour, Education, and the various Provincial Administrations.

The staff at head office was increased on the technical side by the appointment of an ecologist. No major changes occurred in the administrative and clerical staffs.

The *Capetown office* has continued general supervision of the Cape area, the administration of the Biological Control Laboratories, the Vaccine Institute and the general Pathological Laboratory. One of the major activities was meeting the demand for large quantities of vaccine lymph arising out of the campaigns against smallpox. Several important tours of inspection in addition to routine tours were carried out, notably through the north-western districts and the forest areas about Knysna and George.

The *Durban office* has continued general supervision of the Natal Province, as well as administering the malaria control organisation. Special activities of this office were the elaboration of means of disinfesting aircraft and the investigation undertaken by the laboratory staff in elucidating the so-called Durban " mystery " disease.

The *leprosy* section of the Department has remained unchanged except for the appointment of Dr. F. C. Willmot (who recently retired from the position of Deputy Chief Health Officer, Capetown), as Adviser on the subject of leprosy in a part-time capacity. The leper institutions are indicated in the chart.

The *tuberculosis* section has undergone the changes incidental to extension of the institutions at Nelspoort and Rietfontein and the construction of the new King George V Hospital at Durban, as well as those subsidised by the Department at Capetown, Port Elizabeth, Umtata and Lovedale.

The *malarial organisation* in the Transvaal has expanded considerably. It is supervised by the Medical Inspector stationed at the departmental field station at Tzaneen. In Natal no major changes have occurred in this work.

As mentioned in this report in other sections the typhus and plague field staff continued on the same lines as in previous years. Other departmental staff activities will be found in the various sections of this report.

The staff of the maternal and child welfare branch of the Department still consists of one medical inspector and three nurse-lecturers. These officers have continued to undertake extensive district tours for educational and inspection purposes.

Staff Changes.—Sir Edward Thornton, Secretary for Public Health and Chief Health Officer, retired on superannuation on the 9th June, 1938, as foreshadowed in the previous report.

Colonel Sir Edward Thornton, K.B.E., V.D., joined the Health Department of the Cape Colony in August, 1903 as a plague medical officer. He was subsequently appointed an additional medical officer of health in which position he served until Union. In 1910 he was transferred to the Cape Provincial Administration as Medical Adviser. During the War he saw service firstly in connection with the campaign in South-West Africa and later in Europe where he was selected as Officer Commanding the South African Military Hospital at Richmond. Following the War he was created K.B.E. and returned to South Africa to the appointment of Director of Medical Services and Senior Assistant Health Officer for the Union. Service on a number of inquiries and commissions in Uganda and West Africa as well as in this country followed, until in 1932 on the retirement of the late Dr. Mitchell he was appointed to the position of Secretary for Public Health and Chief Health Officer for the Union. In holding this position until this year, Sir Edward has been actively concerned in the initiation and administration of many of the most important developments in South African public health. Especially has he made housing an interest and it is largely due to this that the major works going on in this field have been achieved. It is fortunate that the country is to retain his valuable services in this field by his appointment to the Chairmanship of the Central Housing Board.

Dr. E. H. Cluver, Deputy Chief Health Officer for the Union, was promoted on 10th June, 1938, as Secretary for Public Health and Chief Health Officer for the Union. Dr. A. J. van der Spuy was appointed Senior Assistant Health Officer and Deputy Director of Medical Services, Defence, Pretoria, from 8th September, 1937.

As foreshadowed in the last report, Dr. Peter Allan, Assistant Health Officer, was promoted Deputy Chief Health Officer, Capetown, from 8th September, 1937, while Dr. H. S. Gear, Assistant Health Officer, was appointed Acting Deputy Chief Health Officer, Pretoria, from the 10th June, 1938, *vice* Dr. E. H. Cluver. Dr. B. Maule Clark was appointed to the post of Assistant Health Officer, Capetown, from 29th November, 1937, *vice* Dr. Allan. Dr. A. L. Ferguson was promoted to the newly created post of Medical Inspector, Native Territories, Cape Province, from 1st March, 1938, while Dr. N. L. Murray succeeded Dr. Ferguson as Medical Inspector at Durban. Dr. B. A. Dormer was transferred from Nelspoort to Durban as Medical Superintendent of the new King George V Hospital for Tuberculosis. Dr. H. R. Ackermann succeeded Dr. Dormer at Nelspoort Sanatorium. Dr. J. Meyer succeeded Dr. Murray as Medical Officer at Rietfontein. A new post of pathologist created at Capetown was filled by the appointment of Dr. I Gordon, while the post of ecologist, created to further plague investigation has been filled by the appointment of Mr. D. H. S. Davis, who came to the Department after work in Sierra Leone and under Professor Elton at Oxford.

As mentioned in the last annual report the Department is proceeding to the appointment of a dental health officer. An appointment necessitated by the work done on behalf of the Department of Social Welfare in connection with its disability scheme will also be made shortly. A further important advance to be made in the coming year will be the appointment of three dietitians.

Considerable difficulty has been experienced in filling professional posts owing to the absence of suitable candidates; in some instances it has been found necessary to improve the grading of posts and to readvertise them. Public health is slowly receiving acknowledgment from the medical profession and the general public as an important specialised branch of medicine. It still lacks in many quarters full recognition as a speciality with the dignity and status accorded to the positions occupied by the consulting physician and the surgeon. Many members of the medical profession do not yet appreciate the important, responsible and highly technical functions the health officer plays in the state and community, and as yet the most brilliant members of the profession are liable to seek their careers in other fields than health. The attraction of the best talent to public health is an urgent necessity if the state is to be provided with the wisest advice and most enlightened administration in its health and medical programmes; such talent will not be secured unless status and emoluments correspond in some degree to those of the other medical specialities.

As the problem of securing nurses is being so thoroughly ventilated in topical discussion and as various hospital and other authorities are deliberating on the problem, an analysis of the great shortage is not required here. The shortage, however, is a serious obstacle to many of the extensions of programme that the Department wishes to expedite.

Finally reference is to be made to the assistance and support received from the Medical Association of South Africa, through its Federal Council and individual members, the municipal health staffs, the Director, Sir Spencer Lister and staff of the South African Institute for Medical Research and the Chief Medical Officer of the Rand Mines, Dr. A. J. Orenstein.

27.—Health Staff of Provincial Administrations.

Under the existing constitutional and administrative complex the provincial administrations are concerned very actively and directly in health matters. Local government, hospital and charitable institutions, poor relief and general education, are all subjects of concern to the health administrator, but in this country, difficult to fit into a national health programme owing to their subordination to provincial control.

For the direction of these health activities the Provincial Administrations maintain various administrative departments to which are attached certain medical and health staffs. The medical and nursing staffs of hospitals, with the exception of those in Natal, are employed by hospital boards under the control of the Provincial Administration. In Natal the hospitals are directly administered by the Province. The medical and nursing staffs of hospitals are an important component of the medical and health organisation of the country. They are shown in Table 32:—

Table 32.—The Medical and Nursing Hospital Staffs of Provincial Administrations.

Province.	Hospital Medical Officers.		Nurses.	
	Full-time.	Part-time.	European.	Non-European.
Cape	42	50	1,303 (including district nurses attached to hospitals)	133
Natal	31	6	506	101
Orange Free State	9	16	285	—
Transvaal	92	—	1,199	125

In addition to the staffs of the general hospital system, medical and nursing staffs, relatively few in number, are employed in connection with the chronic sick institutions of the Cape and Transvaal Provinces.

A further important medical and nursing staff organisation in each province is the school medical service. The importance of this service is being more and more realised and the need to increase the staffs recognised. These staffs are in general insufficient at present to undertake adequate health and sanitary supervision of school populations and premises. The existing staffs are shown in Table 33:—

Table 33.—School Medical Service: Medical Inspectors and Nurses as at 30th June, 1938.

Province.	Medical Inspectors.	School Nurses.
Cape	6	20
Natal	2	8
Orange Free State	3	3
Transvaal	5	28

In addition a number of specialists, including dentists, is employed in connection with the school medical service.

Poor relief received the attention of an interdepartmental committee which reported last year. This committee recommended that the administration of poor relief should be transferred from the Provincial Administrations to the Union Government, and that it should include the co-ordination of the work in that field of government, local authorities and voluntary societies, the stimulation of co-operation and contribution by voluntary effort and the expansion of rehabilitative services.

Poor relief in its medical aspects is an involved subject. It is undertaken by the Provincial Administration through its hospital organisation, including out-patient departments and through the use of the district surgeoncy system of this Department.

28.—Medical and Health Staff of Other Government Departments.

Certain other government departments use medical and health staffs.

The *Union Education Department* employs qualified nurses at one reformatory and four industrial schools. This Department has also appointed an officer designated an " inspectress of mothercraft " to organise training for teachers in pre-school education, so as eventually to provide such teaching in domestic science and housecraft schools. The designation is not free from possibility of confusion. The term " Mothercraft " in South Africa is applied to a training in infant care and infant feeding, as taught at the Mothercraft Training Centre at Capetown. The South African Medical Council recognises this course of training and grants a special certificate in connection with it.

The *Department of the Interior* is responsible for the administration of the Mental Disorders Act and in connection therewith employs a large staff. Directly and indirectly concerned in health and medical duties there is a staff of 51 medical officers, 544 male and 832 female nurses.

The *Department of Defence* in connection with its medical and hygiene organisation employs 9 medical officers and 19 nurses.

The Office of the *Commissioner of Pensions* has a medical staff consisting of 2 full-time and 3 part-time medical officers. Their duties include examinations under the War Special Pension Acts; advice on medical matters under the various Civil Pensions Acts; the examination of medical reports on behalf of the Department of Social Welfare for grants to needy physically unfit European persons; and the manufacture and fitment of artificial limbs and appliances.

The *Department of Prisons* has on its staff 2 full-time resident medical officers, stationed at Pretoria and Johannesburg respectively.

The *Department of Mines* controls the Miners' Phthisis Medical Appeal Board with 3 members and the Miners' Phthisis Medical Bureau employing 10 medical officers. At the State Alluvial Diggings at Alexander Bay it employs 1 medical officer and 1 medical orderly, while at Bakerville in the Lichtenburg district, it actually administers the Diggers' Field Hospital. At this hospital there are 2 trained and 5 probationer nurses.

The *Department of Social Welfare* has 17 full-time nurses on its various settlements, chiefly forestry schemes.

The *South African Railways and Harbours Administration* is an extremely important body concerned in health activities. The officer in charge of the health organisation is an assistant health officer of the Union Health Department detached for service to the Railways Administration. Under him there is a qualified health inspector on each of the 8 systems assisted by health foremen. One qualified health inspector is stationed at the Coligny headquarters, while a further inspector serves the workshop and depôts.

An important development occurred during last year in this Administration with the formation of an organisation to undertake social welfare services in the rehabilitation of non-graded employees and their dependents. The field organisation of this service consists of 1 lady health visitor and 1 lady social worker for each railway system, i.e. 16 units in all with a senior unit for each grade to undertake the co-ordination of the work throughout the Union.

The routine duties of the health staff of the Railways Administration during the year included camp management, repairs to roads and drains, maintenance of parks, selection of sites for building purposes, inspection of meat and other food at camps, control of sanitary parties and labourers, anti-malarial and anti-mosquito work, anti-plague and rodent measures, fumigation of buildings, rolling stock, protection of water supplies, inspection of premises and similar sanitary and health duties. The staff undertaking these duties consisted of the Railway Health Officer, 4 health inspectors attached to headquarters and the following field staff—8 inspectors, 33 health foremen and certain subsidiary staff. Seven lady health visitors and 4 lady social visitors are concerned with the important developments being made in the social welfare section of the Railways Administration.

29.—Local Authorities and their Health Staffs.

The numbers of the various classes of local authorities under the Public Health Act as at 30th June, 1938, are shown in Table 34.

Table 34.—Local Authorities under the Public Health Act (1919) as at 30th June, 1938.

Province.	Municipalities.	Village Management Boards.	Local Boards.	Village Councils.	Health Committees.	Local Administration and Health Boards.	Magistrates.	Divisional Councils.	Board of Health.	Mining Commissioners.	Total.
Cape	133	95	24	—	—	—	30	95	1	1	379
Natal	11	—	16	—	19	8	45	—	—	—	99
Transvaal	32	—	—	30	39	—	47	—	—	3	151
Orange Free State	64	4	—	—	—	—	39	—	—	1	108
Union	240	99	40	30	58	8	161	95	1	5	737

Whole-time medical officers of health are employed by 14 of the municipalities listed, namely, Benoni, Bloemfontein, Boksburg, Capetown, Durban, East London, Germiston, Johannesburg, Krugersdorp, Pietermaritzburg, Port Elizabeth, Pretoria, Roodepoort-Maraisburg and Springs. The Divisional Council of the Cape also employs a whole-time medical officer of health. A special arrangement at Kimberley has resulted in the establishment of a combined post of medical officer of health and district surgeon to the Municipality and Board of Health. At Grahamstown, Kingwilliamstown, Queenstown and Cradock there are whole-time officers who carry out the combined duties of district surgeon and medical officer of health to the municipal and divisional councils. At Brakpan a combined post of municipal medical officer of health and district surgeon exists.

The Department has continued to emphasise the value of trained health staffs to local authorities. Where a local authority is financially incapable of itself employing a full-time medical officer of health arrangements such as exist at Queenstown, Grahamstown, Kingwilliamstown and Cradock are a satisfactory alternative, which it is hoped to induce more authorities to accept.

The experience of the smaller Reef towns in the last two years is adequate proof of the value of trained staffs under the direction of a full-time medical officer of health. Enteric fever incidence is falling, serious dangers from smallpox epidemics have been averted, and challenging problems of venereal disease, location conditions, and slums are being solved. There are many other local authorities which could well do with the same energetic assistance and advice.

Accessory and subsidiary health staffs are increasing in number and importance. In large health departments such as those of Johannesburg, Capetown, Durban, Pretoria, Port Elizabeth, Bloemfontein, Pietermaritzburg, Kimberley, East London, and the Reef towns specialisation of the sanitary inspectorial staffs is advancing. Special plague, dairy, building, and other types of health inspectors are now employed. Generally the standard of efficiency of these officers is extremely high. In the smaller towns where the sanitary inspector usually does not have the moral and technical support of a full-time specialised medical officer of health he has extremely difficult and frequently discouraging tasks. It is fortunate that the integrity and sense of duty of the men in the smaller towns are so high. They, too, have often to work not only without the full support of their councils, but even to face active opposition and antagonism from councillors who are themselves transgressors of the health laws.

On the 30th June, 1938, 138 local authorities employed 374 sanitary inspectors and 97 health visitors.

30.—The District Surgeoncy System.

The district surgeoncy system is an extremely important part of the health organisation administered by the Department. The distribution of district surgeons is given in Table 35. Numbering over 300 they form a network extending over the whole Union, and in rural districts are the instruments of disease prevention and control. The district surgeon is an officer on the staff of the local magistrate, who, in terms of the Public Health Acts, is local authority for rural areas outside the Cape. Control of epidemic disease, investigation of sanitary conditions, the provision of pauper medical relief, and the treatment of infectious diseases, especially venereal diseases, are important health functions performed by the district surgeon. Many district surgeons too are called in by small urban local authorities to assist them with various medical and health problems.

It has been the aim of the Department to extend the organisation so as to bring medical care to the remotest districts. The attainment of this objective was assisted by the system of periodical tours made under Section 4 of Act No. 36 of 1927. The increased attention given in the last year or two to venereal diseases in rural areas has been possible through the district surgeoncy system. In many areas throughout the Union district surgeons are now conducting regular venereal diseases tours, whereby efficient treatment is being offered free to Native populations. The keennees which the majority of these officers has shown in this work has resulted in large numbers of district clinics being established, many with Native nurses attached.

A further result is to be seen in the encouraging acceptance by increasing numbers of Native patients in many districts of full courses of treatment for venereal disease. By securing more and more district surgeons with the preventive outlook much will be possible in improving sanitary and health conditions of rural areas. The Department is also considering the advisability of increasing the number of full-time district surgeoncies. In country districts, such as Pietersburg and Pretoria, the use of such officers has been extremely important in securing a comprehensive system of district clinics. These clinics, usually worked in association with Native nurses, as remarked above, have been a very successful and popular means of providing venereal diseases treatment and control.

TABLE 35.—DISTRICT SURGEONCIES AND ADDITIONAL DISTRICT SURGEONCIES AS AT 30TH JUNE, 1938.

Province.	Whole-time.	Whole-time, but jointly with local authority or public body.	Part-time.			Total.
			On inclusive annual salary.		On annual salary with certain supplementary fees and allowances.	
			District Surgeons.	Additional District Surgeons.		
Cape	5	6	—	27	134	172
Natal	3	—	—	2	43	48
Transvaal	8	1	1	20	56	86
Orange Free State	1	—	—	13	47	61
UNION	17	7	1	62	280	367

The seventeen whole-time officers are those at Capetown (2); Durban (3); East London; Port Elizabeth; Pretoria (3), (one stationed at Bronkhorstspruit); Johannesburg (4); Pietersburg; Bloemfontein; and Wynberg.

VI. HOSPITAL AND NURSING SERVICES.

31.—GENERAL HOSPITALS.

The system of routine inspections on behalf of the provincial administrations of the state-aided hospitals and kindred institutions in the Cape Province, Orange Free State and the Transvaal was continued during the year. It is satisfactory to note that generally speaking, hospital boards throughout the Union are eager to modernize existing hospitals and to carry out extensions to meet the increased demands for hospital accommodation. Owing to a shortage of professional officers it was found impracticable to inspect all the institutions in the three provinces mentioned during the year under review. It is anticipated, however, that during the next year a larger number of routine inspections of the state-aided hospitals will be carried out by assistant health officers in the Department. As in previous years, the public hospitals on the Reef and in Pretoria were inspected by the members of the Public Hospitals Advisory Council. The hospitals in Natal are state institutions, with the exception of one which is subsidised, and are not inspected by assistant health officers of this Department.

In the Cape Province the new general hospital at Groote Schuur was opened for the reception of patients. The additional accommodation so provided has gone a long way towards meeting the shortage of hospital beds formerly existing in the Cape Peninsula. In that area, too, the erection of a hospital at Somerset West was commenced. In Port Elizabeth a comprehensive scheme for providing additional accommodation for paying patients and for non-European patients received the attention of the Hospital Board and the Department was asked to advise on the different proposals advanced. Up to the present no definite decision on the line to be adopted appears to have been arrived at. Plans for extensions to the hospitals at East London, Mossel Bay, Grahamstown, Butterworth, Umtata, Kimberley and Upington were prepared and submitted to the Department for examination and report. A scheme for building an entirely new hospital at Vryburg to replace the existing hospital was also submitted to the Department for examination and report.

In the Orange Free State the new maternity section in the grounds of the National Hospital was completed. Plans for an entirely new European section of the Harrismith Hospital and for extensions to the Bethlehem Hospital were submitted to the Department for examination and report.

In the Transvaal Province the work on the erection of new hospitals at Klerksdorp and Middelburg has reached an advanced stage, while a small hospital was completed and brought into use at Piet Retief. Extensive additions to the general hospitals in Johannesburg, Germiston and Boksburg are being carried out. Schemes for extensions to the hospitals at Springs, Pretoria, Potchefstroom, Standerton, Barberton, Sabie, Volksrust and Vereeniging are at present under consideration.

Chronic Sick Hospitals.—The construction of the new chronic sick hospital on the Cape Flats is making satisfactory progress. When completed this institution will provide accommodation for about 630 patients.

In the Transvaal the new chronic sick hospital at Rietfontein is nearing completion. This institution will have accommodation for about 370 patients.

Up to the present no chronic sick hospital has been provided in the Orange Free State Province, though a few beds for chronic sick European patients are available in the Bloemfontein Municipal Isolation Hospital at Tempe. The need for accommodation for incurable cases in the Province is a very real one, and it is understood that the question as to the most suitable scheme has already been investigated by the Provincial Administration. It is, however, not known whether any decision on the subject has been arrived at.

The chronic sick hospital for Natal, situated at Hillcrest, near Durban, provides accommodation for approximately 100 patients.

Mission Hospitals.—There has not as yet been any complete survey in the Union of mission hospitals, although the great majority of them is known to the Department and has been visited at least once by some official. These hospitals are of all religious denominations, many of somewhat mushroom growth, and some located in extremely remote and inaccessible parts. It is hoped that in the near future a more intimate contact will be established and maintained with all such institutions. They have been pioneers in health work, particularly amongst the non-Europeans, and are deserving of recognition and of help. In any general scheme for the furtherance of non-European health work, the mission services will have to be considered. In the existing mission hospitals are found some of the most efficient, single-minded and altruistic of workers, both district nurses and medical men and women.

The question of registration of mission hospitals as nursing homes in accordance with the Regulations regarding Nursing and Maternity Homes has for some time received the attention of the Department. These institutions cannot strictly speaking be regarded as nursing homes conducted " for gain ", since fees are nominal and in most cases non-existent. Nevertheless the Department has during the last few years done everything to encourage registration of these hospitals for the following reasons:—

(1) To enable the Department to keep a more systematic and correct check on the numbers and whereabouts of mission hospitals and so be aware of what medical work is going on in the country.
(2) To give the missions the practical help and advice that a visiting official can supply during the course of a routine inspection.
(3) To ensure a certain amount of official supervision over isolated institutions.
(4) To give official recognition in the form of a certificate of registration and thus possibly make it easier for a registered home to obtain the advantage of government grants which may be available.
(5) To obtain certain valuable medical statistical information which must of necessity be provided by a registered nursing home every year.

There is no fee attached to registration, and the only extra clerical work entailed is in the keeping of registers and the submission of yearly returns, both desirable procedures in themselves.

The position of certain " private hospitals " run by business concerns primarily for the benefit of their employees, is not very satisfactory. These institutions are under no supervision whatever, except that of the matron in charge and possibly a resident medical officer. They are neither private nursing homes nor public hospitals, and yet they admit private cases apart from the employees for whom they are intended.

32.—Nursing and Maternity Homes.

The number of nursing homes registered with the Department is steadily increasing in every province, as shown in Table 36. Constant changes follow the closing down of small homes every month, and the registration of new ones following the tours of inspecting officials. As the more undesirable homes are closed by the Department, the standard is being improved in the bigger towns and the smaller and less satisfactory homes are obliged to close.

In country districts the Department recognises and registers the most primitive type of nursing home provided the essentials of cleanly management and general hygiene and sanitation are provided, believing that at this stage it is better to allow the legitimate use of such homes, than to encourage illegal admissions to such and far worse places. Each home is judged according to its merits, taking into account the dire need in rural and semi-rural areas for beds for maternity cases and for emergency work of all sorts.

The utmost ignorance of the law with regard to nursing homes is met with throughout the country amongst the public and the medical profession. The most difficult position to deal with is that frequently found in very

small towns, remote from any centre with a hospital or an established nursing home, where it is customary for a woman to come in from an outside farm, to hire accommodation for her confinement in any suitable or unsuitable house, and be attended by the local doctor or by a midwife, trained or untrained. The legal position is that the person who lets a room in unregistered premises for such a purpose is breaking the law. The policy pursued by the Department in such cases is as follows:—

(1) Where there is a trained nurse or midwife locally with suitable premises, to persuade her to register the house as a maternity home.

(2) If (1) can be accomplished, to see that the law is strictly adhered to and illegal admission to other premises prevented.

(3) Where no such trained service is available, to inspect all houses known to be used as unauthorised nursing homes, to select the best for registration.

(4) To endeavour to obtain the co-operation and support of all local medical men in upholding the law and to send cases only to suitable premises.

Unfortunately, the co-operation of medical men is not always obtained either in this respect or in regard to the work and supervision of untrained midwives.

TABLE 36.—NURSING HOMES REGISTERED WITH THE DEPARTMENT.

Year.	Cape.	Transvaal.	Natal.	Orange Free State.	Total.
1928–29	104	90	43	26	263
1929–30	124	91	54	29	298
1930–31	110	98	51	25	284
1931–32	95	94	44	26	259
1932–33	105	100	46	25	276
1933–34	115	103	43	28	289
1934–35	126	128	42	28	324
1935–36	120	116	46	34	316
1936–37	134	120	49	35	338
1937–38	140	126	55	55	376

Table 37 shows the number of nursing and maternity homes inspected during the last few years and it will be seen that the bulk of this routine work is carried out by the departmental officers, inspecting in areas where there is no full-time medical officer of health. Full-time medical officers of health are asked to inspect nursing homes in their areas once a year; although this is done regularly in some of the large towns, in others the inspections are very irregular and unsatisfactory.

TABLE 37.—NURSING AND MATERNITY HOMES INSPECTED DURING THE YEARS ENDED 30TH JUNE, 1934, 1935, 1936, 1937 AND 1938, RESPECTIVELY.

Place.	Inspections.									
	By Medical Officer of Local Authority.					By Department and Other Government Officer.				
	1934.	1935.	1936.	1937.	1938.	1934.	1935.	1936.	1937.	1938.
Cape Province.										
Capetown	4	1	4	7	11	—	—	—	—	—
East London	—	2	4	4	6	—	3	—	—	—
Port Elizabeth	8	1	8	14	5	—	—	—	—	2
Elsewhere	9	2	—	3	—	5	49	34	81	35
Natal Province.										
Durban	—	19	—	11	18	—	—	—	—	1
Pietermaritzburg	1	3	—	3	3	—	—	—	—	—
Elsewhere	—	—	—	—	—	9	9	24	2	27
Transvaal Province.										
Johannesburg	1	35	2	54	43	—	—	—	2	4
Other Rand L.A.'s	—	—	—	—	9	—	—	—	—	4
Pretoria	—	11	5	13	7	—	—	—	—	—
Elsewhere	5	1	1	5	—	45	32	65	30	54
Orange Free State.										
Bloemfontein	1	—	—	—	—	—	—	—	—	5
Elsewhere	—	—	—	—	—	9	10	29	8	25
UNION	29	75	24	114	102	68	103	152	129	157

The numbers referring to bed accommodation shown in Table 38 can only be regarded as very approximate calculations, particularly where the non-European beds are concerned. It is hoped that a more accurate survey of the position will be obtained before very long.

TABLE 38.—BED ACCOMMODATION AVAILABLE IN NURSING HOMES.

	1935.	1936.	1937.	1938.
Cape Province—				
Capetown and Peninsula	476	527	556	725
East London	56	59	42	66
Port Elizabeth	129	139	111	126
Queenstown	44	58	58	67
Stellenbosch	58	34	35	39
Rest of Province	349	340	377	404
			92*	117*
TOTAL	1,112	1,157	1,271	1,544
Transvaal Province—				
Johannesburg	683	638	689	880
Rand Municipalities	238	248	248	282
Pretoria and District	125	142	160	162
Rest of Province	188	230	188	272
			137*	217*
TOTAL	1,234	1,258	1,422	1,813
Natal Province—				
Durban	326	522	385	425
Pietermaritzburg	108	113	35	90
Rest of Province	603	454	142	140
			489*	711*
TOTAL	1,037	1,099	1,052	1,366
Orange Free State—				
Bloemfontein	68	59	72	75
Rest of Province	123	151	162	209
				13*
TOTALS	191	210	234	297

* Nearest approximation and includes Coloureds and Asiatics.

A most important step recently taken by the Transvaal Provincial Council was the decision that the Province would pay a subsidy at the rate of 10s. per diem to a district nurse subsidised under section 14 (*b*) of Act No. 57 of 1935, in respect of a pauper midwifery case admitted to her home for nursing. The premises must be approved by the Department and registered with it as a nursing home; there must be no alternative hospital accommodation available. This represents real progress, and should greatly help to solve the problem of providing suitable care and attention to the poor mothers in rural districts. The Department subsidises district nurses and midwives, but cannot undertake to subsidise private nursing homes. Subsidised nurses are only permitted to register two beds for the admission of cases to their premises.

This decision of the Transvaal Provincial Council will probably actually increase the number of beds available, as more subsidised nurses will be prepared to register their homes for the admission of patients. In the Transvaal, too, the proposed expansion of the district nursing and midwifery services under section 13 of Act No. 57 of 1935 should prove of great importance.

An efficient midwifery service should include pre-natal services, a district midwifery service, a maternity hospital for cases needing hospital treatment, post-natal services and, as a corollary service, a system of " home helps " to take charge of housekeeping matters and to assist in the care of the other children in a household when the new baby arrives. This last service could well be undertaken by charitable associations; but the remaining services should be under one control and the woman attended during the whole period of her pregnancy by the same staff of health visitors, midwives and doctors. The present system, under which the pre- and post-natal services are usually municipal and the actual warding of a confinement and district maternity work are controlled by the provincial hospital, is unsatisfactory, even if there is co-operation between the two services.

The solution would be either for the municipalities to have their own maternity hospitals or for the provincial hospitals to conduct their own pre- and post-natal services.

As no municipalities in this country control or provide maternity hospitals, the former plan is at present impracticable. There is also a distinct gap in any existing services where a woman attending a municipal

ante-natal clinic later enters hospital for her confinement, as she passes into entirely new hands for this stage of her treatment; the doctors on the hospital staff are seldom, if ever, those who attend the municipal clinics. In favour is the fact that control of practising midwives is legally invested in the local authority.

The second plan is already successfully in operation in at least one large local authority area—Port Elizabeth—and could with advantage be followed elsewhere, as it provides a completely consecutive service.

The Department is concerned about the very distressing amount of preventable ill-health to mothers resulting from pregnancy. To avoid this the Department is encouraging the establishment of post-natal clinics where mothers can get advice and treatment to enable them not only to regain their own health, but to put them into a position to bear further healthy infants. Part of such advice must necessarily at times be a suitable delay before the next pregnancy occurs. Too early pregnancy before the mother's health has been restored is not infrequently disastrous both to the mother and the child. The Department has made a grant-in-aid of £1,000 to the South African National Council for Maternity and Family Welfare, to be used for the development of this work especially in securing its extension to rural areas. Centres are now functioning at Pretoria, Johannesburg, Port Elizabeth, East London, Benoni, Pietermaritzburg and Capetown. Most of these have extended their work by opening clinics in other quarters of the town or in the surrounding districts. The Department has recently issued a circular to all local authorities employing full-time medical officers of health, urging on them the necessity for developing clinics in conjunction with the National Council. A practical result up to date has been the establishment of a post natal clinic at Maitland, conducted by the Capetown Mother's Clinic Committee in conjunction with the Municipal Health Department and it is hoped that other municipalities will follow suit.

33.—District Nursing Services.

Table 39 shows the growth of the district nursing service in terms of Sections 14 and 15 of Act No. 57 of 1935.

TABLE 39.—DISTRICT NURSING SERVICE: NURSES, MIDWIVES AND NON-EUROPEAN NURSING ASSISTANTS AS AT 30TH JUNE, 1938, IN RESPECT OF WHOM SUBSIDIES OR PART-REFUNDS OF SALARIES ARE PAID, COMPARED WITH THE TOTALS AS AT 31ST DECEMBER, 1935.

Race.	Part-refunds under section 14 (*a*).		Subsidies under section 14 (*b*).		Part-refunds under section 15 (*a*).		Subsidies under section 15 (*b*).		Part-refunds to Provincial Administrations under section 13.	
	1935.	1938.	1935.	1938.	1935.	1938.	1935.	1938.	1935.	1938.
European	23	74	7	65	—	11	—	—	—	80
Native	2	5	—	—	11	35	3	17	—	9
Coloured	—	6	1	4	—	—	—	—		
ALL RACES	25	85	8	69	11	46	3	17	—	89

There has been considerable expansion in all sections, limited still by the extreme difficulty in obtaining trained nurses and midwives.

The few years during which the service has been in existence have revealed the practical difficulties and weaknesses of the Act. The great stumbling block is the lack of financial assistance for transport. In a country like South Africa a rural district nurse without transport is not of much use. In making appointments in terms of Section 13 or Section 14 (*a*) of Act No. 57 of 1935, i.e. whole-time appointments ,the transport question is taken into consideration by the employing body, and some provision therefor made in the original estimate of costs. In the case of private nurses subsidised under Section 14 (*b*), whose district work is really only part-time the difficulties with regard to transport are enormous. These nurses cannot be expected to buy their own cars and carry the whole costs of transport, and the poorer type of patient on whose behalf they are being subsidised has no car or even cart to send for the nurse. In order to assist, the Department has adopted a working rule by which it will increase a subsidy where a local community provides a car for a district nurse. Where the nurse herself provides a car, the Department offers a small increase in subsidy, provided the local people also contribute a certain extra sum.

Section 14 (*b*) continues to offer more administrative difficulties than any other section of this Act because of the extreme difficulty of control of privately subsidised nurses.

Under Section 13 there has been great progress in the Cape, where fourteen hospital boards have made provision for district nursing and midwifery services. The following Boards deserve mention for the progressive manner in which they have tackled the problem, appointing both European and non-European nurses and midwives to work not only in the town concerned, but far afield in the district:—

George, Mossel Bay, Paarl and Worcester.

In the Orange Free State and Natal little expansion has been made under this section, but it is gratifying to note that the Transvaal Province has now come into the picture, and has made a start at Boksburg and Benoni. These now have their own district midwifery services conducted through the Boksburg-Benoni Hospital.

The Provincial Council of the Transvaal has agreed to the principle of establishing district nursing and midwifery services through the hospital boards on the following financial basis:—

One-third of total costs to be met locally.

Two-thirds of total costs to be met by Provincial Administration.

In terms of Section 13 of Act No. 57 of 1935, this Department will then refund to the Provincial Council one-half of its expenditure on the service. This is an extremely important step in the develpoment of district nursing services in the Transvaal Province which will have a great influence on general health development.

Native Nursing Services.—In consultation with the Department of Native Affairs this Department has arranged to subsidise fifteen Native nurses or Native nursing assistants under Section 15 (*b*) in the northern areas, at places selected by the Department of Native Affairs, and where the nurse can be housed and controlled by some suitable responsible body, such as a mission or a local council. In all probability some similar scheme will be adopted for the Transkei and Ciskei. There will be difficulty in procuring sufficient suitably trained Natve girls for the work, and experience shows that unless these nurses are supervised by European doctors or nurses, their work is not of great value.

VII.—PORT HEALTH ADMINISTRATION.

34.—Port Health Administration.

Close supervision has been exercised throughout the year at all Union ports to preclude the possibility of infection being introduced into the country from overseas. A summary of the health measures carried out is contained in Table 40.

TABLE 40.—PORTS OF THE UNION: HEALTH MEASURES DURING THE YEAR ENDED 30TH JUNE, 1938.

Particulars.	Capetown.	Durban.	Port Elizabeth.	East London.	Mossel Bay.	Knysna.	Port St. Johns.	Simonstown.	Port Nolloth.	Total.
Vessels dealt with	1,805	2,054	893	772	443	19	—	36	154	6,176
Cases of infectious or communicable diseases dealt with	224	259	4	2	—	—	—	—	—	489
No. of Vessels involved	139	140	4	2	—	—	—	—	—	285
Disinfections and fumigations—										
Vessels	49	133	3	2	—	—	—	—	—	187
Consignments of second-hand clothing and other articles	1	322*	18	—	—	—	—	—	—	341
Deratizations under International Sanitary Convention—										
No. of Vessels Deratized and Certificates Issued	4	118	—	—	—	—	—	—	—	122
No. of Exemption Certificates Issued	29	64	—	—	—	—	—	—	—	93
Rats Destroyed on Vessels and in Dock Area	2,859	6,131	4,498	1,508	247	—	—	—	—	15,239

* In addition, the bedding and personal effects of 1,110 Indian passengers were disinfected.

There were no cases of formidable epidemic disease—smallpox, plague, typhus, yellow fever, cholera, or sleeping sickness—introduced into any of our ports during the year, although a case at first suspected of being smallpox was landed at Capetown. The S.S. " Umgeni " arrived at that port in June, 1938, and one of the Lascar crew was thought to be suffering from smallpox. All the ship's passengers and crew had been vaccinated by the ship's surgeon when the diagnosis was first made at sea. Those in whom the vaccination had not " taken " were revaccinated at Capetown. The patient was removed with all necessary precautions to Rentzkie's Farm Smallpox Hospital for isolation and treatment. It was subsequently found that he was suffering from acute leprotic fever and he was therefore removed to the Conradie Home where he was isolated until he was fit to travel. He was then sent to Durban for repatriation to India.

Owing to the prevalence of smallpox along the east coast, north of the Union, great care was exercised in examining non-European passengers arriving at Durban from areas under suspicion. It was found necessary on occasion to quarantine some of these passengers until the expiration of the incubation period where only unsatisfactory addresses were obtained.

The incidence of measles among passengers on ships in transit remains about the same as in the previous year; 77 per cent. of the cases were in Japanese vessels. These vessels were subjected to thorough inspections and granted restricted pratique; all children under the age of 12 years were prohibited from going ashore.

The importance of anti-rodent work as a precaution against the introduction of plague through our ports is obvious. The importance was emphasised by the events which took place at Port Elizabeth during the first half of the year. As described, an outbreak of plague occurred in the municipal area and it became evident that there was widespread rodent infection. If this had spread to the port area the effects on overseas trade would have been disastrous. Effective anti-rodent measures had, however, been carried on continuously in the port area for a considerable period and by arrangement with the Railways and Harbours Administration all available additional assistance was obtained and a vigorous anti-rodent campaign was carried out. The position is now satisfactory and the port area has remained free from plague. Extensive structural alterations to eliminate rodent harbourage have been and are being carried out. The work of rodent destruction is continuing and the situation is being carefully watched.

Very extensive works are at present in progress in the harbour area at Capetown. When these are completed, in about five years time, the docks will be more than double their present size. Meanwhile, shipping continues to increase at this port and there is a corresponding increase in the port health work.

One important aspect of port health work which has recently developed is health supervision of the flying-boat service from Europe. This is dealt with in a separate section.

VIII.—LABORATORY SERVICES AND MEDICAL RESEARCH.

35.—Laboratory Services in the Union of South Africa.

Prior to 1902 there seems to have been no laboratory facilities in the country except the combined veterinary and medical laboratory known as the Government Bacteriological Institute at Grahamstown. Somewhere about 1902 a laboratory was started in Capetown although it is believed that before that date there were certain laboratory facilities in the old Colonial Offices in Capetown. In 1911 a second government laboratory was opened in Durban following the closing of the combined veterinary and medical laboratory in Pietermaritzburg.

The present position of laboratory services is as follows:—

The *Union Health Laboratory, Capetown*, receives specimens from the whole of the Western Province, except the Port Elizabeth area; it also examines certain specimens from South West Africa at a reduced tariff rate. This laboratory does free services under the Public Health Act in connection with all infectious and communicable diseases; it does medico-legal work for the Western Province and certain areas in the Eastern Province and also for the Mandated Territory of South West Africa. In addition to this work, anti-rabic vaccine is prepared and issued to the whole of the Union and sold to certain outside governments, such as Northern Rhodesia and on occasions to Southern Rhodesia, Portuguese East and West Africa, and South-West Africa. In conjunction with the Chemical Laboratory, Capetown, the whole of the requirements of the leper institutions of iodised ethyl esters and various other preparations of chaulmoogra oil are issued from this laboratory. These are also supplied at a fixed price to the Basutoland Government and Southern Rhodesia.

The clinical work required by the hospitals under the administration of the Cape Hospital Board is done in the *University Laboratories* at Mowbray. They are indirectly paid for this work; all fees paid by the students for hospital teaching to the Hospital Board are refunded to the University for the laboratory work done by them. Pathological work and bio-chemical work are sent to the University Department of Pathology, bacteriological work to the University Bacteriological Department. The only hospital under the administration of the Cape Hospital Board with a different arrangement is the Victoria Hospital, Wynberg, which employs its own honorary pathologist and does its own laboratory work. Free services under the Public Health Act are done at the Government Laboratory for the following hospitals under the Cape Hospital Board:—

Rondebosch Cottage Hospital,
Woodstock Hospital,
False Bay Hospital,
Free Dispensary,

and certain similar institutions such as the Lady Michaelis Orthopaedic Home and the Princess Alice Home of Recovery for Children.

The University laboratories in addition to doing clinical work which is not a free service under the Act, do the whole of the laboratory work for the new general hospital—the Groote Schuur Hospital—and for the Peninsula Maternity Hospital; the material taken from these sources is required for teaching purposes.

The *Government Biological Control Laboratory, Capetown*, supervises imported and locally manufactured sera, vaccines and other therapeutic substances. In addition, certain work is done here in connection with hormones. The sterility of surgical sutures is also controlled.

The *Union Health Laboratory, Durban*, deals with free specimens under the Public Health Act from the whole of Natal; it also does the Wassermann tests on materials from the Addington Hospital, Durban, Greys Hospital, Pietermaritzburg, and the King Edward VIII Hospital, Durban.

The *Union Health Field Station* at Tzaneen undertakes large numbers of routine examinations for malaria and is also concerned in certain research activities in the same field.

In any consideration of the laboratory services provided by the Government in the interests of health, the laboratories of the Division of Veterinary Services at Onderstepoort and those of the Division of Chemical Services at Johannesburg and Capetown are not to be overlooked. The Onderstepoort Laboratories are co-operating with this Department in anti-rabic work, while the Chemical Laboratories in addition to medico-legal work, carry out examinations of food and water samples on behalf of this Department.

The *South African Institute for Medical Research*, with its chief laboratories at Johannesburg and a branch laboratory at Port Elizabeth, is the largest of its kind in the country. Its origins go back to a laboratory established by the government in Johannesburg after the South African war. This institution came into prominence in connection with the work it did during the severe plague outbreak in 1904. It gradually expanded, including in its functions both bacteriological and chemical examinations. In 1912 these were separated, the bacteriological work being taken over by the new institution—the South African Institute for Medical Research—then established, while the chemical activities were gradually merged into the present Government Chemical Laboratories. The South African Institute for Medical Research is governed by a Board of Management composed of representatives nominated by the Witwatersrand Native Labour Association and the government respectively. Its present activities fall under a research division and a routine division, staffed by over twenty professional officers and a large number of technical and administrative assistants. The research division will receive further comment in another section of this report. The routine division which last year handled over 170,000 specimens undertakes more than 50 per cent. of the routine medical laboratory work of the country.

The *Provincial Laboratory* at the Addington Hospital, Durban, was opened in 1931. It does all the clinical laboratory work for the Addington Hospital and the King Edward VIII Hospital, with the exception of Wassermann tests which are done in the Union Health Laboratories at Durban.

Greys Hospital, Pietermaritzburg, is about to open a laboratory which will do the clinical hospital work and also certain work for the Municipality.

Frere Hospital Laboratory, East London, which will open in July, 1938, will do clinical hospital work and certain work for the Municipalities of East London and Cambridge and the East London Divisional Council. It will also undertake government work in their areas.

At *Bloemfontein* there is a *municipal laboratory* which has recently been opened in the Municipal Buildings. The staff consists of one assistant working under the supervision of the Medical Officer of Health. The *National Hospital, Bloemfontein*, also has its own laboratory with a technical assistant. At *Kimberley* there is a *municipal laboratory* under the control of the Medical Officer of Health for the Kimberley Board of Health.

In *Pretoria* the work of the General Hospital and the Municipality is done by a private bacteriologist.

In addition to the laboratories named there are several private bacteriologists in various towns of the Union.

It will be seen therefore that laboratory work in this country is under several different controls:—

(1) The Central Government is responsible for free services all over the country. These are provided in the two government laboratories at Capetown and Durban, in two institutions under the South African Institute for Medical Research and in the new laboratory at East London.

(2) The Natal Provincial Administration is responsible for the laboratory work done in Durban and Pietermaritzburg at its hospitals, while certain services under the Public Health Act is provided at no cost to Central Government.

(3) In Capetown the University does the work for the Cape Hospital Board with the exception of certain of the free services from the smaller hospitals such as Woodstock and Rondebosch, which are done in the government laboratory.

(4) A few laboratories are controlled by municipalities such as Kimberley and Bloemfontein.

(5) There is also the arrangement in Pretoria where a private pathologist does the work for the municipality and for the Hospital. The National Hospital, Bloemfontein, also falls in this category.

In addition to these laboratory services the government manufactures all calf lymph used in the Union. This lymph is also sold to the Governments of Northern and Southern Rhodesia, Bechuanaland, Basutoland, Swaziland and the Mandated Territory of South West Africa. Occasionally others are also supplied such as Mauritius and Portuguese East and West Africa.

The amount of laboratory work has increased enormously in the last 20 years. It may be expected to increase steadily as more and more laboratory facilities which aid diagnosis of disease are brought into use. The two government laboratories were, in 1920, doing under 8,000 specimens a year. For the year under review the numbers were—

at Capetown	77,000
at Durban	35,000

making at total of 112,000; for the year 1937 a total of 176,900 specimens was done at the South African Institute for Medical Research, Johannesburg and Port Elizabeth. In addition the Provincial and Municipal laboratories were probably doing some 50,000 specimens; approximately a similar amount was done by the University of Capetown. Altogether about 300,000 specimens are being examined annually in the country apart from the work done by private laboratories.

Medico-Legal Work.—In Johannesburg a medico-legal pathologist was appointed in 1933 to take over the whole of the post-mortem work and medico-legal investigations excluding laboratory work for all the Reef towns. The work is actually done by the medico-legal pathologist in conjunction with 4 whole-time district surgeons who, in addition, do the other district surgeons' duties. A laboratory has been built where certain laboratory work is done; the equipment and cost of the building is paid for by the Department of Justice. In Capetown in 1934 the post-mortem work for Capetown Central and Woodstock was taken over by the Government Laboratory. In Durban the post-mortem work is still being done by the District Surgeons quite independent of the Government Laboratory.

Medico-Legal Laboratory Work.—The South African Institute for Medical Research does the largest portion of this work, namely for the whole of the Transvaal, Orange Free State and East Griqualand, at the Institute in Johannesburg and for the Eastern Province at the Institute in Port Elizabeth. Natal work is done in the Government Laboratory, Durban. Work for the Western Cape Province and South West Africa is done in the Government Laboratory, Capetown. The whole of the toxicological work for the Union and South West Africa is done at the Government Chemical Laboratory, Johannesburg, where the work has all been recently centralised. The Government Chemical Laboratory, Capetown, is available to do urgent work under certain circumstances.

The position in this country as regards laboratory work is not yet entirely satisfactory because of the difficulty of getting trained pathologists or for that matter any medical men interested in this type of work. It is also difficult

to get suitable technical assistants who are willing to stay in the government laboratory service owing to certain disabilities which they suffer as compared with other government servants.

A single laboratory control would obviously be more efficient than the several different controls there are at present, namely:— Central Government, Provincial Government, South African Institute for Medical Research, the Universities and the municipalities. Inefficiency is inevitable: salaries vary; conditions of work differ greatly; and staffs are not interchangeable. The South African Institute for Medical Research has the best facilities for training staff; but that staff cannot be employed in government laboratories owing to the fact that the salaries of the South African Institute for Medical Research are much higher that those paid by the Government for similar types of work. It is unfortunate that the government, when laboratory extension became essential, did not extend its laboratory services, or that the Institute did not take over the whole of the laboratory control in the country.

Staff of Government Laboratories.—The present staff of the government laboratories excluding the medico-legal staff in Johannesburg, but including Rosebank Vaccine Institute and the Biological Control Laboratory, Capetown, is as follows:—

3 Senior pathologists,
2 Junior pathologists,
1 Pharmacologist,
6 1st grade technical assistants,
5 2nd grade technical assistants,
5 3rd grade technical assistants.

Government Laboratory Services.—The work done by the government laboratories at Capetown and Durban and that carried out on behalf of the government at the South African Institute for Medical Research, Johannesburg and Port Elizabeth, is shown n Table 41.

TABLE 41.—PATHOLOGICAL LABORATORIES: ANALYSES AND EXAMINATIONS, YEAR ENDED 30TH JUNE, 1938.

Particulars.	Laboratories.		South African Institute for Medical Research.	
	Capetown.	Durban.	Johannesburg.	Port Elizabeth Branch.
Specimens Examined for—				
Government Departments—				
Agriculture	1	5	—	—
Customs and Excise	24	—	—	—
Defence	777	61	1,316	—
Interior (Mental Hospitals, etc.)	998	362	1,085	554
Justice	—	214	1,526	305
Justice (Prisons)	1,794	124	1,763	44
Mines (including Miners' Phthisis)	1	—	9,589	—
Posts and Telegraphs	—	—	—	—
Public Health (including Leper Institutions)	8,230	4,652	44,674	7,641
Public Works	1	—	—	—
South African Railways and Harbours	74	1,539	—	—
Other Government Work	—	11,380*	895	49
General Hospitals (Provincial)	3,164	8,945	41,875	10,294
Local Authorities	45,308	12,924	6,695	15,016
Medical Practitioners	16,200	12,050	13,090	2,123
Department of Education (Provincial)	—	942	—	—
Other Governments or Administrations	104	—	4,465	—
Others	265	—	23,367§	9
TOTAL	76,941	53,198	150,340	36,035
Manufactures and Issues—				
Autogenous Vaccines.....c.c.	50	—	27,100	4,675
Bacterial Vaccines (stock).....c.c.	—	—	1,006,802	†
Tuberculin Dilutions.....c.c.	—	—	—	45
Sera (various), Bacterial Filtrates.....c.c.	—	—	940,732	†
Anti-rabic Vaccine.....c.c.	42,000	—	—	—
Chaulmoogra Oil Preparations.....c.c.	20,500	—	—	—
Smallpox Vaccine—Calf Lymph (prepared at Vaccine Institute, Rosebank)..tubes	3,586,000‡	—	2,015,635	350
Others.....doses	285,000	—	128,606	—
Attendances at Courts of Law by Members of Staff	320	2	6	4
Total Days' Absence entailed by such attendances	215	2	9	24

* Includes 11,335 examinations of Mosquito Larva and Adults (1st July–31st Dec. 1937).
† Included in Johannesburg figures.
‡ Manufactures only: 4,373,491 tubes issued (2,443,000 tubes were on hand at the beginning of the year).
§ Includes 19,857 examinations for the Mining Industry.

36.—Biological Control Laboratories.

The total number of examinations made under the Therapeutic Substance Regulations was less than that during the year 1936-37. Fewer serological examinations account for this difference as the Officer-in-Charge, who is also the serologist attached to the Biological Control Laboratories, was absent on leave during the year. An increased number of pharmaceutical preparations controlled under the Therapeutic Substances Regulations and the Food, Drugs and Disinfectants Act, No. 13 of 1929, was examined.

One additional licence to manufacture bacterial vaccines for sale was issued. Additional import licences were granted to three importers to enable them to import insulin, posterior pituitary extract, antigens and bacterial vaccines. Twelve licences to import therapeutic substances were cancelled during the year and not renewed.

Inspection of laboratories engaged in the manufacture of therapeutic substances including autogenous vaccines was carried out. The premises of all agents granted licences to import therapeutic substances into the Union were also inspected. Several importers were found to possess adequate refrigeration plant which at the time of inspection was not in working order. The importance of adequate refrigeration of stocks of therapeutic substances cannot be over-emphasised. Steps were taken to ensure that all importers' stocks were maintained as required by the Regulations.

Several licences to import therapeutic substances were cancelled during the year. In all cases of cancellation the manufacturers, despite repeated warnings, refused to comply with the labelling requirements laid down in the Therapeutic Substances Regulations. The Department had, therefore, no alternative but to cancel the licences granted to the agents of the manufacturers concerned.

The number of licences under the Therapeutic Substances Regulations in force on the 30th June, 1938, is shown in Table 42 as also the additional licences granted during the year 1937-38 and the licences cancelled during the year.

TABLE 42.—LICENCES ISSUED UNDER THE THERAPEUTIC SUBSTANCES REGULATIONS, GOVERNMENT NOTICE NO. 1131 OF 1935.

Therapeutic substances.	Manufacturing Licences.			Import Licences.			Research Licences.		
	Issued 1937–38.	Cancelled 1937–38.	In Force 30.6.38.	Issued 1937–38.	Cancelled 1937–38.	In Force 30.6.38.	Issued 1937–38.	Cancelled 1937–38.	In Force 30.6.38.
Antitoxic and bacterial sera	—	—	2	—	2	5	—	1	9
Antigens and bacterial vaccines	1	—	12	1	4	11	—	1	9
Arsphenamines and derivatives	—	—	—	—	1	7	—	1	9
Insulin	—	—	—	1	1	12	—	1	9
Pituitary (Post. Lobe) Extract	—	—	—	1	2	14	—	1	9
Sterilised Surgical Ligatures and Sutures	—	—	—	—	2	6	—	1	9

A total of 124 samples of therapeutic substances was examined. These examinations were carried out under the Therapeutic Substances Regulations and Therapeutic Substances Amendment Regulations published under Government Notices No. 1131 of 9th August, 1935, and No. 499 of 2nd April, 1937. The results of the examinations are shown in Table 43.

TABLE 43.—EXAMINATIONS CARRIED OUT UNDER THE THERAPEUTIC SUBSTANCES REGULATIONS: YEAR ENDED 30TH JUNE, 1938.

Name of Product.	Manufactured in Union. No. examined.	Imported into the Union. No. examined.	Number unsatisfactory.
Bacterial Vaccines	32	4	—
Schick Test Toxin	8	1	—
Diphtheria Prophylactic	2	1	1
Tuberculin	—	1	—
Diphtheria Antitoxin	13	5	—
Tetanus Antitoxin	6	3	—
Arsphenamine and Derivatives	—	8	—
Insulin	—	11	—
Pituitary (Posterior Lobe) Extract	—	17	—
Sterilized Surgical Sutures	—	12	2
Total Number Examined	61	63	3

Three of the samples examined were found to be unsatisfactory. One sample of diphtheria prophylactic was inactive. All samples of this prophylactic issued for sale in the Union were withdrawn from sale and returned to the manufacturer. Sales of this manufacturer's diphtheria prophylactic were stopped until all batches issued for sale were examined in the Biological Control Laboratories and passed as satisfactory for use. No unsatisfactory samples of Schick test toxin were found. This compares very favourably with the examinations carried out on Schick test toxin in 1936-37 when 3 out of 16 samples were found to be unsatisfactory.

It is most important that all the Schick test toxin and diphtheria prophylactic sold for use in the Union must conform to the regulation requirements. The diphtheria immunisation campaign in the Union is still in its infancy and no progress can be made using diphtheria prophylactic which does not produce immunity. Inactive Schick test toxin will produce a misleading record of successful immunisations and of immunity to diphtheria where no such immunity exists.

All antitoxins examined were found to be satisfactory and to contain sufficient excess to allow for deterioration during the period over which the manufacturers claimed their products would retain full potency.

During the year samples of arsphenamine derivatives were submitted by a manufacturer whose products had been refused admission to the Union in 1936-37 on the grounds that they did not possess the therapeutic activity required by the Therapeutic Substances Regulations and that they were more toxic than the standard preparations. The samples submitted in 1937-38 were found on examination to be satisfactory. The manufacturer was permitted to import arsphenamine derivatives into the Union, provided samples from each batch imported were submitted for examination in the Biological Control Laboratories and were found to conform to the regulation requirements.

Two samples of catgut were found to be contaminated. Both samples had been removed from their original packings and stored in so-called antiseptic solutions in hospitals. No samples of catgut issued for sale as sterile catgut were found to be contaminated when examined.

The number of examinations carried out under the provisions of subsection (1) of section 5 of Act No. 13 of 1929 was almost double that carried out during the previous year. The increase was due to the assay of a considerable number of samples of Tincture of Strophanthus B.P., which drug had not previously been controlled in the Union. The results of the examinations are shown in Table 44.

TABLE 44.—EXAMINATIONS CARRIED OUT UNDER THE FOOD, DRUGS AND DISINFECTANTS ACT, No. 13 OF 1929.

Name of Product.	No. Examined.		No. Unsatisfactory.	
	1936–37.	1937–38.	1936–37.	1937–38.
Digitalis Powder B.P.	4	4	—	1
Tinct. of Digitalis B.P.	43	42	10	2
Tinct. of Strophanthus B.P.	—	34	—	15
Total Number of Samples Examined	47	80	10	18

A marked improvement was noted in the quality of digitalis preparations offered for sale on the open market. Whereas for the year ended 30th June, 1937, approximately 21 per cent. of the digitalis preparations examined were unsatisfactory, this year only 7 per cent. of the digitalis samples were condemned. In all cases, the stocks from which the unsatisfactory samples were taken were destroyed and replaced by fresh stocks of material. Subsequent tests carried out on samples purchased at a later date from the same sources showed that the preparations sold were of a satisfactory potency. The unsatisfactory samples of Tincture of Strophanthus B.P. fall into two groups. In the first group consisting of samples of low potency some of the specimens were almost inactive, their potency being less than 50 per cent. of the standard preparation against which they were assayed. In the second group, the samples tested were found to have a potency in such excess of the standard requirements as to constitute an undoubted danger. In several cases the preparations were more than three times as strong as the standard preparation. All unsatisfactory samples were condemned and their sale stopped immediately. There is need for a marked improvement in the standard of Tincture of Strophanthus B.P. sold in the Union and it is essential that departmental control is not relaxed until such improvement takes place.

The examination of digitalis preparations was carried out using the Second International Standard Digitalis Powder of 1935 and all the Strophanthus tinctures were assayed against the British Standard Tincture of Strophanthus (1926).

During the year an investigation of the sterility of the catgut used in hospitals in the Union was carried out. Every hospital in the Union was circularised to determine if the sterilisation of the catgut used was carried out in the hospital. In only one instance was the Department informed that the hospital staff carried out sterilisation of catgut and in this case the process of sterilisation was controlled by a bacteriologist. In several cases it was observed that although sterile catgut was purchased, this catgut was removed from its packing and placed in alcohol in jars in the operating theatres. It cannot be too strongly emphasised that alcohol is not a satisfactory antiseptic. Samples of catgut obtained from hospitals in the Union and preserved in alcohol were examined in the Biological Control Laboratories and found to be contaminated with staphylococci and anaerobic bacteria. The dangers of ethyl alcohol as a preservative and storage fluid have been pointed out by Mackie in his " Enquiry into Post-operative Tetanus. A report to the Scottish Board of Health ", 1928, and also by Sir W. Dalrymple Champneys of the British Ministry of Health, " Sterilized Catgut ", Proc. Roy. Soc. Med., March, 1936. The latter also draws attention to a series of four cases of post-operative tetanus where the suspected catgut was sterilized at the hospital by immersion in oil of cloves, followed by storage in absolute alcohol, or in 1:250 solution of biniodide of mercury in absolute alcohol, for 8 days.

An investigation of one case of post-operative tetanus was carried out. The catgut used was a well-known proprietary make and the samples examined were found to be sterile. A piece of rubber drainage tubing was found to be contaminated with aerobic and anaerobic bacteria but no evidence of *Cl. tetani* infection was found. The conclusion arrived at in this case was that the tetanus spores were present in the patient's intestine.

Research into methods of determining bacterial contamination of catgut was continued. The use of papain as a digestive agent was investigated using a large number of commercial catguts. Early conclusions indicating that papain digested catgut prepared under different conditions were not entirely borne out as several different specimens of catgut were not digested even at 60° C. The cause of this resistance to papain digestion is being investigated.

The elaboration of a provisional unit for the standardisation of cobra antivenene and the preparation of a provisional standard antivenene have been carried a stage further. At the commencement of the investigation

samples of cobra antivenene were kindly supplied by the South African Institute for Medical Research, Johannesburg, the Clinsearch Laboratories, Johannesburg and the Behring Institute, Marburg, Germany. The suitability of these samples for the preparation of a provisional standard cobra antivenene was investigated and it was finally decided to prepare a provisional standard antivenene from the serum supplied by the South African Institute for Medical Research. This serum was accurately assayed, dried to constant weight and stored under nitrogen. Before use the serum was dissolved in a predetermined volume of glycerine giving a final glycerine concentration of 60 per cent. The glycerine solution was used as a provisional standard antivenene and the provisional unit was defined as the neutralising power for cobra venom possessed by a fixed volume of the provisional standard antivenene.

A method of assay was devised in the Biological Control Laboratories which enabled commercial antivenenes to be tested with an accuracy of plus or minus 10 per cent. A memorandum on this method along with a memorandum defining the provisional unit and provisional standard serum was forwarded to three laboratories carrying out the assay of cobra antivenenes. These laboratories were also supplied with samples of the provisional standard serum. The laboratories were asked to express an opinion on the suitability of the provisional unit and of the provisional standard serum for use in the control of antivenene sold in the Union.

Two of the laboratories expressed the opinion that the provisional unit and the provisional standard serum would be suitable for use in the control of antivenenes sold in the Union. It was therefore decided that this control should be initiated under the powers conferred by Section F of Part IV of the Second Schedule of the Therapeutic Substances Regulations published under Government Notice No. 1131 of the 9th August, 1935.

The need for a control of antivenenes sold in the Union has been obvious for some time, but no adequate control could be instituted until a unit of potency had been agreed upon and a standard serum prepared. Samples of cobra antivenene examined in the Biological Control Laboratories have shown wide variations in potency and have been found to possess no measurable potency. This serious state of affairs happily will now be corrected, and it is hoped that the labelling of commercial preparations in terms of the new provisional unit will enable manufacturers to produce more uniformly potent serum preparations in the near future.

Attempts are now in hand to prepare a standard antivinene against puff-adder venom and to devise a unit of potency which could be used in the control of commercial preparations of puff-adder antivenene. Owing to the effects produced by this venom in animals it has been found difficult to obtain regular results using the current methods of assay. Investigations of new methods are being carried out and it is hoped that a control of puff-adder antivenene will be initiated in the Unon at an early date.

Requests for assays of vitamin-containing medicinal preparations continue to be received. With the manufacture of these preparations in the Union, the need for adequate biological control becomes still more urgent. International standard preparations are now available for the following vitamins: vitamin A (B-Carotine); vitamin B; vitamin C (l-ascorbic acid) and vitamin D (calciferol). Methods of assay of vitamin A, B, C and D and standards for the vitamin activity of cod liver oil and solutions of calciferol in oil are laid down in the Addendum 1936 to the British Pharmacopoeia 1932.

Many commercial firms issue a variety of products alleged to contain vitamins. At present there is no official control of such products although tests have shown that a number of the preparations possesses little or none of the vitamins they are stated to contain. The importance of a control of vitamin-containing preparations is enhanced by the campaign which has been launched to combat malnutrition in the Union. Some of the insidious forms of malnutrition are due to vitamin deficiency, either total or partial. The curative effects of potent vitamin containing fish-liver oils and concentrates, in diseases produced by deficiencies of vitamins A and D, are well-known. All fish-liver oils do not possess these vitamins and there is undoubtedly a need for a careful control of these preparations sold in the Union. Such a control to be effective can, at present, only be carried out by biological tests.

Equally great is the need for control over the large number of sex-hormone and gonadtropic preparations which are being increasingly used in therapeutics. The use of certain of these preparations may not be unattended by dangers and it has become necessary to standardise their potency accurately and reliably. The standardisation of these products can also be carried out only by biological tests.

International standard preparations of crystalline purity are available through the Permanent Commission on Biological Standardisation of the

Health Organisation of the League of Nations for the male sex hormone (androsterone) and for the female sex hormone(oestrone, oestradiol monobenzoate). During the year the *corpus luteum* hormone progesterone has been made available in crystalline form as an international standard preparation.

The Biological Control Laboratories are actively co-operating in the programme of work launched by the Permanent Commission of the Health Organisation of the League of Nations to consider the establishment of international standards and tests for the gonadotropic substances found in human pregnancy urine and in pregnant mare serum and the gonadotropic, the thyrotropic and the lactogenic hormones of the anterior pituitary gland. In the course of the investigations the suitability of certain South African animals as test objects for the assay of these substances is being ascertained.

The work of the Biological Control Laboratories is increasing rapidly. It is hoped that in the near future it will be possible for examinations of vitamin-containing preparations and sex hormone preparations to be carried out in the laboratories. With the marked increas in the work carried out during the past 3 years and the corresponding need for increased staff, the accommodation has become insufficient for the requirements. Additional animal house accommodation is also needed, especially if vitamin preparations and sex hormones are to be controlled.

Close collaboration with the Department of Biological Standards of the National Institute for Medical Research, London, was maintained during the year and the helpful co-operation and regular supply of international standard preparations was much appreciated.

Spider Bite.—Since the 30th June, 1937, 63 phials of anti-spider serum have been issued to physicians. The total number of phials issued since the serum was first prepared in November, 1936, is now 174. Altogether reports on 43 cases of spider bite treated with serum have been received. All these cases recovered and the consensus of opinion appears to be that the serum is of great value in treating this condition.

An investigation of some of the properties of the spider venom was completed during the year and the results published. At present the pharmacological action of the venom is being carefully investigated in collaboration with the Department of Pharmacology of the University of Capetown.

Research on the properties of the venom of *L. indistinctus* and a comparison of the properties of the venom and arachnolysin of this spider were also carried out and the results published during the year.

37.—Medical Research.

In the Department's Annual Report for 1935 the need for a more intensive and extensive medical research programme in South Africa was strongly emphasised. Since that time medical research has received increasing attention following discussions in regard to the associated need for a national school of hygiene.

At present medical research is not undertaken on a national scale or to a comprehensive co-ordinated programme. It is developed spasmodically by contributions from four chief sources, viz., (1) the various medical laboratories of which the chief is the South African Institute for Medical Research; (2) the two medical schools of Johannesburg and Capetown; (3) the medical work of such government departments as the Department of Mines through the Miners' Phthisis Bureau, and this Department in so far as some of its health and medical officers have interested themselves in research and finally (4) the work undertaken by industrial medical organisations especially those related to the gold mining industry and private investigators.

The South African Institute for Medical Research maintains a group of professional officers concerned purely with research matters, e.g. two bacteriologists, a worker in industrial hygiene, a bio-chemist, a pathologist and an entomologist. The officers of the routine division have also been vigorous contributors to the research output of the Institute. As an indication of the type of medical research undertaken by this institution some brief notes culled from its last annual report may be given. In the Research Division interest in pneumonia goes back to the early contributions made by Lister on the classification of pneumococci and the introduction of a mixed vaccine on the mines. The subject has been continuously studied since, a fillip being given to it in recent years by the problems arising from the use of tropical labour on the gold mines of the Witwatersrand. Plague, rabies and the entomological aspects of malaria are further major subjects handled by the research staff. The industrial hygienist has been recently occupied in the study of the reactions of experimental animals to dust and of the physical and micro-chemical properties of mine dusts. These investigations are of direct importance to the problem of silicosis occurring in the Wit-

watersrand mines. The bio-chemist has continued his interest in the dietetic and nutritional problems of the country especially in so far as its Native populations are concerned. Studies of experimental cancer and of insects of medical importance have been continued. Members of the Routine Division have interested themselves in such problems as the mineral residues from silicotic lungs, typhoid-immunisation, antivenenes, typhus fever, blood grouping and undulant fever.

The contributions from government and departmental sources are embodied to a large extent in the various sections of this report. It must be mentioned that no departmental officer, until the present year, has been free to devote himself wholly to research work, but has had to follow any interest in this direction in conjunction with performance of heavy routine duties. However, the present year has seen the appointment to the departmental staff of an ecologist to study plague in its rodent manifestation.

The medical schools of the Universities of Capetown and the Witwatersrand are, under existing circumstances, potentially very important contributors to the medical research of the country. Though hitherto somewhat slow in implementing to this duty and responsibility of a university there are now signs that the universities will soon play an increasingly important part in building up a medical research tradition. The laboratories and wards attached to the two schools are extremely rich fields for invsetigation into South African medical phenomena, especially as exhibited by the non-European races. The staffs of the medical schools will more and more have to undertake investigations in this field, as demands grow for information regarding the various agencies and factors influencing health in this country. It is invidious to select investigations undertaken by university workers for mention and impossible to summarise all work done by them. It may, however, be mentioned that in the academic and laboratory subjects work has been undertaken for example on South African plants and herbs of medical importance, the histology of human tissues, the chemical constitution of South African foodstuffs, the effects of endocrine extracts in the amphibia, the phenomena associated with reflexes and electrocardiography.

Important medical research has been undertaken by industrial organisations and individual workers in laboratory, clinical and health fields. Typhus, silicosis, heat stroke, typhoid, malaria and Native medical conditions are subjects in which such workers have especially distinguished themselves.

The structure of medical research in this country in spite of these valuable components is a weak one, and compares very unfavourably with the organisations devoted to agricultural and veterinary needs. South Africa is faced with complex health and medical problems, many of extreme urgency owing to their relationship to social and racial elements so fundamental to the form of civilization developing here. The public health administration in demanding, for instance ,a record of population phenomena is interested in a field equally vital to the statesman, industrialist and sociologist. The social, medical and health phenomena of the Bantu are of the most direct importance to the state and should appear prominent in any South African programme of medical research. Here is offered to hand a largely developed field. The birth, fertility and death trends of the Bantu are unknown; disease incidence, prevalence, distribution and form are only vaguely surmised at present. Much experiment is required to evolve social and health systems suitable to the primitive people of the country. A comprehensive programme of field research and experiment is obviously demanded if the country is to fulfil its obligations to the less developed communities and to evolve a sound structure for the country's future.

Problems of adaptation arise not only in the Bantu confronted with European civilization, but also in the European transplanted to a climate and latitude strangely different from his original homeland. The answers to these questions are vital to South Africa's European elements. Is the virility, courage and industry of the European sapped by temperate weather, constant sunshine and the existence of a primitive race performing the menial tasks? As yet this fundamental question has not been examined by our physiologists and hygienists. Disease has variations due to geographical factors. Malaria, typhus, tuberculosis, venereal diseases are not necessarily identical with such diseases in other parts of the world; until all their detailed behaviour is known treatment and control cannot be placed on a scientific basis in this country.

It is perhaps in the fields of applied research that South Africa will find the greatest and most practical scope; but if she is truly to foster a love of wisdom and truth in her scientific workers she must help them in their search for fundamentals and principles. Her geniuses must be able to proceed unfettered in making discoveries in realms considered by the practically minded as unrelated to everyday affairs. Research is a delicate mission; in its truest expression it cannot be moulded and coerced, and the spontaneity so characteristic of its highest achievement is not to be bought.

Independent though it may be of direction and control, research can yet be organised. The demands of equipment and staff essential in many modern branches of hygiene and medicine have to be adequately financed. A definite policy and programme of health and medical research are consequently required. The examples of other countries are very stimulating and encouraging in this respect. In India and Australia national research bodies have operated most successfully for many years and the moneys spent by and through them have given these countries results of direct practical importance and application as well as creating intellectual and scientific ideals and traditions. The time is more than ripe for this country to give generously and plan grandly in the cause of medical and health research. Stimulation and co-ordination of investigation would be achieved if some such body as the magnificent Medical Research Council of the United Kingdom could be reproduced here. That body dispenses government funds, but is above petty departmental or sectional interference. It acts as a vigorous power for good in the whole realm of medical research. A South African medical research council with adequate funds could easily achieve similar successes and by making rich contributions to knowledge it would bring health and wellbeing to the peoples of the country.

IX.—HOUSING, SLUM ELIMINATION AND TOWN PLANNING.

38.—Housing and Slum Elimination.

Full details of the working of the Housing Act, No. 35 of 1920, from the date of its commencement are given in the report of the Central Housing Board for the calendar year (U.G. No. 20 of 1938), which was laid on the table of parliament. A summary of the position as at 30th June, 1938, is given in Table 45:—

Table 45.—Housing Act No. 35 of 1920.—Working from Promulgation (16th August, 1920) to 30th June, 1938.

Province.	Loan Applications Approved.			Loan Issues.	Number of Houses.					
	European.	Non-European.	Total.		Completed.	Under Construction.	Approved, but not yet commenced.	Total.	Total for European Occupation.	Total for non-European Occupation.
(A) *Economic Housing.*	£	£	£	£						
Cape	1,545,936	666,087	2,212,023	2,117,752	7,247	23	295	7,565	2,499 (*a*)	5,066 (*b*)
Natal	562,365	88,110	650,475	639,067	1,032	—	9	1,041	568	473 (*c*)
Orange Free State	561,656	20,618	582,274	570,077	1,624	377	354	2,355	715 (*d*)	1,640 (*e*)
Transvaal	1,805,197	262,212	2,067,409	1,882,232	4,169	171	538	4,878	2,365	2,513 (*f*)
Total	4,475,154	1,037,027	5,512,181	5,209,128 (*g*)	14,072	571	1,196	15,839	6,147	9,692
(B) *Sub-Economic Housing.*										
Cape	755,814	1,669,519	2,425,333	604,098	1,748	604	5,868	8,220	1,761	6,459
Transvaal	741,309	1,521,475	2,262,784	1,048,330	2,357	1,966	1,899	6,222	1,000	5,222
Natal	—	180,245	180,245	18,155	—	453	9	462	—	462
Orange Free State	4,750	—	4,750	3,708	—	—	10	10	10	—
Total	1,501,873	3,371,239	4,873,112	1,674,291	4,105	3,023	7,786	14,914	2,771	12,143
(C) *Housing of the Aged Poor.*										
Cape	12,775	—	12,775	8,835	42	—	4	46	46	—
Natal	25,000	—	25,000	1,191	—	50	—	50	50	—
Total	37,775	—	37,775	10,026	42	50	4	96	96	—
Total (A), (B) and (C)	6,014,802	4,408,266	10,423,068	6,893,445	18,209	3,644	8,986	30,849	9,014	21,835

(*a*) Includes a hostel to accommodate 86 persons.
(*b*) Includes 1,337 single rooms in blocks, 8 barracks and 160 flats.
(*c*) Includes 3 barracks and 36 single rooms in blocks.
(*d*) Includes a hostel for European girl employees at Bloemfontein.
(*e*) Includes 24 single rooms in blocks, the balance of 845 representing the approximate number of dwellings to be built out of a total loan of £16,818 made to three Local Authorities for use exclusively in purchasing materials to be advanced to Coloured persons and Natives building their own homes.
(*f*) Includes 303 single rooms in blocks, 3 compounds and 13 hostels.
(*g*) Includes £1,692,905 re-issued out of repaid capital.

Housing matters have continued to receive much attention and publicity during the past twelve months which has been reflected in the number of applications for housing loans received from local authorities. Enquiries still continue to be received from some of the smaller centres as to the conditions under which loans are granted despite the circulars which have been issued from time to time setting out this information.

The period under review was one of greatly increased activity on the part of a number of local authorities in dealing with bad and insufficient housing accommodation. The number of schemes and dwellings approved in respect of economic housing involved loans totalling £613,879 in 1938 as compared with £324,508 for the corresponding period in 1937, the comparison as regards subeconomical loans being £2,921,854 in 1938 and £1,297,022 in 1937.

The Additional Housing Act, No. 41 of 1937, which was passed during the 1937 session of parliament received the assent of His Excellency the Governor-General and was promulgated on 23rd May, 1937. The provisions of the Act enable assistance to be rendered to a person desirous of constructing a house by means of a loan raised through the medium of a building society. The loan required must be over 60 per cent., but not exceeding 90 per cent. of the cost of the land and of the house erected thereon; the applicant is required to find the remaining 10 per cent. The building society may advance out of its own funds two-thirds of the loan and the Government will advance one-third, the rate of interest on the loan being determined at two-thirds of the rate charged by the society for loans in the area or locality in which the property tendered as security is situate together with one-third of the rate payable on the amount advanced by the Government. The rate of interest on amounts advanced by the Government is as fixed by the Treasury which at present is 3½ per cent. The period of the loan may not exceed 20 years. All applications for loans must be addressed to the society, the latter making advances to the applicant who is required to make all payments by way of interest and redemption to the society. The maximum building loan and the maximum income of persons who may be assisted under this scheme are as under:—

(*a*) At all centres in which the wages of the building industry are prescribed in terms of the Industrial Conciliation Act, No. 11 of 1924, or the Wage Act, No. 27 of 1925.	Maximum loan £1,350. Maximum income £500 with an additional £50 for each dependent in excess of three.
(*b*) At other centres	Maximum loan £1,100. Maximum income £400 with an additional £30 for each dependent in excess of three.

Every person who obtains a loan under this scheme will be required to complete a mortgage bond covering the land and all improvements thereon, and to sign irrevocable power of attorney in favour of the building society. The regulations made under the Act provide for inspections to be carried out during the progress of construction and completion of the house.

The Act requires that every building society desirous of participating in the scheme must enter into a deed of agreement with the Minister. Considerable delay occurred before final agreement could be reached with the representatives of the societies as to the different clauses to be contained in the agreement; it was not until the middle of March, 1938, that the first loan was granted.

In the endeavour to render assistance and guidance to local authorities in formulating their proposals, the Central Housing Board has prepared a number of type plans of dwellings and other useful information all of which are available on application free of charge. In addition a technical member of the Board has visited a number of centres and has been able to offer advice and assistance in solving difficulties which have arisen.

Economic Housing.—The Government's commitment in respect of economic housing stands at £5,000,000. Of this amount the sum of £3,516,223 has been issued whilst a further sum of £1,692,905 out of repayments of capital has been reissued by the Provincial Administrations bringing the total issues from economic funds up to £5,209,128. A sum of £250,000 has been made available by the Government for issue during the present financial year 1938-39, in addition to which it is estimated that the Provincial Administrations have a sum of £179,245 available for reissue out of capital repayments during the year.

The total sum allotted to local authorities out of economic funds from the commencement of the Act up to 30th June, 1938, amounts to £6,860,820. With the increasing activities on the part of local authorities the time is not far distant when the available funds will be exhausted.

The total loan issues from economic funds during the twelve months under review amounted to £511,806 of which the sum of £286,328 was met from funds provided by the Treasury whilst the balance of £225,478 represents reissues out of capital repayments made by the Provincial Administrations.

There has been no change as regards the limits in respect of the cost of constructing the dwelling, and the maximum loan which may be granted remains the same, namely, at those centres in which the wages of the building industry are prescribed in terms of either the Industrial Conciliation Act, No. 11 of 1924, or the Wage Act, No. 27 of 1925, the cost of the dwelling excluding the ground may not exceed £1,000 and the loan 80 per cent. of the cost of the house and ground up to a maximum loan of £950. At all other centres the limits are £900 for the cost of the dwelling with a maximum loan of £800. The limits in respect of the cost of dwellings apply both to houses erected out of individual loans granted in terms of section 6 of the Housing Act, No. 35 of 1920, and houses erected under schemes carried out by a local authority in terms of section 5 thereof.

Sub-economic Housing.—In September, 1937, the Government agreed to increase its commitment in respect of sub-economic housing by providing an additional £5,000,000, thereby making a total commitment of £10,000,000. In view of the large slum clearance schemes being carried out by the larger local authorities and a number of smaller local authorities coming forward for loans it soon became evident that the additional funds made available would be insufficient to meet all applications. Further representations were made and in March, 1938, the Government agreed to provide an additional £3,000,000 bringing the total commitment up to £13,000,000. An amount of £1,674,291 has been issued up to 30th June, 1938. The total allotments made to local authorities from sub-economic funds from the commencement of the Act amount to £10,686,201 which includes a sum of £1,392,000 allotted to the Port Elizabeth Municipality, £1,500,000 to Capetown Municipality, £1,446,940 to Johannesburg Municipality, £800,000 to Pretoria Municipality and £200,000 to Benoni Municipality. The balance is made up of varying sums allotted to several other municipalities. Issues from sub-economic funds during the year amounted to £985,191.

During the year the total value of loan applications approved amounted to £3,618,278 involving the erection or enlargement of 8,317 dwellings, details of which are set out hereunder:—

Economic housing (3½ per cent. loan funds) loans totalling £613,879. Number of dwellings involved, 848.

Sub-economic housing (¾ per cent. loan funds) loans totalling £2,921,854. Number of dwellings involved, 7,392.

Housing of the aged poor and totally unfit (1s. per cent. loan funds). Loans totalling £82,545. Number of dwellings involved 77.

The corresponding figures for the previous years are:—

Economic housing loans £324,508. Number of dwellings involved 904.

Sub-economic loans £1,297,022. Number of dwellings involved 5,629.

Slum Elimination.—The Slums Act, No. 53 of 1934, was extended during the year to three additional centres, Steynsburg (Proclamation No. 183 of 2nd September, 1937), Queenstown (Proclamation No. 152 of 20th August, 1937) and Stellenbosch (Proclamation No. 253 of 24th November, 1937). The number of centres at which this Act is in force now totals 28.

During the year 33 appeals (involving a total of 252 properties) were lodged under section 4 (10) of the Act against the declaration of a single set of premises as a slum, comprising 27 (involving 243 properties) from Johannesburg, 5 (involving 8 properties), from Port Elizabeth and 1 (1 property) from Germiston. Since the commencement of the Act, 25th June, 1934, up to 30th June, 1938, no less than 262 appeals (involving a total of 825 properties), have been disposed of. Of these 205 (646 properties) were from Johannesburg, 11 (78 properties) from Capetown, 2 (4 properties) from East London, 33 (73 properties) from Durban, 4 (14 properties) from Beaufort West, 6 (9 properties) from Port Elizabeth and 1 (1 property) from Germiston.

Thirteen applications for the Minister's approval in connection with the acquisition of land in terms of Sections 17 and 18 of the Act were dealt with during the year, namely, 6 from Capetown, 5 from Johannesburg, 1 from Kingwilliamstown and 1 from George. Section 5 of the Act provides that the local authority shall upon the expiration of the period of ten days after it has in terms of Section 4 declared any premises or any part of any premises a slum, or if an appeal to the Minister has within that period been

noted, upon the confirmation by the Minister of the declaration (if the declaration be so confirmed) cause a notice signed b ythe town clerk to be served on the owner of the slum—

(*a*) directing him to remove the nuisance by reason of which the slum declaration was made, or

(*b*) directing him to demolish the dwelling, or,

(*c*) notifying him that the local authority intends acquiring the property by expropriation.

In the case of the application submitted by the George Municipality, the Council adopted the procedure (*b*) and directed the owner to demolish the buildings. Subsequently the Council submitted an application for the Minister's approval to acquire the property, which, however, had to be refused as, having taken action under the procedure (*b*), it was not competent under the Act for the Council to exercise as well the powers under the procedure (*c*).

General.—As set out in the report of last year the race for armaments in Europe had repercussions in the Union. The prices of building materials and builders ironmongery were forced up. In some cases this necessitated details of schemes having to be revised and building costs cut down to a minimum. Towards the latter end of the period under review a slight decrease in costs of materials became noticeable.

39.—Town Planning and Cognate Matters.

Under the South Africa Act, 1909, and the Financial Relations Act, No. 10 of 1913, as amended by Section 17 of Act No. 46 of 1925, the laying out of new townships, extensions of existing townships and the laying out of land within existing townships are essentially provincial matters, subject, of course, to Union legislation.

The present position in the four provinces may be briefly summarized.

Transvaal.—Dealt with under Ordinance No. 14 of 1904, Act No. 33 of 1907, Act No. 34 of 1908, Ordinance No. 11 of 1931 and Ordinance No. 12 of 1934. The Townships Board consists of the Surveyor-General (Chairman), the Registrar of Deeds, the Registrar of Mining Titles, an officer of the Provincial Administration, and five other persons selected and appointed by the Administrator on grounds of possessing special qualifications.

The duties of the Board are to enquire into and advise the Administrator on matters relating to the establishment of townships and urban settlements, and the provision of town-planning schemes. The Board also deals with agricultural holdings under the Agricultural Holdings (Transvaal) Registration Act, No. 22 of 1919.

Cape Province.—Dealt with under Ordinance No. 33 of 1934. The Townships Board consists of the Surveyor-General (Chairman), the Registrar of Deeds, the Deputy Chief Health Officer for the Union stationed at Capetown, an officer of the Provincial Administration and such other persons not exceeding four selected and appointed by the Administrator on grounds of possessing special qualifications.

The duties of the Board are to enquire into and advise the Administrator on matters relating to the establishment of townships and the sub-division of estates and the provision of town planning schemes.

Orange Free State.—Dealt with under Ordinances No. 6 of 1928 and No. 7 of 1929. The Townships Board consists of the Surveyor-General (Chairman), the Registrar of Deeds, an officer of the Provincial Administration and such other persons not exceeding three appointed by the Administrator.

The duties of the Board are to enquire into and advise the Administrator on matters relating to the establishment of townships and hamlets.

Natal.—Dealt with under Ordinance No. 10 of 1934. The Private Townships Board consists of the Surveyor-General (Chairman), the Registrar of Deeds, an officer of the Provincial Administration, a nominee of the Natal Municipal Association and not more than three other persons selected and appointed by the Administrator.

The duties of the Board are to enquire into and advise the Administrator on matters relating to the establishment of private townships, the sub-division of land for residential, industrial, occupational and similar purposes, the provision of town planning and matters incidental thereto.

Town planning is intimately linked with public health for which reason the above notes have been introduced into this report. The increasing urbanisation of the country has unfortunately not been adequately controlled under existing town planning legislation and administration. This is strikingly demonstrated by the " black belts " of Natal, the peri-urban areas

of Bloemfontein, Witwatersrand towns, Port Elizabeth, Pretoria and other large towns, as well as in such " squatting " communities as Hennenman, Mooiplaas, near Pretoria, and others in each of the provinces. In addition to such deplorable examples of uncontrolled urbanising processes, there is now appearing another evil which is well known in Europe where it is known as ribbon development. All the early symptoms of this ugly process are to be detected along the Pretoria-Johannesburg Road and on certain other main roads of the country radiating from the larger towns.

These matters concern health directly as there arise problems of ventilation, overcrowding, sanitation, provision of public services and the arrangement of the best possible environment. It is regrettable, therefore, that health authorities are not adequately represented on the bodies concerned with the planning of towns and the supervision of the growth of communities. The town planning ordinances specifically name a health officer as a member of the board in one case only, that of the Cape Province. In the other provinces though the advice of the Department is sought on occasions, health officers are not members of the board. There is thus no guarantee that all health, medical and sanitary aspects of town planning are adequately considered by these boards.

X.—MEDICAL, DENTAL AND PHARMACY MATTERS.

40.—The South African Medical Council.

Résumé of Business for the Year ended 30th June, 1938.

The ordinary half-yearly meetings of the Council were held as well as meetings of the various standing committees. The Executive Committee met ten times during the year, the Nurses, Midwives and Masseurs' Education, Examination and Registration Committee five times and the Medical and Dental Education, Examination and Registration Committee four times, besides which the Northern and Southern Disciplinary Committees each met once.

During the year the following registrations were effected: 182 medical practitioners, 18 dentists, 269 medical students, 12 dental students, 608 nurses, 438 midwives and 22 masseurs. Of the nurses and midwives registered, 450 of the former and 368 of the latter had obtained certificates of competency by passing the Council's examinations. Of the medical practitioners registered, 112 had qualified at South African medical schools and of the remainder a number were South Africans who had proceeded oversea for the prosecution of their studies. Of the dentists registered, 5 had qualified at the University of the Witwatersrand.

The influx of nurses from oversea referred to in the last report owing to the alleged shortage of nurses in the Union continued and, of the nurses registered, 158 held certificates of countries outside the Union of South Africa. Most of these held the certificate of the General Nursing Council for England and Wales and the remainder came from the Netherlands, Australia, Canada and the United States of America.

The number of persons whose names appeared in the various registers on the 30th June, 1938, was as follows:—

Medical practitioners	2,981
Dentists	727
Medical students	1,081
Dental students	28
Nurses	5,328
Midwives	3,612
Masseurs	66
Dental mechanicians	119

It will be observed that the numbers of nurses and midwives on the registers are less than those for the previous year. This is due to the fact that the names of a large number of nurses and midwives were erased from the respective registers as registered letters sent to their last known addresses in terms of Section 17 (1) (*b*) of Act No. 13 of 1928, were not replied to.

Examinations for nurses were held quarterly and for midwives half-yearly. Table 46 shows the number of candidates who presented themselves for the various examinations and the number who passed:—

TABLE 46.—S.A. MEDICAL COUNCIL: CANDIDATES WHO PRESENTED THEMSELVES FOR EXAMINATION.

		Presented.	Passed.
Medical and Surgical Nurses	Final	361	343
	Preliminary	771	559
Male Nurses	Final	14	11
	Preliminary	30	20
Mental Nurses	Final	91	74
	Preliminary	196	125
Nurses for Mental Defectives	Final	22	22
	Preliminary	61	37
Midwives		398	368

The number of candidates for the Preliminary Examination for medical and surgical nurses shows an increase of 202 as compared with the previous year. This is to a certain extent due to the holding of examinations quarterly instead of half-yearly, as was the custom in the past, but it is more largely due to the enlarged employment of pupil nurses owing to the recognition of additional training schools and the increase in beddage of existing training schools.

It has been found necessary to hold enquiries into the conduct of 7 medical practioners and 2 dentists. In one case the Council ordered that the name of a medical practitioner be erased from the register and in another that a medical practitioner be suspended from practice for six months. In one case a practitioner was found not guilty of the charge preferred against him: in another case 4 practitioners were found guilty but no penalty was imposed and, in the remaining cases, the practitioners were sentenced to a reprimand or caution. The Council has also enquired into a few complaints of alleged overcharging on the part of medical practitioners, but in no case was it found necessary to hold a formal enquiry into the complaint.

The Council exercised its powers under the Act by holding an inspection in the year 1937 of the medical and dental examinations at the Universities of Capetown and the Witwatersrand. The inspectors submitted, as a result of their visits to the examinations, reports of considerable value and some of the recommendations made by them are receiving the consideration of the Council.

During the year representations were made to the Minister of Education by sundry bodies and persons urging the establishment of a medical school at Pretoria. The correspondence was referred to the Minister of Public Health who in turn referred it to the Council asking it to report on certain points. The matter received the very careful consideration of the Council and it was unanimously resolved that the Minister be requested to appoint a commission, on which the medical profession should be adequately represented, to enquire into the position (1) as to fixing of a quota of students at the existing medical schools, (2) as to remedying the inadequate facilities for training at the existing schools, and (3) as to the establishment of other medical schools for (*a*) the training of Europeans and (*b*) the training of non-Europeans. The Minister of Education subsequently appointed a committee to investigate and report on certain matters and 3 members of the Council were appointed members of the Committee.

One of the most important actions taken by the Council during its term of office was to provide for the registration of specialists. The matter was very thoroughly gone into by the Council in collaboration with the Medical Association of South Africa and the necessary rules were promulgated by Government Notices 1043 and 1044 of 24th June, 1938. Prior to the promulgation of these rules any practitioner could set up as a specialist, but under the rules he will be required to satisfy the Council as to his competency to practice as such. Provision has, however, been made for the recognition as specialists of persons who were practising as such prior to the coming into effect of the rules. It is felt that the compulsory registration of specialists will be a great service not only to the medical profession but also to the public.

Representations have been made from time to time to the Council in regard to the advisiability of instituting a higher diploma for nurses and the Universities of the Witwatersrand and Capetown have now instituted courses for such a diploma. The Council has signified its approval of these courses and agreed that the diplomas will be recognised as additional qualifications under section 33 of the Act.

The Council considered applications from two private bodies for recognition of the training given by them for masseurs. It was not, however, prepared to entrust the training of masseurs to private enterprise and refused the applications. The University of the Witwatersrand has, however, now instituted a course in massage, the period of training being three years and the Council has expressed its approval of this course.

A vacancy in the membership of the Council occurred during the year owing to the death of Dr. A. H. Watt and Dr. G. J. Joubert was elected to fill the vacancy. Dr. Watt had rendered valuable services to the Council while a member. Other changes in the personnel were the appointments of Drs. B. Vivier and E. H. Cluver in place of Dr. F. C. S. Hinsbeeck and Sir Edward Thornton respectively, the last-named gentlemen having ceased to hold the offices in respect of which they had been appointed.

41.—The South African Pharmacy Board.

Résumé of Business for the Year Ended 30th June, 1938.

The usual half-yearly meetings of the Board were held in July, 1937, and January, 1938, and, in addition, two special meetings were held besides several meetings of the standing committees. The half-yearly meetings of the Board each lasted for three days and a large volume of business was transacted at each meeting.

During the period under review the registration of 83 chemists and druggists, 33 managing directors of companies carrying on the business of chemists and druggists, and of 57 apprentices was effected. Of the persons registered as chemists and druggists 37 held the certificate of the Pharmaceutical Society of Great Britain, their registration being effected by virtue of the reciprocity agreement entered into with that body; the remainder held the qualifying certificate of the Board. The large increase in the number of chemists and druggists holding the certificate of the Pharmaceutical Society of Great Britain is mainly attributable to the activities of a corporation recently formed which imported these men to manage its various branches. On the 30th June, 1938, the names of 1,435 chemists and druggists, 129 managing directors and 176 apprentices appeared in the Board's registers.

Examinations were held in December, 1937, and June, 1938. The following tables show the results:—

Table 47.—South African Pharmacy Board: Preliminary Scientific Examination.

	Number of candidates examined.	Passed.	Failed.	Referred.		
				Botany.	Chemistry.	Physics.
Whole examination.....	118	33	54	1	9	21
Botany only.....	11	7	—	4	—	—
Chemistry only.....	1	—	—	—	1	—
Physics only.....	28	21	—	—	—	7
Total.....	158	61	54	5	10	28

Table 48.—South African Pharmacy Board: Qualifying Examination.

	Number of candidates examined.	Passed.	Failed.	Referred.	
				Chemistry.	Dispensing.
Whole examination.....	65	11	30	11	13
Chemistry only.....	18	6	—	12	—
Pharmacy only.....	1	1	—	—	—
Dispensing only.....	35	18	—	—	17
Total.....	119	36	30	23	30

Note.—Candidates for examination in only one subject were previously referred for further study in that subject. By passing in that subject they are accepted as having passed the whole examination.

Very few complaints were received by the Board in regard to the conduct of chemists and druggists and those which were received were not of such a nature as to justify action being taken under the Board's disciplinary powers.

Amended regulations regarding the importation, sale and use of opium and other habit-forming drugs and regarding the labelling and sale of poisons were promulgated in August and November, 1937, respectively. Some years ago the Board published a pamphlet entitled " Extracts from the Act relating to the Practice of Chemists and Druggists and the Sale and Keeping of Poisons and Habit-forming Drugs ", and in view of these amended regulations it was deemed advisable to publish an amended edition of the pamphlet. One thousand two hundred copies of the amended edition were sent to the Commissioner of the South African Police for distribution among the police stations in the Union and a copy was forwarded to each registered chemist and druggist in the Union.

The amended regulations relating to habit-forming drugs laid down a standard form of register of habit-forming drugs. The preparation of this form received the careful consideration of the Board and after the promulgation of the regulations copies of the register were printed and sold. The Board has reason to believe that the standard form has been welcomed by chemists and druggists and is satisfied that it will considerably facilitate the work of persons charged with the duty of inspecting habit-forming drug registers.

Copies of all certificates issued by magistrates under Section 51, Act No. 13 of 1928, as amended, are forwarded to the Registrar of the Board. This serves a very good purpose for, while it is recognised that the issue of these certificates is in the discretion of the magistrates, the Board has been in the position to draw the attention of magistrates to certificates which have actually been issued contrary to the provisions of the Act.

The Board has received complaints from chemists and druggists of colleagues advertising in a manner reflecting adversely on others and also of chemists and druggists unduly advertising their dispensaries or dispensing services. The Board has, therefore, with the approval of the Minister added to its ethical rules by prohibiting advertisements of superior professional skill or ability, and of dispensaries or dispensing services except under certain conditions.

A change was made in the personnel of the Board during the year, Dr. Allan being appointed under Section 2 (3) of the Act in place of Dr. F. C. Willmot who had retired from the position in respect of which he was appointed. The Board placed on record its appreciation of Dr. Willmot's services while a member.

42.—Administration of the Medical, Dental and Pharmacy Act, No. 13 of 1928.

Habit-forming Drugs.—The Administration of the Act in regard to dagga, opium and other habit-forming drugs continues to be carried out by the Department. The enforcement of the regulations is done in co-operation with the Police, the Commissioner of Customs and Excise and the Postmaster-General.

Table 49 shows the prosecutions and convictions during the year.

Table 49.—Prosecutions and Convictions under Laws relating to Habit-forming Drugs during the Year Ended 30th June, 1938.

Province.	European.		Native.		Asiatic.		Other Coloured.		Total.	
	Prosecutions.	Convictions.	Prosecutions.	Convictions.	Prosecutions.	Convictions.	Prosecutions.	Convictions.	Prosecutions.	Convictions.
Cape.....	46	39	540	509	12	10	1,109	1,084	1,707	1,642
Natal.....	17	17	1,719	1,682	68	61	73	70	1,877	1,830
Transvaal.....	62	60	2,666	2,554	20	16	295	285	3,043	2,915
O.F.S.....	8	8	210	197	—	—	20	20	238	225
Union....	133	124	5,135	4,942	100	87	1,497	1,459	6,865	6,612

The total number of prosecutions in the Union amounted to 6,865 of which 6,856 were in respect of dagga and 9 on account of other habit-forming drugs. Considerable quantities of dagga and 16 oz. of opium were seized and confiscated.

The quantities of habit-forming drugs imported into the Union during the year ended 30th June, 1938, were:—

Raw opium, 654 lb. 1750 gr.; medicinal opium, 217 lb. 4,140 gr.; opium in the form of extracts and tinctures, etc., 37 lb. 1,359 gr.; coca leaves, 51½ lb.; Indian hemp in the form of galenical preparations, 65 lb. 2,096 gr.; morphine, 50 lb. 1,247 gr.; diacetylmorphine, 14 lb. 3,850 gr. and cocaine, 37 lb. 5,898 gr.

The following habit-forming drugs were exported from the Union to the adjoining territories during the period under review:—

Medicinal opium, 1 lb.; opium in the form of tinctures, etc., 21 lb. 1,728 gr.; Indian hemp in the form of galenical preparations, 7 lb. 6,125 gr.; morphine, 1 lb. 2,525 gr.; diacetylmorphine, 445 gr. and cocaine 1 lb. 5,137 gr.

Further 4,450 lb. of *Cannabis indica* were exported to Great Britain by a specially licensed producer.

The amended regulations regarding the importation, sale and use of opium and other habit-forming drugs, which embrace certain amendments decided upon in the light of requirements under the 1931 Limitation Convention, came into force as from the 1st November, 1937. The new form of habit-forming drug register, drafted to meet the requirements of all persons who are legally required to keep a record of transactions in such drugs in accordance with the provisions of Chapter VI of Act No. 13 of 1928 is laid down in the regulations.

The uniform type of register has considerably facilitated the work of the Department's inspectors who previously, in the course of their duties, were called upon to examine registers maintained in many and varied forms. Generally the registers have been kept up to date and in proper order; but instances of neglect have come to the Department's notice which have necessitated the institution of legal proceedings, though in the majority of cases written warnings have been sufficient to tighten up any laxity in this respect.

By Instrument deposited with the League of Nations on the 4th January, 1938, the Union Government has acceded to the Convention signed at Geneva in 1931 which supplements the provisions of the International Opium Conventions signed at the Hague in 1912, and at Geneva in 1925, by rendering effective by international agreement the limitation of the manufacture of narcotic drugs to the world's legitimate requirements for medical and scientific needs and by regulating their distribution.

In order to assist in the campaign against the spread of addiction and the illicit traffic in dangerous drugs certain measures to prevent the use of ocean-going steamers for illicit traffic, were submitted by the League of Nations. The measures adopted by the Customs authorities in conjunction with the Police are, however, considered adequate to cope with this traffic. It is not considered necessary at the present time to set up a special branch to deal with the matter as the number of addicts in the Union is relatively low and the illicit traffic in dangerous drugs is being effectively combated.

Act No. 13 of 1928 lays down that habit-forming drugs may be prescribed or used by medical practitioners for definite curative or therapeutic purposes, but not to satisfy a craving or for the relief of a habit. A habit-forming drug may, however, be administered or used for the treatment of addiction in a hospital or instituton maintained wholly or partly by the Government or a provincial administration or approved for the purpose by the Minister of Public Health.

Inspections of chemists' registers have revealed that some medical practitioners were acquiring and using abnormal quantities of narcotic drugs in the course of their practice. The facts on being submitted to the Medical Council led, in one or two cases, to disciplinary action being taken by that body as provided for in Section 42 of the Act. With a view to preventing any such abuse continuing a watch is being kept on the position. Wherever instances come to the notice of the Department steps are taken to ascertain whether the doctor's register of habit-forming drugs is in order.

Poisons.—The amendment to Section 50 and the rewording of Section 51 (1) of the Medical, Dental and Pharmacy Act, No. 13 of 1928, by Act No. 5 of 1937, has clarified the position in regard to the stocking and sale of poisons by general dealers. The amendments necessitated certain alterations being made in the poisons regulations to which effect was given and new regulations were published under Government Notice No. 1903 of 10th December, 1937. These came into force as from the 1st January, 1938. Only one certificate form is now used authorising the stocking or sale by co-operative societies or companies or by general dealers of various poisons and preparations containing poison, which are classified under Lists "A", "B", "C" and "D".

Lists " A ", " B " and " C " deal with vermin killers and insect destroyers used in agriculture and horticulture, poisons and preparations containing poison used for veterinary purposes (including stock remedies containing poison), and poisonous substances used for the cleansing of clothing and similar purposes. List " D " enumerates the " patent ", " proprietary " or " Dutch " medicines containing poison which may be sold by virtue of the certificate. No certificate, however, may be granted for the sale of list " D " poisons by a general dealer or co-operative society if a chemist or druggist is trading within a radius of five miles, nor may a preparation be sold under such certificate if it contains any poison included in Division I of the Fourth Schedule or a habit-forming drug included in the Fifth Schedule to Act No. 13 of 1928.

The notice of the Department has been drawn to numbers of drugs of a dangerous and poisonous nature which do not fall to be classed as poisons within the meaning of Act No. 13 of 1928, and the sale of which is thus not controlled. Steps are contemplated whereby certain of these drugs will be included in either Division I or Division II of the Fourth Schedule to the Act.

General.—The provisions of Section 37 of the Medical, Dental and Pharmacy Act, No. 13 of 1928, make it an offence for any person who is not registered as a chemist and druggist, to carry on for gain business as such or perform any act specially pertaining to the calling of a chemist and druggist. The acts which may only be performed by a chemist and druggist were not specially laid down in the Act with the result that chemists' privileges were usurped and many lay persons not in possession of the necessary qualifications were manufacturing medicines for human use.

Section 2 of Act No. 5 of 1937 clearly defines the acts which may only be performed by a chemist and druggist or a body corporate carrying on business as chemist and druggist as follows:—

(*a*) The manipulation, preparation or compounding of any drug or medicinal or chemical substance (whether it does or does not contain a poison) for sale or supply as a medicine or medicinal substance for human use;

(*b*) the compounding or dispensing of any drug, medicine or therapeutic substance prescribed by a medical practitioner, dentist or authorised veterinarian; and

(*c*) the manufacture or the supervision of the manufacture of any proprietary medicine.

Many medicines were being manufactured and packed by non-professional or lay persons and companies. The legislation was not intended to put an end to or necessarily restrict the activities of these long established and reputable businesses. It was to protect them that a proviso was added, giving the Minister the power, in consultation with the South African Pharmacy Board, to permit the pre-existing manufacture by competent persons or companies not entitled to trade as chemists and druggists, to continue under a system of permits. It will be seen that now there is at least some control over the manufacture of patent medicines.

Inspectors of the Department in the course of their inspection tours under the Food, Drugs and Disinfectants Act, No. 13 of 1929, have reported on various infringements of Act No. 13 of 1928, in regard to the maintenance of poison registers, registers of habit-forming drugs kept by chemists and druggists, and incorrect labelling of poisons. In most cases it was found sufficient to issue warnings. In some instances, however, it was necessary to resort to prosecution.

43.—Charlatanism in Medicine.

Though modern medicine has freed itself of mystical beliefs and has long been striving for a dispassionate scientific assessment of its functions, it has still to deal with a lay community which is not yet entirely free of superstitions and fears. A belief in mixtures, potions, herbs and incantations goes back to the beginning of civilizations and is but part and parcel of the early imaginings of disease causation. Disease and defect were expressions of evil spirits and demanded for their removal equally supernatural forces. Such beliefs persist as a sort of social instinct reinforced by the tenacious despair with which man seeks lost health or flees from death. It is, therefore, not to be wondered at that even to-day many will, in times of illness, turn hopefully to the quack, the herbalist and the patent medicine vendor. Though sympathy may be felt for the individual harassed by sickness and fear seeking help from any quarter, it is necessary constantly to

emphasise the dangers and pitfalls associated with treatment or advice received from charlatans. These are succinctly given by the writer of an article in the Quarterly Bulletin of the Health Organisation of the League of Nations for September, 1935, where he says:—

> "The harm which is done to the individual patient by the quack consists in the fact that (1) he frequently has to suffer longer than he need; (2) he misses the most favourable opportunity, in the early stages of the disease, for the starting of rational treatment; (3) in many cases, not only is his health impaired owing to the irretrievable loss of time, but it is also directly injured by the type of drug administered or the treatment otherwise given; and (4) he is financially exploited without receiving any advantage in return."

Many laymen hearing the indignant attacks made by doctors on unregistered practitioners are apt to suspect base motives or a "keep off the grass" attitude. It seems to such observers that medical practitioners are but jealous of their preserves, or nervous of their livelihood. Such criticism, however, cannot be fairly levelled against hygienists: scientifically trained specialists who do not treat patients for a livelihood, but are engaged in protecting, preserving and enhancing the public health and welfare. Public health experts the world over are unanimous in their condemnation of charlatanism in medicine, because they see in the quack, the herbalist and the disreputable drug vendor, a menace to the public health. In all enlightened countries—the United States of America, France, England and Germany—these public officials have found it necessary to preach against the evils inherent in the practice of medicine and the dispensing of medicines by unregistered persons.

Recent happenings in this country have caused considerable uneasiness to the Department and illustrate the grave dangers in the existing latitude allowed in the treatment of illness. In one instance, a young child suffering from severe symptoms of throat trouble was taken by its parents to a herbalist. The herbalist prescribed some powders, but nevertheless the child died from diphtheria. When it is remembered that scientific medicine has in serum therapy a cure for this disease and that correct diagnosis is an essential preliminary to measures for preventing spread of infectious disease it will be appreciated how serious to the individual and how potentially dangerous to the community it may be to allow a herbalist to treat infectious disease. It need scarcely be emphasised that a considerable training in all branches of modern scientific medicine is necessary to give skill in diagnosis, and that only such skill can discriminate between infectious and non-infectious diseases.

An even more deplorable and sordid example is to be found in the callous exploitation by various herbalists of ignorant, unsuspecting Natives suffering from venereal diseases. These individuals have been extending their nefarious activities into the Native territories proper where the child-like inhabitants too frequently accept all statements by Europeans at their face value and to whom all "doctors" are akin. Several cases from these territories have been reported to the Department, where Natives suffering from gonorrhoea or syphilis have paid over their small cash resources to herbalists for so-called drug and herb mixtures. The evils arising from this shameful trickery of unsuspecting, credulous people are many. In the first place, the poor patient seeing his external condition improve, which in most cases occurs whether treatment of any kind is received or not, believes he is better. In reality the disease when not treated by correct methods has in such instances merely entered a latent phase to develop insidiously until permanent damage is done. Secondly, this false belief in cure diverts the patient from seeking proper treatment at the essential phase, that is, in the early stages of venereal disease. Finally, being untreated by the known curative remedies, the patient all unwittingly continues as a dangerous source of venereal disease infection to others.

Though a herbalist or other quack may occasionally through certain psychological reactions to his personality procure improvements in some conditions with a nervous or hysterical basis, the mere fact that certain sick people approaching him may be suffering from infectious disease should be sufficient justification for refusing him the right to treat sickness. Apart from the individual disasters which follow a belief in quackery, the danger to the public health is such that little sympathy should be wasted on the exponents of irrational medicine. It is not the medical profession which has to be provided with a system of protection. It is rather the public which has to be saved from the plausible appeal of those who rarely have any interests outside their own pockets.

Existing legislation is largely powerless to combat the evils associated with charlatanism. There is at least as great a need for legislation dealing with herbalists and other quacks, as there is for controlling the mass of the useless forms of patent medicines foisted on a gullible public.

XI.—OTHER MATTERS.

44.—Supervision of Food, Drugs and Other Articles.

Table 50 reflects the administrative measures taken during the year under the Food, Drugs and Disinfectants Act, No. 13 of 1929:—

Table 50.—Samples taken for Examination or Analysis under Act No. 13 of 1929, during the Year Ended 30th June, 1938, and the Results.

Place.	Total Taken.	No. Analysed or Examined.	No. found Adulterated or Incorrectly or Falsely Described.	Prosecutions.	Convictions.	Remarks.
Ports of Union.....	349	339	42	—	—	Warnings *re* labelling and standards were issued in respect of 65 samples; 124 were detained pending re-labelling; 1 was destroyed.
Cape Province.....	1,691	1,676	298	196	177	—
Natal Province.....	420	418	103	29	20	—
Transvaal Province..	3,116	2,115	665	591	493	—
Orange Free State Province.....	236	234	44	42	42	—
Total.....	5,812	5,792	1,152	858	732	

A comparison of the foregoing figures with those for the 12 months ended 30th June, 1937, discloses that 253 more samples were taken during the year under review than during the first-mentioned period, while 373 more samples were found on analysis to be adulterated or falsely described, 390 more prosecutions instituted in respect of adulteration or false description and 326 more convictions obtained.

Imported Articles dealt with at Union Ports (including Inland Customs Ports of Entry).—The work in this connection continues to be carried out with the co-operation and assistance of the Department of Customs and Excise. Of the 349 samples submitted for analysis or examination 110 came from Capetown, 64 from Johannesburg, 108 from Durban, 53 from Port Elizabeth, 10 from East London and 4 from Pretoria. Of these, 42 were found to be not up to standard, 65 warnings were issued on account of defective labelling or deficiency in standard, 124 consignments were released after relabelling in Customs, 1 was destroyed and 19 reshipped. The articles examined included cheese (172 samples), ghee (11 samples), disinfectants (20 samples), drugs (12 samples), fish (7 samples), milk powder and fresh canned peas (6 samples each), meats (8 samples), flour (1 sample), process canned peas (2 samples), fresh juices (2 samples), jams (2 samples), condensed milk (10 samples), cream (6 samples), canned mixed vegetables (2 samples), custard powder (7 samples), fats (23 samples), leavening substance (6 samples), margarine, fresh canned beans, caviar, cheese and ham, mustard, ointments, creams, etc. (1 sample each), and soaps (28 samples).

Sampling by Local Authorities.—One fresh delegation in terms of Section 2 (3) of the Act was made during the year, namely the Klerksdorp Town Council and the number of municipalities authorised to undertake the sampling in their areas of perishable articles as also flour, meal, bread and other articles not packed or sold in sealed packages, now is 30. They are:—Capetown, East London, Graaff-Reinet, Grahamstown, Kimberley, Kingwilliamstown, Paarl, Port Elizabeth, Queenstown, Uitenhage, Walmer (Cape Province); Benoni, Boksburg, Brakpan, Germiston, Hercules, Johannesburg, Klerksdorp, Krugersdorp, Nigel, Potchefstroom, Pretoria, Randfontein, Roodepoort-Maraisburg, Springs and Vereeniging (Transvaal); Bloemfontein and Kroonstad (Orange Free State); and Durban and Pietermaritzburg (Natal).

These local authorities are entitled to the examination or analysis in a government laboratory, free of charge, of an annual number of samples calculated on the basis of 4 samples per 1,000 of their European population. During the year a total of 3,320 samples was taken by them under their delegated powers (namely 733 in the Cape Province, 2,127 in the Transvaal, 353 in Natal and 107 in the Orange Free State), of which 472 were found to be adulterated. Legal proceedings were instituted in 378 cases. Convictions were obtained in 321 of these cases and fines totalling £1,293. 15s. were imposed. The more important articles submitted for analysis included 2,423

samples of milk (296 adulterated), 219 meat and fish (47 adulterated), 112 sausages (26 adulterated), 246 ice-cream (72 adulterated), 75 coffee and chicory (6 adulterated), 27 flour and meal (none adulterated), 16 fats and oils (1 adulterated), 22 cheese (1 adulterated), 9 honey (1 adulterated), 10 bread (none adulterated), 6 pepper (none adulterated), 11 dried fruit (1 adulterated), 16 sugar (none adulterated), 16 butter (4 adulterated), 10 rice (none adulterated), 1 oats (not adulterated), 2 tea (none adulterated), and 32 aerated waters and squashes (11 adulterated).

Sampling by the Department.—The Department's inspectors two of whom are stationed at Capetown, one in Pretoria and one in Durban are entrusted with the duty of carrying out sampling in the areas allotted to them for inspection purposes under the Act. In smaller urban areas sampling, especially of milk, takes place with the co-operation and assistance of the South African Police. In Johannesburg, the City Council's inspectors carry out, on behalf of the Department, the sampling of milk on railway premises and of such articles as are not covered by the powers delegated to the Council in terms of Section 2 (3) of the Act. A total of 2,243 samples was submitted for analysis, of which 197 were adulterated. A hundred and one prosecutions were instituted and 89 convictions recorded, in respect of which fines totalling £280 were imposed. Some of the articles analysed included milk 1,809 samples (125 adulterated); drugs and medicines 110 (25 adulterated); meat and fish 41 (3 adulterated); fresh fruit 3 (1 adulterated); aerated waters and squashes 30 (2 adulterated); coffee 58 (2 adulterated); ice-cream 12 (2 adulterated); dried fruit 2 (1 adulterated); fats and oils 41 (18 adulterated); chutneys and sauces 1 (not adulterated); soap 26 (2 below standard); disinfectants 3 (none adulterated); pepper 26 (one adulterated); cheese 4 (none adulterated); baking powder 7 (3 adulterated); canned vegetables 9 (none adulterated); honey 5 (none adulterated); jams 8 (2 adulterated); peanut butter 2 (none adulterated); ginger 3 (none adulterated); curry 1 (not adulterated); flour 2 (1 adulterated); cream 1 (not adulterated); ginger beer 18 (9 adulterated); and 21 articles under the heading miscellaneous (all in order).

Close attention was devoted during the year to the sampling of edible, salad and cooking oils. Acting on information received that a number of locally manufactured brands, more particularly in Natal, did not comply with the standard laid down in No. 14 (10) of the regulations framed under the Act, a total of 22 samples was purchased in and around Durban of which 8 were found to be adulterated. Proceedings in one case resulted in a conviction being secured and a penalty of £5 imposed. Unfortunately, however, on appeal to the Natal Provincial Division the conviction was set aside on a technicality, the Court holding that the oil was a " drug " for the purposes of the Act and consequently the Analyst's certificate was bad in that it did not comply with Section 23 (2) of the Act which required that the analysis be carried out in accordance with the method prescribed by the British Pharmacopoeia. As the judgment applied also to the certificates tendered in respect of the remaining seven adulterated samples, the prosecutions were either abandoned or withdrawn. While it is a matter of regret that prosecution should have failed on a technicality, the publicity surrounding the case served a useful purpose in bringing home to manufacturers the activities of the Department in enforcing the requirements of the law. In Johannesburg and Capetown three successful prosecutions were instituted for the sale of adulterated salad or cooking oil, and fines of £5, £3 and £2 were imposed.

No. 31 of the Food and Drugs Regulations regarding drugs was amended with effect from the 1st October, 1937, by the insertion after the word " edition " of the words " and the 1936 Addendum thereto ". This amendment was necessary on account of the fact that an addendum to the British Pharmacopoeia was issued in 1936.

The Department has decided to amend Nos. 7 (4) and 7 (12) of the Food and Drugs Regulations by the deletion after the words " skim milk " of the words " unfit for infants ". Fresh skim milk has great nutritive value for children and would be a valuable food where whole milk is for any reason unobtainable, e.g. extreme poverty amongst children, or when used in addition to whole milk.

In connection with the taking of samples of milk by inspectors from cans on railway stations and their submission for analysis under the Act, representations have been made to the Department that the procedure operates unfairly against the consignor in that he is deprived of the protection provided in the Act of being offered a portion of the sample to have an independent analysis made in the event of prosecution owing to the refusal of the railway official in charge of the milk to accept the offer of division of the sample into three equal parts.

In view of these representations and after very careful consideration of the whole matter, the Department has decided to enforce as from the 1st November, 1938, Section 17 (7) of the Act the provisions of which have not been enforced hitherto.

The object of enforcing the provisions of Section 17 (7) concerning the sealing of milk cans is to enable sampling to be undertaken at the receiving depôts from bulk stock, in order to obviate the objections referred to.

General Warranties.—No new warranties under Section 28 of the Act, were registered and six were allowed to lapse.

General.—The Department's inspectors continue to carry out inspection tours of the Union in connection with the enforcement of the provisions of Act No. 13 of 1929, and these still reveal irregularities which necessitate written warnings being sent to the offenders. On the whole, however, a decided improvement is noticeable on the part of manufacturers and others in complying with the labelling requirements of the Act.

Unsound Foodstuffs.—The inspection and examination of consignments of foodstuffs entering the country continued as far as was practicable with the collaboration of the Department of Customs and Excise and those condemned as unfit for human consumption included 381 cases canned fish, salmon and sardines; 56 cases tea; 1 bag rice; 15 cases dates; 56 cases confectionery; 6 cases cocoa; 10 cases dessicated cocoanut; 5 cases tinned cheese; 3 cases hams and bacon; 76 tins jelly powder; 4 cases baby food; 1 case pickled onions; 280 bags tamarinds; 110 bags chicory root; 2 barrels and 3 cases anchovies; 26 tins cherries; 1 tin cucumbers; 1 crate potatoes; 1 case mixed foodstuffs; 1 case ice-cream mixture; 1 case sauce; 1 case tinned soup; 10 bags lentils; 1 case and 4 tins beans; 1 bag peanuts; 3 cases figs; 1 case jam; 1 box corned beef and 20 boxes bananas.

The total approximate value of foods destroyed in terms of the Port Health Regulations as unfit amounted to £900.

Inspectors of the Department in the course of their inspection tours under Acts No. 13 of 1928 and No. 13 of 1929 also dealt with tinned foodstuffs stocked by general dealers and such as were found to be blown or otherwise not sound were suitably disposed of.

In places where there is a constituted local authority, action under the Unsound Foodstuffs Regulations devolves on such authority.

Railway Food Arrangements.—These have been considerably improved during the year under review. The various catering depôts throughout the Union and the premises of the suppliers of the main perishables, meat and milk, were inspected and improvements secured. An especial endeavour to protect and improve railway milk supplies was made. In over 70 per cent. of the samples tested, the acidity was over 0·2 per cent. In an effort to correct this and generally to improve milk supplies all producers are being pressed to observe the following requirements:—

(i) The elimination of tuberculous and diseased cattle from the milking herds.
(ii) The provision of adequately lighted, ventilated and cleaned dairy premises.
(iii) The supply of pure water only.
(iv) The insistence on cleanliness of cattle and milkers.
(v) The use of dry milking and handling of milk in fly-proofed milk rooms only.
(vi) Use of clean and sterilised milk utensils, and clean means of transport.
(vii) The cooling of milk as soon as possible after milking, to 45° F., and the insistence on milk conforming to the standards of the Food, Drugs and Disinfectants Act.

Further progress is being made in the attainment of hygienic standards in the premises of catering concessionaires on out-lying stations.

Brandy causing Lead Poisoning.—Dr. J. van Schalkwyk has drawn attention to certain cases of lead poisoning occurring in the Graaff-Reinet District, which are almost certainly due to brandy of the type illicitly distilled and known as " wit-hond ". The sale of " wit-hond " is illegal and the police in co-operation with the Department of Customs and Excise, are taking steps to control, as far as possible, the distillation and disposal of this form of brandy in the Graaff-Reinet District. The lead contaminant of the brandy has its source in lead piping in the stills, and in lead solder used for repairs. This is a difficult matter to control at present, but the Department is investigating it further. In the meantime it is necessary to give publicity to the dangers associated with the consumption of " wit-hond " and similar forms of brandy, and to indicate the poisonous effects liable to follow when lead is allowed to come into contact with food and drink.

45.—Health Education and Propaganda.

A great advance has to be recorded in the field of health education. Previously this subject had received only spasmodic attention which led to the proposals made by the Department last year that a comprehensive programme should be attempted. In planning the programme the principle of delegation was adopted, as it is considered that South African conditions are such that voluntary agencies have a wider appeal and better chance of success than departmental efforts which have necessarily a colder and less intimate appeal.

Voluntary organisations are used for propagating knowledge of health in the United States of America, the United Kingdom and in other dominions. Such delegation has many advantages. There is obvious economy. The work is undertaken by enthusiastic people with great interest in the work. The establishment of the voluntary organisation, by attracting people of all types, is itself profoundly important. An ideal of, and desire for, health improvement in large numbers of influential individuals is thereby created apart from the work of the organisation itself. In other words, the recruitment of the voluntary workers is a substantial achievement secured even before a single step in the campaign proper has been taken. As promotion of health so peculiarly depends upon the willingness of the individual to accept health instruction the instruction must be attractive. The exploitation of every device likely to arouse the interest and attract the attention of the man in the street is much more likely to be understood by voluntary workers than by officials moulded by routine and regulation. Success in such a personal field as health education is therefore more likely to be attained when approached along non-official channels. The acceptance of this view by the Department led eventually to negotiations with the South African Red Cross Society, as the body most appropriate, because of its constitution, history, aims, interests and distribution, to undertake the task of evolving a national programme of health education, likely to reach and appeal to all sections, classes and races of the nation .

The Society has accepted the responsibility and though the scheme is but a few months old, the indications that it supplies a long felt need in the health organisation of the country are so many as to be embarrassing. Receiving a grant of but £1,150 from the Department, the Society launched a comprehensive programme under the direction of a new national committee known as " The Health Education Committee ". Various sub-committees have been constituted, to include all sections of opinion, to work in connection with health films, posters, lectures, health weeks, and all health subjects of a general nature. Following a departmental circular to all local authorities announcing the new scheme, the Society has been overwhelmed by a flood of requests for advice and assistance in developing local campaigns of health education.

Already towns throughout the country have held health weeks and developed other aspects of the work under the new scheme; posters, pamphlets and films are also in preparation. The special needs of the country communities are being particularly studied; every endeavour will be made by cross-representation with such organisations as women's associations, and agricultural unions to ensure that adequate attention is paid to rural problems.

The support being given to the movement by the leading medical, health and social authorities of the country demonstrates the importance and usefulness of health education in the health development of the country. The main need is now money. The voluntary personnel necessary to achieve success by advising and correlating propagandist activity is available. Enthusiasm, however, needs more solid support. The talks, posters, pamphlets, lectures, film shows and demonstrations necessary to make the public health-conscious require money. If the auspicious beginning to popular health education on a national scale in South Africa is indeed to become one of the landmarks of health history there must be ample funds to carry out the ambitious programmes already formulated.

The other aspects of health instruction referred to in the last annual report have also received attention. It was then visualised that a bulletin or other publication could usefully be issued by the Department. The necessary preliminary step to this has been reorganisation of the departmental library, which has been considerably enlarged and improved. When further staff is available it should be possible to proceed with the project, which will undoubtedly meet the needs of technical as opposed to popular health education. South Africa has useful examples to follow in this field in the United States public health reports, the reports of the English Ministry of Health and the bulletins issued by the Bureau of Tropical Medicine and Hygiene, London.

The Department of Native Affairs has included certain aspects of hygiene in its campaign of general propaganda which is being conducted through the Native churches and Press.

Local interest in health education has during the year been most encouraging; local authorities in all provinces have interpreted their functions and responsibilities in a far-sighted manner to include health education. The Department has also to acknowledge the very great efforts being made by numerous bodies, such as the National Council for Child Welfare, the St. John Amblance Association and the National Cancer Association. With propaganda now on a national basis it becomes possible to secure co-ordination of the activities of these bodies, to prevent overlap and duplication and to give an extended usefulness to their campaigns.

The use of the film in health education is receiving recognition too; the Department has established a 16 mm. film library in addition to that previously existing of 35 mm. The films contained in both are given in the following list. The National Film Bureau of Film Education has responded to a request from the department to include health subjects in its library, and a large series is now available for the members of the Bureau.

List of Cinema Films owned by the Department and which are available to Local Authorities and Public Bodies for Exhibition purposes:—

(35 *mm. films.*)

"Fly Danger."
"The Trail of a Pesky Fly" (small reel).
"The Rat Menace."
"Your Mouth."
"Tommy Tucker's Tooth."
"The Story of John McNeil" (Tuberculosis) (2 reels).
"Consequences" (Tuberculosis).
"The War on the Mosquito."
"Malaria" (3 reels).
"New Methods for Malaria Control."
"Bilharzia" (2 reels).
"Bilharziosis" (Human Redwater).
"In His Father's Footsteps" (Insanitary Farm: Enteric).
"The Long Haul *versus* the Short Haul" (Dirty Milk).
"Milk—the Master Builder."
"Drinking Health" (Pure Water) (2 reels).
"London Water Board."
"Preventing the Spread of Disease."
"The Great Crusade" (Slum Clearance) (2 reels).
"One Scar or Many" (Vaccination).
"Bringing it Home" (Child Welfare).
"Well Born" (2 reels).
"Baby's Bath and Toilet."
"The Best Fed Baby."
"Why Willie was Willing to Wash."
"Forming the Habits of Health."
"Camp Sanitation."
"Any Evening after Work" (Venereal Disease) (4 reels).
"John Smith and Son" (Gonorrhoea) (3 reels).
"Peter and the Moon Man."
"The Story of Papworth" (2 reels).
"Almost a Tragedy" (2 reels).
"Jinks."
"The Priceless Gift of Health."
"Confessions of a Cold."
"Deferred Payment" (3 reels) (Venereal Disease).
"Trial for Marriage" (3 reels).
"Giro the Germ" (2 reels).
"Milk" (2 reels).
"Enough to Eat" (2 reels).

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Science of Life Series:
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(viii) " How the Mosquito Spreads Disease."
(ix) " The Fly as a Disease Carrier."
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" Posture."
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" Physical Education—Infants."
" Analysis of Agility Exercise."
" Carriage " (Physical Training).
" Enough to Eat."
" Trial for Marriage."
" The Filter."
" Body Defences Against Disease."
" Ground Water."

The departmental pamphlets have continued to be in demand. The series obtainable is listed as follows:—

Pamphlets and Leaflets published by Department of Public Health:—

" Senecio Disease." (Warning Notice.) No. 166 (Health).
" Food and Health." (No. 194 (Health).
" Anthrax." No. 239 (Health).
" Venereal Diseases: Their Prevention and Treatment." No. 248 (Health).
" Instructions to Persons suffering from Gonorrhoea." No. 249 (Health).
" Instructions to Persons suffering from Syphilis." No. 250 (Health).
" Instructions to Native Patients suffering from Syphilis or Gonorrhoea." (In Zulu, Sixosa, Sesutu, and Sechuana.) No. 358 (Health).
" Poisoning by 'Stinkblaar' or Thorn Apple (*Datura stramonium* and *Datura tatula*)." Warning Notice. No. 256 (Health).
" Smallpox: Duties and Powers of Local Authorities under Public Health Act, and procedure to be followed in dealing with outbreaks." No. 276 (Health).
" Directions for the Performance of Public Vaccination." No. 279 (Health).
" Dagga Smoking and its Evils." No. 289 (Health).
" Plague: Its Control, Eradication and Prevention." No. 316 (Health).
" Plague Prevention and Rodent Destruction." No. 317 (Health).
" Rodents: Description, Habits, and Methods of Destruction." (W. Powell.) No. 321 (Health).
" Houseflies: Their Life-history, Destruction and Prevention, and their Influence on Health." No. 335 (Health).
" Bilharzia (Human Redwater) Disease." No. 339 (Health).
" Snake-bite and its Treatment." No. 348 (Health).
" Influenza." No. 363 (Health).
" Typhoid or Enteric Fever: Its Causes, Spread and Prevention in South Africa." No. 365 (Health).
" Catechism about Typhoid or Enteric Fever." No. 378 (Health).
" Care of the Teeth and Prevention of Dental Disease in Children." No. 368 (Health).
" The Teeth: How to Prevent Decay." No. 379 (Health).
" Typhus or Louse Fever." No. 417 (Health).
" Typhus Catechism." (In Zulu, Sixosa, Sesuto, and Sechuana.) No. 488 (Health).
" Consumption, its Causes, Prevention and Treatment." No. 439 (Health).
" Malaria Catechism for use in Schools." No. 360 (Health).
" Truths about Cancer." (Published jointly with the National Cancer Association of South Africa.) No. 473 (Health).
" Rabies." (Published jointly with the Director of Veterinary Services, Department of Agriculture and Forestry.) No. 501 (Health).
" Motherhood." No. 482 (Health).

Malaria Pamphlet No. 1: "Malaria Control with the Description of the Life-history of the Malaria Parasite and the Habits of the Mosquito Vector." No. 527 (Health).

Malaria Pamphlet No. 2: "Directions for the Prevention and Treatment of Malaria and Blackwater Fever." No. 198 (Health).

"Pail Latrines." No. 580 (Health) and 586 (Health).

"Pit Privies." No. 585 (Health).

46.—Physical Education.

The enthusiasm with which physical fitness has been pursued in such European countries as Scandinavia, Germany and the United Kingdom in recent years has spread to South Africa. Numerous organisations combined to represent to the Government the desirability of a national campaign for physical fitness being adopted in this country too. Eventually an inter-departmental committee reported to the Government on the question. Its report has resulted in the adoption of a most ambitious and comprehensive scheme of physical education. It was considered that such a scheme could most suitably be implemented firstly by improving and extending activities already falling within the scope of various Government departments, such as those of Education, Defence and Railways; and secondly, by stimulating the provision of facilities to serve the public generally, more especially those who, owing to their financial circumstances, are at present denied the opportunities of receiving regular and profitable instruction in physical culture.

Arrangements have been made for the school authorities to be largely responsible for the provision of physical education to pupils other than members of cadet detachments. For this purpose increased attention is to be given to the training of teachers in the subject. The general public will be served through such agencies as the Active Citizen Force, voluntary aid institutions, sports and athletic associations and also through local authorities.

Such a great scheme requires careful guidance and co-ordination. This will be provided by the National Advisory Council of Physical Education. This has been established under the Chairmanship of the Secretary for Education. Representatives of other interested Government departments, municipal and voluntary associations, have been appointed to the Council. Strong arguments for the administration of this great health move by the Department of Public Health could be put forward. Its health aspects are to some extent safeguarded by the inclusion of the Secretary for Public Health as a member of the Advisory Council.

An important and essential feature of the scheme is the establishment of a modern college of physical training. The first steps in this direction have been taken and certain individuals are to be, or have been, appointed to form the nucleus of an institution to be elaborated at Roberts Heights. That a great effort to improve physical fitness is being launched cannot but be greeted with approval by health authorities because of the undoubted benefits to the public and individual health which will follow.

47.—Publications.

Sir Edward Thornton:

"The Policy of the Government in regard to Tuberculosis" (*S.A. Medical Journal*, November, 1937).

Dr. E. H. Cluver:

"Medical and Health Institutions in the U.S.S.R." (*S.A. Nursing Journal*, November, 1937).

"Medical and Health Institutions, U.S.S.R." (*S.A. Dental Journal*, Vol. XI, No. 12, December, 1937).

"Health Provision for the Masses" (*S.A. Nursing Journal*, January, 1938).

"A Decade of Public Health" (*The Leech*, Vol. 9, April, 1938).

"Nutrition of the Union Population" (Paper read at the S.A. Health Congress, February, 1938. Public Health, Vol. 3, June, 1938).

Dr. G. A. Park Ross:

"Automatic Emoustication of Aircraft and Yellow Fever Vector in African Air Travel." Presented to the Office International D'Hygiene publique, Paris.

Dr. Peter Allan:

"The Clinical Pathology of Pulmonary Tuberculosis" (*S.A. Medical Journal*, Vol. XI, November, 1937).

Dr. F. W. P. Cluver:

"Milk and the Public Health" (Paper read at the S.A. Medical Congress Bloemfontein, 1937 (*S.A. Medical Journal*, Vol. XII, April, 1938).

"The Value of Propaganda in Public Health Work" (Address delivered at the annual meeting of the S.A. Red Cross Society in Durban, March, 1938).

DR. L. FOURIE.

"The Endemic Focus of Plague" (*The South African Medical Journal*, Vol. 12, 1938, p. 352).

DR. H. SUTHERLAND GEAR:

"Professor George Ritchie Thomson" (*The Leech*, Vol. 9, April, 1938).

"Dr. Charles Porter: Professor of Public Health" (*The Leech*, Vol. 9, April, 1938).

"The Position of General Hospitals in the S.A. Public Health Organisation" [*S.A. Medical Journal* (in the Press)].

"The Basic Need for Correct and Uniform Statistics" (*Journal Royal Sanitary Institute*, Vol. LIX, August, 1938).

"A South African Institute of Hygiene and Tropical Medicine" (*The Leech*, Vol. 9, April, 1938).

DR. M. H. FINLAYSON:

"Some Properties of the Venom and Arachnolysin of *L. indistinctus*" (*S.A. Journal of Medical Science*, Vol. 2, No. 4, 1937).

"Poisonous South African Spiders" (Address to the Zoological Society of London, October, 1937).

DR. H. A. SHAPIRO:

"The Effect of Prolactin-containing Extracts of Sheep Anterior Pituitary on the Histological Structure of the Amphibian Testis" (*S.A. Journal of Medical Science*, Vol. 4, 1937).

In addition to the publications enumerated above members of staff contributed popular health articles to non-technical journals, and gave numerous addresses on public health subjects to gatherings convened by local authorities, such as health weeks and to meetings of voluntary organisations whose activities include health propaganda.

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MISCELLANEOUS PUBLICATIONS.

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PUBLICATIONS OF GEOLOGICAL SURVEYS.

The Geological Commission of the Cape of Good Hope.

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Fifteenth Annual Report, 1910	2 6

(b) *Geological Maps of the Colony of the Cape of Good Hope:*

Seventeen sheets were published in colour on the scale of 1:238,000, or 3·8 miles to the inch. Price 2s. 6d. each.

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42. Kimberley, 1908. (Out of print.)
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46. Barkly West, 1908.
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52. Mafeking, 1908.

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(c) *Geological Map of the Transvaal:*

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The Geological Survey of the Union of South Africa.

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