1928.

NEW ZEALAND.

PREVENTION AND TREATMENT OF PULMONARY TUBERCULOSIS IN NEW ZEALAND.

REPORT OF THE COMMITTEE OF INQUIRY APPOINTED BY THE HON. MR. YOUNG, MINISTER OF HEALTH.

Laid on the Table of the House by Leave.

CONSTITUTION OF THE COMMITTEE.

FRANK FITCHETT, Esq., M.D. (Edin.), M.R.C.P. (Lond.), Professor of Clinical Medicine and Therapeutics, Otago University (Chairman).

D. EARDLEY FENWICK, Esq., O.B.E., M.D. (N.Z.), M.R.C.P. (Lond.), Honorary Physician, Wellington Hospital; late Examiner in Medicine and Clinical Medicine, New Zealand University.

T. W. J. JOHNSON, Esq., M.D. (N.Z.), M.R.C.P. (Lond.), Honorary Physician, Auckland Hospital: Examiner in Medicine and Clinical Medicine, New Zealand University.

Secretary: J. W. BUCHANAN, Esq.

REPORT.

The Hon. the Minister of Health.

SIR,—

The Committee of Inquiry into the Prevention and Treatment of Pulmonary Tuberculosis appointed by you to inquire into and report upon the matters set out in the order of reference hereunder, have the honour to submit herewith their report.

ORIGIN AND SCOPE OF INQUIRY.

On account of the insistent demands made for increased accommodation for sufferers from pulmonary tuberculosis the Minister of Health duly considered the representations made and decided to set up a Committee to inquire into the whole question of the treatment and prevention of tuberculosis in New Zealand, more especially with regard to the class of consumptives admitted to the sanatoria of the Dominion; the inquiry to have particular reference to the length of stay of the patients at the sanatoria, and whether all the patients so admitted are suffering from tuberculosis in such a form as to render their prolonged stay necessary or desirable.

The Hon. the Minister communicated with the British Medical Association (New Zealand Branch) asking for recommendations as to the names of physicians whom the British Medical Association considered competent in every way to examine, inquire, and report upon generally the present facilities with respect to the care and treatment of patients suffering from pulmonary tuberculosis in New Zealand.

The said association accordingly recommended the names of ten physicians to the Minister of Health, and from the names submitted the Minister duly appointed the following Committee :—

Frank Fitchett, Esq., M.D. (Edin.), M.R.C.P. (Lond.) ;
D. Eardley Fenwick, Esq., O.B.E., M.D. (N.Z.), M.R.C.P. (Lond.) ;
T. W. J. Johnson, Esq., M.D. (N.Z.), M.R.C.P. (Lond.).

The function and duty laid upon the Committee was as set out in the following order of reference :—

To inquire into—

(1) The past and present incidence of pulmonary tuberculosis in New Zealand.
(2) The measures now taken in New Zealand for the prevention and treatment of pulmonary tuberculosis.
(3) Whether the beds available in sanatoria, hospitals, and other institutions for the reception of cases of pulmonary tuberculosis are adequate as regards number and distribution.
(4) Whether the sanatoria, hospitals, and other institutions are being used to the best advantage.
(5) What additional institutions, if any, are required, or what extensions, if any, are necessary to existing institutions.
(6) Whether the action taken against pulmonary tuberculosis, other than the provision of institutional beds, is sufficient, considering—
  (*a*) The incidence of the disease ;
  (*b*) The size and distribution of the population of the Dominion ;
  (*c*) The financial condition of the country, and the public funds available for general health purposes.
(7) What other means, if any, are considered necessary to combat the disease either as regards action by Hospital Boards, voluntary agencies, or the Department of Health.
(8) Whether there exists at the present time sufficient co-ordination of all the agencies dealing with pulmonary tuberculosis ; if not, what measures are suggested.

The Minister of Health appointed the members of the above Committee to be Assistant Inspectors of Hospitals under the Hospitals and Charitable Institutions Act, 1926, to facilitate their inquiries, and expressed his desire that the Committee should hear such evidence and representations on the above matters as it considered necessary to fully inform itself upon the questions referred to.

The following places were visited and inspected by the Committee :—

Dunedin : Public Hospital ; Wakari Hospital ; the tuberculosis dispensary, Public Hospital ; Sarah Ann Cohen Memorial School, Kew.
Palmerston South : Pleasant Valley Sanatorium.
Waipiata : Waipiata Sanatorium.
Oamaru : Annexe for tuberculous patients at the Public Hospital.
Waimate : Annexe for tuberculous patients at the Public Hospital.
Timaru : Annexe for tuberculous patients at the Public Hospital.
Christchurch : Cashmere Sanatoria ; Open-air School, Fendalton.
Wellington : Ewart Hospital ; Public Hospital.
Otaki : Otaki Sanatorium.
Waipukurau : Pukeora Sanatorium.
Palmerston North : Annexe for tuberculous patients at the Public Hospital.
Hamilton : Annexe for tuberculous patients at the Public Hospital.
Auckland : Public Hospital ; Tuberculosis Shelters at the Auckland Infirmary, Epsom ; Shelters for returned-soldier patients ; Cornwall Park School.

Sittings were held at various centres in New Zealand, and a large number of witnesses were examined, as shown in the following table :—

Places and Dates of Sittings.	Witnesses examined or Work done.
Dunedin, Saturday, 2nd June, 1928 ..	Meeting of Committee : Election of Chairman ; arrangement of itinerary.
Dunedin, Sunday, 3rd June, 1928	Meeting with Dr. Valintine.
Dunedin, Monday, 4th June, 1928.. ..	Dr. C. E. Lyth, Medical Superintendent, Wakari.
	Dr. James Thompson, Medical Superintendent, Public Hospital, Dunedin.
Dunedin, Tuesday, 5th June, 1928 ..	Dr. M. A. Champtaloup, School Medical Officer.
	Dr. J. H. Crawshaw, Medical Officer of Health.
	Dr. F. S. MacLean, Medical Officer of Health.
	Dr. M. H. Watt, Deputy Director General of Health, Health Department.
	Mr. W. S. Knight, Chairman, Otago Hospital Board.
	Mr. Quelch, Member of Otago Hospital Board.
	Dr. James Fitzgerald, representing British Medical Association (Otago Division).
	Dr. William Newlands.
	Professor C. E. Hercus, Professor of Bacteriology and Preventive Medicine, Otago University.
Waipiata, Wednesday, 6th June, 1928 ..	Mr. J. Matheson, Chairman, Waipiata Sanatorium Committee.
	Mr. T. Pryde, Secretary, Waipiata Sanatorium Committee.
Waipiata, Thursday, 7th June, 1928 ..	Dr. A. Kidd, Medical Superintendent, Waipiata Sanatorium.
	Mr. J. Ritchie, member of Waipiata Sanatorium Committee.

Places and Date of Sittings.	Witnesses examined or Work done.
Timaru, Saturday, 9th June, 1928 ..	Dr. W. C. Burns, representing British Medical Association (South Canterbury Division). Mrs. W. H. Unwin, member of South Canterbury Hospital Board. Mr. H. G. Naylor, Secretary, South Canterbury Hospital Board. Dr. McKenzie, Medical Superintendent, Public Hospital, Timaru.
Christchurch, Monday, 11th June, 1928 ..	Dr. Walter Fox, Medical Superintendent, Public Hospital, Christchurch. Dr. A. B. Pearson, Bacteriologist, Christchurch.
Christchurch, Tuesday, 12th June, 1928 ..	Mr. H. J. Otley, Chairman, North Canterbury Hospital Board. Mr. A. T. Smith, Chairman, Public Health Committee, North Canterbury Hospital Board. Mr. W. S. Wharton, Secretary, North Canterbury Hospital Board. Dr. G. J. Blackmore, Medical Director, Tuberculosis Institutions, Cashmere. Dr. William Aitken, Medical Superintendent, Upper Sanatorium, Cashmere Hills. Dr. J. N. Waddell. Dr. T. F. Telford, Medical Officer of Health. Dr. F. W. Dawson, Medical Officer of Health. Mr. S. Cheetham. Dr. E. S. Baker-McLaglan, School Medical Officer. Dr. F. G. Gibson, representing British Medical Association (Canterbury Division). Dr. F. V. Bevan-Brown, representing British Medical Association (Canterbury Division).
Wellington, Thursday, 14th June, 1928 ..	Dr. Short. Dr. P. P. Lynch, Pathologist. Dr. T. H. A. Valintine, Director-General of Health. Mr. F. Castle, member of Wellington Hospital Board. Dr. H. B. Ewen, Medical Superintendent, Public Hospital, Wellington. Dr. W. Young, representing British Medical Association (Wellington Division). Dr. A. D. Carberry, Medical Officer, Pensions Department. Mr. A. O. Keisenberg, Secretary, New Zealand Hospital Boards' Association. Dr. Ada Paterson, Director, Division of School Hygiene. Dr. W. B. Mercer, Medical Officer of Health.
Otaki, Friday, 15th June, 1928	Dr. E. Irwin, Medical Superintendent, Otaki Sanatorium.
Palmerston North, Friday, 15th June, 1928..	Dr. Ivan Wilson, representing British Medical Association (Palmerston North Division).
Palmerston North, Saturday, 16th June, 1928	Sir James Wilson, Chairman, Palmerston North Hospital Board. Dr. H. J. C. Durward. Dr. F. G. Ward, Medical Superintendent, Palmerston North Hospital.
Pukeora Sanatorium, Waipukurau, Sunday, 17th June, 1928	Dr. G. Maclean, Medical Superintendent, Pukeora Sanatorium.
Hamilton, Monday, 18th June, 1928 ..	Mr. Campbell Johnstone, Chairman, Waikato Hospital Board. Mr. E. G. Johnson, Secretary, Waikato Hospital Board. Dr. Hugh Douglas, representing British Medical Association (South Auckland Division). Dr. G. W. Gower, Medical Superintendent, Public Hospital, Hamilton.
Auckland, Tuesday, 19th June, 1928 ..	Dr. A. N. McKelvey, Medical Superintendent, Auckland Infirmary. Dr. T. J. Hughes, Medical Officer of Health. Dr. H. J. C. Wilkie, School Medical Officer. Dr. S. A. Bull, representing British Medical Association (Auckland Division.) Dr. P. A. Lindsay, representing British Medical Association (Auckland Division).
Auckland, Wednesday, 20th June, 1928 ..	Dr. C. E. Maguire, Medical Superintendent, Public Hospital, Auckland. Dr. W. N. Abbott, representing British Medical Association (Auckland Division). Mr. H. Aekins, formerly Tuberculosis After-care Officer for Returned Soldiers. Mr. W. Wallace, Chairman, Auckland Hospital Board. Mr. H. A. Sommerville, Secretary, Auckland Hospital Board. Mr. H. Jones, Relieving Officer, Auckland Hospital Board. Dr. C. H. Tewsley, representing British Medical Association (Auckland Division). Dr. C. J. Griffin, representing British Medical Association (Auckland Division). Mr. N. G. Gribble, Hamilton. Dr. R. Bevan-Brown, Acting-Pathologist.

The Committee desire to express their appreciation of the help given by the witnesses, many of whom took considerable trouble to collect information and prepare evidence. Their especial thanks are due to officers of the Department of Health, for supplying statistical information and for preparing graphs and tables; to the members of Hospital Boards, some of whom came to meet the Committee at considerable inconvenience to themselves; to the Medical Officers in charge of sanatoria and hospitals, for the manner in which they gave every possible assistance to the Committee in the inspection of their institutions; and to the members of the medical profession, who gave up their time to submit evidence.

The Committee further wish to make special mention of the services rendered by the secretary, Mr. J. W. Buchanan, whose work has been very heavy owing to the number of witnesses examined and the extent of ground covered in a comparatively short time. This would not have been possible but for the complete arrangements made by Mr. Buchanan, and the ability and energy which he showed generally in the discharge of his duties left nothing to be desired.

REPORT.

In compiling this report the Committee has adopted the method of dealing separately with the various questions in the order in which they are set out in the order of reference.

SECTION I.

Question 1.—Past and present incidence of pulmonary tuberculosis in New Zealand.

In New Zealand, as in other civilized countries, the incidence of pulmonary tuberculosis has declined steadily during the past fifty or sixty years. The fall has been uninterrupted, and does not appear to have been influenced by any of the remedial measures introduced in the last thirty years for the direct treatment of the disease. The explanation usually given is that the decline has been brought about by education, by sanitary reform, and by improvement in economic conditions.

In estimating the incidence of pulmonary tuberculosis in this country two sources of information are available—(*a*) notification returns, (*b*) bills of mortality.

In New Zealand pulmonary tuberculosis has been a notifiable disease since 1901. In the earlier years notification was very incomplete, and even to-day it cannot be relied upon to give trustworthy information. In some cases patients and doctors alike are opposed to notification. Often doctors are careless and neglect to make returns; and, on the other hand, patients who pass from doctor to doctor or from doctor to hospital are sometimes notified more than once. Notifications for the last ten years are shown in Table I.

TABLE I.—NOTIFICATIONS OF CASES OF PULMONARY TUBERCULOSIS, 1918–27.

Year.	Number of Notifications.	Year.	Number of Notifications.
1918	1,072	1923	1,002
1919	984	1924	1,072
1920	1,305	1925	1,247
1921	1,207	1926	1,318
1922	1,129	1927	1,343

The only inference that can be drawn from this list is that there has been a steady increase in notification in the last three years. It is probable that this increase is due to the greater activity of various administrative bodies resulting in a higher proportion of cases being notified.

More reliable information is given by the death-rate. Tables II and III show that the death-rate per 10,000 of the population has fallen from 9·70 per 10,000 in 1872 to 3·88 per 10,000 in 1927.

TABLE II.—DEATHS FROM TUBERCULOSIS OF THE RESPIRATORY SYSTEM, 1872–1927.

Year.	Number of Deaths.	Rate per 10,000 Mean Population.	Year.	Number of Deaths.	Rate per 10,000 Mean Population.
1872	265	9·70	1900	577	7·57
1873	206	7·16	1901	596	7·66
1874	270	8·47	1902	617	7·73
1875	339	9·45	1903	570	6·95
1876	307	7·92	1904	598	7·08
1877	326	8·07	1905	496	5·70
1878	326	7·75	1906	556	6·21
1879	399	8·90	1907	612	6·66
1880	447	9·42	1908	671	7·10
1881	468	9·50	1909	634	6·52
1882	454	8·91	1910	574	5·78
1883	531	10·02	1911	563	5·55
1884	530	9·59	1912	553	5·32
1885	514	9·02	1913	640	5·99
1886	500	8·59	1914	564	5·17
1887	534	8·95	1915	546	4·97
1888	476	7·86	1916	565	5·14
1889	499	8·16	1917	584	5·31
1890	520	8·38	1918	638	5·78
1891	495	7·86	1919	585	5·12
1892	524	8·16	1920	671	5·63
1893	545	8·24	1921	609	4·98
1894	576	8·48	1922	594	4·74
1895	553	7·99	1923	619	4·86
1896	523	7·40	1924	573	4·41
1897	596	8·26	1925	560	4·21
1898	597	8·11	1926	592	4·38
1899	593	7·91	1927	533	3·88

TABLE III.—NOTIFICATIONS OF AND DEATHS FROM TUBERCULOSIS OF THE RESPIRATORY SYSTEM, 1918–27.

Year.	Mean Population.	Notifications.	Deaths.	Rates per 10,000 of Mean Population.		Deaths per 100 Notifications.
				Notifications.	Deaths.	
1918	1,103,022	1,072	638	9·72	5·78	59·5
1919	1,142,889	984	585	8·61	5·12	59·5
1920	1,192,620	1,305	671	10·94	5·63	51·4
1921	1,223,901	1,207	609	9·86	4·98	50·5
1922	1,251,895	1,129	594	9·02	4·74	52·6
1923	1,274,551	1,002	619	7·86	4·86	61·8
1924	1,298,635	1,072	573	8·25	4·41	53·5
1925	1,329,759	1,247	560	9·38	4·21	44·9
1926	1,352,927	1,318	592	9·74	4·38	44·9
1927	1,374,439	1,343	533	9·77	3·88	39·7

NOTE.—Population and death figures are exclusive of Maoris. Notifications probably include a small number of Maori cases.

Table IV gives the death-rate from non-pulmonary tuberculosis over the same period, and this also shows a steady decline from 2·96 per 10,000 in 1872 to 0·98 in 1927.

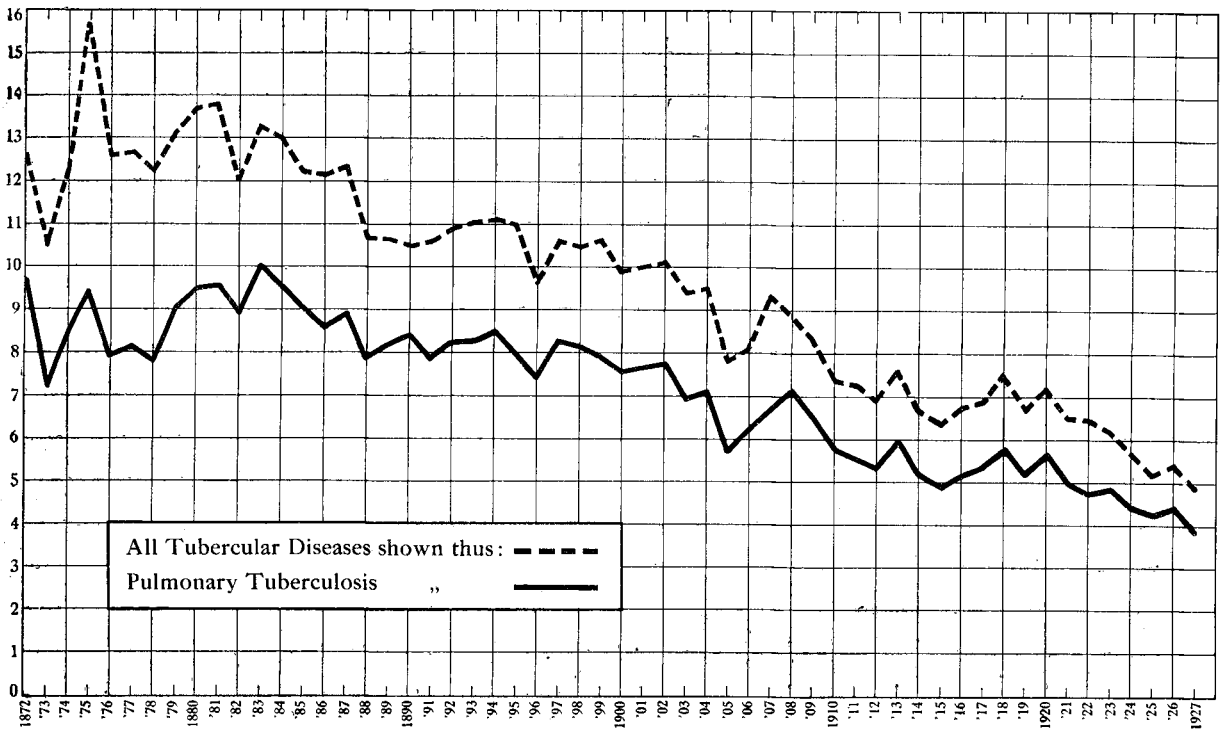
TABLE IV.—DEATHS FROM OTHER TUBERCULAR DISEASES, 1872–1927.

Year.	Number of Deaths.	Rate per 10,000 Mean Population.	Year.	Number of Deaths.	Rate per 10,000 Mean Population.
1872	81	2·96	1900	175	2·30
1873	96	3·34	1901	179	2·30
1874	121	3·79	1902	185	2·32
1875	222	6·19	1903	199	2·43
1876	181	4·67	1904	201	2·38
1877	186	4·61	1905	182	2·09
1878	187	4·45	1906	164	1·83
1879	188	4·20	1907	244	2·65
1880	198	4·17	1908	169	1·79
1881	212	4·30	1909	169	1·74
1882	157	3·08	1910	157	1·58
1883	169	3·19	1911	175	1·73
1884	188	3·40	1912	163	1·57
1885	184	3·23	1913	172	1·61
1886	205	3·52	1914	164	1·50
1887	200	3·35	1915	147	1·34
1888	171	2·82	1916	177	1·61
1889	150	2·45	1917	171	1·56
1890	130	2·09	1918	194	1·76
1891	168	2·67	1919	177	1·55
1892	176	2·74	1920	180	1·51
1893	184	2·78	1921	184	1·50
1894	176	2·59	1922	209	1·67
1895	208	3·00	1923	173	1·36
1896	157	2·22	1924	163	1·26
1897	167	2·31	1925	124	0·93
1898	172	2·34	1926	135	1·00
1899	202	2·69	1927	135	0·98

In commenting on these figures the Government Statistician writes: "As regards pulmonary tuberculosis, the figures prior to 1908 are not altogether comparable with those for the years 1908 to 1927, as they did not apparently include deaths certified as being due to 'tuberculosis' (not further defined), which have since been treated as due to pulmonary tuberculosis. From 1872 to 1884, inclusive, the general heading 'Tuberculosis' included the subheading 'Hydrocephalus,' which from 1885 to 1907 was altered to 'Tubercular meningitis, acute hydrocephalus,' becoming in 1908 'Tubercular meningitis.' To what extent the headings 'Hydrocephalus' and 'Acute hydrocephalus' included non-tubercular hydrocephalus it is impossible to say, though deaths from 'tubercular meningitis, acute hydrocephalus' in 1907 numbered 115, as against only 83 from 'tubercular meningitis,' in 1908. On the other hand, it is possible that up to and including 1884, a number of deaths from tubercular meningitis were included in the subheadings 'Cephalitis' and 'Brain-disease,' &c. of the heading 'Diseases of the nervous system.'"

The decline in the death-rate is shown more clearly in Graph A.

GRAPH A.—DEATH-RATE FROM TUBERCULOSIS PER 10,000 MEAN POPULATION, 1872–1927.



In these figures no account is taken of the incidence of the disease among Maoris. The mass of the Maori population lives in remote districts inaccessible to doctors and inspectors, and in many cases medical certification of death is not made. Thus reliable information is not obtainable. It may be pointed out, however, that statistics relative to Maoris compiled for the quinquennium 1920–24 showed that during the five years 857 deaths of Maoris were recorded as due to tuberculosis of the respiratory system, and 103 to other forms of tuberculosis. These figures correspond to annual rates of about 28 per 10,000 for pulmonary tuberculosis and 32 per 10,000 for all forms of tuberculosis, as against corresponding rates of 5 and 6·5 respectively for the general population.

INCIDENCE OF TUBERCULOSIS IN NEW ZEALAND SCHOOL-CHILDREN.

The total incidence of tuberculosis in 60,275 children examined by School Medical Officers in the year 1927 was 0·1 per cent., of which 0·04 per cent. was pulmonary and 0·06 per cent. tuberculosis of tissues other than pulmonary. This percentage is in accordance with that found in previous years. School medical reports forwarded show that tuberculosis (in a diagnosable form) is rarely found during the routine examination of school-children. These observations accord with those made in England. The annual report of the County Medical Officer of Health and School Medical Officer, London County Council, for the year 1926 says, "Pulmonary tuberculosis was detected in only 102 children (0·1 per cent.), and other forms of tuberculosis in 126 children. It is thus now quite rare to find tuberculosis at routine medical inspection in school."* Again, in Australia, the report of the Principal Medical Officer, Education Department, Victoria (year 1925–26), states: "In 1922, at the request of the Director-General of the Commonwealth Health Department, every School Medical Officer was asked for six months to keep careful notes of all cases of tuberculosis or cases suspicious of tuberculosis. Even when carefully looked for, only two cases of apparently tubercular glands and five cases of chest conditions, probably tubercular, were found among 7,000 children, but no case of tubercular joint disease was amongst this number."†

In view of the modern opinion that tuberculous infection is almost universal before adolescence, it is probable that a percentage of school-children now classified by School Medical Officers as of subnormal nutrition has latent tuberculosis. In the annual report for 1927 the number of New Zealand school-children showing evidence of subnormal nutrition is given as 7·14 per cent.

INCIDENCE OF PULMONARY TUBERCULOSIS IN DIFFERENT DISTRICTS.

It has been suggested that the incidence of pulmonary tuberculosis is greater in the South Island than in the North Island, and Graph B supports this suggestion. In this graph incidence is determined by the number of notifications, and not by the death-rate. When notification is taken as the basis for estimating incidence, it shows that the incidence is also greater in Canterbury and Otago than in Wellington and Auckland.

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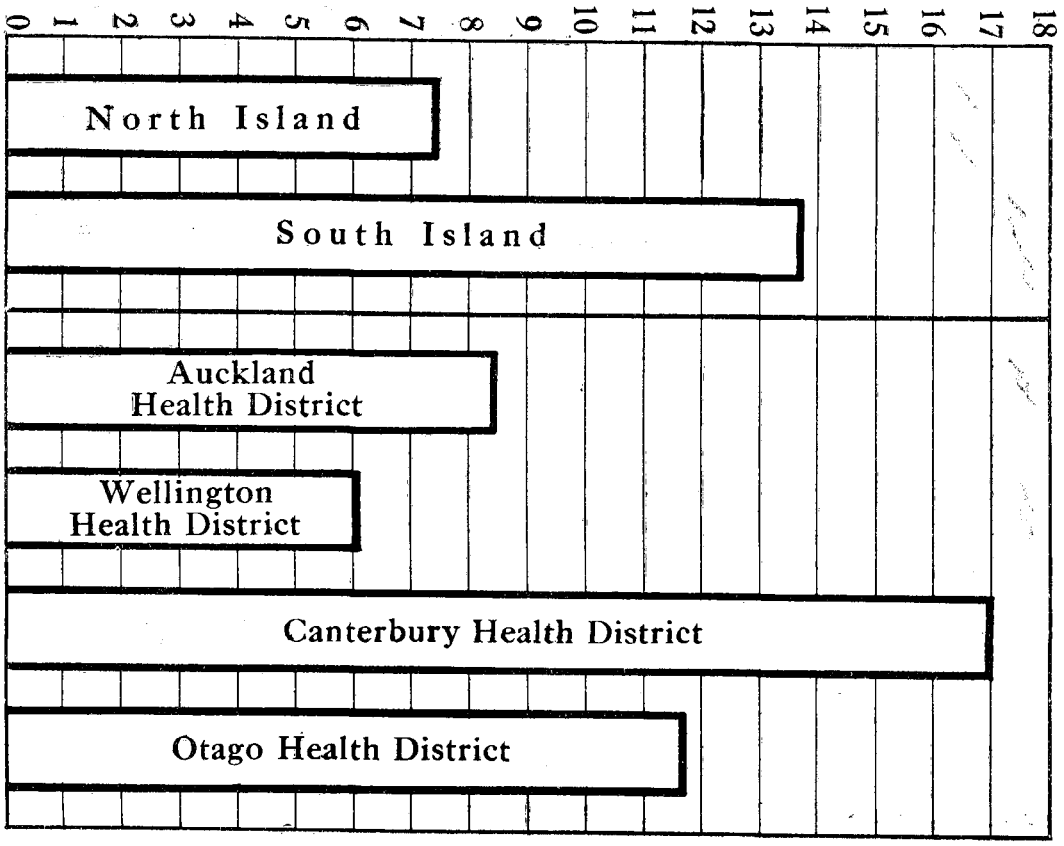
* Annual report of County Medical Officer of Health and School Medical Officer, London County Council, for year 1926.

† Annual report of Principal Medical Officer, Education Department, Victoria, for year 1925–26.

GRAPH B.—NOTIFICATIONS OF TUBERCULOSIS OF THE RESPIRATORY SYSTEM PER 10,000 POPULATION BY ISLANDS AND HEALTH DISTRICTS, 1927.

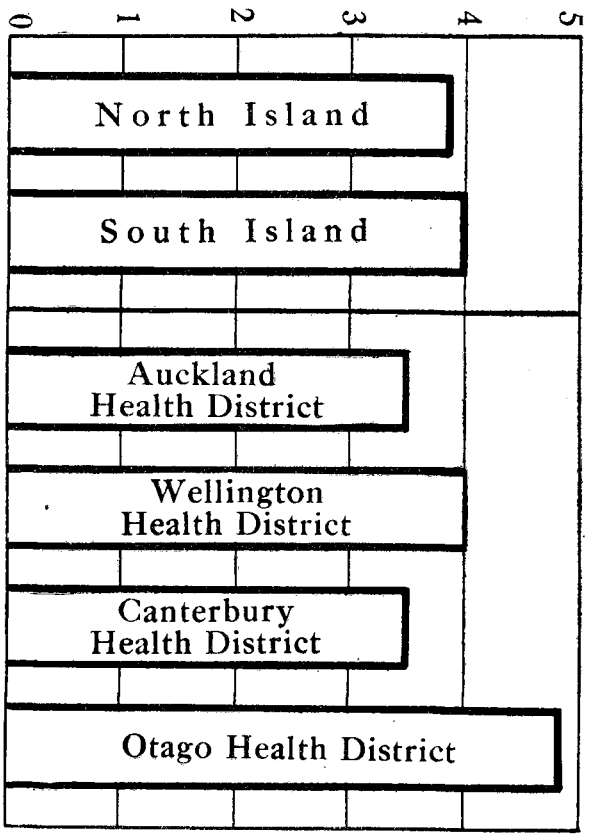


Notification returns are higher in Canterbury and Otago because in Christchurch and Dunedin there are well-organized tuberculosis dispensaries. As a result a more determined effort is made to seek cases out, the interest of the medical profession is quickened, and there are greater facilities (*e.g.*, by consultation with tuberculosis specialists) for reaching a diagnosis. But if the more reliable death-rate is taken as the basis for estimating incidence it will be seen by the following Table V and by Graph C that the difference in incidence between the North and South Islands is negligible, and that, while Otago shows the highest rate, Canterbury shares with Auckland the lowest rate.

TABLE V.—DEATHS FROM TUBERCULOSIS OF THE RESPIRATORY SYSTEM, BY ISLANDS AND HEALTH DISTRICTS, 1927.

District.	Mean Population.	Deaths from Tuberculosis of Respiratory System.	
		Number.	Rate per 10,000.
Islands—			
North	856,774	327	3·82
South	517,665	206	3·98
Health Districts—			
Auckland	419,184	147	3·51
Wellington	480,920	193	4·01
Canterbury	259,604	91	3·51
Otago	214,731	102	4·75
Dominion total	1,374,439	533	3·88

GRAPH C.—DEATHS FROM TUBERCULOSIS OF THE RESPIRATORY SYSTEM PER 10,000 POPULATION, BY ISLANDS AND HEALTH DISTRICTS, 1927.



If the death-rate from tuberculosis, pulmonary and non-pulmonary, in New Zealand is compared with that in other countries, as is done in Table VI, it will be seen that New Zealand is in a favourable position. Indeed, in no other country in the world for which reliable statistics are available is the death-rate so low.

TABLE VI.—DEATHS FROM TUBERCULOSIS IN VARIOUS COUNTRIES.

Country.	Period.	Death-rates per 10,000 of Population.		
		Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	All Forms of Tuberculosis.
New Zealand	1925–27	4·16	0·97	5·13
Australia	1924–26	5·17	0·77	5·94
Canada	1923–25	5·77	1·20	6·97
Denmark	1924–26	7·05	1·98	9·03
United States	1922–24	8·33	1·03	9·36
Netherlands	1925–27	7·01	2·56	9·57
England and Wales	1924–26	8·15	2·04	10·19
Belgium	1923–25	7·11	3·27	10·38
Scotland	1924–26	7·50	3·33	10·83
Germany	1923–25	10·77	1·80	12·57
Italy	1923–25	10·85	4·00	14·85
Switzerland	1924–26	11·10	3·91	15·01
Irish Free State	1924–26	11·97	3·22	15·19
Spain	1924–26	12·34	2·88	15·22
Czecho-Slovakia	1924–26	17·29	2·10	19·39
Norway	1922–24	15·87	3·81	19·68
Finland	1923–25	21·09	3·23	24·32
Hungary	1924–26	24·26	3·10	27·36

SECTION II.

Question 2.—Measures now taken in New Zealand for the prevention and treatment of pulmonary tuberculosis.

New Zealand does not lag behind other countries in the measures adopted for combating the disease. The Health Department is alert to the progress made in preventive medicine, and is actively engaged in trying out new methods of attack. Most of the measures adopted in this country for combating pulmonary tuberculosis have been initiated by the Health Department. They include—(*a*) Notification; (*b*) inspection of the homes of tuberculous subjects and the education of the patient by the distribution of leaflets giving information and instruction; (*c*) the medical examination of school-children, and the active measures arising therefrom for the care of the malnourished and of those who have been brought in contact with the disease in their homes, such as the use of open-air schools, nutrition classes, and health camps; (*d*) the establishment of tuberculosis dispensaries; (*e*) the segregation of chronic cases in hospitals; (*f*) the treatment of other cases in sanatoria; (*g*) research.

(*a*) Notification.

This is one of the most important measures adopted for controlling the disease, for obviously ignorance of the position of the enemy precludes attack. One of the chief obstacles to notification is the distaste of a certain class of patients to the publicity involved. They object to the visit of the Inspector which follows, and in this they are sometimes supported by the medical practitioner, who thinks it undesirable that his patient's mind should be disturbed by a visit of inspection. The Health Officers are willing to refrain from inspection if the practitioner will indicate that this in any particular case is unnecessary.

(*b*) Inspection.

This follows immediately upon notification. It is usually undertaken by a male Inspector, but in some districts a nurse attached to the Health Office or to the tuberculosis dispensary visits the home. If the patient is to be treated at home, advice and instructions are given, and a booklet issued by the Health Department containing information as regards precautionary measures to be taken is left with the patient. The Inspector notes details of all children in the house, and reports to the Medical Officer of Health. Information concerning those of the children who are attending school is passed on to the School Medical Officer, and these are visited in their homes by nurses attached to School Medical Officers. If the patient is removed to an institution, thorough disinfection of the home follows his removal.

(*c*) The Medical Examination of School-children.

This is a highly organized function of the Health Department. The Division of School Hygiene comprises a Director, thirteen School Medical Officers, and thirty-one nurses. Definite tuberculosis is rarely found at school inspections. The largest number of children marked for special consideration are the undernourished, who may possibly be the subjects of latent tuberculosis, and those who have come in contact with pulmonary tuberculosis in their homes. The School Medical Officer interviews the parents, and gives advice regarding the care and nurture of the children. The home is visited by the school nurse, and practical advice is given to the householder and a leaflet is left for his guidance. In some cases the special care required can be tendered at home. In other cases residence in a convalescent home is necessary, and in a few cases sanatorium treatment is called for. Some children are selected for open-air schools, and some for health-camps. In Christchurch a limited number of contacts is accommodated in the Open-air Home for Children, Cashmere.

Open-air Schools.—Throughout the Dominion the Education Department is co-operating by building schools which, according to American standards, can be classed as open-air. In Christchurch where the open-air-school movement is particularly active, several schools on the three-wall "Fendalton plan" have been erected. These are used for all children attending the school, irrespective of health. They find favour with both pupil and teacher; but it is questionable if they offer any advantage over the modern schools of the Education Department. In Dunedin the Sarah Ann Cohen Memorial School has been constructed on the Fendalton plan. This school differs from the Christchurch schools in that the children attending are specially selected on grounds of malnutrition. A special school curriculum is adopted, allowing rest periods, and a milk ration in the morning. A hot midday meal is obtained at the Convalescent Home adjoining. Better facilities for supplying warmth on cold days are desirable.

Nutrition Classes.—In Wanganui and Auckland definite groups of children have been selected for special observation in nutrition. In some Wanganui schools a special milk ration is served to undernourished children in the morning. In Auckland Normal School the school lunch for junior classes is supervised, and suggestions are made with regard to its quality. In all these nutrition classes rest periods are observed, and education on health matters is given to the children.

Health Camps.—For several years past health camps have been held annually in different parts of the North Island. Children attending are specially selected as undernourished. Graduated exercises, sun-bathing, and rest periods are prescribed, and life is lived almost wholly in the open air. The results have been very encouraging.

(*d*) Tuberculosis Dispensaries.

In Christchurch there is a well-organized tuberculosis dispensary. The dispensary is visited twice weekly by the Medical Director and his assistant. The Director sees all new cases, the assistant sees old patients. In addition, the Medical Superintendent of the Upper Sanatorium makes use of the dispensary one morning a week for seeing patients. The nurse attends at the dispensary every week-day from 9 to 10 a.m. to receive inquiries. Medical practitioners send patients to the dispensary when they suspect tuberculosis and wish for advice regarding diagnosis and treatment. No patient is examined unless sent by a practitioner. When the disease is diagnosed as tuberculosis patients are given the chance of treatment in the Sanatorium or Coronation Hospital if they wish it. Nearly all patients are told that admission to these institutions is not compulsory, and that they are at liberty to receive treatment from their own physician if they wish. No patient is admitted except at his own written request. Each patient or inquirer is given a pamphlet dealing with the cause and prevention of tuberculosis, and a leaflet containing advice. Practitioners are written to in every case, and are informed of the diagnosis and of the treatment advised. All cases diagnosed as tuberculous are reported to the Health Department. There has always been close co-operation between the Health Department and the tuberculosis officer. As soon as possible after diagnosis the dispensary sister visits the patient's home if it is in Christchurch or in the suburbs. She obtains full particulars of the home and of the working-conditions of the patient, and reports to the dispensary. She gives general advice as to the life to be lived, the means of preventing infection, and the measures to be adopted to improve home conditions. She urges that persons, particularly children, who have come in contact with the patient be medically examined. On discharge from the Sanatorium or Coronation Hospital all patients receive personal advice as regards their future life, and are urged to report periodically at the dispensary for examination. If patients are willing to come, these examinations are continued for about five years. Many come for a longer period. The nurse continues to visit the homes while patients are in the Sanatorium, and also after their discharge. She is constantly in receipt of requests from patients or their friends to visit homes in order to give advice. Children who have been in the Children's Fresh-air Home are kept under supervision at and through the dispensary. When the nurse meets cases of distress she puts the people in touch with the Charitable Aid Committee of the Hospital Board when money is needed, and with the Sanatorium Ladies' Guild when clothing is needed. Assistance is given to the dispensary by the Social Welfare League, the Women's Christian Temperance Union, Home Economics Association, Rugby Union, and many others.

In Dunedin there is a tuberculosis dispensary run on similar lines to that in Christchurch, which discharges like functions. It is in charge of a tuberculosis officer, and a special nurse is attached. It differs from the dispensary in Christchurch in that it is attached to the out-patient department of the Dunedin Hospital. Though attached to the out-patient department it is not part of it, but has a separate entrance and waiting-room. This is an important feature, as patients in all social grades attend.

In Wellington the tuberculosis dispensary has not reached the same degree of development as in Christchurch and Dunedin. There is no special nurse attached, and the functions of the dispensary have not been so fully elaborated.

In Palmerston North a tuberculosis dispensary is being established in a building in the town apart from the hospital, but it is not yet in working-order.

In Auckland a tuberculosis dispensary in the sense understood in Christchurch and Dunedin does not exist, but tuberculous patients of the poorer classes may attend the Charitable Aid general dispensary. They are there seen by the tuberculosis officer under most unfavourable conditions, and there is no nurse attached.

(*e*) Chronic Hospitals.

In each of the four chief cities of the Dominion there is a chronic hospital reserved for the accommodation of advanced cases of pulmonary tuberculosis.

In Dunedin.—Wakari Hospital is situated at Half-way Bush on the slopes of the hills overlooking Dunedin. It is within easy reach of the city, and not far removed from the terminus of the Kaikorai cable-car. The main building, solidly constructed of brick, consists of four wards of six beds each, and twelve single rooms opening on to a wide veranda. The administrative offices, kitchen, and dining-room are included. In addition there is a series of two-bed wooden shelters adjacent to the main building. There is excellent staff accommodation. A separate block constructed on similar lines is at present used as an infectious-diseases hospital for convalescent cases. The hospital is under the control and direction of the tuberculosis officer, but there is no resident medical officer. This hospital accommodates forty patients, male and female, mostly of a chronic type, but some earlier cases are included. At present there are twenty-six male and fifteen female patients in the hospital.

In Christchurch.—Coronation Hospital is a two-storied brick building situated at the foot of the Cashmere Hills. It is well designed and self-contained, being fully equipped for the treatment of the patients it houses. The dining-rooms, with their services, are on the ground floor, with wards of six beds at either end. In front is a wide veranda, and an open-air corridor runs along the back. The whole of the upper story accommodates patients. In an adjacent building there is an X-ray plant and laboratory. This hospital has sixty-eight beds—fifty for females and eighteen for males. All beds were occupied on the date of inspection.

In Wellington.—The *Ewart Hospital* is a well-constructed single-story brick building, situated on the hills about half a mile behind the Wellington Hospital. It is divided into six-bed wards, with a wide veranda in front facing north. Near by is a smaller brick building for ambulatory cases. The nurses' home and kitchen are in a separate building immediately opposite the main building. This hospital accommodates forty-five patients (male and female). These patients are almost all in an advanced stage of the disease, and are considered unsuitable for sanatorium treatment.

In Auckland.—There is a hospital for chronic cases of pulmonary tuberculosis in the grounds of the Auckland Infirmary. This hospital consists of wooden shelters, most of which contain four beds, arranged around a central dining-room and servery. The kitchen of the infirmary, close by, serves these shelters. The shelters provide accommodation for sixty-nine patients (male and female.) These patients are almost all in an advanced stage of the disease. On the date of inspection there were sixty-seven patients in the hospital. The Medical Superintendent, who is also Medical Officer of the infirmary, resides in the grounds of the institution.

These are the only institutions in the Dominion that are reserved strictly for the accommodation of chronic cases, but throughout the country cases of pulmonary tuberculosis in all stages of the disease are to be met with in the general hospitals and in annexes attached to general hospitals.

In *Dunedin Hospital* there is an open-air balcony of six beds reserved for female cases of declared pulmonary tuberculosis. Patients are admitted to this balcony to await transfer to either Wakari or Pleasant Valley. At present all the beds are occupied by patients awaiting admission to Wakari. There is no like provision for male cases, but no objection is raised to their admission to the general wards.

In *Christchurch Hospital* there is no special provision made for cases of pulmonary tuberculosis, and the Hospital Board is opposed to their admission except in cases of emergency.

In *Wellington Hospital* no impediment is offered by the Hospital Board to the admission of patients suffering from pulmonary tuberculosis, but no special provision is made for them. They are accommodated on the balconies of the general wards. Cases awaiting admission to the sanatoria or to the Ewart Hospital are admitted. At the date of inspection there were twenty-six cases in the Hospital, most of them chronic cases awaiting admission to the Ewart Hospital.

In the *Auckland Hospital* no special provision is made for cases of pulmonary tuberculosis. Patients when admitted are placed in the balconies of the general wards. No objection is raised to the admission of these cases. There were twelve cases of pulmonary tuberculosis in all stages of advancement in hospital on the date of inspection. A new building is being erected in the hospital grounds to accommodate sixteen patients.

Provincial Hospitals.

As shown by the tables that follow in Section III of the report, most of the provincial hospitals in the Dominion provide accommodation for cases of pulmonary tuberculosis. The majority of these cases are chronic cases, but all types are admitted. Some of these hospitals were inspected and are referred to briefly below.

Oamaru Hospital.—This hospital has a special annexe for cases of pulmonary tuberculosis. It is a well-built, comfortable brick building in the hospital grounds, with beds for twelve patients. The patients in this annexe were those awaiting admission to Waipiata Sanatorium, and some more advanced cases judged to be unsuitable for sanatorium treatment. These patients are under the care of a visiting physician to the hospital, and they are also visited at intervals by the Medical Superintendent of the Waipiata Sanatorium.

Waimate Hospital.—Separate shelters of old design placed in the grounds of the hospital near the main building afford accommodation for twelve patients, male and female. The patients are under the care of a visiting physician, and are visited occasionally by the Superintendent of the Waipiata Sanatorium. The shelters, in structure and arrangement, are not suitable for the treatment of advanced cases. At the date of inspection there were two female patients occupying one shelter—an advanced case and an earlier case awaiting admission to Waipiata Sanatorium.

Timaru Hospital.—In this hospital patients suffering from pulmonary tuberculosis in all stages of advancement are admitted to the isolation block. The balconies are fully occupied, and a few patients are accommodated inside. There are twelve beds set aside in this block for tuberculous patients. These patients are supervised by the Superintendent of the hospital, and are visited at intervals by the Medical Superintendent of the Waipiata Sanatorium. At the date of inspection all beds were occupied, several by patients awaiting admission to Waipiata Sanatorium.

Palmerston North Hospital.—Tuberculous patients are accommodated in an annexe in the hospital grounds. It is a well-built wooden structure on open-air lines, with accommodation for sixteen patients, male and female. It is controlled by the Medical Superintendent of the hospital. The patients are almost all in an advanced stage of the disease. On the date of inspection there were fifteen patients in the hospital.

Hamilton.—Tuberculous patients are admitted to an annexe in the grounds of the Waikato Hospital. This building is a wooden one of excellent design. It is completely self-contained, and might well serve as a model for future extensions to other hospitals. It is admirably situated on the slope of the hill below the hospital, and accommodates twenty-five patients (male and female), mostly advanced cases. A few are transferred to sanatoria. It is controlled by the Medical Superintendent of the hospital. There were twenty patients in the annexe on the date of inspection.

(*f*) Sanatoria.

In New Zealand there are six sanatoria for the treatment of early and moderately advanced cases of pulmonary tuberculosis.

In the South Island, *Pleasant Valley Sanatorium*, in the Otago Hospital Board District, is situated in the vicinity of Palmerston, and contains fifty-four beds, for both sexes. Patients' shelters contain one or two beds, and are grouped together in twos and fours, with a large veranda in front of the larger blocks. There is a resident Medical Officer, also an adequate nursing staff. The cases are of mixed types, but there is a preponderance of the middle-stage case. Wakari Chronic Hospital

and the Pleasant Valley Sanatorium are both controlled by the Otago tuberculosis officer, and admissions to, and interchange of patients between, the institutions take place at his discretion.

The sanatorium of the associated Hospital Boards of South Canterbury, Ashburton, Waitaki, South Otago, Southland, Wallace and Fiord, Vincent and Maniototo is at Waipiata, in Central Otago. The sanatorium is situated on the hills some four miles from the Waipiata Railway-station on the Otago Central Railway. It comprises a central main building of brick, with wooden shelters at either end, and accommodates eighty-four patients. Additional wooden shelters to accommodate forty-two patients are in process of construction. The central single-story building faces north. It is of excellent design, with wide verandas, and houses both male and female patients. A large nurses' home of brick and a residence for the Medical Superintendent complete the buildings. The grounds are extensive, and are in process of being laid out and planted. Attached to the sanatorium is a farm of 1,345 acres (895 of which are unimproved) which supplies milk, meat, and vegetables to the institution.

In the North Canterbury Hospital District (1) the *Cashmere Sanatorium* is situated on the steep slopes of the Cashmere Hills, facing north. It overlooks the Coronation Hospital. A well-designed central block, built in brick, contains administrative offices, dining-rooms, rest-rooms, and observation-rooms. The shelters are wooden cubicles, single or semi-detached. These are of modern design, and are arranged in four rows, one below the other. Each row is provided with its own lavatory arrangements. A nurses' home is placed higher up, overlooking the main building. The sanatorium has 105 beds, all for females. All beds were occupied on the date of inspection. Patients admitted to this institution are nearly all early cases, but a few moderately advanced cases that have improved so much in the Coronation Hospital that their transference to the sanatorium is thought desirable are included. The Coronation Hospital and the Cashmere Sanatorium are controlled by the Director of Tuberculosis for the North Canterbury Hospital District.

(2) The *Upper Sanatorium* is situated near the summit of the hills. Originally a military sanatorium, it is now used for returned-soldier and civilian patients. It is built entirely of wood, and comprises a central group of buildings containing administration offices, recreation, work, and dining rooms. Patients are accommodated in wooden shelters arranged in rows below the main buildings. The shelters are old-fashioned in design, and are in a poor state of repair. They are not suitable for the treatment of advanced cases. The sanatorium has 104 beds, all for male patients. Patients in all stages of disease are admitted, as it is the only accommodation available for males in the North Canterbury Hospital Board District, and there were twenty-four chronic advanced cases present. A Medical Superintendent and an Assistant Medical Officer reside in the institution. This sanatorium has no connection with Cashmere Sanatorium and Coronation Hospital. It is administered and controlled by its own Medical Superintendent, who is an independent officer.

In the North Island there are two sanatoria, both under the control of the Health Department.

Otaki Sanatorium.—This sanatorium is pleasantly situated among the sandhills on the outskirts of Otaki. It is about forty miles by rail from Wellington. The buildings are of wood. The adminis trative offices, dining-rooms, and kitchen are placed centrally, with wards on either side, in which cot cases are nursed. These wards are built on open-air shelter lines, and are fronted by a large veranda. The ambulatory cases are accommodated in single and two-bed shelters on either side of this central building. There is accommodation for sixty patients, all female, and they were mostly of the moderately advanced type. There is a nurses' home, and the Medical Superintendent has a house in the sanatorium grounds. There is a farm of 82 acres (thirty-five acres of which are unimproved) attached, which supplies milk, eggs, meat, and vegetables to the institution.

Pukeora Sanatorium.—This sanatorium is situated about four miles from Waipukurau, near the top of a hill overlooking the Takapau Plains and the Tukituki River basin. The buildings are of wood. Administrative buildings occupy a central position, and attached are dining-rooms, rest-rooms, recreation-rooms, kitchen, and a ward for the reception of new cases and for the treatment of cot cases. The majority of the patients are in two-bed shelters, which are arranged on the slopes of the hill immediately below the administrative block. The nurses' home and the Medical Superintendent's residence are separate buildings near by. There are in addition workrooms and storerooms. The X-ray department and the laboratory are in the central block. There is accommodation for 174 patients, all male. There were ninety-two patients in the institution on the date of inspection. The patients are, for the most part, early and moderately severe cases. The Superintendent and the Assistant Medical Officer reside at the sanatorium. The institution has its own electric laundry and hot-water services. Attached to the sanatorium is a farm of 326 acres, employing seven men, which supplies from an average herd of thirty-five to forty cows 55 to 60 gallons of milk and 15 pints of cream daily for consumption at the sanatorium. An average of one thousand head of poultry furnish fourteen to fifteen hundred dozen eggs and two hundred head for dietary purposes per month. Forty-five sheep are slaughtered for mutton each month. There is an orchard of 626 assorted fruit-trees, and sufficient potatoes are grown to satisfy a monthly demand exceeding 3 tons. A variety of vegetables cover an area of several acres.

(*g*) Research.

A special investigation has been made by School Medical Officers on school-children in selected areas. Physical examination by a specialist in tuberculosis, supplemented by X-ray examination and Moro's inunction test, has given definite information as to the frequency of tuberculous infection in supposedly non-tuberculous children. The children showing evidence of infection are being kept under regular medical supervision. It is intended to carry out this research extensively, and thus institute a means of prophylaxis whereby the incidence of the disease may be reduced.

Milk-infection.—In several of the bacteriological laboratories in the country testing for milk-infection has been carried out extensively, and with satisfactory results. In the Christchurch laboratory, in four hundred consecutive examinations no tubercle bacilli were found. Repeated tests throughout the Dominion have shown that tuberculous infection of milk is exceedingly rare, and cannot be regarded as a factor causative of pulmonary tuberculosis in New Zealand.

SECTION III.

Question 3.—Whether the beds available in sanatoria, hospitals, and other institutions for the reception of cases of pulmonary tuberculosis are adequate as regards number and distribution.

It is estimated roughly that there are between six thousand and seven thousand cases of pulmonary tuberculosis in New Zealand. The number of beds set aside for tuberculous patients in hospitals and sanatoria is given in Table VII.

TABLE VII.—RETURN OF SANATORIUM AND HOSPITAL BEDS FOR PATIENTS SUFFERING FROM PULMONARY TUBERCULOSIS

North Island.		South Island.	
Name of Institution.	Total Number of Beds for T.B. Patients.	Name of Institution.	Total Number of Beds for T.B. Patients.
Pukeora Sanatorium	174	Lower Sanatorium (Cashmere Hills)	98
Otaki Sanatorium	40	Upper Sanatorium (Cashmere Hills)	104
Ewart Hospital (Wellington)	45	Waipiata Sanatorium	84
Auckland Hospital	15	Pleasant Valley Sanatorium	54
Costley Home (Auckland)	68	Wakari Hospital (Dunedin)	40
Napier Hospital	16	Coronation Hospital (Christchurch)	68
Waikato Hospital (Hamilton)	25	Fresh-air Home (Cashmere)	38
Wanganui Hospital	7	Timaru Hospital	12
Palmerston North Hospital	16	Nelson Hospital	12
Cook Hospital (Gisborne)	16	Greymouth Hospital	5
New Plymouth Hospital	6	Ashburton Hospital	4
Whangarei Hospital	6	Blenheim Hospital	8
Masterton Hospital	7	Oamaru Hospital	12
Thames Hospital	6	Westport Hospital	1
Dannevirke Hospital	4	Waimate Hospital	12
Hawera Hospital	2	Riverton Hospital	12
Taumarunui Hospital	6	Picton Hospital	2
Waihi Hospital	6	Dunstan Hospital (Clyde)	7
Whakatane Hospital	8	Tuapeka Hospital	1
Tauranga Hospital	12	Tapanui Hospital	2
Kawakawa Hospital	2	Reefton Hospital	5
Mangonui Hospital	2	Kew Hospital (Invercargill)	20
Wairoa Hospital	1		
Opotiki Hospital	1		
Coromandel Hospital	2		
Te Puia Hospital	1		
King George V Hospital (Rotorua)	8		

Summary.

	Population.	Total Beds.	
		Sanatoria.	Hospital.
North Island	924,000	214	288
South Island	525,000	340	261
	..	554	549

NOTE.—This return shows the position as at 31st March, 1927. Since then an additional twenty beds have been added to Otaki Sanatorium.

These figures are taken from the appendix to the Annual Report of the Department of Health for the year ended 31stMarch, 1927.* Since that date twenty beds have been added to the sanatorium at Otaki, and there are forty-two additional beds almost ready for occupation at the Waipiata Sanatorium. These figures do not include beds temporarily occupied by tuberculous patients in the larger general hospitals. In these hospitals there is a never-failing stream of tuberculous patients passing through, so that in effect a number of beds in each hospital is permanently occupied by cases of pulmonary tuberculosis.

* Page 96.

In Dunedin during the year 1927 fifty-two cases of pulmonary tuberculosis were admitted, and the collective stay of these patients was 2,634 days. Some six or eight beds are permanently occupied by tuberculous patients.

In Christchurch thirty-nine cases of pulmonary tuberculosis were admitted to the general hospital during the year 1927–28. During the same period some eight beds were permanently occupied by a succession of cases.

In Wellington 123 cases of pulmonary tuberculosis were admitted during the year 1927–28. On an average thirty beds were permanently occupied during the same period. At present there are twenty-nine cases in hospital, and there are several awaiting admission.

In Auckland during the year 1927–28 ninety-eight cases of pulmonary tuberculosis were admitted to the General Hospital. On an average thirteen beds are permanently occupied by tuberculous cases.

There are thus some fifty-eight beds in the general hospitals of the four chief cities that are not included in the lists in Table VII. When these are included the total number of beds available is 1,161 ; roughly one bed to every five cases of the disease.

Only a few of the hospitals tabulated in these lists were inspected. These are taken as representative of the accommodation provided generally for tuberculous patients.

Otago Hospital District.

Wakari Chronic Hospital.—This hospital serves a district with a population of one hundred thousand. Accommodation is provided for forty-three patients. At present there are forty-one patients in the hospital—twenty-six male and fifteen female. The Medical Superintendent states that he is short of beds for female patients. He estimates that an additional twelve beds would be sufficient. These would be available were the twelve beds at present reserved for convalescent scarlet-fever patients placed at his disposal. There are seven advanced female cases in the Dunedin Hospital awaiting admission to Wakari. There are several advanced cases in the Pleasant Valley Sanatorium that would be better placed at Wakari. The evidence given justifies the assumption that there are many advanced cases lying in their homes in Dunedin who probably could be induced to enter Wakari Hospital. The Committee are of opinion that the accommodation at this hospital is inadequate.

Pleasant Valley Sanatorium.—There is accommodation for fifty-four patients, male and female. The Superintendent states that the accommodation is insufficient, and that there are several patients awaiting admission. Pressure could be relieved by transferring some advanced cases to Wakari were accommodation available there, and by discharging two cases of surgical tuberculosis. There is no need for further extension of this institution.

Associated Boards' District.

The associated Boards have no chronic hospital for advanced cases. These cases, together with moderately advanced and early cases that are awaiting admission to the Waipiata Sanatorium, are accommodated in annexes and shelters attached to the smaller hospitals throughout the district.

Waipiata Sanatorium.—This sanatorium at present accommodates eighty-four cases, male and female. Forty-two additional beds are almost ready for occupation. The Superintendent states that when these are available accommodation will be adequate. There is no need for further extension of this institution.

Oamaru Hospital.—Accommodation is provided for twelve cases, and would be adequate if those cases awaiting admission to Waipiata Sanatorium were admitted, or discharged to their own homes, according as their condition warranted.

Waimate Hospital.—Accommodation is adequate. There is provision for twelve cases, and only two cases were present on the date of inspection.

Timaru Hospital.—There is accommodation for twenty-five patients, male and female. Eleven of these are on the balcony of a ward in the isolation block, and fourteen in the ward. The rate of admission is one or two cases a month. The average number of beds occupied is nineteen. Some of the cases are advanced and chronic, others are cases awaiting admission to Waipiata Sanatorium. There are thirty-one cases in Timaru awaiting admission to Waipiata. Some of them are waiting in their own homes. The Medical Superintendent complains that the working of the hospital is hampered by the presence of so many tuberculous patients. Suitable accommodation is at present inadequate, but pressure could be relieved by expediting the admission of cases to Waipiata.

North Canterbury and West Coast Hospital Districts.

Coronation Hospital.—This hospital accommodates sixty-eight chronic cases—fifty female and eighteen male. Some moderately advanced cases are included. All the beds were occupied at the date of inspection, and the Superintendent states that he is sorely pressed for accommodation for female cases. There are twenty patients awaiting admission. If the eighteen male cases were removed Coronation Hospital would afford adequate accommodation for chronic female cases.

Upper Sanatorium, Cashmere.—There is accommodation for 104 male patients. There were ninety-nine patients in the institution. Of these, twenty-four are advanced cases and are unsuitably placed. The accommodation for sanatorium purposes is adequate.

It is clear from the evidence that there is urgent need in Christchurch for further accommodation for advanced cases. The removal of eighteen male cases from Coronation Hospital is necessary to afford increased accommodation for female cases. Twenty-four advanced male cases should be removed from the Upper Sanatorium. The evidence tendered by representatives from the British Medical Association shows that there are a number of advanced cases in their own homes that should be in a chronic hospital.

Wellington Hospital District.

The Ewart Hospital.—This hospital accommodates forty-five patients, male and female. All the beds were occupied by cases of the advanced chronic type. The Medical Superintendent states that he is embarrassed by inadequate accommodation and estimates that he requires twice as many beds as are now available. The Ewart Hospital is now full, and is always full. In the General Hospital are twenty-nine cases, most of them awaiting admission to Ewart Hospital. There are four cases awaiting admission to the General Hospital. The evidence tendered by the representative of the British Medical Association goes to show that there are many advanced cases in Wellington lying in their own homes. It is clear that accommodation for chronic cases is inadequate.

Palmerston North Hospital District.

Annexe to Palmerston North Hospital.—There is accommodation for sixteen patients. Fifteen of the beds were occupied by advanced cases. Twenty-two cases are admitted in the course of a year. The Medical Superintendent states that he has adequate accommodation, one empty bed being enough to come and go on. The impression conveyed was that the accommodation is insufficient. A tuberculosis dispensary is about to be opened, and this will result in the seeking-out of a number of advanced cases in the district which should be accommodated in hospital.

Waikato Hospital Board District.

Annexe to the General Hospital.—Accommodation for twenty-five patients—fourteen male and eleven female—is provided. Twenty beds were occupied, fourteen by males and eight by females. Only advanced cases are admitted. Early cases are accommodated on the balconies of the hospital. The Medical Superintendent states that the accommodation is adequate for women, but is insufficient for men. The beds for male patients are always fully occupied. During the year 1927 forty-four cases were admitted—thirty males and fourteen females. The accommodation for male cases is inadequate.

Auckland Hospital District.

The Costley Home.—Sixty-eight beds are provided for advanced cases, male and female. At present sixty-six beds are occupied, thirty-four by males and thirty-two by females. The medical Superintendent states that the accommodation is taxed to the uttermost, and that there is urgent need for more beds. He estimates that an addition of sixteen beds would suffice. There are cases in the Auckland Hospital awaiting admission, and the evidence from the British Medical Association shows that in Auckland there are many advanced cases in their own homes. There is no tuberculosis dispensary in the proper sense in Auckland. When this is established many of these cases will be sought out and induced to enter hospital. It is clear from the evidence that the accommodation for advanced cases in Auckland City is inadequate.

Government Sanatoria.

Otaki Sanatorium.—Accommodation is provided for sixty female patients. All the beds are occupied. There are six patients on the waiting-list, and the evidence tendered from Wellington to Auckland shows that there is difficulty and delay in getting patients admitted. Patients are discharged earlier than is wise, in order to cope with the waiting-list. There is not sufficient sanatorium accommodation for female cases in the North Island.

Pukeora Sanatorium.—There is accommodation for 174 male patients. There are ninety-nine patients in the sanatorium—twenty returned-soldier and seventy-nine civilian. There is adequate accommodation.

The conclusions reached by the Committee are—

(1) That there is insufficient sanatorium accommodation for female cases in the North Island; additional accommodation should be provided:
(2) That the sanatorium accommodation for males in the North Island is adequate:
(3) That the sanatorium accommodation in the South Island both for males and females is adequate:
(4) That the accommodation in New Zealand generally for chronic cases is inadequate, and extra provision is urgently required, particularly in Christchurch, Wellington, and Auckland.

New Zealand affords more accommodation for tuberculous cases than other countries. Tables VIII and IX show the hospital beds available for every ten deaths from tuberculosis in different countries. New Zealand is the most favourably placed, with seventeen beds available for every ten deaths.

TABLE VIII.—TUBERCULOSIS HOSPITALIZATION AND MORTALITY IN VARIOUS COUNTRIES.

Country.	Population.		Tuberculosis Mortality.			Hospital and Sanatorium Beds.	Beds available for each Ten Deaths.
	Inhabitants.	Year.	Deaths.	Year.	Rate per 100,000.		
Denmark	3,267,831	1921	3,177	1922	95	3,458	11
Sweden	6,053,562	1925	8,252	1923	136	7,949	10
Scotland	4,882,497	1922	5,390	1925	110	4,170	7 to 8
Canada	9,215,000	1924	7,675	1924	83	5,238	7
United States	112,078,611	1924	99,579	1924	89	73,715	7
England and Wales	39,067,000	1926	37,525	1926	96	22,202	6
Netherlands	7,358,868	1925	7,263	1925	99	3,000	4
Germany	62,365,478	1925	83,000	1925	133	35,000	4
France	39,209,518	1921	66,824	1920	170	29,171	3 to 4
Northern Ireland	1,255,881	1926	2,100	1925	168	376	1 to 2
Italy	40,116,700	1924	65,000	..	162	7,000	1
Czecho-Slovakia	13,982,726	1921	40,000	1924	250	5,291	1
Japan	59,736,704	1925	120,719	1921	213	3,000	¼
New Zealand	1,374,439	1927	668	1927	49	1,123	17

References.—(1) Ministry of Health (England): Annual Report of Chief Medical Officer, 1926; (2) Bulletins of L'Union Internationale Contre la Tuberculose; (3) *Journal of Royal Sanitary Institute*, February, 1928; (4) League of Nations report on "Health Organization in Denmark."

TABLE IX.—TUBERCULOSIS HOSPITALIZATION AND MORTALITY IN VARIOUS COUNTRIES: BEDS AVAILABLE IN SANATORIA AND OTHER INSTITUTIONS.

Country.	Tuberculosis Mortality.			Beds available.			Beds available for each Ten Deaths.		
	Deaths.	Year.	Rate per 100,000.	Sanatoria.	Other Institutions.	Total.	Sanatoria.	Other Institutions.	Total.
New Zealand ..	668	1927	49	574	549	1,123	9	8	17
England and Wales	37,525	1926	96	14,458	7,744	22,202	4	2	6
Denmark ..	3,177	1922	95	1,382	2,076	3,458	4	7	11

This favourable position has been reached in the last twenty-five years, and reflects credit upon the Health Department and upon Hospital Boards. In Table X it is shown that since 1880, of the total number of deaths from pulmonary tuberculosis, the percentage that occur in hospital has steadily increased.

TABLE X.—DEATHS FROM TUBERCULOSIS IN PUBLIC HOSPITALS AND SANATORIA IN NEW ZEALAND.

Year.	Tuberculosis of Respiratory System.			All Forms of Tuberculosis.		
	Total Deaths.	Deaths in Hospital.		Total Deaths.	Deaths in Hospital.	
		Number.	Percentage of Total Deaths.		Number.	Percentage of Total Deaths.
1880	447	98	21·9	645	100	15·5
1900	577	90	15·6	752	121	16·1
1925	560	253	45·2	684	343	50·1
1926	592	284	48·0	727	383	52·7
1927	533	296	55·5	668	381	57·0

NOTE.—Total deaths are exclusive of Maoris, but Maoris are included in hospital figures.

Effort should be made to still further increase this percentage. It has been stated that the endeavours to combat the disease by direct methods in this country have had little apparent influence upon the already declining death-rate. If this can be effected it will be done probably by segregating the indigent bedridden cases. These cases disseminate the disease, and are a menace to the country. They should receive especial attention. It is better to protect the mass than to cure the individual.

It is appropriate here, when the question of sufficient accommodation is under discussion, to emphasize the fact that in New Zealand the possibilities for home treatment are extraordinary as compared with other countries. The standard of medical education is high. The financial resources of individuals are greater than those of persons in the same social grade in other countries. The less-well-endowed people generally are provident, and insure against ill-health by joining friendly societies. It is true that there is always a substratum of indigent persons, and that the disease is particularly rife among these, but this class is incomparably smaller than in other countries. There is no stint of good food. Climatic conditions are favourable, and the country affords a wide range. In every country the majority of patients will always be treated at home, for it would be impossible to erect sanatoria for all of them. In this country at present most cases are treated at home, and successfully treated. Sanatorium treatment is not essential for the cure of the disease. "It can be stated without fear of meeting proofs to the contrary that, on the whole, sanatoria do not show better lasting results than properly conducted home treatment" (Fishberg).* There will always be a large number of patients who prefer home treatment, and there are many who for temperamental and other reasons will not respond so well to treatment in sanatoria as they do at home. Eminent authority is divided in opinion on the value of sanatorium treatment, and also as to the proper function of a sanatorium. That a large number of patients do well in sanatorium is unquestionable, but doubt is expressed by some authorities whether they do better than under home treatment. These considerations have an important bearing upon the question of sanatorium accommodation, but do not touch the problem of the chronic case. As stated, sanatorium accommodation is adequate, except in the case of Otaki.

Chronic-hospital accommodation is inadequate, and should be provided either in suitable annexes to the general hospitals, which is to be preferred, or by the building of special hospitals. To provide for chronic cases is a step in the direction of prevention, which is always better than cure.

SECTION IV.

Question 4.—Whether the sanatoria, hospitals, and other institutions are being used to the best advantage.

Legitimately quite different opinions may be held, and are held the world over, as to how sanatoria should be used. In the early days of the sanatorium movement it was supposed that sanatoria would be filled with incipient, ambulant cases and that all that was necessary in the way of construction was an open-air shelter, with no provision for warmth or nursing. As more importance was attached to climatic influence then than is the case to-day, these institutions were placed in districts, often remote, where the climate was held to be favourable. As experience in the last twenty-five years has shown that a large number of more advanced cases benefit from sanatorium treatment, ideas have changed, and the modern view is that a sanatorium should be planned to receive and treat all classes of cases, and, as accessibility is regarded as of more importance than climate, the modern sanatoria are placed not far from centres of population. For admission to the modern American sanatorium "patients are grouped broadly into three classes—infirmary cases, semi-ambulant cases, and ambulant cases"—and the bed accommodation allotted to each class is "40 per cent. infirmary beds, 35 per cent. modified infirmary type, and 25 per cent. for ambulant cases."† In New Zealand, where the budget for health purposes is not great, sanatorium-construction has not been able to follow *pari passu* the change in opinion. As a result most of our sanatoria are placed at considerable distances from centres of population, and in construction some of them (Cashmere, Upper Sanatorium, and Pleasant Valley) have not advanced beyond the early shelter-aggregate plan. Two of them, Otaki and Waipiata, show advancement in planning, but only Pukeora approaches what is now regarded as the best type of sanatorium building. But we must take things as we find them, and ask, "Are the institutions we have at command being used in the best interests of the tuberculous patients in this country?" Before attempting an answer it is necessary to point out that in New Zealand the advanced chronic case is not regarded as a suitable inmate for our sanatoria. These cases are accommodated in special hospitals in the larger towns or in annexes attached to hospitals in country districts. They require nursing care and hospital comforts that our sanatoria cannot supply, and it is desirable that they should be within easy reach of their relatives. For the treatment of all cases of pulmonary tuberculosis other than the advanced chronic bedridden case the sanatoria are supposed to be available. They must be available if the best interests of tuberculous patients is to be served. If any sanatorium is not admitting all patients other than the advanced chronic cases, that sanatorium is not being used to the best advantage of the tuberculous patients in this country.

The class of cases in any of our sanatoria is regulated by the persons who select the cases for admission. In the North Island the Superintendents of the sanatoria have practically no say in selecting the patients for their institutions. They do not see them before admission. The selection is done largely by the tuberculosis officers attached to the Auckland and Wellington Hospital Boards, and by the medical officers in charge of patients in annexes; but general practitioners in country districts are at liberty to send cases in. In the South Island selection is made by the Medical Superintendent of each sanatorium. He, and he alone, is responsible for the class of cases in his institution. In making their inspection the members of the Committee saw every patient in the sanatoria individually. In every case the records were examined, and in most cases X-ray films were inspected. The patients were not examined physically. As regards the class of cases undergoing

* Fishberg: "Pulmonary Tuberculosis," 3rd ed., p. 726.
† "Transactions of the American Hospital Association," vol. 29, p. 341; 1927.

treatment in each sanatorium the result of the inspection was arresting. It was possible to classify the sanatoria sharply into two groups. In the first group—represented by the Middle Sanatorium, Cashmere, and Waipiata Sanatorium—the cases were almost all of the very early, minimal, type. The Director of Cashmere claims a recovery ("disease arrested") rate of 98 per cent., and states that he has had only one recurrence in ten years, and that a doubtful case. No more eloquent testimony could be adduced in support of the statement that the cases admitted are all of a very early type. At Waipiata only four of eighty-four patients in the sanatorium had ever been proved to have had tuberculous sputum. A large majority of the patients had neither cough, sputum, nor constitutional symptoms, not had these symptoms been present since admission. The charts showed that a rise of temperature rarely occurred. Clearly, the cases were of a minimal type. In the second group—represented by Pleasant Valley, Upper Sanatorium, Otaki, and Pukeora—every class of tuberculous patient (if we include one or two advanced chronic cases in Pleasant Valley and twenty-four advanced cases in the Upper Sanatorium) was undergoing treatment. Most of the cases were of the moderately advanced type and there were relatively few very early cases.

In the Cashmere and Waipiata sanatoria the patients were very largely of a class that can be treated successfully at home if their home conditions permit. The possibilities of home treatment have been discussed in Section III. Cashmere and Waipiata sanatoria are not strictly comparable as regards suitability of accommodation. Waipiata is more suitable for the admission of moderately advanced cases than Cashmere Sanatorium; but the Director of Cashmere has this advantage over his colleague—he has Coronation Hospital near at hand. As he controls both institutions and can transfer patients from one to the other as he sees fit, they really comprise one sanatorium, Coronation Hospital serving as the hospital block. To this hospital he is able to admit moderately advanced cases; but, nevertheless, the proportion of minimal cases in the whole sanatorium is too high. The Director is doubtless influenced in his selection of cases by the unsuitability of the accommodation in Cashmere Sanatorium for moderately advanced cases; but in Pleasant Valley the accommodation is even less suitable, and yet good work is being done there with moderately advanced cases.

Waipiata Sanatorium is the only distinct institution serving a country district of 212,000, with no large centres. All tuberculous patients other than advanced chronic cases in this district look to this institution for assistance. All have an equal right to enjoy its benefits; but inspection reveals that admission is restricted to incipient, minimal cases, and to those of the more advanced cases that have demonstrated their ability to improve while living in the annexes to the district hospitals, where, as the Superintendent states, treatment is unsatisfactory. Some of these patients go downhill while waiting, some die; while the earlier cases selected, who also have to wait, often recover before their time for admission comes. A return handed in at Timaru by the representative of the Hospital Board states that "During the past eighteen months thirteen patients selected as suitable for admission to Waipiata did not enter the Sanatorium for the following reasons: Seven refused to go, as patients stated health had improved; two refused to go—no reason given; two failed to make application; one died while waiting; one could not go owing to business ties." It is probable that the twelve patients in the list who failed to avail themselves of the opportunity of entering the sanatorium were so slightly affected that they need not have been selected unless home treatment were out of the question. Had they entered the sanatorium when their turn came, although they had by then in all probability recovered, they would have been detained there for many months. That one patient died whilst waiting is a reflection upon a system of selection that denies a chance to a deserving case until it has proved itself capable of improvement.

It is possible that the Medical Superintendent is influenced in his selection of cases by the facts that he has no infirmary block and that the winter weather at Waipiata is rigorous. But his sanatorium is, in construction, more suitable for the admission of moderately advanced cases than is Pleasant Valley, and the rigour of the winter weather might be met by the installation of central heating. He should be influenced rather by the reflection that his is the only institution in the district where, on his own showing, treatment for these cases can be carried out satisfactorily. At this sanatorium the records were meagre and not sufficiently informative, and compared unfavourably with those seen in other institutions. In fairness to the Superintendent, it should be stated that he is absent from the institution, visiting the district on twelve days in each month. If this leaves him insufficient time to make records he should be provided with an assistant, for the work of an institution is mirrored in its records and must be judged by them. Cashmere and Waipiata sanatoria, despite the fact that the cases admitted are of a type allowing of earlier discharge than is possible in the case of the more advanced disease treated in other sanatoria, have each a list of patients awaiting admission. Cashmere has a waiting-list of thirteen patients; the first on the list has been waiting three months. Waipiata has a waiting-list of seventy-four patients; the first on the list has been waiting many months.

Inspection revealed another striking fact by which the sanatoria could again be classified into the same two groups. In Cashmere and Waipiata tuberculin injections are given as a routine treatment to every patient who can tolerate it. As only very early cases can undergo this treatment, practically every patient in these institutions is subjected to a course. In Waipiata the duration of the course is seven months, provided that delay does not occur by the patient showing a reaction as the doses increase. If this occur the course takes longer. The course is not begun until after the preliminary rest, followed by a full course of graduated exercises. The Superintendent attaches so much importance to this treatment that in order to complete the course he retains patients three or four months longer than he otherwise considers necessary. He states that his purpose in using tuberculin is to immunize the patient and so insure him against reinfection.

It is neither the function nor the desire of this Committee to condescend upon details of treatment, except in so far as they may appear to impair the usefulness of the sanatoria; but, as the use

of tuberculin admittedly prolongs the stay of the patients in these sanatoria, its use becomes a proper subject for criticism.

The Committee have taken the opinion of three leading bacteriologists in the country upon the immunizing value of tuberculin. Their reports appear as an appendix. Suffice it to say here that experiment and observation the world over have produced little evidence in support of this theory. The consensus of expert opinion denies that tuberculin has any immunizing value, and certainly it has none as used in New Zealand. "All efforts at producing partial or complete immunity with the administration of tuberculin have utterly failed." (Fishberg.)*

At Cashmere Sanatorium also tuberculin is used as a routine treatment. The Director states that his purpose in using it is for its curative effects and for its psychic effect, and it is employed on every case in the institution who can tolerate a course of treatment—the early case. The duration of the course is twelve months, and patients are retained until the course is finished.

Tuberculin is no new remedy. It has been on trial since Koch first introduced it nearly forty years ago, and its value for treatment is regarded by a large number of eminent authorities as very questionable.

"If any form of treatment was really effective in all or the majority of cases, it would, within a very short time of its introduction, be used as a routine procedure in the treatment of pulmonary tuberculosis all over the world and in spite of any prejudice there might be against it. Its routine use would not be confined to a few enthusiasts, which is the position with regard to tuberculin to-day. In theory, properly prepared and properly administered, tuberculin should be a specific treatment capable of producing successful results in almost all forms of the disease. In practice it fails. Not even personal experience, much less figures, support its claim, and it should never be allowed to supersede other treatment." (Wingfield.)†

"The writer has given tuberculin therapy a fair trial in both his hospital and private practice, and found it either altogether wanting in therapeutic effects when used in infinitesimally small doses, as is advised by most of its contemporary advocates, or decidedly harmful when given in substantial doses. This opinion is shared by most of those engaged in the treatment of tuberculosis, excepting such as have themselves discovered some tuberculin, or who are in charge of sanatoriums. In this country" [America] "very little of tuberculin is used for therapeutic purposes. The vast majority of patients in these institutions are cared for by the old methods." (Fishberg.)‡

"In phthisis the ideal cases" [for tuberculin treatment] "are said to be those in the incipient stage of the disease. But when we recall that a really incipient case is one which has 'slight or no constitutional symptoms, including particularly gastric or intestinal disturbances or rapid loss of weight; slight or no elevation of temperature or accelerations of pulse at any time during the twenty-four hours,' we are not surprised that many recover with tuberculin treatment." (Fishberg.)§

"For my part, I have never seen a patient doing well under tuberculin without remaining in doubt whether he would not have done as well without tuberculin. Nor have I met with cases where the influence of tuberculin was so strikingly favourable that I could feel justified in letting them abandon the classical treatment and rely on tuberculin alone." (Rist.)‖

"The tuberculin did not favourably influence the course of the disease in the majority of cases; in some cases the effects were detrimental; and even in stationary and improved cases it was difficult to ascribe any distinct improvement to the injections which might not have been equally attained under the treatment ordinarily employed in the Brompton Hospital." (Sir James K. Fowler.¶)

Possibly authority could be quoted on the other side, but that does not affect the statement that tuberculin is a therapeutic agent of questionable value.

In none of the other sanatoria is tuberculin used as a routine treatment. In Otaki and Pukeora it is used as an inunction in a percentage of the cases; but the course of treatment is a short one, and no patient is detained solely for the purpose of completing the course. In Pleasant Valley and in Upper Sanatorium, Cashmere, its use is occasional, and in specially selected cases only. It has been made clear to the Committee that the utility of Cashmere and Waipiata sanatoria is impaired by the routine use of this questionable therapeutic agent.

It must be stated emphatically that criticism is levelled solely at the principle underlying selection, which fills these institutions with the earliest cases, and against the routine use of a questionable remedy, which unduly prolongs the stay of these patients in the institutions. In other respects the work done in these sanatoria is admirable, as the happiness and well-being of the patients testify. Cashmere Sanatorium, in particular, is a model of administrative ability. Inspection fills the visitor with admiration of and respect for the organizing and administrative genius that has brought this institution into being.

Of the other sanatoria little criticism can be made. In Pleasant Valley and Upper Sanatorium good work is being done, under difficulties, for all classes of cases, the buildings being planned to accommodate only ambulant cases.

At Otaki and Pukeora the Superintendents do not select their own cases, and so are absolved from criticism under this head. The Committee are of opinion that in some cases the duration of stay is too short relative to the class of case handled, and that sufficient judgment in the apportioning of rest and exercise is not always displayed. These faults were noticeable particularly at Otaki; but here the Superintendent is embarrassed by insufficient accommodation, and in her endeavours to cope with the difficulty that besets her in admitting patients she lays herself open to criticism.

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* Fishberg: "Pulmonary Tuberculosis," 3rd ed., p. 763.
† R. C. Wingfield: "Modern Methods in the Diagnosis and Treatment of Pulmonary Tuberculosis," p. 71; 1927.
‡ Fishberg: "Pulmonary Tuberculosis," 3rd ed., p. 761.
§ *Ibid.* p. 765.
‖ E. Rist: *Pari Medical*, 1913, vol. 4, p. 241. (Quotation in Fishberg, 3rd ed., p. 767.)
¶ Sir James Fowler: Quotation in Fishberg, 3rd ed., p. 767.

The Committee is of opinion that Cashmere and Waipiata sanatoria are not being used to the best advantage. They would recommend that the routine use of tuberculin be discouraged, and that Waipiata Sanatorium be opened to all types of pulmonary tuberculosis that appear to offer a reasonable chance of benefiting by sanatorium treatment.

It is the usual sanatorium practice to retain likely patients until they can be discharged cured, or, as it is phrased "disease arrested." This limits the usefulness of the sanatorium to the greater number of tuberculous patients in the country. It has been stated that the value of sanatorium treatment is largely educative. In private practice difficulty is often met, when beginning to treat a case of pulmonary tuberculosis, in impressing upon the patient the importance of all the little details of treatment, and in inducing him to inure himself to the open-air life that is necessary. It is felt that if at the beginning of treatment the patient could enter a sanatorium for two or three months, learn to live the life and become inured to the open-air conditions, and then return to continue treatment at home, the proper conduction of home treatment would be greatly facilitated. Desire for co-ordination in treatment between sanatorium and practitioner in this way has been expressed to us by all the representatives of the British Medical Association interviewed, from Dunedin to Auckland. The Committee are of opinion that this might well be regarded as a useful function of the sanatoria in this country, and that it would help to lighten the tax upon the accommodation of these institutions.

Again, sometimes in the home treatment of a chronic case an acute exacerbation occurs. A relatively short stay in a sanatorium is all that is necessary to bring the patient back to a condition that will allow the resumption of home treatment. Our sanatoria might well be used to assist home treatment in this way.

As regards the other institutions, the special chronic hospitals—Wakari Hospital, Coronation Hospital, the Ewart Hospital, and the Costley Home—are certainly used to the best advantage. The Coronation Hospital may, without prejudice, be selected for special praise. It is admirably constructed and furnished, and the administration leaves nothing to be desired.

The annexes to hospitals visited are also discharging their function satisfactorily. The Sunshine Ward, Waikato, and the annexe at Palmerston North are specially to be commended.

The Committee is of opinion that the general hospitals in the large cities are not being used to the best advantage of tuberculous patients, because no suitable accommodation is specially reserved for them. Indeed, there is a disinclination to admit this class of patients. This failure in function reacts directly upon those seeking admission to the hospital, and indirectly, through the medical profession (as is shown in Section V), upon all people in the country who suffer or who may suffer from pulmonary tuberculosis.

SECTION V.

Question 5.—What additional institutions, if any, are required, or what extensions, if any, are necessary to existing institutions.

It has been shown that, as far as is known, New Zealand has the lowest death-rate from pulmonary tuberculosis in the world, and that the present provision for the tuberculous is more generous than that in other countries. It is clear then that no extensive addition to existing institutions is necessary; but nevertheless the Committee is impressed by the evidence given that many chronic open-cases are living in their own homes, and by the observation that the provision made for these cases in institutions is not always suitable. It does not follow that in the lists of "beds available" included in Section III, the bed is always a suitable bed for the patient who is obliged to occupy it. In Waimate the shelters are quite unsuited for the nursing of chronic cases, and in the Upper Sanatorium, Cashmere, this is even more emphatically impressed upon the visitor. The chronic advanced case should not be far removed from easy reach by his relatives, and he requires all the comfort and the nursing facilities that are available in our general hospitals for seriously ill or dying patients. In certain districts where well-organized tuberculosis dispensaries exist endeavour is directed towards seeking out these cases. As tuberculosis dispensaries come into being in other districts more and more of these cases will come to light, and difficulty will be found in providing suitable accommodation for them. And yet it is most important that, wherever possible, the bedridden, open*, chronic case, particularly the indigent patient, should be segregated, for it is these cases that disseminate the disease. The demand everywhere throughout the country is for more accommodation for chronic cases. At Wakari twelve additional beds are asked for. This demand could be met by handing over the beds now reserved for convalescent scarlet-fever cases. In Christchurch a new chronic hospital of forty beds is an urgent necessity. In Wellington the demand is for double the accommodation, and the Committee is of opinion that there are good reasons for meeting this demand. In Auckland sixteen additional beds are required at the Costley Home, and the evidence satisfies the Committee that this is a reasonable demand. The annexes attached to the provincial hospitals have not much to come and go upon, but there is no immediate necessity for enlargement, and the Hospital Boards are prepared to build when the pressure becomes too great. Except in Dunedin, there is a disinclination on the part of Hospital Boards to admit cases of pulmonary tuberculosis to the general hospitals. In Christchurch, by regulation of the Board, tuberculous cases are not admitted except in cases of dire emergency. The Hospital Boards might reasonably modify their policy. Infectivity of pulmonary tuberculosis is of a low order, and there is no reason why cases should not be admitted to balconies or side rooms, or to annexes in the hospital grounds. In the view of the Committee there is an important reason why cases in all stages of advancement should be admitted, preferably to specially arranged annexes. It

* An open case is one that is discharging tubercle bacilli.

has been pointed out in Section III that in New Zealand the possibilities for home treatment are great, and it is clear that if home treatment is extensively carried out the burden upon the ratepayer will be lightened. For properly conducted home treatment the opportunity for studying cases of the disease must be given to medical practitioners and medical students, and this cannot be done if tuberculous patients are denied admission to the general hospitals. With this object in view, the Committee recommends that at the general hospitals in the four chief centres some accommodation be specially set aside and reserved for patients suffering from pulmonary tuberculosis. In this way doctors and students will be given opportunities for the investigation and diagnosis of doubtful cases, and for the study of special methods of treatment.

As regards sanatoria, the only deficiency in accommodation that cannot be met by change of practice in the selection and treatment of patients is at Otaki. This is the only sanatorium for female cases in the North Island, and it serves a population of 946,540. It has been shown that as a direct result of pressure upon its accommodation this institution is not being used to the best advantage. Whether extensive addition should be made, or whether another sanatorium for females should be established further north, is a moot question, and the problem must be reserved for future solution. In the meantime Otaki Sanatorium is in urgent need of additional accommodation for twenty patients. The Committee strongly recommend that this addition be made at once.

SECTION VI.

Question 6.—Whether the action taken against pulmonary tuberculosis, other than the provision of institutional beds, is sufficient, considering—(*a*) The incidence of the disease; (*b*) the size and distribution of the population of the Dominion; (*c*) the financial condition of the country, and the public funds available for general health purposes.

Question 7.—What other means, if any, are considered necessary to combat the disease either as regards action by Hospital Boards, voluntary agencies, or the Department of Health.

For convenience these two questions in the order of reference are taken together. Having regard to the facts that, as far as is known, the incidence of the disease in this country is lower than it is elsewhere, that the population relative to the size of the country is small and widely distributed, and that the budget for health purposes is not great, it may be stated generally that the organization in this country for the campaign against tuberculosis compares favourably with that in other countries. It includes in some form almost all the measures tabulated in the subjoined ideal scheme.

A. Preventive Measures.

(Department of Health.)

1. To increase the powers of resistance in the individual:—
   - (*a*) General hygiene and sanitation.
   - (*b*) Care of children—
     - Medical inspection of schools.
     - Open-air schools.
     - Health camps.
     - Open-air homes.
     - Nutrition classes.
2. To prevent the spread of infection—
   - (*a*) Notification. Inspection and instruction to householder.
   - (*b*) Domiciliary supervision.
   - (*c*) Institutional treatment.
   - (*d*) Control of milk-supply.
3. Education of the public.

B. Measures for Eradication.

(Medical profession, Hospital Boards, and Voluntary Aid Associations.)

1. Medical profession.
2. Tuberculosis dispensaries.
3. Institutions.
4. Care and after-care.
5. Voluntary aid.

We shall consider this scheme in detail, and indicate where necessary what further means we think should be taken.

A. Preventive Measures.

1. (*a*) *General Hygiene and Sanitation.*

The Department of Health and the local authorities throughout the Dominion are fully alive to all the means available for sanitary reform and are active in making them effective. The Committee has no recommendation to make.

1. (*b*) *Care of Children.*

Sir George Newman, in evidence given before an Inter-departmental Committee on Tuberculosis in England in 1919, gave it as his opinion that to grapple successfully with the problem of tuberculosis it is necessary to begin with the child, which provides the primary occasion of infection and the ideal

opportunity for treatment. It is imperative that measures be taken to conserve the health of children. As shown in Section II, the Health Department, the Education Department, and Voluntary Aid Associations have already done much in this country to meet this prime indication.

Medical Inspection of Schools.—The medical inspection of schools is well organized and efficiently carried out. It is desirable that medical inspection be extended to the high schools as opportunity permits.

Open-air Schools.—Efforts are being made to establish open-air schools; but the modern schools of the Education Department appear to meet all requirements, and it were better that the energy expended for this purpose were directed into other channels and used where there is more pressing need.

Health Camps.—The health-camp system has given very satisfactory results. It is only in a small way at present, but it should be extended to all parts of New Zealand. It is not an expensive measure, yet funds are lacking. This scheme deserves strong support by voluntary-aid associations. Time and money would be saved if fixed health camps were established. At present a fresh start has to be made each year, and unnecessary difficulties are found in obtaining sites, in arranging for stores, and in organizing the camps.

Open-air Home for Children.—The open-air Home for Children at Cashmere is an interesting experiment, but it is expensive, and of limited application. The Committee are of opinion that measures applicable to a larger number of children have a prior claim, and this should be met before other open-air homes are established.

Nutrition Classes.—The nutrition classes for the malnourished that have made their appearance in a few schools might with advantage be extended to other schools.

Convalescent Homes for Adults.—There is a real need for convalescent homes for adult patients. The patient under treatment at home or who is discharged from hospital is often greatly benefited by a change in the country. Otago Central is, in the South, the happy—or, as at present, unhappy—hunting-ground for this class of patients. The hunt is often unsuccessful, for tuberculous patients are not well received, and often have to resort to deception to gain admission to the ordinary accommodation-houses. There are already convalescent homes for patients discharged from hospitals who suffer from other diseases, as at Warrington, but the great fear the public has of the infectivity of pulmonary tuberculosis bars these places to the tuberculous subject. A convalescent home constructed on open-air lines, and placed in some suitable locality, would meet an ever-present need, and would save many slightly affected patients from the cost of sanatorium treatment. Voluntary Aid Committees might well consider this suggestion.

2. (*a*) *Notification.*

We would recommend that the Health Department deal stringently with medical practitioners who neglect or decline to notify cases. The Health Officers are willing to forgo inspection if they have an assurance from the practitioner that all necessary precautions are being taken. The dread of inspection is the only reasonable ground for declining to notify. Inspection would in every case be less objectionable and always more helpful if it were done by a nurse. We recommend that local authorities employ a nurse for the purposes of inspection in these cases, or else pay the Health Department for the services of a specially trained departmental nurse. For work of this kind special post-graduate training is necessary, and we note with appreciation that a course of post-graduate training for nurses, which includes instruction in public-health work, has been initiated this year in Wellington.

2. (*b*) *Domiciliary Supervision.*

All representatives of the medical profession that have appeared before the Committee have stressed the fact that there are many advanced infectious cases in their homes who are under little or no supervision. Some of these are patients discharged from hospitals or who have left hospital against medical advice; some are cases who cannot enter general hospitals because they are barred by Hospital Board regulations, or chronic hospitals for the tuberculous because there is insufficient accommodation. The spread of infection from these cases could be lessened considerably were they supervised periodically by a visiting nurse. This domiciliary supervision is already being done in Dunedin and Christchurch, where there are well-organized tuberculosis dispensaries, but there is need that the system should be extended. It is a very important function of a tuberculosis dispensary, and wherever these exist a nurse detailed for this duty should be attached. In Wellington a tuberculosis dispensary has been opened, but a visiting nurse is not provided. If this dispensary is to do good service this provision must be made. The work of the dispensary nurse must co-ordinate with the inspecting-work done by the local authorities and by the Health Department. In country districts where there are no hospital facilities and distances are great this supervision can only be done by the local medical practitioners; but a financial difficulty at once arises. The patient discharged from hospital fails to report to the practitioner for economic reasons; the practitioner is disinclined to visit from fear of being charged with making a case. The solution of this difficulty is that the Hospital Board concerned should subsidize the practitioner where the patient is unable to pay.

2. (*c*) *Institutional Treatment for Chronic Cases.*

The chronic open case is the danger. Wherever practicable, these cases, especially indigent bedridden cases, should be admitted to hospital. As already indicated in Section III, there is inadequate accommodation in the country for these cases. This need should be supplied, and should have the first call on funds available for prosecuting the fight against tuberculosis.

2. (*d*) *Milk-supply.*

Although, as far as the evidence goes, the type of bacillus responsible for pulmonary tuberculosis is the human type, careful supervision of the milk-supply is important. Some research work has been done, and goes to show that tuberculous infection in milk in New Zealand is low. Four hundred consecutive examinations of samples of milk in the Christchurch laboratory were negative. More of this work should be done. In the Auckland Hospital laboratory no regular examinations are made. Only nine samples of milk have been submitted by the Health Department for examination in the last two years.

3. *Education.*

Something is being done by the Health Department and at the tuberculosis dispensaries to educate the public. Leaflets are distributed, children are instructed by the school medical nurses, lectures are given in sanatoria, health columns are contributed to the press, notices pointing out the danger attending expectoration are affixed in railway-stations. This is commendable; but a more determined, more extensive and concerted effort should be made to impress upon the public the facts that pulmonary tuberculosis is a preventable disease if certain simple precautions are taken, and a curable disease if persons are not misled by its insidious onset and will co-operate whole-heartedly in the treatment prescribed.

"Perhaps at the moment the directions in which public education is most urgently required are—

"(i) As to the vital importance of seeking skilled advice at the earliest possible moment if there is the slightest suspicion that the lungs may be affected.

"(ii) To accept treatment at once when the tuberculosis officer or other medical authority discovers signs of pulmonary tuberculosis, instead of waiting until the disease has diminished working-capacity.

"(iii) To persevere in sanatorium treatment so long as advisable, instead of returning to work as soon as obvious signs have disappeared. One of the greatest educational forces at present available to the tuberculous patient is the sanatorium. Residence in such an institution affords the opportunity to instruct the patient as to the routine of life which will conduce to his own recovery, and enable him to avoid being a danger to others." (Sir George Newman.)*

B. Measures for Eradication.

1. *The Medical Profession.*

The following quotations express the views of the Committee:—

"In the forefront of the campaign against tuberculosis stands the general practitioner. It is on him we must largely depend to bring the tuberculous person within the scope of the tuberculosis scheme at the earliest stage, and to impress on the patient the urgency of taking prompt steps on the first appearance of any signs indicative of tuberculosis, and the prevention of its infection." (Sir George Newman.)†

"The Departmental Committee on Tuberculosis is of opinion that it is of primary importance to the lasting success of any scheme for dealing with tuberculosis that it should enlist the hearty co-operation and stimulate the interest of the general medical practitioners of the country. Their intimate personal relations with patients and their influence in the homes of the people are forces which should be actively enlisted in the campaign against the disease as aids to securing its early recognition and methodical treatment, as well as in promoting the effective after-care of cases of tuberculosis, and in encouraging those healthy habits of life which are so essential to building up the powers of resistance to the disease." (Report of the Departmental Committee on Tuberculosis.)‡

"A last word on the subject of tuberculosis to the general practitioner. The leadership of the battle against this scourge is in your hands. Much has been done, much remains to do. By early diagnosis and prompt, systematic treatment of individual cases, by striving in every possible way to improve the social condition of the poor, by joining actively in the work of the local and national anti-tuberculosis societies you can help in the most important and the most hopeful campaign ever undertaken by the profession." (Osler and McCrae.)§

In New Zealand the medical profession as a whole is keenly interested in the diagnosis and treatment of pulmonary tuberculosis. Opportunities for diagnosis come first to the medical practitioner, and a large number of patients elect to be treated by him. It is harmful to the cause to assume that the diagnosis and treatment of pulmonary tuberculosis is a matter for the specialist only. Rather should effort be made to afford the general practitioner opportunities for keeping himself conversant with advances made in the study and treatment of the disease, and this can be done best (as indicated in Section V) by admitting patients for investigation and for special treatment to beds reserved for them in the general hospitals.

The British Medical Association in each centre might assist by devoting one meeting of the winter sessions annually to the discussion of various aspects of the tuberculosis problem, and to the demonstration of cases and diagnostic methods.

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* Annual Report of the Chief Medical Officer of the Ministry of Health for the Year 1925, p. 83.
† *Ibid.*
‡ *Ibid.*
§ Osler and McCrae: "The Principles and Practice of Medicine," 9th ed., p. 231.

2. *Tuberculosis Dispensary.*

A tuberculosis dispensary is an organization. It is the centre of the tuberculosis scheme in any district. It is the headquarters from which local operations are directed. The functions of a dispensary as set out by the departmental Committee are: "(1) Receiving-house and centre of diagnosis; (2) clearing-house and centre of operations; (3) centre for curative treatment and supervision of domiciliary cases; (4) centre for examination of 'contacts'; (5) centre for after-care; (6) information bureau and educational centre."*

In Dunedin and Christchurch tuberculosis dispensaries are working to this scheme. It is to be regretted that nowhere else in New Zealand do such well-organized dispensaries exist, and we make a strong recommendation to Hospital Boards that these really essential organizations be established in all considerable centres of population. In Dunedin the dispensary is a unit of the general hospital. All resources for thorough investigation of cases are at hand. The officer in charge of the dispensary is a member of the visiting medical staff of the hospital, and is readily available to his colleagues for consultation. In Christchurch the dispenary is at a distance from the hospital. Advantage lies with the Dunedin system, and this system should be followed wherever tuberculosis dispensaries are established.

3. *Institutions.*

This subject has been dealt with in previous sections.

4. *Care and After-care; and* 5, *Voluntary Aid.*

When a patient is discharged from an institution he should continue under supervision. This supervision must be undertaken either by the tuberculosis dispensary or by the medical practitioner. There must be co-ordination between the sanatoria and hospitals on the one hand, and the tuberculosis dispensary or medical practitioner on the other. At present co-ordination in this way is not satisfactorily maintained, and as a consequence patients in an inefective state leave hospital and return to their homes without adequate supervision being provided. A patient discharged from hospital or sanatorium should be urged to report to his own medical adviser or to the dispensary. The dispensary or practitioner, as the case may be, should be notified of the patient's discharge, and a statement giving details of the patient's condition should accompany the notification form. Hospital Boards should afford patients the means of supervision—in the larger towns, from a dispensary; in the smaller towns, from the out-patient department of the hospital; and in country districts by medical practitioner.

The victim of pulmonary tuberculosis is particularly unfortunate in that he is affected, often early in life, with a chronic illness which seriously impairs his working-efficiency, and which has a marked tendency to relapse. Relapse may be ascribed chiefly to the following circumstances: "(*a*) Life under unsatisfactory conditions; (*b*) occupation of unsuitable character or under conditions of too great stress; (*c*) absence of strict medical supervision; (*d*) laxity on the part of the patient in matters relating to treatment and hygiene." (Sir George Newman.)†

So far sufficient attention has not been paid to care and after-care in New Zealand. To effect improvement in this it is suggested that more liberal provision be made for the relief of consumptive patients than is the case at present. There is a tendency to restrict relief to bare essentials, with the result that often the patient returns to unsuitable work before he is fit for it. This can have but one result—the early breakdown of the patient. If relief were given on a more liberal basis the consumptive patient would have a better chance of retaining his health and of prolonging his life. Whether this extra provision should be made by Hospital Boards or whether the Government should introduce an invalidity pension scheme is a matter upon which the Committee do not feel competent to express an opinion.

It is suggested, further, that care committees be set up in the main hospital districts. These committees should be closely associated with the Hospital Boards and their institutions. They should comprise voluntary workers (including representatives of such voluntary organizations as the St. John Ambulance Association, Red Cross Society, &c.), together with representatives of the three official agencies concerned with the control of the consumptive—viz., Health Department, Hospital Board, and local authority. The duties of such committees might well include all or any of the following: (*a*) Attention to measures which will enable patients to take full advantage of treatment in residential institutions, such as making arrangements for the care of the children, obtaining suitable clothing for the patient, &c.; (*b*) the removal of children from homes where the parent is in an infective condition; (*c*) the finding or provision of work for patients on discharge from institutions; (*d*) endeavouring to ensure that patients on discharge from institutions return to suitable homes.

The committees should be left to work largely on their own lines. It would be a mistake to attempt to stereotype the work. The committees would supplement, and not replace, the activities of the Hospital Boards. It is most important that the committees should have a preponderance of voluntary workers. The Principal Medical Officer of the British Ministry of Health says, "The personal interest of voluntary workers in individual patients sometimes leads to action which would probably have been impracticable under a purely official organization."‡

A widely representative committee such as has been suggested will ensure that there is no overlapping of effort and no duplication of charity. The funds to enable the care committees to undertake these various duties should be derived from voluntary contributions. In some European

* Annual Report of the Chief Medical Officer of the Ministry of Health for the Year 1925, p. 86.
† Annual Report of the Chief Medical Officer of the Ministry of Health for the Year 1925, p. 95.
‡ Annual Report of the Chief Medical Officer of the Ministry of Health for the Year 1925, p. 96.

countries and in America voluntary effort plays a very large part in the campaign against tuberculosis. A novel but very successful means of raising funds is by the so-called charity stamp or Christmas seal. This is a special stamp issued at Christmas-time which is placed on letters and parcels in addition to the ordinary postage. In 1925 approximately one million pounds was raised by this means in the United States of America. It is suggested that funds derived in this way should be apportioned *pro rata* amongst the various care committees.

Research.

As shown in Section I, little accurate information is available as regards the incidence of the disease in Maoris, and not much appears to be done to combat the disease among this section of the community. The Committee would recommend that more definite information be obtained in regard to the extent of tuberculosis amongst Maoris, and that more active measures be taken for the control of the disease in Maori districts. A new health district at East Cape, with headquarters at Gisborne, has been opened, and this will enable more active measures to be taken in relation to the eighteen thousand Maori residents in this district; but further effort is desirable.

Comparatively little pathological research has been done in this country. This is to be regretted, for New Zealand, forming a distinct and separate community, richly endowed, relative to the size of the population, with hospitals, laboratories, and pathologists, offers great opportunities for research work that would be valuable not only to her own people, but to the world. The attempts that have been made so far have come to little or nothing for lack of co-operation and of co-ordinated effort. It is the view of the Committee that this difficulty can be met by the appointment of a Director for Tuberculosis. It is the Committee's opinion, further, that the Health Department might reasonably call upon the pathologists attached to the large hospitals to furnish statistics—*e.g.*, of the number of cases examined *post mortem* that show lesions indicating latent tuberculosis. These pathological statistics, if collected and published in the New Zealand Year-book along with statistics relative to various diseases, would be of great value to all persons interested in the problems associated with pulmonary tuberculosis.

SECTION VII.

Question 8.—Whether there exists at the present time sufficient co-ordination of all the agencies dealing with pulmonary tuberculosis; if not, what measures are suggested.

The answer to the first part of this question is in the negative. Commendable progress in co-ordination has been made in the South, where several Hospital Boards have combined to build and maintain the Waipiata Sanatorium. This is a good beginning, and the question has arisen whether the lead given by the associated Boards should not be followed in other parts of the country. It has been suggested that a pooling scheme to embrace all the Hospital Boards in each Island should be adopted. In the South Island, where the sanatoria are more conveniently placed and where the onus of supporting them already rests upon Hospital Boards, this is perhaps practicable. But in the North Island the sanatoria are Government institutions. The Palmerston North and Waikato Hospital Boards express themselves as content with the present arrangement, whereby they pay the cost of patients' maintenance to the Government, and as unwilling to shoulder the burden of controlling these institutions. While the Auckland Board can hardly be expected to join in taking over institutions so far removed from its own district, the Chairman of the Auckland Hospital Board has stated that he favours a pooling scheme for the North Island, with a central sanatorium, say, at Waimarino; but any scheme that involves the scrapping of two such admirable institutions as Pukeora and Otaki is not to be entertained. A pooling scheme for the North Island is a policy for the future. When the need for another sanatorium arises, it should be located in Auckland Province, and supported by an association of the Hospital Boards of Southern Auckland, Bay of Plenty, Auckland, and Northern Auckland. The control of the present sanatoria might then pass from Government to a committee selected from the Hospital Boards of East Coast, Hawke's Bay, Wellington Province, and Taranaki. Reference to Map I will make this delineation clear. The populations above and below the dividing line are almost the same. Both sanatoria are well below the line.

In the South Island the beginning made by the associated Boards is deserving of the highest commendation. The committee of the association is doing excellent work. The cost of administration compares most favourably with that of other institutions, and shows that this system under capable management is practical and efficient. The personal interest of the committee in the welfare of patients was striking. The arrangement whereby the tuberculosis officer pays periodic visits to hospitals and is available to medical practitioners in the district for consultation and advice is especially praiseworthy. It is difficult to understand why the Otago Hospital Board should stand out from this pooling scheme. Were it to combine with the associated Boards the association would have at command three institutions, all of which could be utilized, and a satisfactory grading of patients for each arranged according to the severity of disease, and the services of two tuberculosis officers would be available. This would be greatly to the advantage of all the Boards concerned. A glance at Map II will make clear the anomaly that at present obtains.

A glaring example of the result of lack of co-ordination between these Boards may be given. An advanced case of pulmonary tuberculosis at Kaitangata unable to gain admission to Waipiata Sanatorium was refused accommodation by the Otago Hospital Board and was ultimately transferred to Otaki.

North of Ashburton no association of Hospital Boards has been established, but the Hospital Boards of the West Coast and Wairau have an arrangement with the North Canterbury Hospital Board whereby they pay the cost of maintenance of patients from their districts admitted to the Cashmere Sanatorium. It were better if all the Boards in the South Island north of Ashburton formed an association and set up a representative committee to control the sanatorium at Cashmere. An arrangement for the tuberculosis officer to pay periodic visits to various hospitals, as at Waipiata, is desirable, and would be of advantage to practitioners in outlying districts.

A pooling scheme for the whole of the South Island does not commend itself to the Committee. The distances to be covered by members attending committee meetings are too great, and personal interest in the welfare of patients which was so strikingly in evidence in the case of the associated Boards' committee is apt to be lost.

Lack of co-ordination is shown in the control of sanatoria, two being governed by the Health Department and three by Hospital Boards.

As Health Department control of institutions is an anomaly, and is outside the spirit of the Hospitals and Charitable Institutions Act, the question whether Hospital Board control of institutions or Government control is preferable has been made the subject of inquiry by the Committee. The consensus of opinion expressed by members of Hospital Boards, by tuberculosis officers, and by representatives of the medical profession is in favour of Hospital Board control. The reasons assigned are that control by Hospital Boards is more efficient, that the cost of running the institutions is less, and that the welfare of patients discharged from hospital (which is a more natural function of Hospital Boards than of the Government) is more satisfactorily carried out. It was repeatedly stated that there is "more heart" in Hospital Board control than in Government control. In the meantime, for reasons assigned already, universal Hospital Board control appears to be impracticable.

But where lack of co-ordination is most in evidence, and where it is most needed, is in the general organization of the campaign, and particularly in the control and direction of executive work. We have evidence and have ourselves observed that admirable work is being done, but that the effort expended is often wasted by lack of co-ordination. We have seen enthusiasm in one part of the country, and indifference in another; we have observed well-developed organization in one district, and almost complete lack of organization in another; we have noted that earnest attempt at research is being frustrated by indifference and carelessness; and we have been convinced that the value of sanatoria is being impaired by the lack of a guiding and controlling hand.

The Committee have given much thought to the question of co-ordination, and would strongly recommend the Government to appoint a Director, who shall be head of a Division for Tuberculosis in the Health Department and be subordinate to the Director-General of Health. It is important that the work of this officer should not be purely administrative. If he is to serve the purpose the Committee have in view, he must have clinical attainments that will command the respect of institutional officers, and this can only be secured to him by placing him in charge of a sanatorium. It is recommended that the Director should have an office, with adequate clerical assistance, in the Health Department; that he be placed in charge of and reside at one of the Government sanatoria; that he be provided with an Assistant Superintendent, who will be responsible for the control of the sanatorium during his absence; that he be given the powers of an Inspector of Hospitals; that he should guide and exercise a controlling influence upon the work of all institutional officers; that he should stimulate and organize research work; that he should use the various institutions in the country for trying out different methods of treatment; that he should convene annual meetings of all tuberculosis officers, at which problems in tuberculosis and sanatorium management may be discussed; and that he should co-ordinate all efforts that are being made to fight the disease. The Committee are of opinion that the office should be filled by a New Zealand graduate of high attainment in general medicine, and that character and personality should be carefully weighed in making the selection. Before taking office he should be sent abroad to study the problems that are to engage his attention in this country.

Summary of Recommendations.

1. That a Division for Tuberculosis be established in the Health Department, and that a Director of this Division be appointed.
2. That Hospital Boards should be encouraged to establish tuberculosis dispensaries.
3. That the routine use of tuberculin in sanatoria be discouraged.
4. That the Medical Superintendents of sanatoria be urged to admit all cases that would be likely to benefit.
5. That the stay of minimal cases should not, as now, be unduly prolonged.
6. That the accommodation at Otaki Sanatorium be increased.
7. That extra accommodation be provided for chronic cases in the special hospitals at Dunedin, Wellington, Christchurch, and Auckland.
8. That sufficient accommodation for tuberculous cases be reserved at the general hospitals in Dunedin, Christchurch, Wellington, and Auckland for the benefit of patients, and to afford medical practitioners and medical students opportunities for studying the disease.
9. That the medical profession be encouraged to co-operate with local authorities, the Department of Health, and Voluntary Aid Associations in their efforts to control the disease.
10. That the Otago Hospital Board be encouraged to join with the associated Boards to form one association.
11. That the Hospital Boards in the South Island north of Ashburton be encouraged to form an association, with a committee representative of each district.
12. That specially trained nurses be employed for inspection.
13. That the establishment of Voluntary Aid Committees be encouraged.

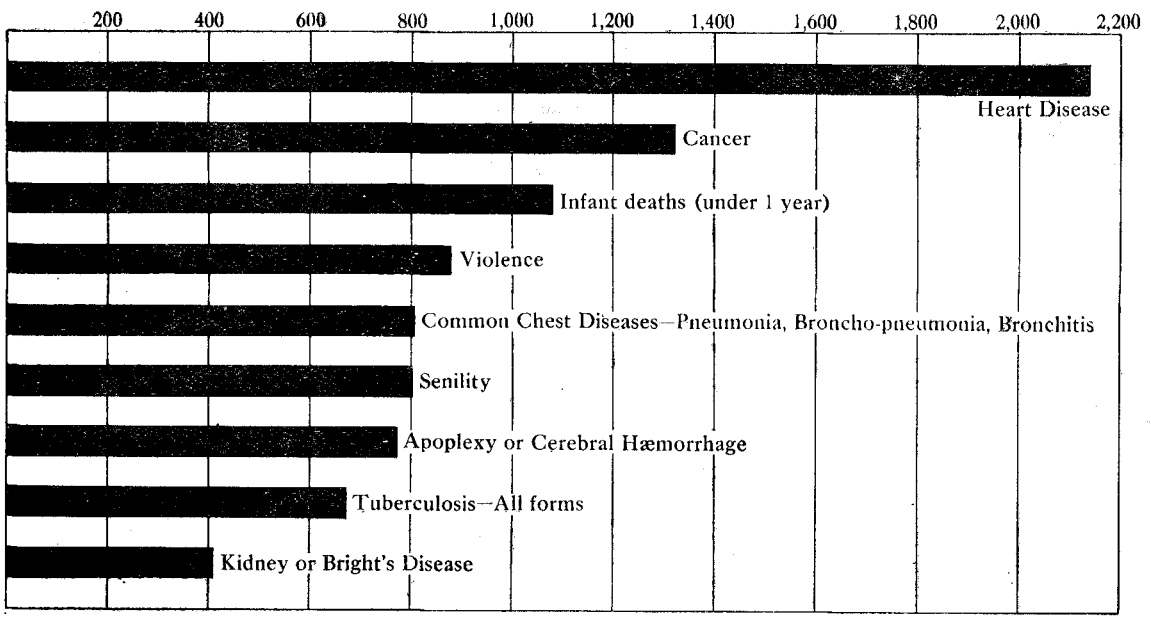
CONCLUDING REMARKS.

Investigation has satisfied the Committee that pulmonary tuberculosis in this country does not constitute a grave national menace. As shown by Graph D fewer people die from all forms of tuberculosis than are killed by violence. As far as can be ascertained the prevalence of pulmonary tuberculosis in this country is less than in any other country. Substantial progress has been made in adopting measures for its control and treatment; but pulmonary tuberculosis is an insidious and protracted infective disease which will gain ground and become a menace unless constantly repressed. The most important contribution that can be made to the successful issue of the campaign is co-ordination of the measures and of the efforts now employed in fighting the disease.

F. Fitchett, Chairman.
D. Eardley Fenwick, Member.
T. W. J. Johnson, Member.

J. W. Buchanan, Secretary.

Graph D.—Causes of Death in N.Z. during 1927.



APPENDIX.

Report received from Professor C. E. Hercus, D.S.O., O.B.E., M.D., B.D.S., D.P.H., Professor of Bacteriology and Preventive Medicine, Otago University.

(1) The Value of Tuberculin as an Immunizing Agent against Pulmonary Tuberculosis.

There is a vast literature relating to this subject. Every possible modification of tuberculin has been tried with the object of producing a prophylactic immunizing agent against tuberculosis, including pulmonary tuberculosis. The results have been in the main negative, although Petroff and his co-workers make claims that they can confer a certain degree of immunity against tuberculosis to guinea-pigs by means of what is practically a tuberculin vaccine. The present trend of immunological thought is, however, in the direction that, as in smallpox, prophylactic immunization can only be secured by the use of attenuated living tubercle bacilli which would produce a mild and retrogressive infection. The B.C.G. vaccine of Calmette is being widely used throughout Europe, and in the January number of the *Bulletin de l'Academie de Medecine* the results of 52,772 immunizations are given for a period extending from July, 1924, until December, 1927. The children were exposed to an infected environment, and careful control groups were observed. The mortality in the vaccinated group was less than half that in the unvaccinated group. Although the method must still be regarded as in its experimental stage, the findings are distinctly significant.

(2) The Value of Tuberculin in the Treatment of Pulmonary Tuberculosis.

If tuberculin was really a sovereign remedy in the treatment of pulmonary tuberculosis it would be a reasonable assumption, after making due allowance for individual prejudices, that it would be a more or less routine treatment throughout the world. It is common knowledge that this is not so, and that even where it is used there is no uniformity in dosage and methods of administration. Experimental work on animals shows that the tubercle bacillus is too feebly antigenic, and any antibodies which can be demonstrated are not considered to have any curative effect. The principle use of tuberculin in treatment, it is generally admitted, is due to the hyperemia which its injection produces around infected foci. This chronic congestion, long continued, produces a fibrosis to which its therapeutic action can be ascribed. There can be little doubt that in properly selected cases in experienced hands this mechanical action at the site of infection may be produced with benefit to the patient. It is also fairly clear that non-specific agents, such as milk, &c., in larger doses, may produce the same end result.

19th June, 1928. C. E. Hercus.

Report received from Dr. P. P. Lynch, M.B., Ch.B., Univ. N.Z., Pathologist, Wellington Hospital.

(1) The Value of Tuberculin as an Immunizing Agent against Tuberculosis.

Immunity in tuberculosis is best acquired by infection during childhood. If the infecting dose is small, and not repeated too often, cure of the lesion results with the development of a varying degree of immunity to subsequent infections. The chief difficulty in this, the natural process of immunization, is that the dosage can in no way be regulated. Calmette and Guerin have attempted to overcome this difficulty by using an attentuated strain of tubercle bacillus and inoculating the children of tuberculous parents. The children, during the period of inoculation or immunization are kept as free as possible from other infection. There is no evidence that tuberculin used in the same way has any power of conferring immunity.

Tuberculin is quite a different reagent from living strains of bacilli, whether attenuated or not. So far as I know, no attempts have been made to immunize non-infected persons by means of tuberculin. Treatment of an already-infected case with tuberculin cannot be referred to as immunization.

(2) The Value of Tuberculin as a Therapeutic Agent in Tuberculosis (Pulmonary).

I have often been consulted about the use of tuberculin in cases of phthisis, and I have always held the view that such treatment is not advisable. The natural process of cure by fibrosis should not, I think, be interrupted by any stimulus likely to lead to breaking down and spread from a partly healed focus. In addition, it is extremely difficult to state which of the tuberculins has the most to recommend it, or which, for that matter, is the least dangerous.

19th June, 1928. P. P. Lynch.

Report received from Dr. R. E. Bevan-Brown, M.A. (Camb.), M.B., Ch.B., Univ. N.Z., Acting-Pathologist, Auckland Hospital.

(1) The Value of Tuberculin as an Immunizing Agent.

This, as it stands, implies the immunizing of a non-tuberculous subject against subsequent tuberculous infection.

There is no evidence that dead tubercle bacilli or their products can produce any appreciable immunity. All the evidence is to the contrary. Behring, in 1902, and since then many other workers, have shown that only living tubercle bacilli can confer this: these bacilli may be attenuated or

avirulent, but they must be living. The work of Calmette and Geurin supports this, and their extensive experimental work in connection with the non-virulent strain of bovine bacilli, named by them B.C.G., is an interesting and promising attempt to confer immunity on new-born babies. Their results are at present being discussed, and their claims are receiving criticism at the present moment.

The effect of inoculation with tuberculin in a non-tuberculous animal is to induce a state of sensitiveness to the tubercle bacillus and its products, but there is no evidence to show that this sentiveness implies any degree of immunity. In the words of Kolmer, "Few subjects in medicine are as perplexing as the nature and mechanism of the action of the tuberculins, despite a very large amount of clinical and laboratory investigation. Brought forward by its great discoverer as an immunizing and therapeutic agent, we have since learned that its immunizing-power is almost negligible, and its application in treatment surrounded by definite limitations." To sum up, definite immunity to tuberculosis in the non-tuberculous subject is only obtained by infection with living tubercle bacilli; there is no satisfactory eivdence to show that either in man or in experimental animals this result can be obtained by tuberculin.

(2) The Value of Tuberculin as a Therapeutic Agent in Pulmonary Phthisis.

Tuberculosis is unlike most other infectious diseases, in that it tends to produce a number of circumscribed local lesions surrounded with fibrous tissue; the centre is usually necrotic, and the blood-supply tends to be obliterated by endarteritis.

Now, the production of immunity depends probably on two main factors—(1) The elaboration of antibodies which are carried in the blood-stream; the site and method of elaboration we do not know: (2) immunity produced locally by the tissue at the site of the lesion, in the form of immune bodies, which are also carried by the blood-stream to all parts of the body. Now, the centre of the caseous tuberculous lesion has no blood-supply, and it is difficult to see how any effective lethal power can be exerted in the midst of this mass by means of substances carried in the blood-stream. The periphery of the lesion is composed of more or less avascular fibrous and granulation tissue. Consequently, penetration seems improbable.

Local immunity at the site of the lesion may be increased; or, at any rate, the fibrous barrier may be stimulated to proliferate, and thus wall-off the diseased area. It is probable that, if tuberculin has any salutary effect, it is in this latter way. It has been found, however, that a dose sufficient to excite a constitutional reaction usually causes a breaking-down of this fibrous barrier and the spread of the disease. In any case, there is an increased local congestion (focal reaction), which carries off poisonous products and very probably tubercle bacilli. Consequently, very small doses are the rule, with a gradual increase till, after a long period, large doses can be tolerated: but in no case is a definite general reaction allowed. A local reaction (at the site of inoculation) may be obtained, and the assumption is made—which I consider unproved—that a focal reaction also occurs (at the site of the lesion). It is generally accepted that in vaccine therapy generally (and tuberculin treatment belongs to this category) immunological response is only obtained when the dose is sufficient to excite a focal or general reaction. In this case a general reaction is avoided and a focal reaction presumed.

The tolerance to doses of tuberculin does not prove that immunity to tuberculosis has been established. That some patients improve after or during tuberculin treatment is certain: that this improvement is due to the tuberculin is open to grave doubt. It is not improbable that the doses exhibited have little or no effect other than a psychological one. It is quite clear that tuberculin may be dangerous, and that it is harmful to some patients under certain conditions. Landis, writing in the "Oxford System of Medicine," says that the best that can be said of it is that in the vast majority of cases it exerts no influence whatever. While treatment of certain forms of surgical tuberculosis with tuberculin may find stronger advocacy, it seems to me that the use of tuberculin in pulmonary phthisis presents special dangers owing to the vascularity and looseness of the pulmonary tissues.

The fact that after thirty years' trial no general agreement has been reached as to the value of tuberculin, and that amongst its advocates no two agree as to form, dosage, or interval between doses, may reasonably induce a scepticism as to its therapeutic value, particularly in pulmonary phthisis. Its use in surgical tuberculosis may be partly due to the fact that it is less dangerous in these cases.

Tuberculin must be regarded as one of the most disappointing of the specific therapeutic agents introduced by bacteriology.

R. E. Bevan Brown.

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[illegible] virulent, but they must be living. The work of Calmette and Guérin supports this, and their extensive experimental work in connection with the non-virulent strain of bovine bacilli, named by them B.C.G., is an interesting and promising attempt to confer immunity on new-born babies. These results are at present being discussed, and their claims are receiving [illegible] at the present moment.

The effect of inoculation with tuberculin in a non-tuberculous [illegible] is to induce a state of sensitiveness to the tubercle bacillus and its products, but there is no evidence to show that this sensitiveness implies any degree of immunity. In the words of Kolmer, "Few subjects in medicine are as perplexing as the nature and mechanism of the action of the tuberculins, despite a very large amount of clinical and laboratory investigation. Though [illegible] the great discovery of an immunizing and therapeutic agent, we have since learned that [illegible] immunizing-power is almost negligible, and its application in treatment surrounded by definite [illegible] dangers." Definite immunity to tuberculosis in the non-tuberculous subject is only obtained by [illegible] with living tubercle bacilli; there is no satisfactory evidence to show that either in man or in experimental animals this result can be obtained by tuberculin.

(2) The Value of Tuberculin as a Diagnostic Agent in Pulmonary Phthisis.

Tuberculosis is unlike most other infectious diseases in that it tends to produce a number of circumscribed local lesions surrounded with fibrous tissue, the centre [illegible] being [illegible] blood supply, tends to be cut off and by endarteritis.

Now, the production of immunity depends probably on two factors: (1) The elaboration of antibodies which are carried [illegible] blood stream; [illegible] method of elaboration we do not know; (2) immunity produced locally by [illegible] of the [illegible] of immune bodies, which are also carried by the [illegible] tissues. [illegible] tuberculous lesion has no blood supply, and [illegible] tissue [illegible] cannot be carried in the midst of this mass by means of substances [illegible] in the blood-stream. The centre of the lesion is composed of more or less avascular fibrous and granulation tissue [illegible] [illegible] are impossible.

[illegible] be [illegible], or in any case the fibrous barrier must be [illegible]. It is probable that, if tuberculin [illegible] be able to [illegible] these substances, [illegible] to excite a constitutional reaction [illegible] breaking down of the fibrous barrier and the spread of the disease. In any case, there is an increased local reaction (local reaction), which carries off poisonous products and very probably tubercle bacilli. [illegible] shall [illegible] are the rule, with a gradual increase till, after a long period [illegible] in no case is a definite general reaction allowed. A local reaction (or the local inoculation) may be obtained, and the assumption is made—which I consider fundamental—that a local reaction also occurs (at the site of the lesion). It is generally accepted that in vaccine therapy generally (and tuberculin treatment belongs to this category) immunogenic response is only obtained when the dose is sufficient to excite a local or general reaction. In this case a general reaction is avoided and a local reaction produced.

The tolerance to doses of tuberculin does not [illegible] [illegible] has been established. That some patients improve after or during [illegible] is [illegible] that this improvement is due to the tuberculin is open to grave doubt. It is not [illegible] that the cases exhibited have little or no effect other than a psychological one. It is quite clear that tuberculin does no harm, and that it is harmful to some patients under certain conditions. Landis, writing in the "[illegible] System of Medicine," says that the best that can be said of it is that in the vast majority of cases it exerts no influence whatever. [illegible] in cases based on morbid tuberculoses with tuberculin may [illegible] the life of tuberculin in pulmonary phthisis [illegible] and lesions of the pulmonary tissues.

The fact that after [illegible] general agreement has been reached as to the value of tuberculin, and that emerging the advocates on two sides as to form dosage, or initial between doses, may reasonably induce a scepticism as to its therapeutic value, particularly in pulmonary phthisis. It can in surgical tuberculosis may be partly due to the fact that it is less dangerous in these cases.

Tuberculin must be regarded as one of the most disappointing of the specific therapeutic agents introduced by bacteriology.

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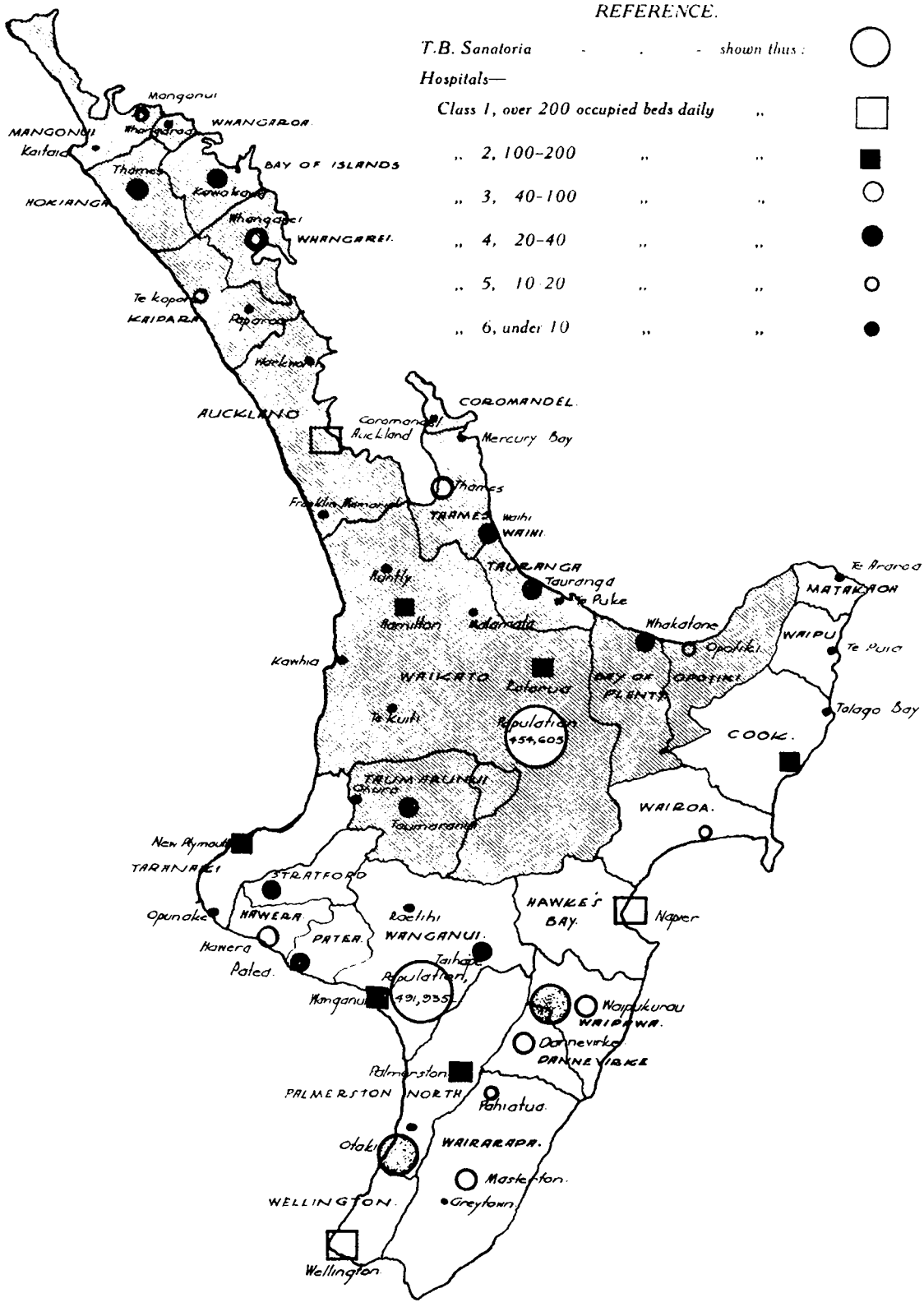
NORTH ISLAND
NEW ZEALAND



MAP II.


SOUTH ISLAND
NEW ZEALAND
PICTON
Picton
Nelson
Havelock
Blenheim
BULLER
NELSON
WAIRAU
Westport
Denniston
INANGAHUA
Nauta
Greymouth
GREY
Hokitika
Kaikoura
Hanmer
Amuri
Population 211,850
Waikari
NORTH CANTERBURY
Oxford
Christchurch
Cashmere
Upper Sola
Lyttelton
Ellesmere
Akaroa
WESTLAND
ASHBURTON
Population 171,245
Ashburton
Fairlie
SOUTH CANTERBURY
Timaru
WAITAKI
Waimate
Queenstown
Cromwell
VINCENT
Clyde
Naseby
Oamaru
Palmerston
Pleasant Valley
SOUTHLAND
Population 104,445
OTAGO
Dunedin
Wakari
WALLACE AND FIORLD
Tapanui
Gore
Milton
Balclutha
Kotangata
Riverton
Invercargill
SOUTH OTAGO
Owaka
REFERENCE.
T.B. Sanatoria - . - shown thus :
Hospitals—
Class 1, over 200 occupied beds daily
2, 100–200
3, 40 100
4, 20–40
5, 10-20
6, under 10