1929.

NEW ZEALAND.

DEPARTMENT OF HEALTH.

ANNUAL REPORT OF DIRECTOR-GENERAL OF HEALTH.

Presented in pursuance of Section 100 of the Hospitals and Charitable Institutions Act, 1926.

HON. A. J. STALLWORTHY, MINISTER OF HEALTH.

CONTENTS.

REPORTS.

The DIRECTOR-GENERAL OF HEALTH to the Hon. the MINISTER OF HEALTH, Wellington.

I HAVE the honour to lay before you the annual report of the Department for the year 1928–29.

PART I.—GENERAL SURVEY.

VITAL STATISTICS.

The crude (actual) death-rate for the Dominion for the past year was 8·49 per 1,000 of the mean population. In 1927 the death-rate was 8·45. The infantile mortality was 36·18 per 1,000 births, as against 38·74 for 1927. The birth-rate of 19·56 per 1,000 still shows a falling tendency. In 1928 the children born numbered 27,200, much the lowest for the last nine years.

Tuberculosis.

The death-rate of 5·02 per 10,000 of the mean population gives New Zealand a remarkably low death-rate for this cause in comparison with other countries. The medical committee appointed to inquire into the question and treatment of pulmonary tuberculosis in New Zealand, after a very thorough investigation, presented their valuable report. The findings of the committee are well indicated by the concluding paragraph of its report, which reads as follows: "Investigation has satisfied the committee that pulmonary tuberculosis in this country does not constitute a grave national menace. Fewer people died 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 that 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."

The general Conference of the New Zealand Hospital Boards' Association, held at Palmerston North, adopted recommendations that Hospital Boards should combine into four groups—two for the North Island and two for the South Island—for the administration of tuberculosis sanatoria. Satisfactory progress is being made towards the carrying-out of this scheme.

Cancer.

The death-rate of 9·87 per 10,000 of living persons represents an increase on the preceding year. Cancer is principally confined to persons of forty years of age and upwards, and during 1928, of all persons over the age of forty years whose deaths were registered, one in every seven of males and one in every six of females died from cancer. The Department has continued to give wide publicity by the aid of the press and display of posters and circulation of leaflets as to the early signs and symptoms of this disease, so as to encourage early treatment. The visit of Mr. Sampson Handley, the eminent English authority on cancer, resulted in the formation in New Zealand of a branch of the British Empire Cancer Campaign. With the formation of this branch we can look forward with confidence to renewed endeavours to fight this formidable disease.

Venereal Diseases.

The Department gratefully acknowledges the help it has received from the medical profession as a whole in its difficult and delicate task of administering the Social Hygiene Act and regulations. There is good reason to believe that the knowledge that there is power to enforce treatment has been a deciding factor in determining many patients to continue treatment until cured. It can be safely said that the social-hygiene legislation has proved of definite value.

Infectious Diseases.

Of the notifiable infectious diseases, the most common was scarlet fever, being epidemic for the last two years. Fortunately, in comparison with the extensive epidemic of 1903, the disease appears of a milder type. However, the case-mortality of 0·89 per cent. in 1928 showed an increase on the rate for 1927, which was 0·73. Influenza (all forms) showed an increase and a higher death-rate; diphtheria, a slight increase; while a light year was experienced in regard to whooping-cough and measles. Enteric fever is still rare. Dr. McKibbin, in his report, surveys the situation in reference to these diseases and the principal causes of death. An outbreak of dysentery in the Auckland District, particularly among the Native race, occasioned much concern. A full report will be available for next year's annual report.

Maternal Welfare.

The reports of Dr. Henry Jellett and Dr. Paget outline the efforts taken and steps essential for the protection of motherhood. These reports, in conjunction with the report of Dr. McKibbin, deal with the problem of maternal mortality as a whole. Deaths from accidents and diseases of the puerperal state remained at practically the same level in 1928 as in 1927, the numbers being 137 in 1927 and 134 in 1928. Owing to the lower number of births in the latter year, however, the rate per 1,000 births increased slightly, from 4·91 to 4·93. The reduction of deaths from these causes is a perplexing problem, but with the better training of medical students and the midwife, a higher standard of asepsis, and extension of ante-natal supervision, we hope to be able to look forward to a reduction of deaths.

Medical Research.

Dr. Hector has been investigating the problem of still-births and neo-natal deaths. Dr. Morris Watt, of the Otago University Medical School, has been working on hay-fever. Dr. Maclean, Dr. Helen Bakewell, and Dr. Turbott present reports respectively on an enteric-fever outbreak, posture of school-children, and comparative study of health standards of Maori and European children. These reports are included in the Appendix.

Hospitals.

New Zealand Hospital Boards' Association Conference: The annual Conference of the New Zealand Hospital Boards' Association was held in Palmerston North, and there was a large attendance of delegates representing forty-four Boards, with the addition of Boards' Secretaries, Medical Superintendents, and representatives of the Department. Many important matters affecting Hospital Board activities were discussed.

During the past year every endeavour has been made to ensure economy in hospital administration, and it is gratifying, taking the Boards as a whole, to report a lessening of the expenditure for the current year. The estimates for the current year show a reduction in the net estimated cost of capital expenditure of over £11,500 compared with last year. Still further reduction in this direction is anticipated in the coming year.

It is with extreme regret that I have to record the resignation, to fill the important position of Town Clerk, Timaru, of Mr. Killick, who has been connected with the Department since 1907, and for eleven years has held the responsible position of Secretary. Mr. Killick performed outstanding service in connection particularly with the financial side of the Department's activities, including the preparation of the Appendix to the Department's annual report relating to hospital and charitable-aid statistics. Mr. Allan, who has been responsible for many years past for the preparation and supervision of hospital plans, was another loyal and excellent officer who has resigned to fill an outside administrative appointment.

Information with regard to hospitals and institutions under the control of Boards will be given in the Appendix to this report to be issued after the Secretaries' returns come to hand.

Health Education.

A considerable amount of health educational work has been carried out by the Department in respect to the population generally. Leaflets of advice and warning have been issued in times of epidemics. Weekly health articles on a variety of subjects, including cancer, sanitation, principles of preventive medicine, child welfare, nutrition, milk, infectious diseases, care of milk in the home, and so forth, have been supplied to the press. District and school nurses have by personal interviews and the circulation of health literature touched a wide field in their health educational work. A feature of many of the shows held throughout the Dominion has been the exhibits prepared by the Department. In conjunction with the New Zealand Trained Nurses' Association, a comprehensive exhibit was prepared of the nursing activities of New Zealand, to be shown at the International Council of Nurses being held in Montreal, Canada. Posters of cancer, tuberculosis, venereal diseases, &c., have been displayed at the railway-stations. A refresher course for sanitary inspectors was inaugurated. Those who attended included sanitary inspectors from local bodies, Government Health Inspectors, and Public Works building overseers. It is intended to make this an annual feature. Through the medium of the Department's library officers have been kept informed of the recent advances of clinical and preventive medicine.

British Medical Association Conference.

The inauguration of a Preventive Medicine Section at the last Conference of the New Zealand Branch of the British Medical Association proved most successful. Under this section papers were delivered by officers of the Department on various phases of preventive medicine.

School Hygiene.

The school medical service, under the direction of Dr. Ada Paterson, is a branch of the Department which is undoubtedly changing for the better the whole physical and mental outlook of thousands of children. I agree with a well-known authority, Sir George Newman, when he states, "It is manifest that a healthy childhood of sound physique is the genesis on which alone this new preventive medicine can be established. Every infant saved from death in infancy and every school-child equipped for useful citizenship is a living stone in this new building. The school doctor who makes possible the mending of an ailing child makes two blades of grass grow where one grew before. He is laying the only possible foundation of national health, and he builds for the future; for the routine work of the school medical service has a vastly wider purpose than the collection of medical statistics and even the individual amelioration of a particular child. It makes practicable a fuller education of the people as a whole, it adds to life 'the joy of those who are healed, it is the prelude of national efficiency.'" Dr. Paterson's report indicates the scope and importance of the work being achieved on behalf of our school-children.

Dental Hygiene.

The report of Mr. T. A. Hunter shows the growth of the work under his direction. It will be seen that steady progress is being made in the matter of providing dental treatment among children, and there is no doubt that the service is being utilized to the best advantage and a great amount of good is being done. The high standard of training undergone by the dental nurses fully qualifies them for their responsible work. The service is being extended as fast as economic conditions will allow.

Nursing.

A review of the scheme of training of midwifes and maternity nurses, the issue of an amended schedule of subjects for examination of nurses, arrangement of reciprocity with overseas branches of the British Empire, and the establishment of ante-natal clinics at all training-schools for maternity nurses are among important matters mentioned in the Director's report as having been dealt with by the Nurses and Midwives Registration Board. The post-graduate course for nurses is proving successful.

Maori Hygiene.

The report of the Director of the Division of Maori Hygiene testifies to the excellent work that is being achieved on behalf of the health of the Native race. The Maori Health Councils continue to perform their useful functions, with a result that a higher standard of sanitation is being maintained and better water-supplies are available in the Native settlements. It is satisfactory to note that the incidence of typhoid fever shows a marked improvement over the previous year.

Board of Health.

Quarterly meetings of the Board of Health were held during the year. Requisitions were served upon a number of local authorities requiring them, in terms of section 22 of the Health Act, to undertake the provision of certain sanitary works. Some of these works involved large expenditure of money. Other matters considered by the Board included a review of the working of the law in regard to venereal diseases in New Zealand, the training of medical students in midwifery, and the subject of medical research.

During the year Professor A. M. Drennen, having accepted an appointment overseas, relinquished his seat on the Board, and his place was filled by the reappointment of Sir Lindo Ferguson. Recently the Board has sustained a great loss by the death of Sir James Wilson, who has been a member of the Board since its inception in 1921.

The Board of Health has done a great deal of good work during the year, and the Government is indebted to the members of the Board for the services they have rendered.

Medical Practitioners Act, 1914.

Four meetings of the Medical Council were held during the year under review. The following table, covering the past five years, summarizes the Board's work so far as the granting of applications by medical men for registrations, &c., are concerned.

——	1924.	1925.	1926.	1927.	1928.
Number on register on 1st January	1,138	1,204	1,211	1,283	1,320
Number added during year	85*	78†	94‡	54§	45‖
Number removed during year	19	71	22	17	8
Number on register at end of year	1,204	1,211	1,283	1,320	1,357

* Includes 67 with New Zealand qualifications. † Includes 59 with New Zealand qualifications. ‡ Includes 69 with New Zealand qualifications. § Includes 38 with New Zealand qualifications. ‖ Includes 30 with New Zealand qualifications.

The work of the Medical Council is largely of a confidential nature, and involves inquiries into charges of misconduct which from time to time are made against medical practitioners. A number of such cases have been dealt with during the year.

Plumbers Registration Act, 1912.

Two meetings of the Plumbers Board constituted under this Act were held during the year. Examinations under the Act were held in June and October. A total of 456 candidates presented themselves for examination, the result being that eighty-one passed in the theoretical part and 110 in the practical; eighty-five qualified or completed in both parts of the examination and were duly granted registration. The *Gazette* notice for 1928 contains the names of 1,951 plumbers.

Masseurs Registration Board.

Four meetings of the Masseurs Registration Board were held during the year under review. The present number on the masseurs roll is 465. During the year the usual examinations were conducted, and fifteen persons were placed on the register.

The question of training of blind masseurs received consideration, and the matter is held over until such time as the Massage School can ascertain by experience whether it is possible to combine the training of blind masseurs with the candidates at present in training.

Reciprocity was arranged with Victoria, thus completing reciprocity with the whole of the Commonwealth.

LEGISLATION.

For some years the organized opticians have been seeking to obtain statutory recognition and registration, and this has been established by the Opticians Act, 1928. The object of the Act is to ensure that the optician is so trained that he can be permitted to test defects in vision, to prescribe the remedial lenses for such defects, and this training includes a sufficient knowledge of diseases of the eye to enable him to know when the case is one which must be referred to an occulist. The Opticians Board has held three meetings, and fifty-nine names have been entered upon the Register of Opticians to date.

STAFF.

It is with deep regret that I have to record the deaths of Mr. S. H. Sargeant and Mr. C. A. Schauer, steadfast Inspectors of Health, who had most loyally served the Department.

In conclusion, I wish to pay a tribute to the very excellent and faithful service rendered by officers of the Department during a particularly strenuous year, calling for unremitting vigilance and economic administration.

T. H. A. VALINTINE, Director-General of Health.

PART II.—PUBLIC HYGIENE.

I have the honour to submit my annual report for the year ended 31st March, 1929.

SECTION 1.—VITAL STATISTICS.

POPULATION.

The mean population of the Dominion for 1928 (exclusive of Maoris) was estimated to be 1,390,684. This total represents an increase over the corresponding figure for the previous year of 16,245, or a percentage increase of population of 1·18.

BIRTHS.

The births of 27,200 living children were registered in the Dominion during 1928, as against 27,881 in 1927. The birth-rate for 1928 was thus 19·56 per 1,000 of mean population.

The general course of the birth-rate during the last ten years is shown in the following table :—

Births (Number and Rate) in New Zealand, 1919–28.

Year.	Total Number of Births registered.	Birth-rate per 1,000 of Mean Population.
1919	24,483	21·42
1920	29,921	25·09
1921	28,567	23·34
1922	29,006	23·17
1923	27,967	21·94
1924	28,014	21·57
1925	28,153	21·17
1926	28,473	21·05
1927	27,881	20·29
1928	27,200	19·56

The birth-rate steadily declines. There were 27,200 births for a population of 1,390,684, and there were 11,811 deaths, the difference, or natural increase, being 15,389 persons, or 1·1 per cent. only of the total population. Back in 1870 the natural increase was 3·1 per cent.

DEATHS.

The total number of deaths (11,811) registered during the year 1928, as compared with 11,613 in 1927, shows an increase of 198.

Crude Death-rates.

Year.	Crude Death-rate per 1,000 Mean Population.	Year.	Crude Death-rate per 1,000 Mean Population.
1901	9·81	1924	8·29
1911	9·39	1925	8·29
1921	8·73	1926	8·74
1922	8·77	1927	8·45
1923	9·03	1928	8·49

STILL-BIRTHS.

Still-births, which are defined by the Births and Deaths Registration Act of 1924 as "children which have issued from their mother after the expiration of the twenty-eighth week of pregnancy, and which were not alive at the time of such issue," are compulsorily registrable in the Dominion. The next table shows the number of such births and their rate per 1,000 live births in individual years for the quinquennium 1924–28.

Still-births (Number and Rate) in New Zealand, 1924–28.

Year.	Total Number of Still-births registered.	Rate of Still-births per 1,000 Live Births.
1924	855	30·5
1925	861	30·6
1926	886	31·1
1927	878	31·5
1928	839	30·8

A noticeable feature of the table is the reduction in the rate of still-births for the year under review, this being the first time during the quinquennium that the proportion of still-births to live births has shown a decline.

(NOTE.—Still-births are not included, either as births or deaths, in the various numbers and rates given elsewhere in this report.)

THE PRINCIPAL CAUSES OF DEATH.

The following table gives the main causes of deaths last year in their order of magnitude, and the actual number of deaths therefrom:—

TOTAL DEATHS IN NEW ZEALAND IN 1928, 11,811.

Causes.	Actual Deaths.	
Heart-disease (all forms)		2,315
Cancer		1,374
Chest-diseases—		
Pneumonia	422	
Pneumonia secondary to influenza, whooping-cough, and measles	147	
Broncho-pneumonia	230	
Bronchitis	228	
	—	1,027
Violence		956
Tuberculosis (all forms)		699
Apoplexy or cerebral hæmorrhage		643
Senility		544
Kidney or Bright's disease		455
Disease of the arteries		394
Diabetes		167
Diseases and accidents of childbirth (*i.e.*, maternal mortality)		134
Diarrhœa and enteritis		110
Appendicitis		107
Hernia and intestinal obstruction		100
Epilepsy		60
Common Infectious Diseases.		
Influenza (all forms, including pneumonic)		242
Diphtheria		72
Scarlet fever		55
Whooping-cough		26
Typhoid fever		16
Measles		12
Infant Mortality.		
Infant deaths (under one year), all causes		984

The first six causes in the above list account for 7,014 deaths, or approximately two-thirds of the total. Obviously with some of them—*e.g.*, tuberculosis, the common chest-diseases, some forms of heart-disease, and apoplexy—habits of life and environment are important factors. The correction of faulty habits, where applicable, and the improvement of the environment of an unfortunate or careless minority of the New Zealand public would reduce these deaths, and the numbers are such as to offer a margin of gain worth the effort. It is only by the active co-operation of the public, the local authorities, the medical and nursing professions, and the Department of Health in definite disease-prevention in the home, school, and workplace environment of the people that great reduction in our death-rate will be made.

New Zealand has a low general death-rate—the lowest in the world—but its reduction has been far less rapid than that of the birth-rate.

Consideration of the above table indicates that there are prospects of considerable reduction in the number of deaths, provided the efforts of central and local governing authorities, including the Hospital Boards, the medical and nursing professions, and the general public, are united, and also that they are well directed.

Concentration upon further reduction of the already low infant-death rate, the still-birth rate, or the maternal deaths (134) will reduce deaths under these three headings, but the numbers are such that thereby no great reduction can be made in the general death-rate. Of the grand total of 11,811 deaths, 10,827 apply to persons over one year of age, and, of these, 10,693 were not associated with maternity.

Pregnancy and birth are events dangerous to both mother and child, and our intended efforts to reduce this danger cannot affect the general death-rate to any considerable degree.

It is obvious that we must widen our preventive effort to include persons of both sexes and all ages. It is particularly necessary to correct bad living-habits, to treat disease in its early stages, and, wherever possible, to prevent the spread of any infectious illness.

A definite alliance rather than a "cordiale entente" with the army of general medical practitioners is advisable, and it is equally important that they should be definitely engaged in the prevention of disease. The ideal to strive for is that the local authorities and their Medical Officers of Health should be aiding the medical practitioners in disease-prevention by measures intended to improve the environment of the general public.

For the past five years graduates from the Otago Medical School have received special training in preventive medicine.

It is both expensive and inadequate to send State medical officers and nurses from twenty to one hundred miles or more to introduce children from school or home to medical practitioners living in close proximity to those children.

National insurance for sickness and invalidity is one method already in operation in England, and throughout Europe and Asia, of partnership with the general medical practitioner for the purpose of disease-prevention, and I recommend advocacy of its adoption by New Zealand to your favourable consideration.

The Birth-rate.—Reference should be made to the steadily decreasing birth-rate.

(1) *Actual Reduction in the Number of Births in the past Two Years.*

Year.	Births.	Reductions.
1926	28,473	..
1927	27,881	592*
1928	27,200	681*

* Despite an increased population.

(2) *Actual Reduction in Infant Deaths for the same Period.*

Year.	Infant Deaths (under One Year).	Reduction.
1926	1,132	..
1927	1,080	52*
1928	984	96*

* Contributed to by reducing birth-rate.

Quite a good way of increasing a population is the direct method. Early marriage induces large families. If by more and earlier marriages the birth-rate can be increased, the infant-death rate will tend automatically to rise, but there will be a considerable net gain in population.

THE PRINCIPAL CAUSES OF DEATH ITEMIZED.

Heart-diseases (all forms)	2,315
Apoplexy or cerebral hæmorrhage	643
Diseases of the arteries	394
	3,352

These diseases of the heart and arteries account for 3,352, or nearly one-third, of the deaths. In the last half-century the death-rate from each of these three causes has increased very greatly—*e.g.*, that from heart-disease (all forms) has trebled, and that from apoplexy more than doubled. Quite a proportion of these deaths apply to persons under 60 years of age. Habit, environment, and infection are important causative factors. In last year's report I discussed several causes of the various forms of heart-disease.

CANCER, 1,374.

The following table, taken from the "New Zealand Official Year-book," shows the cancer death-rate in the Dominion for the last ten years.

Number of Persons who died from Cancer, the Proportion per 10,000 Persons living, and the Percentage of all Deaths, 1919–28.

Year.	Deaths from Cancer.	Total Deaths, all Causes.	Deaths from Cancer per 10,000 of living Persons.	Deaths from Cancer per 100 of all Deaths.
1919	1,031	10,808	9·07	9·54
1920	1,029	12,109	8·72	8·50
1921	1,044	10,682	8·53	9·77
1922	1,066	10,977	8·52	9·71
1923	1,115	11,511	8·75	9·69
1924	1,245	10,767	9·59	11·56
1925	1,207	11,026	9·08	10·95
1926	1,341	11,819	9·91	11·35
1927	1,324	11,613	9·63	11·40
1928	1,374	11,811	9·87	11·63

We know not the cause of cancer. It is increasing in prevalence at a slow, not rapid, rate. Being a disease of late life, and having in the past often missed detection or registration, its apparent increase is in considerable measure accounted for by our longer span of life and greater skill in diagnosis. The real increase is slight, and can be checked if advice and treatment be sought early in the disease. Recent results show that the proportion of actual cures from the treatment of early cancer is very high indeed.

It has always been an important cause of death, but results show that nowadays submission to skilled treatment at an early stage is worth while. Particularly after the age of thirty-five we should seek medical examination for any unusual condition which might be cancer.

CHEST-DISEASES, 1,027.

Pneumonia	422
Pneumonia secondary to influenza, whooping-cough, and measles	147
Broncho-pneumonia	230
Bronchitis	228
	1,027

There is reason to believe that many of these deaths could be prevented. In some countries the experiment has been tried of making every pneumonia case compulsorily notifiable and attempting isolation. Apparently the results achieved have not justified the expense and trouble thereby involved, but the fact remains that probably a large proportion of these illnesses are infectious. All associated with epidemics of influenza, measles, whooping-cough, or diphtheria certainly are. Again, when in the absence of a recognized outbreak of such common infectious diseases, groups of pneumonia or broncho-pneumonia cases occur in a community, affecting in considerable measure virile young adults, adolescents, and children, of which it can be said the infecting agent is virulent, then measures can be taken which give promise of considerably reducing the death-rate from these lung-ailments. Such measures are complete case-isolation to be practised by doctor and nurse, and convalescents to be restrained from close contact with other persons, attendance at indoor public gatherings, &c., until they have completely recovered.

The following table illustrates that a noteworthy feature during the prevalence of influenza is that the death-rate not only of pneumonic influenza, but also of acute primary pneumonia and pneumonia (all forms), rises, showing infection which should respond to preventive effort. It is believed, too, that epidemic pneumonia occasionally occurs unassociated with influenza.

Disease.	Number of Deaths. 1927.	1928.
Influenza	131	242
Influenzal pneumonia	43	100
Pneumonia	313	422
Broncho-pneumonia	207	230

Both during epidemic and normal periods living-habits and environment certainly have an influence upon the incidence and severity of chest-diseases.

VIOLENCE, 956.

Regarding the 956 deaths last year from violence, of which 744 were due to accident, 202 to suicide, and 10 to homicide, it is noteworthy that in the last eight years, whereas the death-rates from suicide and homicide has shown little variation, that from accident, especially motor-vehicle accident, has increased considerably.

In the last three years the number of deaths annually from motor-vehicle accidents has averaged 154.

TUBERCULOSIS (ALL FORMS), 699.

The following table indicates the course of this disease since 1872:—

Tuberculosis (all Forms) in New Zealand, 1872–1928.

Year.	Number of Deaths from Tuberculosis.	Death-rate from Tuberculosis per 10,000 of Mean Population.	Year.	Number of Deaths from Tuberculosis.	Death-rate from Tuberculosis per 10,000 of Mean Population.
1872 ..	346	12·66	1901 ..	775	9·96
1873 ..	296	10·50	1902 ..	802	10·05
1874 ..	391	12·26	1903 ..	769	9·38
1875 ..	561	15·63	1904 ..	799	9·46
1876 ..	488	12·59	1905 ..	678	7·79
1877 ..	512	12·68	1906 ..	720	8·04
1878 ..	513	12·20	1907 ..	856	9·31
1879 ..	587	13·10	1908 ..	840	8·89
1880 ..	645	13·60	1909 ..	803	8·26
1881 ..	680	13·80	1910 ..	731	7·36
1882 ..	611	12·00	1911 ..	733	7·27
1883 ..	700	13·23	1912 ..	716	6·89
1884 ..	718	12·99	1913 ..	812	7·60
1885 ..	698	12·25	1914 ..	728	6·67
1886 ..	705	12·11	1915 ..	793	6·30
1887 ..	734	12·31	1916 ..	742	6·74
1888 ..	647	10·69	1917 ..	755	6·87
1889 ..	649	10·61	1918 ..	832	7·54
1890 ..	650	10·47	1919 ..	762	6·71
1891 ..	663	10·53	1920 ..	851	7·21
1892 ..	700	10·90	1921 ..	793	6·48
1893 ..	729	11·02	1922 ..	821	6·56
1894 ..	752	11·07	1923 ..	792	6·21
1895 ..	761	10·99	1924 ..	736	5·67
1896 ..	680	9·62	1925 ..	684	5·14
1897 ..	763	10·57	1926 ..	727	5·37
1898 ..	769	10·44	1927 ..	668	4·86
1899 ..	795	10·60	1928 ..	699	5·02
1900 ..	752	9·85			

New Zealand has the lowest death-rate from tuberculosis in the world. In common with that of many other countries, including Great Britain, it has steadily reduced in the last half-century. Last year's rate was remarkably low, and this year's is consistent with the general falling tendency. Tuberculosis, however, still takes fifth place as a cause of death in New Zealand, and disables temporarily or permanently many more than it kills.

Of 699 deaths from tuberculosis last year, 569 were assigned to pulmonary tuberculosis and 130 to other forms of this disease, comprising tuberculous meningitis and peritonitis, and tuberculosis of the bones, joints, glands, &c.

Pulmonary Tuberculosis.

Last year's increase in deaths was wholly in pulmonary cases, which are regarded by most authorities as conveyed from human sources. There were 1,512 notifications of fresh cases during the year, and although during the last few years the number has steadily increased, while that of the deaths has reduced, there is reason to believe all are not yet notified. In the South Island particularly there is a growing tendency for special institutional treatment to be undertaken in the early course of the disease.

A distressing feature of this disease of adult—often early adult—life, and one which frequently assumes economic importance owing to the involvement of breadwinners in the process, is the protracted convalescence. Modern sanatorium practice is to retain cases in such an institution for long periods, owing to the frequency of relapses following short courses of treatment.

New Zealand has not yet embarked upon a colony to accommodate tuberculous adults with their families and enable them to earn a little under medical supervision at suitable occupations before they are fitted to engage independently in full-time occupation. If the Hospital Boards continue to develop sanatoria, some such provision will probably be found advisable.

Other Forms of Tuberculosis.

The 130 deaths last year from other forms of tuberculosis were made up as follows:—

Tuberculosis of meninges and central nervous system	58
Tuberculosis of intestines and peritoneum	28
Tuberculosis of vertebral column	17
Tuberculosis of bones	1
Tuberculosis of genito-urinary system	10
Tuberculosis of other organs	2
Disseminated tuberculosis	14
	130

A small proportion only of these latter deaths, particularly those of children, are deemed by recognized authorities to be possibly due to infection from the cow, and bacteriological tests of milk-supplies in New Zealand have shown the milk-supply to be remarkably free from bovine tubercle.

KIDNEY OR BRIGHT'S DISEASE, 455.

Since 1900, unlike heart-disease, apoplexy, and diseases of the arteries, the death-rates from which have greatly increased, that from kidney or Bright's disease has shown little variation.

DIABETES, 167.

There has been little variation in the death-rate from diabetes in recent years.

DISEASES AND ACCIDENTS OF CHILDBIRTH, 134.

MATERNAL MORTALITY.

The following table shows the number of deaths from puerperal causes, and the rate of such deaths per 1,000 births for the five-yearly period 1924–28 :—

Deaths from all Puerperal Causes, 1924–28.

Year.	Number of Deaths from			Death-rate per 1,000 Live Births from		
	Puerperal Septicæmia.	Other Puerperal Causes.	All Puerperal Causes.	Puerperal Septicæmia.	Other Puerperal Causes.	All Puerperal Causes.
1924	52	88	140	1·86	3·14	5·00
1925	42	89	131	1·49	3·16	4·65
1926	39	81	120	1·37	2·88	4·25
1927	70	67	137	2·51	2·40	4·91
1928	56	78	134	2·06	2·87	4·93

In last year's report I included a graph showing the periodic rises in maternal mortality, which have tended to recur every nine or ten years. The puerperal septicæmia rate, although lower than last year's, is still an epidemic rate, and the rate from other puerperal causes has risen.

Puerperal Septicæmia, 56.

This disease usually accounts for approximately one-third of the maternal deaths, but during the epidemic of the last two years, now apparently waning, it has been responsible for nearly half the maternal deaths.

Local Distribution of Puerperal Septicæmia Deaths.

The following table gives the actual number of deaths from puerperal septicæmia in each hospital district during the three years 1926–28 inclusive :—

Hospital District.	Puerperal Septicæmia.			Hospital District.	Puerperal Septicæmia.		
	1926.	1927.	1928.		1926.	1927.	1928.
North Island.				*North Island*—continued.			
Mangonui	..	..	..	Wellington	4	4	6
Whangaroa	..	..	..	Wairarapa	1	1	1
Hokianga	..	1	..				
Bay of Islands	..	..	..		26	51	41
Kaipara	..	..	..	*South Island.*			
Whangarei	..	..	1	Wairau	..	..	1
Auckland	13	25	13	Picton	..	..	..
Waikato	5	3	4	Nelson	..	1	1
Taumarunui	..	..	..	Buller	..	..	..
Thames	1	..	..	Inangahua	..	..	..
Waihi	..	1	1	Grey	..	1	1
Coromandel	..	..	..	Westland	..	..	..
Tauranga	..	1	1	North Canterbury ..	7	6	6
Bay of Plenty	..	..	..	Ashburton	2	1	..
Opotiki	..	1	..	South Canterbury ..	..	1	2
Cook	..	1	2	Waitaki	..	..	..
Wairoa	..	..	..	Otago	1	5	..
Hawke's Bay	..	4	1	South Otago	..	..	..
Waipawa	..	2	..	Vincent	..	..	1
Dannevirke	1	..	..	Maniototo	..	..	..
Taranaki	1	2	4	Southland	2	4	3
Stratford	..	2	1	Wallace and Fiord ..	1	..	..
Hawera	..	1	2				
Patea	..	..	..		13	19	15
Wanganui	..	1	2				
Palmerston North	..	1	2	Total for New Zealand ..	39	70	56

It is noticeable that in the last two years most of the hospital districts have been affected. Auckland and Otago, which last year showed a markedly increased number of deaths from this cause, have returned to their former low level, while the deaths in Wellington and Taranaki have increased.

Despite the endeavours of medical practitioners and nurses throughout the Dominion to prevent the occurrence of secondary cases of puerperal septicæmia, it is a definite fact that at approximately ten-year intervals an epidemic wave of puerperal septicæmia occurs, causing primary cases in most of the hospital districts and necessitating extreme caution to prevent further spread. Most infectious diseases display this periodicity.

It is a loose habit, lacking justification, to ascribe the undue prevalence of puerperal fever in any given year to the coincident prevalence of other diseases, such as scarlet fever. Investigation, however, of the deaths in New Zealand during the last half-century from scarlet fever, influenza, pneumonia, and the other common notifiable diseases shows that a high death-rate from these causes is not linked up with a high death-rate from puerperal septicæmia. The coincident prevalence in the last two years of scarlet fever and puerperal septicæmia is an unusual event.

Another theory sometimes advanced is that the undue prevalence of some other non-notifiable disease, such as streptococcic or staphylococcic infection, associated with a low degree of acquired immunity among women, causes the epidemic waves of puerperal septicæmia. This theory, though plausible, is unproven. The periodic epidemic wave of puerperal septicæmia may be a separate entity, as apparently is the case with diphtheria, influenza, infantile paralysis, scarlet fever, and other infectious diseases, which diseases also show periodic variations in incidence.

Other Causes of Maternal Deaths in 1928, 78.

1. Puerperal albuminuria and convulsions	38
2. Puerperal hæmorrhage	15
3. Other accidents of labour	4
4. Accidents of pregnancy	11
5. Puerperal white-leg, embolus, and sudden death	9
6. Following childbirth (not otherwise defined)	1
	78

The total number of deaths from these causes in the previous year (1927) was 67. In 1928 items 1, 2, and 3 showed an increase, mainly the first—viz., puerperal albuminuria and convulsions. Items 4, 5, and 6 showed a slight decrease.

International List.

The following table gives the death-rate from puerperal causes in various countries (a quinquennial average—such an average discounts annual extremes) :—

Country.	Period.	Death-rate per 1,000 Births from		
		Puerperal Septicæmia.	Other Puerperal Causes.	All Puerperal Causes.
Sweden	1920–24	1·15	1·36	2·51
Italy	1922–26	1·02	1·52	2·54
Netherlands	1923–27	0·59	2·03	2·62
Norway	1921–25	0·74	1·91	2·65
Uruguay	1922–26	1·67	1·01	2·68
Denmark	1922–26	0·95	1·81	2·76
Hungary	1922–26	1·43	1·57	3·00
Japan	1921–25	1·21	2·07	3·28
England and Wales	1923–27	1·48	2·52	4·00
Germany	1921–25	2·80	1·47	4·27
Spain	1922–26	2·25	2·09	4·34
Switzerland	1922–26	2·07	2·57	4·64
Irish Free State	1923–27	1·67	3·05	4·72
New Zealand	**1924–28**	**1·86**	**2·89**	**4·75**
Northern Ireland	1921–25	1·55	3·21	4·76
Union of South Africa	1923–27	2·03	2·96	4·99
Australia	1923–27	1·84	3·65	5·49
Belgium	1921–25	2·68	2·85	5·53
Canada	1923–27	1·80	3·98	5·78
Scotland	1923–27	1·78	4·47	6·25
Chile	1922–26	1·69	4·98	6·67
United States	1920–24	2·54	4·36	6·90
Trinidad	1923–25	3·58	5·68	9·26
British Guiana	1922–25	2·68	11·55	14·23
Ceylon	1923–27	7·40	11·75	19·15

It will be seen from this that New Zealand's puerperal death-rate, unlike her general death-rate, is relatively high, due less to puerperal-septicæmia deaths than to deaths from other puerperal causes, such as puerperal albuminuria and convulsions, puerperal hæmorrhage, and other accidents of labour. It will be seen also that several other countries believed to possess skilled midwifery service, which show a relatively high puerperal death-rate, also owe their relatively high rate more to these other puerperal causes than to puerperal septicæmia. I instance Northern Ireland, Australia, Canada, Scotland, and the United States of America. In previous reports, by graphs and tables, I have demonstrated that in New Zealand these other puerperal causes are less fatal to women residing in the fourteen principal urban areas than to women in the rural areas and the smaller towns. It is probable that not only in New Zealand, but also in the several other countries to which I have referred, this higher death-rate is in some measure attributable to the scattered distribution of population rendering antenatal care and the procurement of skilled midwifery service more difficult of attainment.

Another factor which should be taken into account is that we have reason to believe that the collection of statistics is more accurately performed in New Zealand than in many European countries. The notification of puerperal septicæmia in New Zealand is so thorough as to have occasioned comment overseas, and the questionnaire of medical practitioners by the New Zealand Government Statistician regarding female deaths is searching.

SECTION 2.—THE COMMON INFECTIOUS DISEASES.

Influenza (all Forms), 242.

Number of Deaths from Influenza in New Zealand, 1923–28.

Year.	Number.	Year.	Number.
1923	403	1926	288
1924	90	1927	131
1925	86	1928	242

Pneumonic Influenza.

Pneumonic influenza, the deaths from which are included in influenza (all forms), is a form of influenza which is compulsorily notifiable.

Pneumonic Influenza in New Zealand, 1923–28.

Year.	Notifications.		Deaths.	
	Number.	Rate per 10,000 of Mean Population.	Number.	Rate per 10,000 of Mean Population.
1923	1,144	8·98	223	1·75
1924	180	1·39	32	0·25
1925	69	0·52	23	0·17
1926	641	4·73	132	0·98
1927	176	1·28	43	0·31
1928	354	2·55	100	0·72

Diphtheria, 72.

Diphtheria in New Zealand, 1924–28.

Year.	Notifications.		Deaths.*	
	Number.	Rate per 10,000 of Mean Population.	Number.	Rate per 10,000 of Mean Population.
1924	2,717	20·84	82	0·63
1925	1,518	11·42	52	0·40
1926	1,975	14·59	66	0·49
1927	1,446	10·52	58	0·42
1928	1,600	11·51	72	0·52

* Figures include deaths from croup.

SCARLET FEVER, 55.

The course of scarlet fever in New Zealand is briefly shown in the table below.

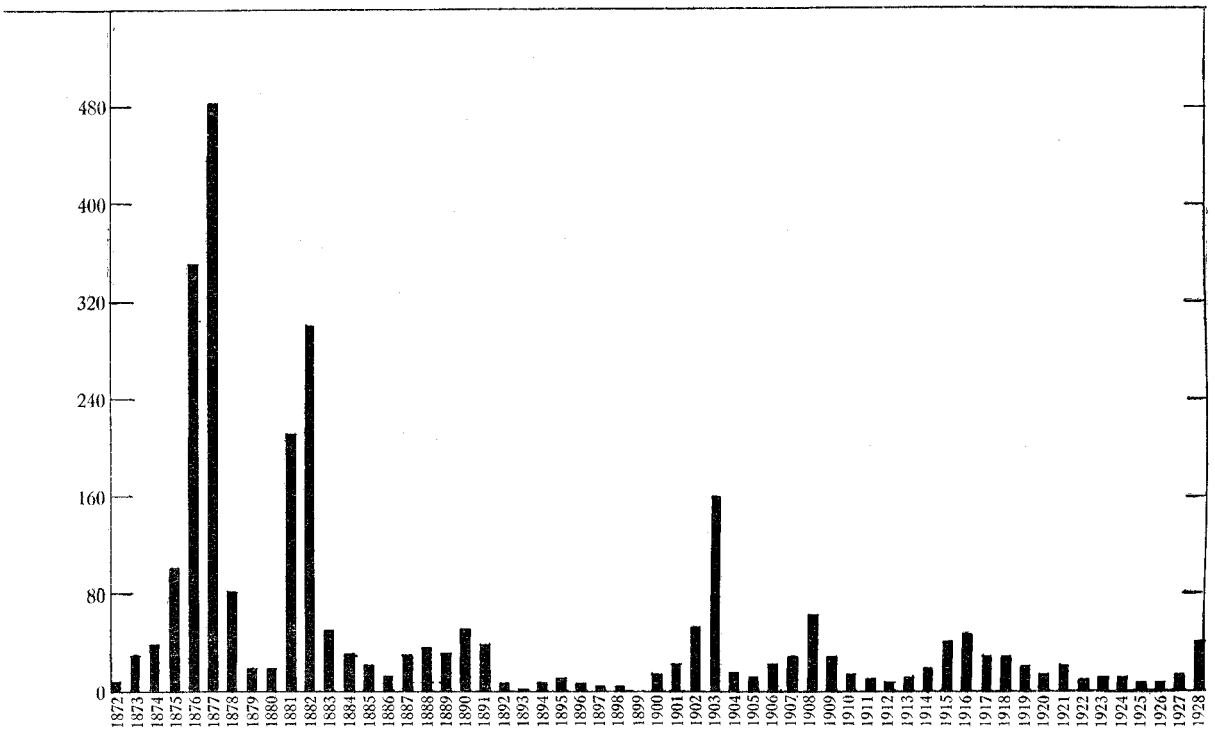
Scarlet Fever in New Zealand, 1924–28.

Year.	Notifications.		Deaths.	
	Number.	Rate per 10,000 of Mean Population.	Number.	Rate per 10,000 of Mean Population.
1924	1,176	9·05	13	0·10
1925	1,025	7·71	7	0·05
1926	1,583	11·70	8	0·06
1927	2,185	15·89	16	0·12
1928	6,127	44·06	55	0·40

It will be seen from the above table that this disease has been definitely epidemic for the last two years, and that last year, although there were seventeen fewer deaths from scarlet fever than from diphtheria, over six thousand notifications of scarlet fever were received. Staffs have been kept busy in effecting isolation measures, and in many districts all available public hospital beds for infectious cases have been occupied. Latterly home isolation has been attempted where the domiciliary conditions were favourable. Fortunately, the virulence has been mild, the deaths per 100 cases notified producing a case mortality rate of under 0·9 per cent.

There is no established inoculation method of preventing this disease. What is known as the Dick test and preventive-inoculation method is still in the trial stage, and entails a number of needlings of all the children of a district. In treating the disease hæmolytic streptococcal serum has been freely used, with apparently favourable results.

In order to more definitely gauge the import of the present epidemic, I present hereunder a columnar graph giving the death-rate per 1,000,000 of population since the year 1872.



SCARLET-FEVER DEATH-RATE PER 1,000,000 OF POPULATION FROM 1872 TO 1928.

(NOTE.—No figures available for year 1899.)

This graph shows from the annual deaths recorded that epidemics of scarlet fever tend to run a course of two or more years, and that up to the present this epidemic has been less fatal than previous visitations.

All the health districts throughout the Dominion have been involved in the present epidemic. The incidence has now definitely reduced in some of the districts which were the first to be attacked, and, regarding the Dominion as a whole, although even in the first four months of the present year the notification rate is still high, it would seem, judging from the very large number of notifications that have been received and the fact that all the health districts have been affected, that probably a large proportion of the susceptible individuals have already been in contact with infection and the incidence may shortly be expected to reduce.

Last year particularly the control and treatment of scarlet fever has entailed great cost to the Department, to Hospital Boards, and to parents. The value of notification and the strict isolation of scarlet-fever cases lies in the belief that rapid spread among susceptible individuals exalts the virulence of the disease.

In 1903 there were 3,400 notifications received, 131 deaths occurred, and those who remember that epidemic will recollect that many who recovered suffered severely and serious after-effects remained.

In 1928 there were 6,127 notifications, 55 deaths occurred, and the serious cases and sequelæ were comparatively few in number.

Whooping-cough, 26; Measles, 12.

The year 1928 was a light one for both whooping-cough and measles. Epidemics of these two diseases tend to recur every few years, but the death-rate over the last fifty years has reduced greatly.

Typhoid or Enteric Fever, 16.

The position as regards this disease for the period 1924–28 is shown in the table below:—

Enteric Fever in New Zealand, 1924–28.

Year	Notifications.		Deaths.	
	Number.	Rate per 10,000 of Mean Population.	Number.	Rate per 10,000 of Mean Population
1924	354	2·73	19	0·15
1925	278	2·09	16	0·12
1926	302	2·23	19	0·14
1927	270	1·96	11	0·08
1928	290	2·09	16	0·12

It is also of interest to state that the death-rate from typhoid fever (average) for the last five years was approximately forty times less than a similar average taken fifty years ago.

SECTION 3.

Infant Mortality, 984.

The infant-mortality rate for 1928 was 36·18 per 1,000 births. This constitutes a low record for New Zealand and also for the world.

Infant Mortality in New Zealand, 1900–28 (per 1,000 Live Births).

Year.	Under One Month.	One Month and under Twelve Months.	Total under Twelve Months.	Year.	Under One Month.	One Month and under Twelve Months.	Total under Twelve Months.
1900 ..	31·1	44·1	75·2	1915 ..	29·2	20·8	50·0
1901 ..	29·8	41·6	71·4	1916 ..	27·0	23·7	50·7
1902 ..	32·2	50·7	82·9	1917 ..	27·9	20·3	48·2
1903 ..	31·7	49·4	81·1	1918 ..	26·7	21·7	48·4
1904 ..	29·4	41·6	71·0	1919 ..	28·4	16·9	45·3
1905 ..	30·1	37·4	67·5	1920 ..	30·8	19·7	50·5
1906 ..	29·6	32·5	62·1	1921 ..	30·7	17·1	47·8
1907 ..	30·4	58·4	88·8	1922 ..	27·2	14·7	41·9
1908 ..	31·2	36·7	67·9	1923 ..	29·1	14·7	43·8
1909 ..	29·9	31·7	61·6	1924 ..	24·0	16·3	40·3
1910 ..	30·2	37·5	67·7	1925 ..	26·4	13·5	39·9
1911 ..	28·5	27·8	56·3	1926 ..	25·46	14·3	39·76
1912 ..	30·1	21·1	51·2	1927 ..	25·83	12·91	38·74
1913 ..	29·7	29·5	59·2	1928 ..	25·41	10·77	36·18
1914 ..	28·9	28·5	51·4				

It will be seen from the above table that the greatest decline in the infant-death rate applies to infants aged one month and over and not to the new-born.

Analysis of Deaths of Infants under One Month of Age, 1928.

The following table gives the causes of these deaths during the year :—

Cause of Death.	Under One Day.	One Day and under One Week.	One Week and under Two Weeks.	Two Weeks and under Three Weeks.	Three Weeks and under One Month.	Total.
Influenza	..	..	1	..	..	1
Syphilis	..	..	2	..	1	3
Meningitis	..	..	..	2	..	2
Convulsions	..	6	1	..	..	7
Broncho-pneumonia	..	3	2	3	1	9
Pneumonia	..	2	1	1	..	4
Diarrhœa and enteritis	..	1	3	..	2	6
Congenital malformations	22	61	14	5	6	108
Congenital debility	6	21	8	2	3	40
Injury at birth	23	51	8	..	1	83
Premature birth	149	120	25	10	10	314
Other diseases	24	46	6	1	..	77
Accidental mechanical suffocation ..	1	2	..	..	..	3
Other causes	5	12	9	6	3	35
Totals	230	325	80	30	27	692

Thus 555 of a total of 692 infant deaths in the first month of life occurred during the first week, and may be regarded as mainly due to pre-natal influences. It is also of interest to record that well over half of the infant deaths (in the first twelve months of life) occurred in this first week—*i.e.*, 555 in a total of 984.

TABLE A.—NOTIFIABLE DISEASES IN NEW ZEALAND, 1928, SHOWING DISTRIBUTION BY MONTHS.

Month.	Scarlet Fever.	Diphtheria.	Enteric Fever.	Tuberculosis.	Cerebro-spinal Meningitis.	Poliomyelitis.	Pneumonic Influenza.	Pneumonia.	Erysipelas.	Puerperal Fever.	Septic Abortion.	Eclampsia.	Tetanus.	Hydatids.	Trachoma.	Ophthalmia Neonatorum.	Lethargic Encephalitis.	Food Poisoning.	Chronic Lead Poisoning.	Dysentery.	Actinomycosis.	Leprosy.	Totals.
January	201	80	29	85	2	5	23	67	17	7	6	4	..	4	2	1	2	2	1	1	..	..	539
February	204	40	19	163	1	5	8	49	22	18	9	3	1	4	..	..	..	..	..	6	..	..	552
March	428	81	32	133	..	11	11	48	23	12	9	4	1	6	1	2	1	1	..	11	1	..	816
April	529	132	38	92	3	11	10	76	26	12	9	4	1	8	4	..	4	2	..	3	..	..	964
May	567	167	48	150	3	4	24	79	26	17	9	7	..	3	1	3	1	6	..	2	1	..	1,118
June	652	236	15	131	1	1	33	104	35	11	4	9	..	5	2	3	4	1	..	1	1	..	1,249
July	798	209	18	114	..	..	43	135	46	22	10	9	1	1	..	3	4	..	1	3	..	..	1,417
August	754	189	23	171	1	1	66	199	42	19	12	9	4	4	1	1	3	1	..	..	..	..	1,500
September	527	136	11	135	5	3	38	138	43	19	10	11	1	9	..	1	2	..	..	..	1	..	1,090
October	513	103	20	138	2	2	36	156	49	14	8	14	3	11	..	6	2	..	3	..	..	1	1,081
November	499	132	20	108	3	2	37	131	33	14	8	4	2	4	1	1	4	6	1	..	..	..	1,010
December	455	95	17	92	2	2	25	103	23	19	19	10	4	3	1	3	..	..	..	..	..	..	873
Totals	6,127	1,600	290	1,512	23	47	354	1,285	385	184	113	88	18	62	13	24	27	19	6	27	4	1	12,209

TABLE B.—NOTIFICATIONS OF CASES OF NOTIFIABLE DISEASES FOR YEAR ENDED 31ST DECEMBER, 1928.

Name of Disease.	North Auckland.	Central Auckland.	South Auckland.	Thames-Tauranga.	Taranaki.	East Cape.	Wanganui-Horowhenua.	Wairarapa-Hawke's Bay.	Central Wellington.	Nelson-Marlborough.	Canterbury.	West Coast.	Otago.	Southland.	Totals.
Scarlet fever	106	354	151	56	585	73	536	799	663	50	2,059	65	428	202	6,127
Diphtheria	69	291	109	75	68	64	96	213	396	16	87	98	15	3	1,600
Enteric fever	27	17	88	45	8	8	8	45	2	1	30	2	8	1	290
Tuberculosis	69	195	111	51	36	18	88	117	138	25	395	19	179	71	1,512
Cerebro-spinal meningitis	..	2	..	..	1	..	4	2	7	..	2	2	2	1	23
Poliomyelitis	3	6	1	..	..	..	3	2	2	3	24	1	2	..	47
Influenza	36	28	27	12	28	..	11	28	13	6	111	4	37	13	354
Pneumonia	65	142	85	33	163	28	125	122	195	5	223	9	65	25	1,285
Erysipelas	18	48	25	9	18	10	28	29	70	2	74	1	45	8	385
Puerperal fever—															
Ordinary	12	18	16	7	17	2	19	10	19	8	34	3	12	7	184
Following abortion or miscarriage	5	50	3	2	1	6	3	5	7	..	28	1	2	..	113
Eclampsia	4	25	3	2	6	2	3	5	14	1	9	..	8	6	88
Tetanus	1	4	2	1	..	1	2	3	..	1	2	..	1	..	18
Hydatids	..	..	3	3	5	1	6	13	1	3	17	..	8	2	62
Trachoma	1	..	4	..	..	..	2	..	5	..	1	..	..	..	13
Ophthalmia neonatorum	1	4	2	..	2	1	..	3	4	..	4	..	3	..	24
Lethargic encephalitis	..	..	2	1	1	1	1	4	2	..	11	..	3	1	27
Food poisoning	4	..	1	5	..	1	..	..	1	..	6	1	..	..	19
Chronic lead poisoning	..	1	..	..	..	..	..	..	3	..	1	..	1	..	6
Dysentery	..	7	..	..	3	..	10	7	..	..	..	..	..	..	27
Actinomycosis	..	1	..	..	..	..	..	..	..	..	1	..	1	1	4
Leprosy	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1
Totals, 1928	421	1,194	633	302	942	216	945	1,407	1,542	121	3,119	206	820	341	12,209

TABLE C.—NOTIFIABLE DISEASES IN NEW ZEALAND, 1928, SHOWING DISTRIBUTION BY AGE AND SEX.

Disease.	Under 1 Year.		1 to 5 Years.		5 to 10 Years.		10 to 15 Years.		15 to 20 Years.		20 to 25 Years.		25 to 30 Years.		30 to 35 Years.		35 to 40 Years.		40 to 45 Years.		45 to 50 Years.		50 to 55 Years.		55 to 60 Years.		60 to 65 Years.		65 to 70 Years.		70 to 75 Years.		75 to 80 Years.		80 Years and over.		Total Cases at all Ages.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Scarlet fever	23	23	577	646	971	1,312	409	658	172	312	96	242	49	150	42	134	32	84	45	58	13	32	6	20	4	8	2	2	2	1	..	1	..	..	..	..	2,443	**3,684**
Diphtheria	9	5	229	185	347	306	81	99	30	60	34	55	18	35	14	22	13	22	6	11	2	10	2	2	..	2	1	..	..	..	..	..	..	..	..	..	786	**814**
Enteric fever	..	..	12	16	32	16	23	19	26	12	24	18	11	14	7	10	4	5	4	6	7	4	6	4	4	2	3	..	..	1	..	..	..	..	..	..	163	**127**
Tuberculosis	2	1	2	5	17	15	20	43	71	118	95	192	133	147	107	94	77	52	57	33	49	24	44	16	27	10	19	10	19	5	3	2	1	1	1	..	744	**768**
Cerebro-spinal meningitis	..	1	4	3	3	3	1	..	1	1	1	..	..	..	..	..	1	..	..	1	2	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	14	**9**
Poliomyelitis	..	1	8	3	4	1	5	3	8	3	3	..	4	3	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	33	**14**
Puerperal fever ..	..	..	..	..	..	..	..	..	..	15	..	45	..	63	..	31	..	17	..	12	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	**184**
Septic abortion ..	..	..	..	..	..	..	..	..	..	4	..	22	..	37	..	33	..	14	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	**113**
Eclampsia	..	..	..	..	..	..	..	..	..	12	..	25	..	27	..	11	..	10	..	1	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	**88**
Erysipelas	2	4	14	7	4	9	2	5	8	8	5	15	12	19	10	19	20	26	22	25	10	27	15	25	7	14	19	7	5	5	3	7	1	1	2	1	161	**224**
Ophthalmia neonatorum	10	12	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	11	**13**
Pneumonic influenza ..	2	1	14	10	18	14	21	6	29	22	22	10	14	10	9	10	21	5	19	7	24	7	12	10	11	3	6	3	2	2	4	3	..	..	1	2	229	**125**
Pneumonia	40	20	118	98	139	80	69	40	53	36	48	26	36	33	52	26	66	29	49	23	43	17	36	11	23	10	19	4	10	5	7	1	8	4	2	4	818	**467**
Lethargic encephalitis ..	..	..	1	2	1	2	..	1	3	4	..	2	1	1	..	1	1	..	2	..	..	1	1	1	..	1	..	..	1	..	..	..	..	..	..	..	11	**16**
Trachoma	..	..	..	..	..	..	..	..	1	1	1	1	3	1	1	..	..	..	1	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8	**5**
Hydatids	..	..	..	2	..	..	1	1	2	2	2	5	1	2	3	4	6	1	8	1	4	4	5	1	2	2	..	..	..	..	2	..	..	..	..	..	37	**25**
Tetanus	..	..	1	..	2	1	..	..	1	..	..	2	1	1	2	..	..	..	1	..	2	..	..	1	1	..	1	..	1	..	..	..	..	..	..	..	13	**5**
Dysentery	..	..	1	..	9	3	3	2	2	3	..	..	..	..	..	..	..	2	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	17	**10**
Food poisoning ..	..	..	..	1	2	2	..	3	..	..	..	2	1	..	..	2	1	..	1	1	..	1	1	..	..	..	..	..	..	1	..	..	..	..	..	..	6	**13**
Chronic lead poisoning ..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	2	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	..
Actinomycosis ..	..	..	..	..	..	1	..	..	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	**2**
Leprosy	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Totals ..	88	68	982	979	1,549	1,765	635	881	408	614	332	662	287	543	247	397	245	267	216	183	159	131	129	91	79	52	71	26	40	20	19	14	10	6	7	7	5,503	**6,706**

TABLE D.—VENEREAL CLINICS.—CASES TREATED DURING THE YEAR ENDED 31ST DECEMBER, 1928.

Reference.	Auckland.		Wellington.		Christchurch.		Dunedin.	
Number of persons dealt with at or in connection with the out-patient clinic for the first time and found to be suffering from—	M.	F.	M.	F.	M.	F.	M.	F.
Syphilis	67	21	41	20	23	13	27	8
Soft sore	10	..	..	..	14	..	..	..
Gonorrhœa	634	70	422	60	278	75	73	5
No venereal disease	70	28	246	111	30	22	18	..
Total attendance of all persons at the out-patient clinic who were suffering from—								
Syphilis	988	315	3,065	591	2,201	792	850	293
Soft sore	74	..	..	..	88	..	..	..
Gonorrhœa	17,997	860	33,991	506	8,129	2,217	1,310	218
No venereal disease	..	..	408	203	100	26	22	..
Aggregate number of in-patient days of treatment given to persons suffering from—								
Syphilis	342	121	729	..	..	..	443	261
Gonorrhœa	1,559	327	6,434	..	..	..	278	104

SECTION 4.—NUMBER OF VESSELS INSPECTED DURING THE YEAR ENDED 31ST DECEMBER, 1928.

Port.	Number of Vessels inspected.	Prohibited Immigrants.	Infectious-disease Cases.	V.D. Cases.	Mental-defective Cases.
Combined Auckland Health District—					
Auckland	303	127	..	..	..
Whangarei	1	..	..	..	..
Hokianga	2	..	..	..	..
Taranaki Health District—					
New Plymouth	21	..	..	..	..
East Cape Health District—					
Gisborne	4	..	..	..	..
Combined Wellington Health District—					
Wellington	142	..	6	12	20
Wanganui	7	..	..	..	..
Napier	5	..	..	..	..
Picton	2	..	..	..	..
Combined Canterbury Health District—					
Lyttelton	21	..	2	3	..
Timaru	2	..	..	2	..
Westport	7	..	..	..	..
Greymouth	4	..	..	..	..
Combined Otago Health District—					
Port Chalmers	17	..	..	..	..
Bluff	43	..	..	..	..
Totals	581	127	8	17	20

SECTION 5.—WORKING OF THE SALE OF FOOD AND DRUGS ACT.

TABLE 1.—SHOWING SAMPLES RESPECTIVELY OF MILK AND OTHER FOODSTUFFS TAKEN AND DEALT WITH DURING THE YEAR ENDED 31ST DECEMBER, 1928.

Health District.	Number of Samples taken.		Number of Vendors.		Samples not complying.					
					Number of Samples.		Number of Warnings issued.		Number of Prosecutions recommended.	
	Milk.	Other.	Milk.	Other.	Milk.	Other.	Milk.	Other.	Milk.	Other.
North Auckland ..	168	71	160	64	13	2	9	15	14	11
Central Auckland ..	1,140	194	1,134	186	102	47	88	36	10	10
South Auckland ..	197	80	193	70	4	21	3	19	1	2
Thames-Tauranga ..	24	24	24	23	..	12	..	6	..	6
Taranaki	116	22	93	18	4	3	3	2	2	1
East Cape	52	11	42	11	2	..	1	..	1	..
Wanganui-Horowhenua	168	82	166	69	3	8	..	2	3	6
Wairarapa - Hawke's Bay	339	147	328	130	5	4	..	..	6	4
Central Wellington ..	1,677	80	1,646	50	32	13	18	2	13	10
Nelson-Marlborough ..	150	76	138	67	3	1	1	..	2	1
Canterbury ..	1,604	67	1,506	60	104	9	52	4	49	5
West Coast ..	117	18	79	17	3	1	2	..	1	..
Otago	702	194	399	146	56	42	48	34	4	4
Southland	295	160	190	105	30	42	21	33	5	8
Totals, 1928 ..	6,749	1,226	6,098	1,016	361	205	246	153	111	68
Totals, 1927 ..	6,399	1,004	5,863	827	395	203	227	115	117	82

TABLE 2.—SHOWING INSPECTION OF PREMISES ENGAGED IN SELLING OR MANUFACTURING FOODSTUFFS DURING THE YEAR ENDED 31ST DECEMBER, 1928.

Health District.	Number of Premises inspected engaged in the selling or Manufacture of Foodstuffs.	Number of Instances Articles were "seized" or "destroyed."	Number of such Food Premises requiring Sanitary Alteration.
North Auckland	2,376	11	260
Central Auckland	1,998	101	297
South Auckland	3,412	4	294
Thames-Tauranga	830	..	292
Taranaki	532	14	183
East Cape	551	8	116
Wanganui-Horowhenua	459	48	53
Wairarapa - Hawke's Bay	653	7	76
Central Wellington	548	28	57
Nelson-Marlborough	582	2	86
Canterbury	830	8	28
West Coast	672	11	78
Otago	1,834	34	229
Southland	1,468	11	49
Totals, 1928	16,745	287	2,098
Totals, 1927	16,552	179	2,448

TABLE 3.—LEGAL PROCEEDINGS FOR YEAR 1928.

	Number of Prosecutions.	Amount. £ s. d.
Milk below standard	65	376 7 6
Milk adulterated	14	74 16 4
Butter under standard	11	51 14 1
Ice-cream below standard	3	8 3 0
Vinegar below standard	3	16 11 6
Sale of unsound fruit	2	22 12 0
Boracic in bacon	4	13 17 0
Breach of Regulation H. 125	11	23 14 0
Adulterated spirits	3	35 14 6
Whisky (improper labelling)	4	99 10 7
Rebottling spirits	6	356 10 9
Beer below standard	1	8 13 6
Honey-labelling	1	5 14 9
Obstructing Inspector	2	7 4 0
Nuisances	2	8 12 0
Chinese in possession of opium	6	237 13 0
Sections 210 and 233, Licensing Act	10	291 11 6
Section 77, Health Act	1	4 10 0
Hospitals and Charitable Institutions Act	2	7 4 0
Nurses and Midwives Registration Act	1	2 1 6
Plumbers Registration Act	1	3 8 0
	153	£1,656 3 6

PARTICULARS OF WORK CARRIED OUT AT THE GOVERNMENT VACCINE-STATION, WELLINGTON, DURING THE YEAR ENDING 31ST MARCH, 1929.

Dr. Lynch, the Director, reports as follows:—

Calves inoculated, 14; calves rejected, nil; amount of lymph prepared, sufficient for 24,512 tubes; vaccine issued in tubes, 7,954; vaccine lymph in stock, equivalent to 18,000 tubes.

A quantity of active vaccine lymph very much in excess of average requirements is kept in stock to provide against emergencies. Should cases occur in New Zealand and a demand for wholesale vaccinations result, several weeks would be required to provide an adequate supply of vaccine lymph. To provide against such a happening it is considered wise to keep always on hand a large supply. This arrangement adds to the cost of upkeep of the vaccine-station, but it is justified when the need arises. The new vaccine-station is very conveniently placed, and is proving ideal for the purpose.

Mr. Dore and Mr. Rollet, of this staff, still give me every assistance, and the work of the station, which, of course, in only done at intervals, proceeds smoothly and efficiently.

SECTION 6.—ADMINISTRATION.

Extracts from the reports of the various Medical Officers of Health, which appear in another part of this report, show a progressive improvement in the sanitary conditions generally throughout the Dominion.

The policy of most local authorities as regards the installation of sanitary works, such as water-supplies and drainage, continues active. The occasions upon which requisitions from the Board of Health were sought to enforce such installations were few.

There are now three Medical Officers of Health stationed at Auckland, three at Wellington, two at Christchurch, two at Dunedin, and both at New Plymouth and Gisborne one Medical Officer of Health combines the duties of Medical Officer of Health and School Medical Officer.

An important duty of a Medical Officer of Health anywhere is to advise local governing authorities in matters of health and sanitation. In New Zealand particularly, owing to the large number of independent local governing authorities and the fact that the revenue of many is too limited to permit the employment of skilled services, it is specially necessary, if difficult, to establish personal contact with them and advise them regarding major health and sanitary questions, such as town-planning, housing, and the economic installation of sanitary works.

The Department's Health Inspector appointment scheme for grouped local authorities is an endeavour to co-ordinate the health work of the smaller local authorities and provide skilled inspection at low cost under the direct supervision of the Medical Officer of Health. In order to maintain compact Inspector districts with low mileage radius, and resultant economic working, it is essential that when small local authorities essay to appoint their own Sanitary Inspector the matter be carefully considered in relation to its effect upon neighbouring local authorities in existing groups.

Senior Supervising Inspector appointments are for the purpose of aiding the Medical Officer of Health in co-ordinating the work not only of Health Inspectors, but also the sanitary work of many local authorities which employ their own Sanitary Inspectors. In all major problems, however, of health or sanitation, and even in minor ones requiring comprehensive review, it is essential that the Medical Officer of Health should himself know the circumstances and see that the local authority is fully advised.

Food and Drugs.—The usual amount of routine sampling has been carried out, and the results indicate that, in general, no serious manipulation or adulteration of foodstuffs is prevalent. Importers are becoming more alive to the necessity of making inquiries before importing new lines, thereby avoiding difficulties in meeting regulation standards and labelling requirements.

The City Councils of Wellington, Christchurch, and Dunedin each have their own officers specially appointed under the Sale of Food and Drugs Act for the purpose of regular milk-sampling in collaboration with the respective Medical Officers of Health.

The weighing of foodstuffs, including bread, is being continued by the Department of Labour in conjunction with its regular activities under the Weights and Measures Act.

Thanks are again due to the Comptroller of Customs and the Dominion Analyst and their officers for valuable assistance and advice.

Dangerous Drugs.—The regulations are now in force, and follow closely those existing in England and the Australian States. Everything possible has been done to provide every one concerned with full advice as to their responsibilities.

I desire to record my appreciation of the continued loyal and able co-operation of the Medical Officers of Health and their staffs.

T. McKibbin,
Director, Division of Public Hygiene.

PART III.—SCHOOL HYGIENE.

I have the honour to report on the work of the Division of School Hygiene for the year ended 31st March, 1929.

Staff.

The permanent staff consists of a Director, twelve School Medical Officers, and thirty-one school nurses. In addition to this staff, Dr. Helen Dougall acts as junior School Medical Officer, Wellington, and Dr. Phyllis Moir as junior School Medical Officer, Otago (temporary appointments).

During the year Dr. Elaine Gurr resigned from the position of School Medical Officer, Hawke's Bay, in order to enter private practice. Dr. Collier, School Medical Officer, Southland, was transferred to Hawke's Bay, Dr. Collier's place being filled by the appointment of Dr. Catherine Anderson. There have been during the year several resignations and fresh appointments in the School Nursing Service.

Dr. Mecredy continues to act in the dual capacity of Medical Officer of Health and School Medical Officer for Taranaki.

A new separate health unit has also been created, with centre at Gisborne, Poverty Bay. Dr. Turbott, who is in charge of this district, acting as both Medical Officer of Health and School Medical Officer.

Figures relating to Work accomplished in 1928.

The following summary serves to indicate the extent of work accomplished during the year :—

Schools inspected—		
Of roll under 100	1,010	
Of roll 100 to 500	394	
Of roll over 500	159	
		1,563
Children examined—		
Complete examinations	67,709	
Partial examinations	39,980	
		107,689
Number of notifications sent to parents		46,363
Number of addresses to school-children		946
Number of parents interviewed		11,876
Number of lectures or addresses to parents		76
The figures for the work of the school nurses are as follows :—		
Number of days assisted Medical Officer in schools		1,659
Number of children examined for medical schedule (H. 529)		88,786
Number of days engaged wholly in clerical work		1,351½
Number of children re-examined after Medical Officer's inspection		46,155
Number of visits to homes in—		
Large towns	10,250	
Small country towns	2,958	
Scattered districts	1,811	
		15,019
Number of children taken personally to hospital		363
Number of children taken personally to dental clinic or dental hospital		682

Summary of 51,490 Complete Examinations.

Number of children examined	51,490
Percentage found to have defects	85·90
Percentage with defects other than dental	60·69
Percentage of children showing evidence of—	
Subnormal nutrition	6·84
Pediculosis	1·87
Uncleanliness	2·28
Skin—	
Impetigo	2·04
Scabies	1·64
Ringworm	0·32
Other skin-diseases	0·88
Non-vaccination	66·67
Heart—	
Organic disease	0·88
Functional disturbance	0·72
Respiratory disease	0·99
Total deformities of trunk and chest	20·05
Mouth—	
Deformity of jaw or palate, including irregularity	7·32
Dental caries	56·15
Extractions of permanent teeth	7·02
Fillings	25·51
Perfect sets of teeth	3·83

Percentage of children, &c.—*continued.*	
Nose and throat—	
Nasal obstruction	4·68
Enlarged tonsils	21·08
Enlarged glands	14·80
Goitre—	
All degrees	16·25
Incipient	13·08
Small	2·94
Medium	0·20
Large	0·03
Eye—	
External eye-disease	1·62
Total defective vision	3·14
Corrected	1·39
Uncorrected	1·75
Ear—	
Otorrhœa	0·30
Defective hearing	0·36
Defective speech	0·63
Mental—	
Feeble-mindedness	0·20
Epilepsy	0·03
Other nervous defects	0·16
Tuberculosis—	
Total	0·09
Pulmonary	0·04
Other tissues	0·05

Work of School Nurses.

The demand upon the services of the school nurse increases yearly, both on account of the recognition of her value by teachers and parents and because of the extension of duties required from her by the Department. It is satisfactory to note an increase in the number of home visits paid by school nurses (this year equals approximately 15,000).

Treatment Returns.

Of 19,271 children notified for treatment in the main centres and subsequently followed up by school nurses, 64 per cent. obtained the necessary treatment. In Nelson this percentage equalled 80 per cent. In many of the big town schools the percentage of treatment obtained was over 90 per cent. Of 12,670 children in country districts notified for treatment and subsequently followed up by school nurses, 51 per cent. obtained it, Nelson again leading with 75 per cent. In studying the various returns which go to make up this total it is evident that parents in remote areas, for financial or other reasons, often find it difficult or impossible to undertake the necessary journey to the centre where treatment can be obtained.

Co-operation between Health Officials.

It is obviously desirable to secure, as far as possible, co-operation between various officers engaged in health work in a district, some of whom, such as School Medical Officers and nurses, work under the direct control of the Health Department, others of whom (*e.g.*, district nurses) work under the control of the local Hospital Board. Hospital Boards were therefore approached and an arrangement made by which district nurses are now notified when the School Medical Officer intends visiting the district, authority being given for them to attend the medical examinations at various schools. Such an arrangement is of mutual advantage. A district nurse has undoubtedly considerable local knowledge which is of assistance to the School Medical Officer, and she herself in turn gains useful information from the opportunity thus afforded of discussing the welfare of the children in her area with the visiting School Medical Officer. A similar arrangement is made with regard to nurses to Natives, who are officers of the Health Department.

Native Schools.

Owing to lack of staff, the routine examination of Native schools has hitherto been impossible, though School Medical Officers have been encouraged to inspect them whenever facilities permit. The arrangement by which a separate health unit has been created in the Poverty Bay District has enabled the Native schools of that area to receive greater attention than hitherto. This district contains that section of the Maori population which has least mixture with the white race and which shows considerable loyalty to the ancient racial customs. Dr. Turbott is devoting special attention to the physique of the present-day Maori. Some interesting observations, the result of his work in Native schools, are to be found in the Appendix to this report, entitled "Maori and Pakeha: A Study in Comparative Health." These are the more valuable in that they tend to remove any undue pessimism with regard to the future of the Maori people.

Health Education.

Since co-operation with parents is essential, every opportunity is given for them to attend the medical examination of school-children. It is satisfactory to note that a considerable number avail themselves of this. Last year the number of parents personally interviewed by School Medical Officers approximated twelve thousand. School nurses paid last year over fifteen thousand visits to homes. This closer association between parents and health officials is mutually helpful and assists in inculcating in the minds of the public a knowledge of the principles of good nurture.

It is satisfactory to note that the syllabus issued last year by the Education Department lays stress on the need for health instruction in the schools, and places particular emphasis on the necessity for the school environment and regime to exemplify to the utmost possible the laws of hygiene. Health education, therefore, occupies a firmer position in the school syllabus. Many teachers show considerable energy and enthusiasm in this direction. The regular cleanliness survey for younger pupils, frequent health talks, the establishment of an organized lunch, and the insistence upon cleanliness (to which beauty and order may be added) in the school surroundings are some of the means by which improvement is gained.

Health Exhibits.

During the year health exhibits were established under the auspices of the Department at the agricultural shows held at Hamilton, Palmerston, and Wellington. In the School Medical Section special emphasis was placed upon nutrition (sample diets being exhibited), posture, and clothing (including footwear). Considerable interest was shown by the visiting public, the school nurse in charge being fully engaged in demonstrating various features of the exhibit. Pamphlets giving simple advice on various health topics were widely distributed.

Nutrition.

To say in these days that good nutrition is fundamental to healthy development, whether individual or racial, is to utter a platitude. Nevertheless, as is indicated above, it is recognition of this fact which is responsible for many of our activities.

The number of children suffering from subnormal nutrition is approximately 7 per cent. It is this group that requires special attention.

Health Camps.—The annual health camp at Turakina took place again this year, there being in attendance at camp 111 children for a period of five weeks. The success of the camp was, as always, beyond dispute. Special appreciation is due to Mr. Lethbridge, on whose estate the camp is held, his generosity being the chief factor in making the establishment of the camp possible and in ensuring its success each year.

The health camp was again held at Levin for mentally backward children attending the special classes in Wellington City. For this group the educational value of such camps is great, giving opportunity, as they do, for practical instruction in health habits and behaviour generally. Those in charge of the camp state that at the end of a month of camp life there is evident to a greater degree not only good health, but that capacity for social co-ordination which is so often lacking in children of this type.

Nutrition Classes.—In a few centres children suffering from malnutrition are given a special curriculum, involving more rest and greater supervision of the diet, including a special milk ration at school. Among these are the health class at the Auckland Normal School, the "milk" classes in Wanganui, and the open-air school at Kew, Dunedin.

Posture.

Considerable attention has been paid this year to the question of posture. It is recognized that a large group of children do not conform to the standard of correct posture as described by certain authorities—*e.g.*, see U.S.A. Department of Labour, Children's Bureau, publications. We do not feel certain that we are able to give correctly the answer to the question, "What is the correct standing-posture for New Zealand children at various ages?"

With the object of obtaining more exact information on the subject, a survey was carried out last year by Dr. Helen Bakewell, School Medical Officer, Wellington, and Miss Blackburne, Physical Instructress under the Education Department. The result of this will be found in the Appendix to this report.

Two findings demand attention because of their practical importance: (1) The young New Zealand child of school age is apparently of a loose-limbed elastic type which responds readily to environmental influences, particularly such influences as habitual posture, exercise, and rest; (2) the high incidence of postural defect in the 7–8-year-old group.

It must be remembered that at this age period, which is one of rapid growth, instability of posture may tend naturally to be increased; but we must consider also whether the great percentage of postural defect found in the 7–8-year-old group is not a result of a school curriculum which makes too great a demand upon the sensitive and immature body of the entrant child.

It is the wrongly fed, insufficiently rested child that most readily develops physical deformity. The fatigued nervous system is expressed in general bodily slackness. There is deficient muscular and ligamentous tone. The typical faulty posture is thus acquired, with drooping head, flat chest, wing shoulders, prominent abdomen. Vitality is depressed, and the bodily mechanism out of gear. For the prevention of defect a simple routine is needed where adequate rest alternates with free exercise and play, and where full advantage is taken of sunlight, fresh air, and suitable food. The school curriculum should permit of this. It is essential that the class-room should offer hygienic conditions—*e.g.*, good lighting and ventilation, suitable furniture, &c. Few young children get sufficient rest. Absolute relaxation in the recumbent position for half an hour daily would be a boon to primer children, and also to all who suffer from physical or nervous fatigue.

The answer to the question, "When does a deviation from set standard become a defect worth recording?" is difficult. We wish to emphasize the fact that Dr. Bakewell's paper is suggestive rather than dogmatic. The ultimate test of physical perfection must be the reaction of the individual to life. Many minor defects of posture noted are almost certainly only of æsthetic importance, since physical and mental endurance are often found in association with the unathletic frame. From careful observation and consideration of evidence in future, however, we hope to obtain more definite information with regard to the physical development of the New Zealand child.

Tuberculosis Contacts.

The system of following up and keeping under supervision children from homes where there is an inmate suffering from tuberculosis is being satisfactorily established. The percentage of such contacts showing actual sign of infection is extremely small, but there is no doubt but that, as a group, they show a higher proportion of subnormal nutrition. In Dunedin the open-air school at Kew continues to do good work for children of this type.

In Auckland a civic effort is being made to establish a "sunshine school," in the management of which officers of the School Medical Service will co-operate. Here it is hoped to provide such measures as open-air class-rooms, extra feeding, sunlight treatment, &c.

The Pre-school Child.

Examination of kindergartens is being put upon a more established basis. In the Wanganui District arrangements for the examination of pre-school children are being freely utilized, the results of this work being its own justification.

Mentally Backward and Feeble-minded Children.

The passing of the Mental Defectives Amendment Act, 1928, gives opportunity for better provision for the ascertainment and care of feeble-minded children. With the establishment of psychiatric clinics it will be possible to obtain not only the expert examination of many cases which at present do not attend school, and therefore escape notice, but the better classification for training and educational purposes of feeble-minded children at present in special classes and special schools. All School Medical Officers appreciate the urgent necessity for such a measure.

Medical Examination of Teachers.

The result of the medical examination of entrants to the teaching profession last year showed that out of 657 applicants 20 per cent. suffered from faulty posture, 20 per cent. from dental caries, 8 per cent. from some degree of obstructed breathing, 16 per cent. from some degree of goitre, and 13 per cent. from defective eyesight. Since the percentage of defective eyesight of Standard VI children examined in the primary schools last year was only 4·6, it is evident that there must be a great deterioration of vision during the secondary-school period. In many cases the relationship of this defect to excessive study is apparent.

Reasons for Rejection.—For thirty-two candidates for entrance into the teaching profession rejected as physically unfit the reason given is as follows: Tuberculosis (past or present), 4; poor physique, 6; poor physique plus unhealthy tonsils, 1; poor physique plus defective eyesight, 2; poor physique plus defective posture, 2; poor physique plus cardiac irregularity, 2; dysmenorrhœa, 1; defective eyesight plus nervous instability, 1; defective eyesight plus goitre, 1; defective eyesight alone, 3; goitre, 3; congenital heart-disease, 1; rheumatism, 1; nervous debility, 1; fæcal fistula, 1; mastoid, 1; fainting-attacks, 1.

There is no doubt as to the desirability of secondary-school pupils receiving regular medical examination as do children attending primary schools. At present an arrangement is being made by which all applicants for entrance into the teaching profession are examined one or two years before the termination of their secondary-school life. By this means unsuitable candidates are rejected at a time when they are able to devote themselves to preparing for another means of livelihood. There were appointed in New Zealand last year 565 pupil-teachers, all of whom, in addition to some hundreds of rejected applicants, were examined by School Medical Officers.

The evidence of School Medical Officers in general indicates that the standard of physical fitness of applicants for entrance to the teaching profession is not as high as it should be. Moreover, the amount of remedial defect found among them is sufficient to indicate that supervision of the health of boys and girls in secondary schools is inadequate. We should certainly look forward to the day when a candidate for entrance to the teaching profession or for the Public Service should be able to produce a record card showing his medical history from the time of his beginning school until the day of his seeking employment, as could easily be provided by extending medical inspection to secondary schools.

Curriculum of Secondary Schools.—There can be no doubt that the curriculum of many secondary schools is in urgent need of revision, too great a tax being made upon the pupils therein. From recent discussions in the press it is clear that parents are becoming increasingly concerned. A questionnaire was last year submitted to all applicants for entrance into the teaching profession in order to obtain information regarding the physical and mental demand made by school life. From the answers given it appears that a considerable proportion of secondary-school pupils spend three hours and over in the preparation of home-work. In many cases the fatigue of manual work at home or of a long journey to school, with an inadequate midday meal, is added. At the conference of the New Zealand Branch of the British Medical Association held in Wellington at the beginning of this year the Preventive Medicine Section of the Conference (composed largely of School Medical Officers) discussed the question of medical examination of teachers and the physical condition of applicants for entrance into the teaching profession. The following resolution was passed: "After consideration of information furnished by answers to a questionnaire issued to secondary-school pupils, and from the evidence afforded by the reports of their medical examination, this meeting of the Preventive Medicine Section, New Zealand Branch of B.M.A., Wellington, 21/2/29, is of the opinion that the amount of study outside school hours required from such pupils is excessive and therefore prejudicial to their physical and mental welfare." Two hours preparation at home-work is the maximum which should be required of secondary-school pupils.

School Buildings: Open-air Schools.

Schools erected by the Education Department in recent years show progress in their recognition of open-air principles. In one or two of them vita-glass has been introduced, and observation will be made to determine its effect (if any) on the health and nutrition of pupils.

The Open-air Schools League in Canterbury (largely a civic effort) continues to flourish, and to its energy and enthusiasm may be attributed in great measure the demand for open-air schools of the "Fendalton" type in that district.

School-cleaning and Sanitation.—Special attention is being paid by School Medical Officers in reporting on school-cleaning and sanitation. In many country districts, especially where labour is scarce and no water-carriage system available, there is great need for improvement in this direction.

Special Inquiries.

The reports of two investigations—(1) "The Posture of New Zealand School-children" (Dr. Helen Bakewell), and (2) "Maori and Pakeha—Study in Comparative Health" (Dr. Harold Turbott)—will be found published in the Appendix.

The School Hygiene Division wishes to express appreciation to the Education Department, various Education Boards, School Committees, and teachers for much valuable co-operation.

A. G. Paterson,
Director, Division of School Hygiene.

PART IV.—DENTAL HYGIENE.

In connection with the work of my Division, I beg to submit a report for the year ending 31st March, 1929:—

SECTION 1.—STAFF, CLINICS, ETC.

Staff.—The allocation of the staff of the Division is as follows: Wellington—Mr. J. L. Saunders, B.D.S., Deputy-Director, Division of Dental Hygiene; Mr. R. D. Elliott, Inspecting Dental Officer; Mr. F. B. Rice, B.D.S., Inspecting Dental Officer; Mr. J. B. Bibby, Clinical Demonstrator; Mr. A. D. Brice, B.D.S., Clinical Demonstrator; Miss E. M. Haines, Senior Dental Nurse.

In the field, eight dental officers and seventy-four dental nurses, stationed as follows: Dental officers—One at Christchurch, one at Dunedin, one at Motueka, one at Nelson, one at North Auckland, one at Tikitiki, one at Timaru, one at Wellington. Dental nurses—One at Avondale, one at Beresford Street, one at Cambridge, one at Dannevirke, one at Dargaville, one at Eltham, one at Feilding, one at Grey Lynn, one at Greytown, two at Gisborne, two at Hamilton, one at Hastings, one at Hawera, one at Henderson, one at Huntly, one at Lower Hutt, one at Marton, one at Masterton, one at Morrinsville, two at Napier, two at New Plymouth, one at Onehunga, one at Paeroa, one at Pahiatua, two at Palmerston North, one at Papakura, two at Ponsonby, one at Stratford, one at Taumarunui, one at Tauranga, one at Te Awamutu, one at Te Kuiti, one at Thames, one at Waipukurau, one at Wairarapa, one at Wanganui, one at Whangarei, one at Alexandra, one at Ashburton, one at Balclutha, one at Beckenham, two at Blenheim, one at Christchurch East, one at Dunedin, one at Dunedin South, one at Greymouth, one at Gore, two at Invercargill, one at Lyttelton, one at Mosgiel, one at Nelson, one at Oamaru, one at Otautau, one at Palmerston South, one at Reefton, one at St. Albans, one at Sydenham, one at Tapanui, one at Temuka, one at Timaru, one at Waimate, two at Westport, one at Winton, one at Woolston, one at Rarotonga. Owing to the resignations from the Service, the clinics at Edendale, New Brighton, and Hokitika have been closed for a part of the year, but at this date the positions have been filled.

New Clinics.—Since the 31st March, 1928, new clinics have been opened at the following places: Henderson, Onehunga, Thames, Morrinsville, Stratford, Marton, Greytown, Tikitiki, New Brighton, Lyttelton, Wairarapa, Waimate, Reefton, Palmerston South, and Winton.

During the next few weeks clinics will be opened at Pukekohe, Phillipstown, Hornby, Petone, Levin, Eketahuna, Wairoa, Waihi, Te Aroha, Otahuhu, Okahune, Kurow, Southbridge, Geraldine, Milton, Wyndham, and Takaka.

Training of Dental Nurses.—The past year has been a busy one for the instructional staff of the training-school, owing to the fact that the number of dental nurses undergoing training has been greater than in any previous year. At the commencement of the year under review (1st April, 1928) there were sixty-four probationer dental nurses in training. Of these, thirty-four were in the first year of their training and thirty in their second year. The latter, except for two whose services were terminated, completed their two-years course in March, 1929, when on passing their final examination they became available for the Director of Dental Hygiene to utilize their services in various parts of the Dominion. At the date of this report (31st March, 1929) the number of dental nurses in training is seventy-four, of whom thirty-four are entering on their second year and forty are new probationers who commenced duty on the 19th March, 1929.

The primary examination (anatomy and physiology) was held in November, 1928, the examiners being Dr. M. H. Watt and Dr. Ada Paterson. Of the thirty-four candidates, two failed in one subject. Both were successful in passing a special examination held at a later date.

Mr. Millen Paulin, B.D.S., of Wellington, assisted by a member of the instructional staff, conducted the final examination this year. In the course of his report he stated that "their practical work was of a very high order, and reflected credit on those responsible for their training."

The staff of the training-school consists of the Deputy-Director (Mr. J. L. Saunders, B.D.S.), who is Superintendent and Chief Instructor, Messrs. J. B. Bibby and A. D. Brice, B.D.S., Lecturers and Clinical Instructors, and Miss E. M. Haines, Senior Dental Nurse, who performs the duties of Matron.

As in previous years, the number of applicants for admission to the training-school far exceeded the number of vacancies—this year by more than four to one. The Public Service Commissioner is thus able to maintain a high standard in making appointments to our Service.

During the year the syllabus of training has been thoroughly revised. The scope of certain subjects has been curtailed, and in other cases lengthened, while some new subjects of a practical nature have been introduced. The result is an improved course of training, in which the various subjects are well balanced, and which is calculated to even more completely fit dental nurses to fulfil their duties and responsibilities as officers in charge of school dental clinics.

The number of children receiving treatment at the Wellington Clinic is 15,000. As attendance at this clinic is purely voluntary, and is not, as in the school dental clinics, a part of school routine, a certain amount of difficulty has been experienced in the past in ensuring that patients returned at the due date for re-examination and the performance of any further treatment required. By a reorganization of the system of keeping records and statistics, a great improvement has been effected in this direction, and the majority of the children are now returning to the clinic regularly for re-examination. A striking result of this is the very marked falling-off in the number of extraction cases. The children's teeth are being retained in a healthy condition, and their general health will no doubt benefit accordingly.

Treatment performed during 1928.—The following is a summary of the operations performed from the 1st January to the 31st December, 1928, by dental officers, dental nurses, and probationers in training: Fillings, 146,354; extractions, 76,555; other operations, 99,701: total operations, 322,610. Of the above treatment the dental nurses in the field have performed the following: Fillings, 109,113; extractions, 59,449; other operations, 68,900: total operations, 237,462.

SECTION 2.—PROPAGANDA, ETC.

I am pleased to be able to report that there are indications of good results being obtained from our efforts in all districts where clinics have been established. I feel, however, that if parents would in a greater degree take advantage of the valuable opportunity offered them of bringing their children to the clinics from the age of two years onwards for advice and minor treatment, and where advantage could be taken to instruct them with regard to diet, &c., as a means of preventing dental disease, a much greater amount of good would result, as it would reduce to a minimum the terrible amount of initial treatment required by the children who enter school and are examined for the first time, and I am of opinion that consideration should be given to the question in an endeavour to attain this object. Applications, which are fairly numerous, are being received from time to time from different associations and societies for addresses to be given on the subject for prevention of dental disease, and it has been found that much interest is being taken in the subject. All officers and dental nurses are instructed and are expected to take every opportunity to give talks to parents and the children. During the year, in Christchurch, part of an afternoon was set aside, and parents were invited by means of the radio and public press to inspect the several dental clinics, where those in charge had arranged to address the visitors.

Inspection.—With the steadily increasing number of dental clinics being established it has been found necessary to increase the inspecting staff, and Mr. F. B. Rice, B.D.S., has been appointed.

Equipment.—Arrangements have been made so that our equipment will be more suitable for mobile purposes. This is necessary, as in most cases where clinics have been established sub-bases are attached. Our equipment generally may be considered to be fairly well standardized now.

In conclusion, I would like to place on record my appreciation of the services of Mr. Saunders, Deputy Director, and those engaged in the training of the nurses. The keenness displayed by these officers, as well as the Inspecting Officers, is much to be commended.

I cannot conclude without referring to the fine spirit of service which is displayed generally by officers and dental nurses throughout the Service.

I would take this opportunity also of again expressing my appreciation of the ready assistance and co-operation generally of the Education Department, Education Boards, teachers, and members of Committees, &c., which has very materially tended towards that measure of success which I think it is admitted my Division has attained.

THOS. A. HUNTER,
Director, Division of Dental Hygiene.

PART V.—NURSING.

I beg to submit my annual report for the year ending 31st March, 1929.

NURSES AND MIDWIVES REGISTRATION ACT, 1925.

The two examinations for the State registration of general nurses held in June and December show an increase of thirty-eight on the previous year's number, there being 351 candidates, of whom 304 were successful From countries overseas twenty-seven nurses were admitted to the register.

The examinations for the State registration of midwives held in April, August, and December also show an increase, 117 candidates having been successful, as against ninety-six in 1928. Only five midwives from overseas were admitted to the register, owing to the standard of training in New Zealand having been raised.

The number of candidates for registration in maternity nursing shows a considerable decrease. This is no doubt due in a large measure to the misapprehension in the minds of many as to the real scope of this training, which is practically equivalent to that of the midwife under the former Act, who almost invariably preferred to work with a medical practitioner.

NURSES AND MIDWIVES REGISTRATION BOARD.

There were five meetings of the Board held during the year.

Personnel.—The personnel of the Board was changed through the retirement of Miss H. C. Inglis and Miss L. Kohn, and the appointment of Miss E. P. Tennant and Miss H. Newman.

Present Scheme of Training of Midwives and Maternity Nurses.—The Board made a lengthy review of the present scheme of training for maternity nurses and midwives, and decided that the present scheme was a very great improvement over the previous scheme in force, and was of opinion that the present system should be retained.

Instructional Course for Nurses.—The whole question of training received full consideration, resulting in the issue of an amended schedule of subjects in which candidates must be qualified for examination. The syllabus of training and instruction in invalid cookery was retained without alteration for further use.

Regulations under the Nurses and Midwives Registration Act, 1925.—During the year the regulations under the above Act and the requirements of the Nurses and Midwives Registration Board were consolidated and, together with the Act, reprinted and bound in book form, the officers of all training-schools being supplied with copies.

Obstetrical Case-books.—Additional pages were provided for these books so that persons in training as maternity nurses or midwives could record the number of "assistances at labour" and "lectures taken" in addition to the other information contained in the book.

Reciprocity.—Reciprocity was arranged with the following additional countries: Tasmania, New South Wales, South Australia, Scotland.

Ante-natal Clinics.—It was decided to have ante-natal clinics established at all training-schools for maternity nurses. This was in addition to the previous decision to establish these clinics at training-schools for midwives.

POST-GRADUATE COURSE FOR NURSES.

This course has more than justified its existence. It was decided to limit the number of students to twenty, it being difficult to arrange for practical instruction for a larger class. This year there are nineteen nurses taking the course. Of these, nine are sent on bursary by Hospital Boards with the understanding that they return for a stated period to the service of the Board concerned; three are officers of the Department, also pledged to return to the Service; while the remaining seven, having entered at their own expense, will be free agents at the conclusion of the six-months period of instruction. It is pleasing to note in this connection that nurses throughout the country are showing their appreciation of the value of this means of gaining additional knowledge. Many have announced their intention of taking the course as soon as they have saved the necessary amount to enable them to do so.

The New Zealand Trained Nurses' Association has decided to use the sum contributed towards the establishment of the course as a fund for the assistance of suitable nurses who may otherwise be debarred owing to lack of means from participating in its benefits.

The organization of this course is planned on the lines of a teachers' training-college, and is affiliated with Victoria University College for lectures in certain subjects. Like the normal school attached to such a training-college, the Wellington Hospital and Public Health organizations provide the wide practical experience in which the greater part of the students' time is spent. The Department appreciates very highly the co-operation of these bodies in its efforts to provide a sound practical basis for the course.

Preliminary Training-schools.

We are now a little nearer the establishment of preliminary training-schools for pupil nurses throughout the hospitals of the Dominion. It is hoped that as a step towards this end several of the smaller institutions may combine to establish central schools in which their respective candidates for training may be tested before being placed on the staff. The larger hospitals where this system is instituted, though on a modified scale, are already proving its worth in the increased efficiency of the pupils thus selected, as shown in the higher standard reached in the State examinations.

Departmental Hospitals.

King George V Hospital, Rotorua.—Eight nurses completed their training and passed the State examination, one being selected to take the post-graduate course in Wellington. There have been few changes on the nursing staff, but owing to an outbreak of enteric fever at Whakarewarewa it was recently found necessary to employ several additional nurses.

Pukeora Sanatorium.—There is nothing of special importance to report on the nursing side. The work is carried out satisfactorily, and all concerned appear to act in harmony.

Otaki and Sanatorium.—Miss Pownall, the Matron, returned in August from her visit to England, during which she saw many institutions devoted to the treatment of tuberculosis, thereby learning much that has proved helpful in her work.

St. Helens Hospitals.

Wellington.—During the year this hospital, with a bed state of thirty, had a daily average of twenty-three patients. The number attended in the district was fifty-five. The trained staff consists of Matron, Sub-Matron, and five qualified nurses, the number of pupils in training being fifteen. There have been no cases of illness among the staff or pupil-nurses during the year. Fourteen pupil-midwives qualified and ten pupil maternity nurses.

Miss Newman, who for many years was Matron of St. Helens, first at Christchurch and for the last six years at Wellington, retired on the 30th September, 1928, her place being taken by Miss M. Bagley, Matron of St. Helens, Wanganui. Miss Newman's knowledge and experience of midwifery are not entirely lost to the Department, as she has now been appointed a member of the Nurses and Midwives Registration Board.

Auckland.—This, the largest of the State maternity hospitals, has had a daily average of twenty-seven patients to its thirty beds. The nursing staff consists of Matron, Sub-Matron, and six doubly qualified nurses, while there are usually twenty-nine to thirty pupils in training. Here the average number of hours worked by nurses daily is eight and a half to nine. Pupil-nurses are given days off duty in turn when possible. During the year one member of the permanent staff was on sick-leave for three months owing to heart-condition. Two pupil-nurses were off duty for varying periods—one as the result of an accident, the other suffering from the effects of influenza—but otherwise the health of the nurses has been good throughout the year. Unfortunately there have been several staff changes, and it has not always been easy to secure suitable substitutes, and this makes the administration of the hospital a somewhat difficult proposition for the Matron and Sub-Matron. Miss Broadley and Miss Potts are still occupying these positions. Twenty-five pupil-midwives qualified and thirteen pupil maternity nurses.

Christchurch.—This hospital, with fifteen beds, has that number occupied daily. Miss Trotter, who has been Matron for the past two years, resigned in order to take up private work. Her place will be taken by Miss N. M. Ward, recently on the staff of St. Helens, Auckland, who has just completed a course of training in Plunket nursing. Miss F. Wilson is still in charge of a very successful ante-natal clinic in connection with the hospital, and carries out an extensive follow-up practice in the homes of patients. It is greatly regretted that Dr. Lindsay, whose work as Medical Officer was so highly appreciated by the Department, was obliged through illness to relinquish his post, which is now being filled by Dr. Averill. The trained staff, apart from those already mentioned, consists of the Sub-Matron and three doubly qualified nurses, and there are fifteen pupil-nurses. Eleven pupil-midwives qualified and nine pupil maternity nurses. The average number of hours worked by the pupils is nine hours daily. Days off to the number of eight to ten are given to nurses undergoing the eight-months course, while those taking the twelve-months course are given fourteen days during that period if it is possible to arrange to do so.

Dunedin.—There are sixteen beds in this institution, with a daily average of 6·4 patients. In the district sixty-one patients were attended outside. Staff: Matron, Sub-Matron, and one sister; six pupils in training. In future the number of the latter will be reduced in accordance with an agreement made with the Medical School whereby the training of midwives is to be discontinued in order that medical students may have improved facilities for gaining experience in this branch. Maternity-nurse training will still be carried on in the institution. As there appear to be rather more midwifery training-schools (for nurses) than necessary or desirable, this change should prove beneficial in more ways than one. Three pupil-midwives qualified and eight pupil maternity nurses. The pupil-nurses' hours are much the same as in the other St. Helens Hospitals, leave being arranged as work permits throughout the period of training.

Miss M. J. Gow, after twenty-two years' service as Sub-Matron, was obliged to retire on superannuation on account of ill health in November, and Miss Sparkes was appointed to succeed her. Miss Oppenheim is still Matron.

Invercargill.—In this hospital of twelve beds the daily average is 8·5. The work is increasing, and the homelike atmosphere of the place, set in its pleasant garden, is greatly appreciated by the patients. Miss Arnold is assisted by a Sub-Matron, Miss Paterson, recently promoted from the staff of St. Helens, Auckland, and a doubly qualified sister. There are seven pupils in training, but as soon as sufficient accommodation is provided another trainee will be added to the number in order that it may be possible to give regular days off duty. There have been no cases of illness among staff or pupils during the year. Four pupil-midwives qualified and eight pupil maternity nurses.

Wanganui.—With eleven beds this hospital has a daily average of seven patients, while twelve were attended on the district during the year. This latter number will probably be increased when the additional accommodation is provided at the Nurses' Home, the present staff being too small to cope with more. An ante-natal clinic is also to be erected for the ever-increasing number of patients who seek advice and treatment.

Miss Boyce, late Sub-Matron of St. Helens, Wellington, succeeded Miss Bagley as Matron when the latter was promoted to Wellington in September. Miss Joyce, who was also on the staff at Wellington, was transferred to Wanganui as Sub-Matron about the same time, each of the two Matrons concerned thus having the benefit of an assistant with whom she had already been closely associated in her work.

There are six pupils in training, but with adequate accommodation provided another will be added to provide for shorter hours on duty than can be arranged at the present time. Seven pupil-midwives qualified and four pupil maternity nurses. With regard to days off duty, the practice is to grant these when the number of indoor patients is under six. One pupil only was ill during the year, being off duty for several days with an attack of tonsillitis.

Gisborne.—There are fourteen beds; daily average, nine patients. Miss Clark and Miss E. Knight still hold the positions of Matron and Sub-Matron respectively, and are especially successful in dealing with Maori patients, who constitute a large proportion of their cases. With them is associated a doubly qualified sister, and there are six pupils in training. Eight pupil-midwives qualified and two pupil maternity nurses. With the alterations made when an ante-natal clinic was established the building has been greatly improved and is now much more convenient for working.

Taking the St. Helens Hospitals as a whole, the past year has been one of progress and increased usefulness.

District Nurses to Maoris.

This body of women continues to do splendid work, mainly in the backblocks of the country. They number twenty-three, and the majority of them are doubly qualified, so that they are able to cope with any emergency. The usual practice is for the Department to pay their salaries, though in some instances the Hospital Boards are responsible. Their accommodation and means of transport are, as a rule, the concern of the Hospital Board of the district, and efforts are being made to bring more uniformity into the scheme.

J. Bicknell,
Director, Division of Nursing.

PART VI.—MAORI HYGIENE.

I have the honour to submit a brief annual report of the work done by the Division of Maori Hygiene for the year ended the 31st March, 1929.

General Health.

The general health of the Native people continues of show steady improvement, and, on the whole, even better than previous years. The improved sanitary and housing conditions, individualization of their lands (thus enabling them to become separated from the previously overcrowded state), becoming more amenable to advice and treatment are factors contributing to the very satisfactory position for the year just closed.

As mentioned in my previous report, the younger and more enlightened Natives have assumed control of affairs and have shown that what was acceptable to their elders in the past is not sufficient for the present, and this is reflected throughout the villages by the general advancement of sanitary improvements and living-conditions generally.

The continued installation of water-supplies has assisted greatly in health matters, and, although the number this year is not so great as previously, we have nevertheless made provision for twelve supplies within the settlements of Kerepouia, Te Kao, Tongoake (in the North Auckland District), and Opoutama (East Coast), at a total estimated cost of £600.

The drainage scheme laid out last year at the Te Kuiti Pa is now proceeding, and the work should shortly be completed. This entails four up-to-date W.C.s, drainage from large dining-hall, and extension of the borough sewer so that connections can be made therewith, the total cost being £200, of which sum the Natives are contributing £50, with all labour in addition. A drainage scheme was also laid out at the Ngaruawahia Pa, provision being made for six up-to-date W.C.s and septic tank, with the necessary drainage, at a total estimated cost of £175, the Natives contributing £1 for £1 and supplying labour in addition. This work I hope to commence as soon as details of finance are completed.

These will be permanent works, and give some indication of the desires of the Native people to better the conditions of the past and to ensure improved sanitary facilities in the interests of health in the future.

Privy accommodation at the individual homes show greatly increased numbers over previous years, and the erecting of these is fast becoming a routine procedure.

Such innovations as I have mentioned and the casting-aside of old customs in these directions all take time to being about, but nevertheless are proceeding very satisfactorily, and the teachings of the Department, not only in these matters, are being rewarded by the co-ordination of efforts of the Native people in the preservation of health and the betterment of sanitary conditions generally. It is nevertheless necessary to exercise strict supervision and personal touch during the transitory stages of introducing customs and ideas differing from those that have existed amongst our Native people since the beginning.

Maori Health Councils.

These Councils continue to show their usefulness, and I have nothing but praise for their endeavours in carrying on their duties as defined under the Acts they administer. They work in co-ordination with the various Medical Officers of Health, Inspectors, and nurses. Their organizations and Village Committees, spread as they are throughout the country, are of valuable assistance in carrying out the dicta of the Department generally.

We have completed the formation of four additional Councils, all being in the South Island, and which include the Chatham Islands. By-laws have been prepared in each instance and forwarded for approval, and when these are returned I shall have the necessary gazetting attended to, after which they can function accordingly. This has entailed a large amount of work, but I feel sure that when completed these organizations will give us good service and, like all other Councils, be a valuable agency in carrying on the works of the Department. This completes the whole of our Councils, with the exception of the Waikato District, which, however, I hope shortly to link up.

We are not experiencing quite so much difficulty as last year with the Ratana element in their attempts to usurp the powers and functions of our Councils. This is accounted for by the determination of our Chairmen to demand compliance of the by-laws from this element, and possibly by the movement generally being not so pronounced as previously. We have in the past received passive resistance from large sections of these people, and although a deal of it still exists it is not nearly so general.

The concealment of sick cases and refusal to call medical and nursing aid has caused the Department a deal of trouble by the spread of disease which, had we known of in the early stages, could have been checked. However, the position is easing by the misguided element becoming more amenable to the dictates of the Department.

Typhoid Fever.

During the year we had two outbreaks, one being in the Hot Lakes district, where twenty-two cases were treated, and the other in the East Coast area, where fourteen cases occurred. Fortunately we were able to confine the sickness to their own particular settlements, and no further spread occurred. It is satisfactory to know that notwithstanding these two outbreaks the incidence of the disease shows marked improvement over previous years. Sporadic cases will no doubt present themselves, but I have every reason to forecast a diminution of the disease year by year.

The general improvement in sanitary and housing conditions is being reflected to a marked degree in the lessened incidence of the disease, which was a few years previously a menace amongst the Native people.

Instructions and advice to the Native are sent in pamphlet form in the Maori language for distribution amongst the people, and these, together with lectures by our Native Inspectors, nurses, and myself, provide a valuable means of imparting information in safeguarding the position generally.

Dysentery.

Towards the end of March an epidemic occurred, the majority of the cases being in the Auckland District. The fatality rate has certainly been high to the total number of cases, but the position is being carefully watched, all settlements are being combed, and every precaution being taken to prevent its spread. At the time of writing I am still engaged upon the supervision of the areas affected.

Influenza.

The Native, as the white, suffered a good deal of influenza, but, although widespread, it was really of the mild type, very few severe cases being reported. Special instructions for prevention and treatment were tabulated in pamphlet form in the Maori language and distributed broadcast throughout New Zealand, and many appreciative replies have been received from the people concerned.

Tuberculosis.

A good deal of the disease exists, and, although fairly scattered, I believe the northern portion of New Zealand to be the most seriously affected, especially the Hokianga district. The low-lying, wet, bleak, and foggy areas on the shores and branches of Hokianga River often result in damp living-conditions among the resident Natives. The Maori is not really prone to the disease, and it is in the lesser bloods that the trouble lies. However, speaking generally, the position is not so serious as it was previously, owing to the improvement in living-conditions by better housing and the forsaking of the lower levels for the higher areas, the continued supervision of our nurses and Inspectors, propaganda, and personal visits by myself amongst them.

There are difficulties to surmount in dealing satisfactorily with tuberculosis amongst the Natives —the expense entailed by travelling to and from the various sanatoria, and largely by incipient cases not being reported in the early stages to receive treatment at the onset of the disease. The Natives in the past have raised objections to going to the various sanatoria, but this aspect is passing quickly, and many now enter through the channels provided by the local Hospital Boards. Pamphlets in the Maori language are distributed amongst the people, and these, together with the constant supervision exercised by the Department, will do much to improve still further the whole aspect surrounding the position.

Trachoma.

Since joining the Department I have made many inquiries regarding the incidence of this disease amongst the Natives, and, although a deal of ground has yet to be traversed, I am of opinion that the trouble is one that need not cause much apprehension. The latest figures available give the number of probable sufferers as forty, which, however, cannot be accepted as strictly correct, as many of the cases, no doubt, are of an altogether different type. However, I am continuing my investigations, and upon completion I shall make the matter one for special report.

Subsidized Medical Officers to Natives.

This matter has received a deal of my attention, and so far as the northern portions of the South Island are concerned I have submitted a special report to you, from which you will observe that I propose to eliminate one or two subsidies and substitute a nurse in lieu of medical service. The North Island subsidizes medical officers, all, upon the whole, giving splendid service, but these will also be made the subject of a special report upon completion of my investigation.

Nursing Service.

It is with pleasure I have again to report upon the valued service of these officers. I am of opinion that this service should be extended, and in this connection I have already reported fully upon this matter.

Native Inspectors.

From my own observations I am satisfied these officers give valued service, their special knowledge of the Maori being the factor that leads to the success of their work. I consider these officers should have the opportunity (through the various Medical Officers of Health) of improving their knowledge of dealing with epidemic diseases and sanitation generally by having examinations set for them in such subjects. I have discussed the matter with the Medical Officers of Health and Directors of other Divisions, and feel sure when this has been finalized we shall receive still better service from these officers.

Population.

The Maori population, according to the latest figures available (April, 1928), totals 64,817, an increase over the previous year of 583, or 0·9 per cent., the numbers and proportional strength of Maoris in the various provincial districts being as follows :—

Provincial District.	Numbers of Maoris.	Percentage of Total Maoris.	Percentage of Maoris to Europeans.
Auckland	46,464	71·68	10·45
Hawke's Bay	4,900	7·56	7·21
Taranaki	3,820	5·89	5·49
Wellington	6,777	10·45	2·37
Total, North Island	61,954	95·58	7·14
Total, South Island	2,863	4·42	0·55
Totals for New Zealand	64,817	100·00	4·67

HOUSING-CONDITIONS.

Supplementing my previous remarks under "General Health" regarding housing-conditions being a large factor in the improvement of health conditions, I give for your information the approximate number and class of dwelling which house the Native people :—

	Number.	Percentage of Specified Total.
Private dwellings	7,347	68·70
Huts and whares	1,800	16·83
Other dwellings	277	2·59
Tents and camps	1,270	11·88
Not specified	77	..
Total	10,771	100·00

Class of Building.

Private houses of three, four, or more rooms	7,347
Whares of one, two, or more rooms	1,702
Station hands' quarters	29
Meeting-houses	119
Boarding-houses	30
Rooms attached to shops	28
Educational beds	5
Miscellaneous	66
Bush camps	398
Slab huts of two rooms	98
Other temporary structures	566
Tents	383
Total	10,771

It will be observed that the dwellings with three rooms or more are by far in excess of any other, and many of these are up to date in every respect ; others, again, are of the crude variety, but they are constantly undergoing improvement. The number of tents occupied may appear large, but it is to be remembered that the Natives are a migratory people, and this aspect to a marked degree explains this type of housing. It is, nevertheless, healthy, and will ever remain as part of the housing of the people.

CONCLUSION.

I wish to express my appreciation to the officers under my control, who have at all times assisted to further the work of the Division.

To the Directors of other Divisions, Medical Officers of Health, and their staffs, I am also indebted for the valuable assistance rendered in the co-ordination of their services with those of my Division.

E. P. ELLISON,
Director, Division of Maori Hygiene.

PART VII.—MATERNAL WELFARE.

SECTION I.—REPORT OF THE CONSULTING OBSTETRICIAN,

HENRY JELLETT, M.D. (DUBL.).

The work with which I have been entrusted as Consulting Obstetrician to the Department has continued in a systematic and satisfactory manner throughout the past year. So far as it is specially concerned, there is, I think, only one matter which calls for comment.

This matter is my efforts to get into touch with medical practitioners in all obstetrical cases which come to my knowledge in which either the nature of the case or the ultimate result suggest that my personal advice or criticism might be of assistance. I have had occasion to deal with a number of such cases. The majority of these were noted in the monthly returns from maternity hospitals or in the reports from general hospitals on maternity patients admitted to their wards. A smaller number were cases directly reported to me by the medical practitioners concerned. As such reports constitute the only means of getting into touch with cases which occur in private houses, I hope their number may be increased. There have been some sporadic objections to my action in this respect, practically all of which were founded on the idea that the Department was trying to interfere with the rights of private practitioners, and that in some mysterious way some record was kept which might be opposed to their legitimate interests. With the object of getting rid of these wholly erroneous ideas, I have addressed several meetings of medical practitioners during the current year, and tried to explain the objects of my action. So far I have addressed on this subject the Obstetrical Section of

the British Medical Association at its Wellington meeting, the local branch of the Obstetrical Society at Christchurch, and the Auckland, Taranaki, Wellington, and Hawke's Bay Branches of the British Medical Association. I am glad to be able to say that after I had explained to each meeting the actual facts of the case I received every encouragement to continue as I was doing. I hope later to address other branches of the Association.

I referred last year to two matters of clinical interest. The first was eclampsia—its notification, treatment, and mortality rate; and the second was the excessive use of the midwifery forceps.

The position in regard to eclampsia is improving in all three respects, as is shown by the following table:—

Table A.—Eclampsia.

	Lived.		Died.		Total.	
	1927.	1928.	1927.	1928.	1927.	1928.
Ante-partum eclampsia—						
(*a*) Conservative treatment	27	42	1	7	28	49
(*b*) Accouchement force	1	..	2	..	3	..
(*c*) Cæsarean section	5	3	2	3	7	6
(*d*) Induction of labour	5	5	4	2	9	7
Post-partum eclampsia	10	21	5	3	15	24
Total notifications	..	..	..	..	62	86

Death-rate: 1927, 22·9 per cent.; 1928, 17·2 per cent.

The position regarding the excessive use of the forceps in maternity hospitals has also improved, as can be seen from the following table:—

Table B.—The Rate of Forceps Application.

Hospitals of	Number of Full-term Labours.		Percentage of Forceps Deliveries.	
	1927.	1928.	1927.	1928.
(1) 50 confinements and under ..	3,794	3,912	15·06	12·35
(2) From 51 to 100	5,589	4,750	12·63	10·78
(3) From 101 to 150	3,044	2,566	16·29	12·70
(4) Over 150	4,229	6,750	7·35	7·85
Dominion totals.. ..	16,656	17,978	12·51	10·30

It is to be noted that the percentage rates are calculated on the number of full-term labours, and not on the number of total deliveries. As I said last year, I think that 6 per cent. may not unfairly be regarded as the average rate which ante-natal care and the proper management of the first and second stages of labour should render possible without causing unnecessary suffering or injury to mother or child. If this view is right, there is still room for improvement. At the same time, if the rate of forceps application in private houses has also been reduced to approximately 10 per cent., I do not regard the position as unsatisfactory. I fear, however, that this is very far from being the case; but I have no reliable information on the subject before me.

There are still some fifteen hospitals in the Dominion in which the forceps rate is 30 per cent. or over. I propose to approach these hospitals on the matter, through the respective Medical Officers of Health, in a similar manner to that in which I last year approached hospitals with a rate of 40 per cent. or over. It is not without interest to note that, of these fifteen hospitals, eleven are to be found in Group 1, two in Group 2, and only one in each of the other groups respectively. I propose next year to approach hospitals in which the rate of application exceeds 25 per cent.

I have recently undertaken the compilation of a short work on "The Cause and Prevention of Maternal Mortality." During its preparation certain matters relating to the manner in which this mortality is reduced in other countries have impressed me so much that I should like to take the present opportunity of referring to them.

The more I see of the results of the present system of obstetrical care, the more I am inclined to believe that a permanent reduction in the present rate of maternal mortality can only be obtained by the radical change of such system. Radical changes, even if they are recognized as reforms, are notoriously difficult to effect. Still, there is no reason that some of these changes should not come within a comparatively short period. For others, however, so complete a re-education of the public in obstetrical matters is necessary that time for such re-education is essential.

If we compare two sets of statistics, and then examine the factors which are responsible for the difference between them, we shall, I think, be guided towards certain definite conclusions, to which I shall later refer. These statistics are as follows :—

	Maternal Mortality.
Part of the British Empire (Great Britain, Ireland, Australia, New Zealand), six million births, approximately	4·22 per 1,000 live births.
Holland and the Scandinavian countries, two million births, approximately	2·53 per 1,000 live births.

The difference between these rates is so great that there must be some very definite causes at work to account for it, and I think a full examination of these causes will well repay any one interested in the subject. Here it is only possible to summarize them briefly. There are five essential differences between midwifery practice as carried out in Holland and the Scandinavian countries and in the British Empire.

In the first place, the education of the medical student in obstetrics is, in Holland, as full as is that in medicine or in surgery. I think I am probably correct in saying that the time devoted by students to the subject of obstetrics and gynæcology is at least four or five times longer than that devoted by them to the same subjects in Otago University, or, indeed, in most other parts of the British Empire.

In the second place, the training of the midwife is more carefully carried out in Holland and the Scandinavian countries. In the former country the period of training is three years. In the latter countries it is two years. In New Zealand the corresponding course is a year and four months; in Great Britain it is a year. The education in aseptic technique is thus far fuller in Holland, with a corresponding reduction in the incidence of sepsis.

In the third place, ante-natal diagnosis and care have been fully developed. The result of the former is that abnormal conditions have been recognized before labour begins, and either have been or can be treated under the most satisfactory conditions. The result of the latter is that the various diseases of pregnancy are either prevented or properly treated. It is impossible to overestimate the importance of these two things. Existing septic conditions are recognized and their consequences in great part or in whole prevented. Difficult labour is anticipated and loses three-fourths of its dangers. Eclampsia, a disease which is almost wholly preventable if the patient will submit to proper care, is almost wholly prevented. If all deaths preventable by ante-natal diagnosis and care were prevented, it would, I think, reduce maternal mortality by nearly 2 per 1,000. That is to say, it would bring it down to a rate comparable with that of Holland and the Scandinavian countries.

In the fourth place, all normal cases of midwifery are attended by midwives who are compelled by law to obtain medical assistance if any abnormality occurs.

In the fifth place, in most parts of the country specialists' advice is obtainable by general practitioners when it is wanted.

It is difficult to see why, in the course of time, New Zealand cannot reach the standard of obstetrical practice of Holland. Both the medical profession and the public have everything to gain from such progress, and already several steps have been taken along the road leading to the goal. Since my last report a Chair in Midwifery has been created in Otago University and the obstetrical curriculum has been revised. Practical teaching is, however, still limited by the want of a proper maternity hospital in Dunedin. Moreover, the professorship ought to be a full-time post. When these two changes are made it will be possible for obstetrical teaching in Dunedin to become truly effective, always providing that the University Council gives to obstetrics the position in the medical curriculum which its importance demands, and not the position which tradition has sanctioned for it. Unless this is done in no uncertain manner, the net result will, in my opinion, continue to be unsatisfactory.

The training of midwives has been already very much improved, and, although my inspection of the training-schools for this year is not complete, I can see that considerable progress has been made, and that in most hospitals the usual initial resistance to change is disappearing. I think that if a temporary interchange of staff nurses, or even of Matrons, could be made between the different hospitals it would lead to a still further improvement in technique. I am not so satisfied as to the training of maternity nurses in smaller hospitals, though perhaps it may be because I know little of them. Still, I have a feeling that hospitals are recognized as training-schools for maternity nurses on other grounds than suitability, and that it is possible for ill-trained maternity nurses to be thus created. I am afraid I do not regard the fact that a candidate successfully passes her examination as a proof that she is necessarily to be regarded as a reliable nurse, particularly in so far as aseptic technique is concerned.

Ante-natal care and diagnosis can only be carried out by carefully controlled ante-natal clinics which work in close touch with the Medical Officer of a hospital or with private practitioners. Such clinics have been established at the various maternity hospitals which train midwives, and I hope will soon be extended to those which train maternity nurses. Still, they have only reached a small part of the community, and a great increase in their number is essential. The Plunket Society has established clinics in the main centres. It would be of enormous benefit to pregnant women if the society could create clinics in the other towns of New Zealand, provided that such clinics were kept, as I have said, under close supervision and worked in association with local medical practitioners. I trust that it may be possible for the society to undertake this much-needed work. As I have already said, ante-natal care is, next to asepsis, the most important factor in the reduction of maternal mortality.

The universal management of normal labour by midwives is one of those considerable changes which can only come gradually. When it does come, as I believe it will, it will mean that the medical profession must become to a greater degree responsible for the management of every pregnant woman during pregnancy, both in order that the care of pregnancy may be effective and that it may be as certain as is possible that labour will be normal. It will also mean that the medical attendant must continue to be, as at present, responsible for the treatment of all abnormal cases. Lastly, it will mean that he must be responsible for the "post-natal care" of the patient—that is to say, for the diagnosis and treatment of all injuries, complications, and ill health resulting from labour. The importance of "post-natal care" is well recognized, but it has not yet become a matter of general adoption.

It is not difficult to see how great a benefit it would be to the medical profession to be freed from the irksome demands of normal labour. The advantages to the patient are also obvious. Medical attendance on normal labours brings two inevitable disadvantages in its train. The first is the element of haste, which under present conditions is almost unavoidable even by those who most clearly recognize its dangers; the second is the additional risk of sepsis which the attendance of a second attendant imply. If this second attendant—*i.e.*, the medical practitioner, whose profession necessarily brings him into contact with many sources of septic infection—can be eliminated, it seems obvious that the septic death-rate will fall. The disadvantages which I have mentioned are inevitable; but the blame for them must not be thrown on the medical profession: they are the result of the wrong system which has grown up and which is due at least as much to the insistence of the general public as to the wish of the medical profession. Once such wrong system is established, then the disadvantages I have mentioned are inevitable. Until the example of Holland is universally followed, it is well to remember that the essential part of a medical practitioner's duty is ante-natal care and diagnosis, and that his presence during the final stages of a normal labour, while often gratifying to the patient, is not essential to her welfare.

The results of the association of effective ante-natal care and of the management of normal cases by midwives can be seen from the statistics of the Queen Victoria Jubilee Institute. Amongst 317,758 patients confined under the care of the Institute's nurses, with medical assistance in abnormal cases, the total mortality, including deaths from associated disease which are not included in official statistics, was at the rate of 1·64 per 1,000 deliveries; while if this rate is adjusted by excluding associated deaths, and on a basis of live births instead of on a basis of deliveries, it falls to approximately 1·41 per 1,000 live births. Such a rate is not only a considerable improvement on that of Holland and the Scandinavian countries, but also clearly shows that the low mortality-rate of these countries is not due to any special qualities of its women, but can be also obtained in British countries. In this connection the following statistics may be of interest:—

Table C.—Comparative Causes and Rates of Maternity Mortality.

Cause of Death.	Rate per 1,000 Live Births.			Rate per 1,000 Deliveries, Queen Victoria Jubilee Institute.*
	England and Wales.*	New Zealand.*	Holland.†	
Puerperal sepsis	1·46	1·82	0·92	0·33
Puerperal albuminuria and convulsions	0·72	1·16	0·45	0·16
Puerperal hæmorrhage	0·52	0·69	0·51	..
Accidents of pregnancy	0·45	0·49	0·35	..
Accidents of labour	0·44	0·29	0·21	0·33‡
Puerperal embolism, sudden death, and phlegmasia dolem	0·33	0·37	0·38	0·18
Other causes	0·30	0·05	0·30	0·16
Diseases independent of childbirth ..	..	..	..	0·48§
Total death-rate	3·96	4·87	2·59	1·64 1·41‖

* Six years' statistics. † One year's statistics. ‡ Including hæmorrhages. § Such cases are not included in official statistics. ‖ Adjusted rate comparable with official statistics.

To show what can be done in New Zealand under most favourable conditions, I append a mortality table similar to the above compiled from the collected statistics of the St. Helens Hospitals of this country. It must be noted that the number of patients admitted to the St. Helens suffering from the diseases of pregnancy is below the normal rate, and that the death-rate may not be strictly comparable with that of the country generally for this reason. On the other hand, all deaths, whether they occurred in these institutions or, in the case of transferred patients, in other hospitals, are included.

Table D.—St. Helens Hospitals, 1928.

Hospital.	Total Deliveries.	Total Deaths.
Auckland	.. 670	0
Christchurch	.. 356	1
Dunedin	.. 157	1
Gisborne	.. 176	0
Invercargill	.. 265	2
Wanganui	.. 155	0
Wellington	.. 599	1

Mortality-rate per 1,000 deliveries, 2·1.

So far there has been no attempt made in New Zealand to provide medical practitioners with the assistance in difficult cases which obstetrical specialists can give; and, indeed, there does not seem to be any great recognition of the need for such specialists, either by the medical profession or the public. This is apparently contrary to the view held in Great Britain, where there is a demand for the provision of specialists who will come to the help of the general practitioner. There are few conditions in medicine or in surgery which both call for, and can be so much benefited by, special skill as can some of the grave complications of midwifery. For this reason it is, to my mind, imperative that facilities should be created for the education of obstetrical specialists in this country. Such facilities can be provided by the larger St. Helens Hospitals and by the general hospitals of the main centres. I therefore very much regret to find that neither in the Wellington nor the Auckland General Hospital is there any provision for the appointment of an obstetrician or a gynæcologist on the honorary staff. The absence of such an officer means that obstetrical patients admitted to these hospitals drift under the care of the surgeon on duty, irrespective of whether he has either obstetrical leanings or any special obstetrical knowledge. In this way not only is there a tendency for the treatment of the individual patient to be conducted on surgical as opposed to obstetrical lines, but the opportunity of training an obstetrical specialist is lost, as is the opportunity of teaching the students of the hospital. I very much hope, therefore, that the system which at present prevails at the Christchurch and Dunedin Hospitals, whereby a gynæcologist is appointed under whose care all obstetrical patients are admitted, will become universal through the Dominion.

There is another matter whose consideration I should like to include with the above. The proper environment of lying-in women, whether in hospitals or in private houses, is a matter of great importance, inasmuch as without it it is impossible to ensure asepsis and the satisfactory management of obstetrical emergencies. The environment of the patient in private maternity hospitals has been enormously improved by the efforts and inspections of Dr. Paget and the officials of the different Health Offices of the country. There is, however, one point to which I am not sure that sufficient attention has been paid. The great majority of private hospitals are, owing to their original construction, structurally unsuited for the purpose to which they are put, and I do not know that it is possible to make them suitable. It is, however, impossible to change them by a stroke of the pen. The economic conditions under which they are worked are such that money is not available to rebuild them. I think, therefore, that we must regard their continuance as inevitable until they are gradually eliminated by the establishment of hospitals of a better type. On the other hand, I do not think that the continuance of the type should be encouraged by the licensing of *new* hospitals of a similar type. I think that, unless the special circumstances of the case forbid it, new maternity hospitals should only be licensed if they comply with the structural needs of a maternity hospital. The Christchurch St. Helens was originally placed in an old hotel, and circumstances have compelled it to remain there until the new hospital is built. No one would at the present time sanction the creation of a large maternity hospital under similar conditions, and I think that the creation of private maternity hospitals in houses with similar defects should equally be regarded as improper.

Earlier in my report I suggested that the examination of the differences between the present conditions under which obstetrics are practised in Holland and the Scandinavian countries and in the greater part, if not the whole, of the British Empire would lead us towards certain conclusions. I now suggest that these conclusions are as follows :—

(1) That it is difficult for this country to provide an *adequate* training in obstetrics for maternity nurses, midwives, medical students, or obstetric specialists, and that, hence, every opportunity of improving or providing such training must be taken.

(2) That proper ante-natal care and diagnosis must be regarded as one of the great essentials of modern obstetrical practice.

(3) That the suitable environment of the patient during and after labour, both in maternity hospitals and in private houses, is essential. In the former such improvement is being carried out; in the latter, I fear, we are still only skirting the edge of the improvement necessary.

(4) That the time is coming, if it has not already come, to consider if the interests of the public and of the medical profession will not be best served by handing over the management of normal labour to midwives. By so doing it may be possible to ensure that the wholly underpaid obstetrical work of the medical profession will, at any rate, be directed into the channels in which it is essential to the exclusion of those in which it is not.

In conclusion, I wish to thank you, sir, Dr. Watt (the Deputy Director-General), and the different officers of the Health Offices throughout the country for the kindness and assistance I have received throughout the past year.

ST. HELENS HOSPITALS.—GENERAL STATISTICS SUBMITTED BY THE CONSULTING OBSTETRICIAN.

The work of these hospitals has continued in a most satisfactory manner through the past year. The accompanying statistics, which are published for the first time, show its nature and the excellence of its results. It is obvious that such results can only be the result of the closest relations between the medical and the nursing staff and of the recognition by the former that they are responsible for the treatment and general management of every patient who comes into the hospital.

It is only right to call attention to the very low rate of mortality amongst the patients of the St. Helens Hospitals. Five deaths occurred during the year amongst 2,378 patients, a rate of 2·1 per 1,000 births. This rate contrasts very favourably with that of last year, when nine deaths occurred amongst an approximately similar number of patients. Such a low rate of mortality testifies eloquently to the care which is exercised by the Medical Officers, Matrons, and all others concerned in the care of the patients.

St. Helens Hospitals.—General Statistics, 1928.

—	Auckland.	Christchurch.	Dunedin.	Gisborne.	Invercargill.	Wanganui.	Wellington.	Total.	Percentage of Total Deliveries.
Total admissions	705	377	171	193	271	171	626	2,514	..
Total deliveries	670	386	157	176	265	155	599	2,378	..
Primiparæ	195	103	40	40	52	29	186	645	..
Multiparæ	475	253	117	136	213	126	413	1,733	..
Presentations—									
Vertex	650	332	150	148	242	147	541	2,210	92·93
Occipito-posterior, persistent	10	11	6	23	9	4	27	90	3·78
Face	2	..	..	1	1	...	1	5	0·21
Brow	3	..	..	2	..	..	2	7	0·29
Breech	10	13	3	3	10	8	21	68	2·86
Transverse	1	..	..	3	1	..	1	6	0·25
Twins	6	6	2	4	3	4	5	30	1·26
Complications of pregnancy—									
Hyperemesis	..	1	1	..	..	1	1	4	0·17
Hydramnios	6	1	13	7	..	1	5	33	1·39
Pre-eclamptic toxæmia	27	3	1	2	1	2	10	46	1·93
Eclampsia	1	2	1	..	1	..	5	10	0·42
Nephritic toxæmia	10	1	1	1	8	3	..	24	1·01
Hæmorrhages—									
Unavoidable	..	2	1	1	3	1	2	10	0·42
Accidental, external	4	..	2	..	1	1	2	10	0·42
Accidental, internal	..	..	..	..	..	1	..	1	0·04
Post-partum, atonic	12	4	8	1	2	3	6	36	1·51
Post-partum, traumatic	2	..	..	..	..	..	1	3	0·13
Post-partum, internal traumatic	..	..	1	1	..	..	..	2	0·08
Lacerations of genital tract—									
Perinæum	112	46	39	8	9	19	124	357	15·00
Cervix	2	1	..	..	..	..	..	3	0·13
Uterus	..	..	..	..	1	..	..	1	0·04
Contracted pelvis, inlet	34	..	3	2	1	1	1	42	1·77
Contracted pelvis, outlet	6	..	..	..	1	1	1	9	0·38
Prolapse of cord	4	..	..	..	..	1	2	7	0·29
Complications of puerperium—									
Sepsis, local	3	1	..	2	4	4	1	15	0·63
Sepsis, general	..	..	1	..	2	1	1	5	0·21
Pulmonary embolism	..	..	..	..	1	..	..	1	0·04
Insanity	..	..	..	..	..	..	1	1	0·04
Crural phlegmasia, venous	..	1	1	..	..	..	..	2	0·08
Crural phlegmasia, lymphatic	..	..	..	..	1	..	..	1	0·04
Mastitis	10	3	..	2	1	1	..	17	0·71
Operations—									
Internal pelvimetry	..	4	..	..	1	..	..	5	0·21
Induction of labour	6	5	4	1	..	2	49	67	2·82
Forceps	35	11	6	5	1	3	24	85	3·57
Version	2	1	6	4	5	1	4	23	0·97
Manual removal of placenta	4	1	2	3	4	1	..	15	0·63
Cæsarean section—									
Abdominal, conservative	6	3	1	..	..	1	1	12	0·50
Abdominal, radical	1	1	..	..	..	..	..	2	0·08
Pubiotomy	..	1	..	..	..	..	..	1	0·04
Craniotomy	3	..	..	..	..	..	..	3	0·13
Cleidotomy	1	..	..	..	..	..	..	1	0·04
Decapitation	1	..	..	..	..	..	..	1	0·04
Morbidity—Total	17	8	4	5	9	6	25	74	3·11
Mortality—Total	..	1	1	..	2	..	1	5*	0·21
Infant statistics—									
Total births	676	356	144	180	263	159	603	2,381	..
Premature—									
Alive	11	8	14	1	6	6	18	64	2·69
Dead	3	4	..	..	1	2	8	18	0·76
Full term—									
Alive	650	337	126	174	258	148	558	2,251	94·54
Dead	4	7	4	5	5	3	19	47	1·97
Children born alive who died in hospital	7	6	2	5	5	1	5	31	1·30
Total born dead or died in hospital	22	17	6	10	11	6	24	96	4·03

*In this figure are included all deaths which occurred either in the hospital wards or among patients confined in the hospital and transferred later to another institution.

St. Helens Hospitals.—Mortality Statistics, 1928.

Hospital.	Patient's Initial.	Place of Death.	Cause of Death.	Remarks.
Christchurch	A	General Hospital	Eclampsia ..	Cæsarean section adopted as other means had proved unavailing.
Dunedin ..	L	St. Helens ..	Septic infection ..	Associated with lobar pneumonia.
Wellington	S	,, ..	Eclampsia.. ..	Admitted in a comatose condition after delivery.
Invercargill	E	Southland Hospital	Septic infection and pulmonary embolus	..
,,	C	,,	Septic infection ..	Following rupture of uterus and hysterectomy.

SECTION 2.—REPORT OF THE INSPECTOR OF PRIVATE AND MATERNITY HOSPITALS.

T. L. Paget, L.R.C.P. (Lond.), M.R.C.S. (Eng.).

I have the honour to submit my annual report on licensed hospitals, maternity hospitals, and ante-natal clinics, with certain remarks on their influence upon maternal welfare, for the year ending 31st March, 1929.

From personal inspection and from the reports of the Medical Officers of Health of the different districts, I have to report that the 371 hospitals which it is my duty to inspect have, on the whole, been maintained in a satisfactory condition. These hospitals consist of seven St. Helens Hospitals; fifty-nine maternity hospitals or maternity wards attached to hospitals; ninety-three private medical and surgical hospitals; forty-five mixed medical, surgical, and maternity hospitals; and 167 private maternity hospitals. This shows an increase of six public maternity hospitals since my last report. During the past year twenty-six licensed hospitals were voluntarily closed—some because they were superfluous, or for other reasons did not meet with sufficient support, and some because they were not being conducted satisfactorily.

The comparatively low charges for obstetrical nursing and hospital services as compared with those for medical and surgical services continues to create a difficulty when the question of establishing new private maternity hospitals is being considered. The economic factor makes it impossible for private enterprises, which must look to a reasonable financial return, to build more than is just necessary for the purposes for which it is intended; and in most instances only necessary conveniences can be afforded, and others that I regard as desirable, but not essential, have to be omitted.

The same economic condition is a considerable factor in making it difficult to get private maternity hospitals equipped in such a way that sterilization can be carried out with ordinary facility. While the standard of sepsis has undoubtedly been considerably improved, there are still a number of instances where the licensees prefer to adopt methods of sterilization which are cumbersome and costly in fuel, time, and trouble sooner than spend a small sum on a high-pressure dressing-sterilizer, even though that can be now obtained for £10 or £12. Though it is indisputable that sterilization of dressings can be carried out by means of boiling, steaming, and baking to dryness, in practice it is found that such methods are so cumbersome that the amount of sterilized articles necessary for use in emergency are seldom on hand. It will be a very great advance when not only all hospitals but all obstetrical practitioners consider a high-pressure dressing-sterilizer an essential part of their equipment. The economic factor is not the only one working against the provisions of this equipment, as, in spite of indisputable evidence of the value of efficient asepsis in obstetrics having great influence in reducing the number of septic cases, this fact is not universally admitted by the medical profession or recognized as essential by the public. That it is being more generally accepted by the profession both in New Zealand and elsewhere is evident by a statement made by Sir John Bland Sutton, who says: "Science has given us a new commandment," and in impressive terms states, "that the obstetrician who conducts a labour without wearing sterilized gloves cannot be held guiltless if the woman develops puerperal sepsis." Whilst this is perhaps a rather extreme statement, as there are cases when departure from this rule may be necessary, I give it to show the trend of opinion towards insisting upon full aseptic precautions being taken in all obstetric cases. Also the opinion expressed by Sir George Newman, of the British Ministry of Health, in the following words: "It is equally certain that the application of the principles of aseptic surgery to midwifery practice is the only sure preventive of puerperal infection." I also quote from the *New Zealand Medical Journal* the following publicly expressed opinion by a member of the New Zealand Obstetrical Society who, after severely criticizing some figures I published last year which I considered emphasized the necessity of a further extension of asepsis to private practice, states: "Despite all of which comments, I habitually use sterile guards myself, and hope the day is close at hand when every New Zealand practitioner will carry a small drum of sterile guards, gowns, and dressings to every confinement conducted in private houses."

In view of the changing attitude of the profession towards the practice of aseptic midwifery in New Zealand and elsewhere, I look forward to the near future when the demands of the profession will afford me the necessary support to the action I am anxious to take towards the provision of more up-to-date and convenient methods of carrying out asepsis in private maternity hospitals than are at present provided. Continued effort along these lines is one of the greatest needs at the present time, and by its continuation, together with the support of the medical profession and the creation of an educated public opinion on the question, I look forward to a marked diminution in the incidence of sepsis.

Dr. Jellett, Consulting Obstetrician, publishes elsewhere a report and tables showing some of the influences of well equipped and conducted hospitals upon the clinical work done therein.

In medical and surgical hospitals, owing to the economic conditions being more satisfactory and to the higher standard demanded by surgeons and physicians of such hospitals, I have little difficulty in seeing that the necessary efficiency in the conduct and equipment of these hospitals is maintained. With a few exceptions their efficiency reaches a high standard, and I have found the equipment in all cases is sufficient and usually maintained in good order. I have, however, found it advisable to point out the necessity of periodical testing of dressing-sterilizers, which, being in many instances somewhat complicated pieces of machinery, are apt, like other machinery, to occasionally get out of order.

Ante-natal Clinics and Lectures in Maternal Welfare.—Returns from public ante-natal clinics are available in most cases, and the following table shows an extension in the number of clinics and a satisfactory increase in the attendances.

Ante-natal Clinics.

Health District.	New Cases.	Total Attendances.	Outfits sterilized.
Wellington.			
St. Helens Hospital, Wellington	504	2,176	55
Plunket Clinic, Wellington	558	3,157	13
Plunket Clinic, Lower Hutt	122	829	..
Plunket Clinic, Petone	161	919	4
Alexandra Home, Wellington	331	1,456	54
Salvation Army Home, Wellington	83	187	..
St. Helens Hospital, Wanganui	130	413	4
Totals, 1928	1,889	9,137	130
Totals, 1927	1,615	6,917	139
Totals, 1926	1,257	5,152	122
Totals, 1925	975	3,531	..
Increase for last twelve months	274	2,220	—9*
Central Auckland.			
St. Helens, Auckland	798	2,948	71
Plunket Society, Auckland	356	1,761	82
Salvation Army, Auckland	81	176	53
St. Mary's Homes	26	122	59
Totals, 1928	1,261	5,007	265
Totals, 1927	1,237	4,971	202
Totals, 1926	1,105	4,295	119
Totals, 1925	517	1,603	..
Increase for last twelve months	24	36	63
Canterbury.			
St. Helens, Christchurch	612	2,431	320
Plunket Society, Christchurch	204	1,379	2
Essex Home, Christchurch	197	573	..
Salvation Army, Christchurch	79	259	..
Totals, 1928	1,092	4,642	322
Totals, 1927	1,067	3,518	174
Totals, 1926	876	3,107	160
Totals, 1925	797	2,682	..
Increase for last twelve months	25	1,124	148
Otago.			
St. Helens, Dunedin	129	367	..
Plunket Society, Dunedin	34	134	..
Totals, 1928	163	501	..
East Cape.			
St. Helens, Gisborne	128	262	9
Taranaki.			
Stratford Maternity Annexe	153	305	..
North Auckland.			
Whangarei Maternity Annexe	143	344	..
Southland.			
St. Helens, Invercargill	221	542	2
Totals, New Zealand	5,050	20,740	728

* Decrease only apparent, and due to Taranaki Health District being shown separately.

It will also be noticed that the number of sterilized maternity outfits is showing a gradual increase, which emphasizes my remarks with regard to the more general acceptance of asepsis in obstetric practice.

In view of the fact that maternal mortality in rural districts compares unfavourably with that in urban districts, particularly as regards eclampsia, the need of the extension of these clinics as an organized method of giving systematic and skilled ante-natal care to expectant mothers is brought home to one.

The statistical record shows that the rural maternal mortality from eclampsia and allied conditions is approximately 50 per cent. greater than in towns where there are better facilities for systematic ante-natal care and the difficulty of the patient in availing herself of these facilities is less. With a view to remedying this condition by spreading the knowledge of what systematic ante-natal care will do towards this and other causes of maternal mortality, addresses on this subject to various women's societies have been given, and I wish to express my thanks to all those who have given me the opportunity of bringing this important subject to the notice of their members, and to the secretary and many members of the Obstetrical Society who have co-operated in this work. My thanks are due particularly to the Women's Division of the Farmers' Union, whose many local branches held a "Mothers' Welfare Week" recently, and to many branches of the League of Mothers, who gave me the opportunity of addressing them on this subject; also to the Plunket Society for the continuation and extension of ante-natal clinics.

Puerperal Sepsis.—This cause of illness and mortality still looms very large in the maternal-mortality returns. One hundred and eighty-four cases of puerperal sepsis were notified to this Department during the year, and the tables published by the Government Statistician show that forty-three cases due to puerperal sepsis following labour, but excluding cases of septic abortion, occurred in 1928, which, though I am glad to say was a reduction in number from the sixty-one cases in 1927, is still the largest cause of all the groups of conditions causing maternal mortality as provided by the Government Statistician.

Last year an extension of research into the conditions governing the causes and consequences of this condition was made. Within the limits of time and opportunity available, all Medical Officers of Health in New Zealand have co-operated with me in the collection and examination of certain aspects of 174 cases of puerperal sepsis reported to them. Of these, 158 cases are among the Europeans and sixteen cases among Maoris. Of the 158 European cases investigated, 126 cases recovered, twenty-eight died, and in four the result was not stated. Of the sixteen cases among Maoris, eight cases recovered, six died, and in two cases the final result was not stated. It is probable that only the most serious of the Maori cases were reported, which would account for the high mortality.

The inquiry form has over twenty headings, and is designed to ultimately gain statistical information which it is hoped will have an important bearing in elucidating the underlying causes of this condition. So far the number of cases investigated is not sufficient to make it possible to draw any definite conclusions. This is particularly so as, owing to the large number of observers making the returns, the personal factor in giving more or less weight to various symptoms, or to the standard of asepsis, the presence or not of abnormality, &c., must have a big influence in the conclusions come to. The following facts, however, are interesting:—

Pregnancy was returned as being normal in ninety-four and abnormal in fifty-four of 148 cases.

Labour was returned as normal in seventy-nine and abnormal in seventy-six of 155 cases.

Delivery of the infant was spontaneous in 100 and artificial in fifty-five of 155 cases.

Delivery of the placenta was spontaneous in 129 and manual in twenty-five of 154 cases.

Approximately 66 per cent. of the cases occurred in licensed or public hospitals and 33 per cent. in private houses, which corresponds very closely to the proportion of the confinements which took place in hospitals and private houses in 1928.

The day of onset as given in 152 cases is of some interest; but in considering these figures it must be borne in mind that the personal factor looms very large in this connection, there being no means of accurately determining the day of onset, and the interpretation of signs and symptoms varying greatly with different observers.

The average day of onset of infection after the confinement as estimated in 154 cases was 6·5 days.

Dividing the cases up into two groups, in the first we get 127 cases beginning on the seventh day or earlier, the mortality for these cases being 13·6 per cent. In the second group, of twenty-seven cases, in which the day of onset is estimated as from the eighth to the twentieth day, the mortality is 22·2 per cent.

It will be of importance in the continuation of this research to determine whether these figures are borne out by subsequent inquiries, and, if so, to determine whether the higher mortality among those reported as being infected late is due to a greater danger consequent upon late infection, or is it rather that detection of the infection, and consequently treatment, was delayed beyond the actual day of onset.

The duration of the illness in each case supplies interesting figures, and within the limits of the investigation, which in most cases terminated on the twenty-eighth day, is probably more accurately informative than those showing the period of onset. In the twenty-six cases that died the average

length of illness was 11·1 days. In the 104 cases that recovered inquiry was made into the number of days of illness. The result was as follows: In the ninety-nine cases in which the inquiry extended to the twenty-eighth day of the illness only fifty-four cases had recovered by that time, and forty-five were still persisting. In five cases the investigation was extended beyond the twenty-eighth day, and the average period of illness in those cases was forty-eight days. The average for the 104 cases was 19·9 days.

Taking the total of 184 cases of puerperal sepsis following labour which were notified during 1928, and deducting the forty-three fatal cases due to the same condition, it leaves 141 cases which recovered, and which it may be presumed had the same average period of illness as the 104 cases of recovery which were investigated—viz., 19·9 days. According to these figures, the *economic* loss in 1928 from this disease was therefore forty-three fatal cases, and a minimum of 2,806 days of illness, not allowing for the period over twenty-eight days in forty-five cases, or the period of convalescence and a further economic loss in those cases in which health has been permanently damaged, or in which further medical or surgical treatment is or was required.

I advance these figures as the first result of an investigation into these cases which it is hoped will be extended and improved upon from year to year. So far, though imperfect and incomplete, they give food for serious thought, but are not to be regarded as forming the basis of any definite conclusions.

I wish to point out that this is not a problem special to New Zealand. There is no reason to suppose that similar investigations elsewhere would reveal a material difference in the average economic loss incurred by each case of puerperal sepsis. The economic loss is a very serious matter, and that a great deal of it is preventable is shown by the results quoted in Dr. Jellett's report. From the purely economic point of view the question arises as to what expenditure of money in preventative measures is justifiable to save this substantial economic loss every year due to the largely preventable illness of so many wives and mothers.

I further quote here the information given me by the Medical Superintendent of one of our St. Helens Hospitals, who says: "Under conditions of systematic and skilled ante-natal care, complete sterilization of dressings, and sound aseptic technique the last thirteen thousand consecutive deliveries in this St. Helens Hospital resulted in only one maternal death, which was due to embolism, and occurred after the patient had returned home against the advice of the medical officer. One other death which occurred in this hospital during this period was a case of eclampsia which was brought in after delivery elsewhere, and was then in a comatose condition." The first case rejected the advice of the Medical Officer; the second case had no systematic ante-natal care.

The same authority also states that the still-birth rate and the deaths of infants in the first fortnight of life have been reduced under these conditions to thirty-eight per 1,000 births, as compared with New Zealand rate of fifty-two per 1,000.

Referring to the same subject, the Government Statistician says: "It is gratifying to note that a definite improvement has been recorded in the last few years in which ante-natal clinics have been established and other steps taken to ensure healthy children being born."

The more my experience of investigation into the conditions influencing maternal mortality extends, the more I am convinced that the problem of reducing maternal mortality can be solved best by three principal methods: Firstly, by the universal acceptance by women of the necessity for skilled and systematic ante-natal care during pregnancy, which can best be brought about in New Zealand, firstly, by lectures to women's societies emphasizing this important fact, and, secondly, by the institution of public ante-natal clinics conducted by nurses trained for this work and co-operating in every way with the medical attendant of each expectant mother who attends; secondly, by the general application of the principles of aseptic surgery in the practice of obstetrics both in and out of hospitals, which can be greatly helped by the provision of sterilized outfits through the ante-natal clinics; thirdly, by the provision of small well-equipped maternity hospitals so located that they are available within reasonable distance to all women where the conditions of their home make it impossible to give reasonable attention therein, and particularly to all those cases in which ante-natal investigation leads one to anticipate some serious departure from normal during labour. Of these the most important are the first two, and the number and quality of the maternity hospitals being on the whole satisfactory; and as the provision of more public maternity hospitals must be a gradual process depending largely on financial conditions, I propose to give as much attention as possible to sound propaganda work in a further and extended effort to increase the quantity and quality of public ante-natal clinics and the universal provision of means of maintaining asepsis throughout labour and the puerperium. Success will depend largely on the hearty and friendly co-operation of all forces concerned, which, judging by the past year's work, I anticipate will continue to increase as the importance and nature of the subject becomes better understood. I therefore invite the continued help of all those societies that have so far co-operated with us in this work. In conclusion, I wish to express my thanks for and appreciation of the help extended to me by the many members of the medical and nursing profession, and by the societies mentioned in the body of this report; also to my fellow-officers of the Health Department for their co-operation and advice on many points, particularly to the Medical Officers of Health and their Nurse Inspectors, with whom my work is most closely associated, and on whom the main burden of inspecting the private hospitals conducting inquiries has fallen.

PART VIII.—HEALTH DISTRICTS.—EXTRACTS FROM ANNUAL REPORTS OF MEDICAL OFFICERS OF HEALTH.

SECTION I.—CENTRAL AUCKLAND HEALTH DISTRICT.

Dr. HUGHES, Medical Officer of Health.

INFECTIOUS DISEASES.

Most of the notifiable infectious diseases have run a fairly normal incidence throughout the year, and, with the exception of scarlet fever and diphtheria, no particular outbreak has occurred. Certain of the schools have been affected by these two diseases, but not to any marked extent, as prompt measures were taken to deal with the matter whenever it became apparent that school infection was taking place, the precautionary measures taken having included the swabbing of contacts and treatment and isolation of diphtheria "carriers" detected and of their contacts, also disinfection of houses affected, and, on occasion, of school class-rooms.

A matter specially dealt with in connection with infectious diseases was the strict investigation of cases of puerperal fever reported, especially when these occurred in a public or a private maternity hospital, and all necessary steps for the prevention of the spread of infection were strictly enforced.

A few cases of bacillary dysentery were notified during the year, but few of these were proven bacteriologically; there were, however, three cases in one household at Remuera which were so proven.

The district has been noticeably free from enteric fever, and this is very satisfactory.

GENERAL ADMINISTRATION.

A general improvement is noted in the sanitation of the district, which has been effected by the co-operation of all the local authorities.

Swimming-baths.—Considerable improvements have been carried out during the year at the public baths under the control of the City Council and other local authorities. Chemical and bacteriological examinations of the baths were carried out by the Department during the summer months, and recommendations were made for improvements for safeguarding bathers. Each of the three salt-water baths under control of the City Council are now provided with liquid chlorinating plants for the sterilization of the sea-water during the filling of the baths. Two of these baths rely on the frequency of emptying and refilling for purity, while the third is provided with a recirculation and heating system, being a tepid bath. The position of the intake for these latter baths I consider is most unsatisfactory. The safety of the water depends on efficient chlorination. Examination of public-school baths shows that more frequent emptying and cleansing is necessary. Examination of St. Cuthbert's School swimming-bath showed that the bath, with its up-to-date chlorination, filtration, and recirculation system, had been in use for twelve months without emptying and renewal of the bath-water, and still showed no coli in 100 c.c. The ammonia figure was somewhat raised, but not above three parts per 1,000,000.

Pollution of Waitemata Harbour.—Investigations were carried out during the year as regards pollution of this harbour. There is no doubt that a considerable amount of pollution from agricultural and pastoral lands enters the harbour from the various creeks discharging into same; also from storm-water drains from the city streets, storm-water sewage overflows, and from shipping, quite apart from the sewage-discharge from Northcote, Devonport, and Orakei.

Examination of a number of samples of sea-water from various parts of the harbour were made during the year, the results showing that the harbour is not polluted to any great extent. This is, no doubt, due to the huge dilution which is available, and to the action of the tides. However, a nuisance is created through the discharge of solids at all states of the tide from the Devonport sewage, there being no sewage-treatment at North Head. Similarly, at Orakei, during the discharge of the collecting-tank a nuisance is created. This sewage is discharged on the ebb tide. It is screened before passing into the collecting-tank. Improvements are being carried out in connection with the screening at Orakei works in accordance with a request from the Department. The deposition of solids on beaches is more likely to occur from the discharge of sewage which is not screened and from shipping. Examination of samples of mud from beaches did not disclose sewage contamination. A daily refuse-collection is made by the Harbour Board from all shipping in the harbour, this having been instituted at the request of the Department.

Pollution of Manukau Harbour.—This matter is one which still awaits solution. A marked nuisance from the discharge of drainage effluents from the various offensive trades is being created. Similarly, the discharge of sewage into this harbour from Onehunga is a matter requiring urgent attention. With the increase in population the limit of the sewage-collecting tank has been reached, and on certain occasions the discharge of the sewage creates a nuisance. The discharge of Mount Roskill sewage into this harbour does not in itself give rise to difficulty, but nuisance has been created in the past during the emptying of the sludge.

The above drainage problems have been placed before the various local authorities and the Auckland Drainage Board and Harbour Board, and have been the subject of conferences during the year. It is recognized that a combined drainage scheme dealing with these is the only solution, and that the first step is for the districts involved to be included in the Auckland Drainage Board area. The various parties agreed that a comprehensive scheme should be drawn up by the Engineer to the Auckland Drainage Board, and this is being undertaken.

Drainage.—Drainage throughout the city and suburbs has been pushed ahead during the year. Of special importance has been the provision of the combined drainage scheme in Mount Eden and Mount Albert. For years portions of Mount Eden and Mount Albert and Mount Roskill districts have been seriously flooded during times of heavy rain. Although the scheme is not entirely completed, it was effective in preventing a recurrence of very serious effects during last winter, and Cabbage-tree Swamp, which has always been a mosquito-breeding area, is now a thing of the past.

The question of drainage for Ellerslie is one of the most urgent problems in the suburbs. This district has no outlet for drainage except through other local bodies' districts. The natural outlet is to the Manukau Harbour, but the finances of the district do not permit of the local body undertaking a scheme involving, as it does, such a large expenditure. The Engineer to the Auckland and Suburban Drainage Board has assisted the Department by investigating the various alternatives for draining this area. The urgency for drainage is accentuated by the fact that storm-water from the city, One Tree Hill, and Ellerslie districts all gravitates to the depression in which the septic tank is situated, causing flooding of the tank and surrounding area whenever excessive rainfull occurs. This polluted surface water at times surrounds houses in the adjacent low-lying area.. It is agreed that the drainage scheme for this district should be continued through One Tree Hill and Onehunga and Mount Roskill districts to the Manukau, and should include also drainage from the offensive trades in Mount Wellington district.

Conferences have been held during the year with the above local bodies, and also with the Harbour Board, with a view to providing a combined drainage scheme for those local bodies on the Manukau watershed, such watershed to be included in the present Auckland and Suburban Drainage Board's area.

Storm-water Overflows.—In the city many of these discharge into creeks or gullies, and at times create nuisance. It is time that a proper supervision for these should be provided, and I have strongly recommended that the Auckland Drainage Board should be vested with special legal powers and have full control of such streams, &c. Arch Hill Gully, for example, requires urgent attention, and should be concreted, if not piped.

Complaints concerning disposal of refuse at the two City Council's refuse-dumps were received from time to time. The city destructor is not of sufficient capacity for dealing with the whole of the refuse of the City Council's areas. Great improvements have been made in the control of these, and general improvements were carried out. Still, the smoke nuisance at the Grey Lynn tip was considerable on occasions during the year. Inspections were made with City Council officials of sites proposed for additional destructors, the final decision being held over pending the appointment of a successor to the City Engineer. The Remuera tip is being closed, and the Freeman's Bay destructor is to be used in the meantime for garbage from that portion of the city. During the year the Mount Roskill tip was closed by the Department, and arrangements were made for refuse from Mount Roskill district to be disposed of at the new destructor at Onehunga, which destructor has proved very economical and satisfactory. The care and supervision of tips at Mount Albert and Mount Eden are such that no complaints have been received by the Department during the year.

Smoke Nuisance.—It has been necessary to deal with nuisances created by smoke at two factories. In one case heating by oil fuel was substituted, while in the second it was decided to instal the "Iron Fireman," and this installation is being carried out at the present time. From reports obtained it appears that this installation is giving very satisfactory results in other parts of New Zealand and in other countries.

Mosquito-control.—All local bodies were circularized by the Department as regards the steps required in dealing with this nuisance. During the year research work has been carried out by the Mosquito-control Committee, and a survey made of the city for breeding-places. A report of the latter was forwarded to the local bodies concerned. For a period the Committee's officer acted as an inspector for the City Council on this particular work, and householders were personally given information concerning the necessary precautions to be taken. Most local bodies show apathy in regard to this work, and much remains to be done. Nevertheless, the surface drainage undertaken by local bodies, especially Mount Eden and Mount Albert Borough Councils, has assisted in removing a number of mosquito-breeding areas.

Water-supplies.

A great deal of work has been done in the supervision of the purity of the various water-supplies throughout the district, and many tests as to the effective carrying-out of chlorination of the supplies have been made, and, in addition, samples of water have been obtained for bacteriological and chemical examination from all the supplies.

Auckland City.—Most of the water-supplies of the metropolitan area are drawn from the city supply, which has proved satisfactory throughout the year. Additional storage capacity has been provided, and the Candy filtering plants at Nihotapu and Waitakere have effectively dealt with the suspended impurities which have been experienced after heavy rain in previous years.

Papatoetoe.—A poll on a loan proposal to provide a suitable water-supply was carried by a large majority in November last, and contracts have been let for the building of a reservoir and service reticulation-pipes to the town.

Papakura.—Samples taken during the year indicate that this supply is being efficiently chlorinated and filtered, Candy Chlor filter being used, although on one occasion it was necessary to take up the matter of ineffective chlorination with the Town Board, which has been urged to obtain control over the catchment area, but has not yet done so.

Waiuku.—During the year a loan proposal of over £10,000 for providing a water-supply was approved by the ratepayers. The water is obtained from a bore, and provision is made for a pumping plant and reservoir and for reticulation.

Supervision of the other supplies of the district has been exercised, and, when necessary, the attention of local authorities concerned has been drawn to the necessity for effecting improvements.

Food and Drugs.

Due supervision has been exercised over the sale of food and drugs throughout the district during the year. Large numbers of samples of various foodstuffs and drugs have been obtained for examination, and generally considerable improvement is manifested in the conditions under which these are sold and in the quality of the goods themselves. Most of the breaches of the Food and Drugs Regulations which have occurred have been committed unwittingly, and warning notices issued to vendors have proved salutary.

Considerable work has also been done in connection with the labelling of foodstuffs, and many cases of incorrect labelling were dealt with.

A special matter dealt with during the year has been the purity of the milk supplied to the metropolitan area, and the following report is submitted, covering this work :—

Much improvement has been made in the Auckland milk-supply of recent years, although no doubt there it still room for improvement. The farms are not under the jurisdiction of the Health Department, but the latter closely co-operates with the Department of Agriculture in endeavouring to assist in the matter of clean milk-production. Nevertheless, considerable improvement has been obtained in this direction. Apart from this, the question of cooling of milk directly it is drawn from the cow is a very important matter, and it is still found that milk arrives in the city at a temperature, in certain months of the year, as high as 75°F. The difficulty of obtaining water at sufficiently low temperature on the farms without the use of cooling plants for efficient cooling is recognized, but it is gratifying to know that special plants of the refrigidaire type have been installed on several farms, and this is to be encouraged. The temperature then obtained is as low as 49°F., and less, and the benefit of the use of such plants is reflected in the results of examination of milk from these farms. The question of efficient cooling at the farm is a real difficulty in this climate, and the cost of refrigerating plants is prohibitive for the majority of farmers.

Those in charge of the milk-depots in the city are making endeavours to obtain clean milk for the city supply, and they are always notified by this Department of any milk arriving at their depot which is doubtful as to quality. Certain of these depots make inspections of the farms in question and assist in having any necessary action taken. On the other hand, certain depots pay the farmer according to the grading of the milk, and I am of opinion that this is the best method of obtaining the best milk for the city, as unless a farmer is paid for the extra trouble in turning out a good article he has but little incentive. In other cases he is either paid on the butterfat basis, or paid a regular price whether the milk is clean or dirty, rich or poor. About 1,200 samples was examined during the year by the Department from the city. In only three instances has it been necessary to take legal procedure against milk-vendors in the city for selling milk below the fat standard during the year, but it has been found that approximately 3 per cent. of samples taken of milk being forwarded from the farms to milk-depots in the city were deficient in fat content. However, when such milk is bulked at the depot the average fat content has complied with the standard required. The deficiency in the fat has been due principally to the class of cattle preferred by farmers, which give quantity of milk, but quality with too narrow a margin of milk-fat at special times of the year, when with the springing of the grass and other natural causes the fat content is liable to be reduced slightly below the standard. This is liable to occur during September, October, and November. This matter was fully discussed with those interested about two years ago, and the position has improved, and, to my mind, is not difficult of solution. The standard required is not too high. The percentage of samples below standard varies in different years, and in 1925 was as high as 6·5 per cent. as regards samples of farmers' milk before being bulked at the depots.

The reductase test showed that 2·5 per cent. of samples did not comply with the regulations, as against 3·9 per cent. in 1926. This test shows the freshness and keeping-quality of milk, and is a guide as to cleanliness of milk.

As regards the addition of water, this is now a very rare occurrence in the city.

The results at the pasteurizing plants show improvement, but in a certain number of instances the coli content remains too high. This is not so much due to inefficient pasteurization as to the quality of the milk to be pasteurized.

During the collection of milk from some farms milk-cans have been left at the corners of main roads or on platforms from which motor-lorries collect the cans, and the latter have been unduly exposed to the sun and dust. In the same way milk-cans on being returned by lorries to the farms have been deposited at corners of roads, to be later removed by farmers. These cans have been washed and sterilized in the city before being returned, and are liable to injurious effects due to dust and the heat of the sun. This matter has been brought before the parties responsible and improvements have been made in this respect. I maintain that the first essential is clean milk-production and efficient cooling at the farms, whether the milk is to be later pasteurized or not. In the past farmers have been apt to regard it as a waste of time to take any special care in milk-production, owing to the fact that the milk was being forwarded to a pasteurizing-depot and that it would be cleaned up there.

Storage of milk in dairies in the city has been considerably improved, and such premises are registered by the City Council and other local authorities, and unless conditions are satisfactory a license is not issued. A great number of such premises store their milk in coolers.

Although improvements have been made in the city in many respects, I am of opinion that the main point in tackling the question of obtaining a pure milk-supply is to be found at the place of production—namely, at the farms.

Port Health and Anti-rat Work.

In all, 343 overseas vessels were inspected during the year and 142 prohibited or restricted immigrants were reported to the Customs Department. With the exception of a few cases of ordinary influenza reported during December, no cases of epidemic infectious disease were reported. The Shipping Inspector has carried out the work of inspecting the sanitary conditions of all shipping in the port and of the wharves.

The refuse-collection service inaugurated by the Auckland Harbour Board has proved of very great use, and large quantities of refuse have been carried out to sea and dumped. It also disposed of waste fish offal from small shopkeepers in the city. The Inspector reports that the sanitary conveniences on the wharves generally are kept in good order and that there has been an abatement of the nuisance caused by the discharge of oil from ships whilst in the harbour.

Considerable work has been done in connection with the anti-rat campaign on the waterfront, the trapping and poisoning of rats being carried out continually throughout the year and numbers of rats being destroyed when vessels were undergoing fumigation. The City Council and Harbour Board both employed one officer continually on this work, the Harbour Board's official trapping a total of 6,167 rats, in addition to laying a large number of poison baits. The City Council's catches were also very large, and, in addition, some one thousand poison baits were distributed by the Council free every week to householders making application for them.

Much work has been done in connection with the inspection of overseas goods, and a good number of packages of personal effects, and of bristles, animal-hair, tooth-brushes, &c., from the East have been disinfected in the fumigator by departmental officers.

General.

Much good work has been done by the School Medical and School Dental Services throughout the year, and close co-operation has been maintained with the officers of these branches. The school dental service was extended during the year by the opening of four new clinics, situated at Onehunga, Henderson, Morrinsville, and Thames.

Co-operative work has been carried out in conjunction with the Labour Department in the supervision of factories and food-sellers' premises.

A good deal of work has also been done in connection with cemeteries and burial-grounds in the matter of arranging for suitable control and supervision.

Interest has been maintained in the Makogai Leper Station, to which New Zealand lepers are now transferred, and various Christmas gifts and other necessaries have been forwarded.

SECTION 2.—AUCKLAND AND THAMES-TAURANGA HEALTH DISTRICTS.

Dr. Chesson, Medical Officer of Health.

Infectious Diseases.

Various mild outbreaks of infectious disease occurred during the year, and of these enteric fever was responsible for the greatest number. Of this disease there were notified small outbreaks as under: North Auckland, at Dargaville and in the Whangarei district, and Thames-Tauranga, at Thames. Of these, the Thames outbreak was by far the worst, some nineteen cases, two of which proved fatal, being notified from the borough area during August and September. Most of the cases occurred in one section of the town, and it is considered that it was probably of water-borne origin, as a bacteriological examination of the water-supply proved unsatisfactory, requiring immediate measures for effective chlorination. Later, in November, a further five cases occurred here, in which instance the infection was traced to a "carrier," who has since been subjected to the necessary restrictions. Whenever practicable, and especially in Native cases, all enteric-fever contacts were given anti-typhoid inoculation treatment.

Four cases of food poisoning at Glen Eden were traced to the eating of reheated old gravy-stock.

General Sanitation and Drainage.

Steady progress has been made in sanitation and drainage matters, and improvements specially are the extension of drainage schemes with increased house connections, and better supervision by local authorities over refuse and nightsoil disposal, the tips and dumps generally being kept in good condition. Over all these and other public health matters due supervision has been exercised by the departmental officers, and real progress has been made. Improved roading conditions have largely contributed to the more efficient working of the departmental Inspectors and nurses.

Water-supplies.

In connection with the supervision of the public water-supplies, samples have been obtained from most of the supplies for bacteriological, and, as required, for chemical examinations. It has been necessary to advise local authorities of action required to improve their supplies.

Food and Drugs.

A general all-round improvement has been effected in doth districts in the condition of food-sellers' premises, and vendors generally realize that it is in their best interests to sell food under hygienic conditions, and have for the most part co-operated to that end. Samples of foodstuffs, especially the staple articles of diet, such as bread, milk, butter, &c., have been obtained for analysis, and in some instances it has been found necessary to institute legal proceedings for breaches of the regulations, but for the most part warning notices have sufficed to effect the necessary improvement. It was found necessary to institute several prosecutions against vendors of liquor-samples which were not true to label. The labelling of foodstuffs and drugs has also been given a good deal of attention.

Native Health.

Good work has been done amongst the Native population by the district nurses and Inspectors, and the educational side of their work has not been neglected. Lectures have been given on public-health matters, and departmental publications distributed amongst the Natives. There has been little disease amongst them, despite the dry summer, which caused an acute shortage of water and consequent resort to doubtful sources of supply. They were warned to boil all water before using and against the danger of typhoid fever (taipo piwa) should they neglect this precaution, and this advice was largely followed, so that no serious trouble was caused. The new water-supply installed at Te Hapua Pa, Mongonui County, is not yet a success. General living-conditions have greatly improved, and those Maoris who have taken up dairying are immeasurably ahead of the others in this respect. In North Auckland they have been encouraged to take up tobacco-growing, and this so far promises to be a success, as the crops are satisfactory.

The Native-school teachers have greatly assisted in the case of minor sickness by advice and treatment with medicines supplied by the Department and by notifying cases of sickness which have come under their notice.

General.

During the year a special investigation regarding the incidence of goitre was made by Dr. R. A. Shore in the Thames and Coromandel districts, samples of soil and water being taken for analysis and some 3,500 school-children subjected to an examination.

The work of the School Medical and Dental Services has been harmoniously and satisfactorily carried on, and good progress has been made.

Work has also been done in connection with the inspection of hotels and cemeteries, of offensive trades premises, cattle-saleyards, and the condemnation of insanitary buildings.

In all these matters definite improvement was effected, and the whole work of the year has tended to the betterment of the health conditions of both the districts.

SECTION 3.—SOUTH AUCKLAND HEALTH DISTRICT.

Dr. Boyd, Medical Officer of Health.

Infectious Diseases.

A review of infectious diseases notified during the year reveals the fact that, with the exception of diphtheria and enteric fever, of which disease several minor outbreaks occurred, the position has been fairly satisfactory throughout the year. Such diseases as influenza, pneumonia, infantile paralysis, &c., which in previous years have assumed epidemic proportions, were noticeably absent during the year.

Several small outbreaks of enteric fever occurred during the year, the Native population being principally affected. During January seven cases occurred in one household at Whakarewarewa, Rotorua, and in April eleven cases from the Reporoa and Ngapuna Settlements. Cases also occurred at the Waitetuna Maori Settlement, Raglan district, and in December six cases, one of which proved fatal, occurred at the Waikeria Borstal Institute. All the inmates and staff were given anti-typhoid inoculation, and all precautions to prevent the spread of infection were taken. The Prisons Department was also advised to install a septic tank and up-to-date drainage, and this work is to be put in hand. All Maori contacts of enteric fever have, whenever possible, been given anti-typhoid inoculation by the district nurses to Maoris.

Sanitation and Drainage.

The general sanitation of the district has been fairly satisfactory throughout the year, and careful supervision has been exercised over all matters affecting the health of the community. Attention has been regularly given to the conditions existing at nightsoil and refuse dumps and public utilities generally. Improvements have for the most part been effected as occasion arose, and conditions are fairly satisfactory. Most of the boroughs and Town Boards of the district lack compulsory rubbish-removal services, most of the refuse being removed by private carters to tips provided by the local authorities or buried on the householders' sections. The rubbish-tips have been kept in good order, and such of the local bodies who have nightsoil services have given them due attention.

Water-supplies.

Close supervision has been exercised over the various water-supplies throughout the district, and, as required, samples have been obtained for bacteriological and chemical examinations. The results have been of value in determining the necessary action and in enabling the Department to urge improvements upon the local authorities concerned.

Food and Drugs.

Regular inspection of foodstuffs and food-sellers' premises has been carried out during the year, and very considerable improvements have been effected in the conditions under which food is sold, compliance with the departmental regulations regarding food-sellers' premises being largely responsible for this. Samples of various foods and drugs, and especially those in everyday use, have been obtained for analysis during the year, and in a few instances it has been found necessary to institute legal proceedings for the sale of milk, ice-cream, and butter which did not comply with the regulations. There was generally noticeable a willingness on the part of vendors to comply with the regulations, and breaches of the labelling regulations were quickly remedied when brought under notice.

Native Health.

The incidence of infectious disease in the Native population has been fairly low, and district nurses to Maoris and Inspectors have done good educational work by lecturing on various health and sanitation matters and by the distributing of departmental pamphlets. As previously recorded, there were minor outbreaks of enteric fever, but these were carefully investigated and all necessary precautions were taken, patients being removed to hospital whenever practicable. The Natives seem to seek the help of the Department in case of sickness more than formerly, although cases sometimes occur where the disease is secreted. In one fatal case the police were informed and a post-mortem examination was made, which proved of salutary effect.

There are a number of T.B. cases in the district, some of whom will not submit to proper treatment. Others are attended by doctors and the hospital, and some have been sent, through the Waikato Hospital, to a sanatorium. Continual advice is given in these cases as to the mode of living, and also precautions *re* spread of infection.

I would place on record my appreciation of the assistance rendered to the Department by the Native-school teachers, who have assisted in reporting cases of sickness and in treating minor ailments with medicines and ointments supplied for the purpose by the Department.

General.

Other matters which have received attention have been the inspection of hotels and of cemeteries and burial-grounds, also the supervision of offensive trades.

The School Medical and Dental Services have carried out much good work amongst the school-children during the year, and some expansion of the work has been effected.

Some educational work was effected by the Department in connection with the Waikato Winter Show in Hamilton, when arrangements were made to demonstrate as many of the departmental activities as possible, special features being made of the School Medical and Dental Services and of the Ante-natal Division.

In conclusion, I may record that the year past has been one of definite progress in all branches of departmental activity.

SECTION 4.—CENTRAL WELLINGTON HEALTH DISTRICT.

Dr. Findlay, Medical Officer of Health.

Birth-rate.—18·98 per 1,000 mean population.

Death-rate.—9·44 per 1,000 mean population.

Scarlet Fever.—Number of cases, 663. Rate per 10,000 of population, 46·49. Five deaths.

Control: A nurse has not been employed full time upon infectious-disease work. In all cases where necessary, however, a school nurse visited affected schools and examined the children and in some cases the homes. I have instituted a new card system showing infectious diseases in schools, thereby enabling a very close watch to be maintained. School authorities and the public appear to appreciate the close school supervision. Reasonable attention to this enables us to combat complaints and requests for more extreme and unnecessary action.

Home Nursing as against Hospital: Fewer cases were sent to hospital than in 1927. Perusal of the reports does not show that the results as to a second case occurring in the house are any greater where home treatment was employed than where the case was sent to hospital. Where conditions appeared reasonably good and the request was made for the patient to remain at home permission was generally given. Home treatment is, as you know, quite in accordance with the views of British authorities. In such cases the need for strict adherence to precautions was expressly stressed. A departmental pamphlet on the subject is left in the home as a routine. During the year a certain number of suspicious cases were discovered in the schools, and these were usually kept at home until certified free from infection. The keeping of these cases in the home did not adversely affect the other members of the family. In mild epidemics home treatment appears to be sound, and certainly must result in a considerable saving in public-hospital costs.

Diphtheria.—Three hundred and ninety-six cases notified. Rate per 10,000, 28·11. Fourteen deaths.

Again experience shows that deaths are, in almost all cases, practically attributable to delay in obtaining a medical attendant or in recognition of the cases. It seems undoubted that medical men should swab almost every sore throat, and, if in doubt, should administer anti-toxin in some cases when waiting for bacteriological report. Laryngeal diphtheria has been the cause of death in more than one instance, and in the absence of signs upon the tonsils diagnosis would in some cases be difficult.

Pulmonary Tuberculosis.—Cases notified, 137. Rate per 10,000, 9·6. Death-rate for urban area, 5·24 per 10,000.

Control: Contact is kept as far as possible with all cases. Every six months the register is checked.

Child Contacts: All child contacts are followed up by the School Medical Officer. This work is increasing, and, as the years go by, there will be a considerable number of children under observation.

Enteric Fever.—Two cases were reported, but only one proved to be enteric. This case contracted the infection in the Auckland Province.

Poliomyelitis.—Five cases. No deaths.

Pneumonia.—One hundred and forty-seven cases notified. Rate per 10,000, 10·4. Sixteen deaths.

It will be noted that there was an increased rate in 1928. This is probably to some extent due to the fact that a system of notification from the Ambulance now exists in Wellington City.

Puerperal Fever.—Full-time cases: Nineteen cases notified. Three deaths.

Of the nineteen full-time cases notified, thirteen occurred in maternity hospitals, and six in their own homes. Of the total births in the Wellington metropolitan area (2,461 for 1928), 1,959 took place in maternity hospitals, 702 of which were in St. Helens.

Chronic Lead Poisoning.—Three cases were reported from a porcelain establishment. In conjunction with the Labour Department, full observance of the Lead Process Regulations has been insisted upon. The company have secured the services of a medical man to clinically examine all employees monthly. Washing-appliances have been installed and also exhaust-fans. A great deal depends upon the personal element, and I think that we have required as much as can be asked for.

Measles and German Measles.—Although there was some incidence in these diseases, there was not the prevalancy which existed in 1927.

Infantile Mortality.—34·54 per 1,000 births.

General Administration and Health Conditions.

Wellington City.—Population, 103,100.

City Council Organization.—With the advent of the new City Engineer at the end of 1926, the sanitary staff has been placed under better supervision. Both infectious-diseases work and general sanitary work are well carried out. As usual, the Medical Officer of Health and Senior Inspector Middleton attended to many matters concerning local administration in the city, and paid many visits of inspection. During the course of the year many complaints from diverse sources were referred to this office and the necessary collaboration with the City Council carried out.

Garbage: As mentioned last year, garbage-carts now have folding canvas covers suspended on a frame. Much still depends, however, upon the dustman. When providing fresh vehicles the Council might consider whether or not the new type of completely closed-in dustless vehicle now in use in some parts of England might be given a trial.

Disposal of Garbage: The destructor and masticator at Rongotai continue to do good work. The masticator at Rongotai has done good work in that it has assisted very materially in the reclamation of the sandhills area, part of which is now being laid out as an air base.

Stables and Fly Nuisance: With the continued increase of motor traffic the number of stables in the city continues to decrease. In 1923 there were 209 stables; there are now only fifty-four. During the year ended 31st March, 1929, sixteen stables ceased to exist. The experimental work *re* the fly nuisance commenced the previous summer by Inspector Cowdrey was finalized during the summer just ended. The experiments indicated that the application of sodium arsenite to manure, &c., appears to be the best chemical available. The information has been transmitted to surrounding local authorities. A full report of the work carried out has previously been submitted to you.

Water-supplies: These continue to be supervised by inspection and chemical and bacteriological tests. A Paterson chloronome for use at the top Karori dam has been ordered by the City Council for use in emergency. Tests of various streams in the Upper Hutt area have been made at the request of the City Engineer on behalf of the Water Board. Investigation of possible sources of future supply for Wellington and surrounding areas has been taking place during the year. The Wellington City Council are not negligent of the need for new supplies in future years.

The Board of Health, on the application of the City Council, decided to issue a requisition for £38,752 for water and drainage reticulation in various suburban areas.

Drainage: The Board of Health, on the application of the City Council, decided to issue a requisition for the entire work of storm-water drainage at Miramar. The total amount embraced by the requisition, including the special amount for water and drainage, is £14,800. The completion of the Miramar scheme will remove a source of complaint which has existed for several years, and should make conditions satisfactory in what has been one of the most rapidly growing suburbs in Wellington.

With the completion of the above works I think it may be said that Wellington is probably the most completely reticulated and sewered city in the Dominion.

City Milk-supply: The municipal milk-depot has had another very satisfactory year. Plans and proposals *re* the new station have been under close consideration. I have perused the final plans for the new station, which will be commenced shortly. During the year bacteriological and chemical checks of the milk from various portions of the sterilizing and bottling plant were carried out. These were very satisfactory.

Near-by Farmers' Supply: Inspector Rawlinson, under the City Council, continues to do good work in the supervision and sampling of this supply.

Housing: During the year ending 31st March, 863 new dwellings were erected. With the increased building activity in the Hutt Valley and activities in the State Advances Department, I think it may be considered that the housing question in Wellington is well grappled with. Fifty-three houses were demolished, and structural alterations under the Health Act were required of sixty-two premises. Analysis of the reports received upon infectious-disease cases very rarely discloses overcrowded conditions.

By-laws: The consolidated or remodelled by-laws which have been under consideration have not yet been finalized. I have made a point that all such relating to public health, &c., will be submitted to this office for perusal. In the meantime I have suggested that the City Council adopt our departmental plumbing and drainage by-laws. In some respects the present city by-laws are not up to the standard of those now obtaining in the surrounding boroughs and counties.

Public Baths: There is a proposal to establish baths at Karori. New baths in the centre of the city have not yet been erected. I shall endeavour to ensure that new installations will embrace any necessary provisions as regards the proper filtration, and, if thought desirable, chlorination, of the water.

Recreation-grounds and Play Areas: The City Council have not neglected this work during the year. Additional facilities were provided and improved in various parts of the city. The new area retrieved from the sandhills at Rongotai should prove useful for sport and other purposes.

Rat Nuisance: During the year 276 rats were caught on ships and 372 in Harbour Board sheds; also 958 by the Wellington City Council. Investigation of the work and methods adopted by the Wellington City rat-catcher has been attended to at intervals. Thanks are again due to the Harbour Board for their co-operation in the matter of rat-catching on wharves and ships. Seven hundred and eighty-eight rats were examined by the Bacteriologist.

Free Ambulance (Wellington City): This continues to do good work. The organization is proving extremely useful in enabling quick notification of infectious cases removed to hospital.

Theatres: Occasional visits were paid to theatres and experimental observations taken.

Food Premises (City): These continue to improve. Evolution in all cases to the standard of our new regulations must necessarily be a slow matter. During the year I visited the majority of the bakehouses in company with the Officer in Charge, Labour Department. In some instances there is still room for improvement. The question is one, perhaps, not so much of structure of building but of the personal factor. During these inspections, bakers were examined for baker's dermatitis. Only one example of this was discovered, and that of a very mild type. During last summer a special effort was made to induce fish-shops to provide cases during the fly season. Several co-operated, but in some instances great reluctance was shown. I think that during the summer months some further protection from flies is desirable.

Lower Hutt.—The standard of sanitation continues to improve in all directions in this borough. The new by-laws are well up to standard, and the work generally of the sanitary staff is efficient. The rate of increase in this borough has been so great that the Borough Council is in some respects hard put to it to keep pace with developments; especially is this so when it is remembered that the low-lying nature of certain portions particularly adds to the difficulties.

Garbage: Sooner or later this borough will require to combine with Petone in the erection of a destructor, somewhere in the neighbourhood of the industrial area, possibly. In time there will be practically no place available for tipping, even if carried out according to up-to-date English methods.

Petone Beach: Conditions have improved. The Gear Meat Co. have devoted considerable time towards experimentation and the installation of a new "save-all"; also several self-cleansing screens. These are proving very effective. The gut-works have also adopted similar methods, and have improved and extended their outfall. The Woollen Co. are also making improvements.

Eastbourne.—The necessity for water and drainage again became apparent on many occasions.

Upper Hutt.—Drainage: During the year the Borough Council applied to the Loans Board *re* a drainage scheme. The Board refuses to approve of the application at present. The question of drainage for this borough, in view of its steady progress, must not be lost sight of.

The excellent bitumen road from Wellington to the borough is adding considerably to the popularity of this area as a residential town.

Johnsonville.—Water-supply: The new supply from the Ohariu Valley has proved most valuable during the dry summer months.

Titahi Bay.—The seaside resort of Titahi Bay requires careful supervision as regards sanitation.

Hutt County.—As reported last year, the whole of the county is now controlled by the sanitation and health by-laws. In many parts of this county there are areas which are now townships or will become so in the future. There is at times a tendency for houses to be erected which are not altogether what they should be as regards structure and sanitary appliances. The Council must watch this matter carefully.

The problems of this Council are somewhat difficult, in that it administers rural areas and more closely settled areas. Great opportunity exists in the county for the application of the best town-planning principles, thus removing in some instances serious administrative difficulties in the future.

Private Hospitals.

There are now ten private maternity hospitals in the district, and eight medical and surgical homes, in addition to the Alexandra Home and St. Helens Hospital. The increased inspection and application of regulations governing private hospitals has, I am sure, resulted in a higher standard, especially in maternity hospitals.

Sale of Food and Drugs Act.

Wellington being the principal port of entry for imports and a large distributing centre, a great deal of work has been performed with regard to the Act and regulations. In conjunction with the Government Analyst, much valuable work is carried out. Premises for the manufacture of food are gradually being improved.

Ice-cream Manufacture.—Conditions *re* the protection of this are much improved as compared with those a few years ago.

Eating-houses and Food-shops.—Here again the regulations are effecting a great deal of improvement. The difficulty, which will probably never be eliminated, is that proposals are sometimes received to use buildings as eating-houses which were not originally built for same. Under these conditions it is sometimes extremely difficult to obtain all that one would like as regards the arrangements.

Port Health Inspection.

One hundred and fifty-four overseas vessels were inspected by the Port Health Officer. Nine infirm and prohibited persons were dealt with under the Immigration Restriction Act.

Inspector Frew continues to carry out good work in connection with the sanitary supervision of ships and other duties for the Department in regard to ships, especially rat-infestation.

Quarantine Station.

The accommodation remains the same. During the year Inspector York commenced his duties as caretaker. The buildings are, generally, in a good condition of repair. Mr. York is carrying out valuable work with regard to general maintenance, &c.

Epidemic Organization.

In view of influenza in England and Europe a few months ago, attention was paid to our own organization, should such have been required.

Industrial Hygiene.

There has been close co-operation between the District Officer, Labour Department, and the Medical Officer of Health, and frequent visits to premises are made together. Through our joint co-operation considerable improvements have been made at the porcelain-works, Petone. With regard to the ventilation of buildings generally, a great deal depends upon the personal factor as regards the employees. Complaints are sometimes received regarding conditions, and on investigation one finds that the fullest use is not made of the existing means of ventilation. Even in Wellington a little careful attention will often ensure efficient ventilation without the creation of disagreeable draught.

Administration.

During the year the closest co-operation and co-ordination existed between the Medical Officer of Health and the School Medical Division. With regard to infectious-disease work, the assistance of the school staff is extremely valuable.

In conclusion, I desire to express my appreciation of the valuable services rendered by nurses, Inspectors, the District Clerk (Mr. Kershaw), and the general office staff.

Amongst the Inspectors, Inspector Lerwill is giving extremely useful service to the local bodies whom he serves.

SECTION 5.—HOROWHENUA - WANGANUI HEALTH DISTRICT.

Dr. Shore, Medical Officer of Health.

Infectious Diseases.

The following infectious diseases have been notified:—

Notifiable Disease.	Number.	Deaths.
Scarlet fever	536	3
Diphtheria	96	5
Enteric fever	8	2
Tuberculosis	90	26
Cerebro-spinal meningitis	4	2
A.A. poliomyelitis	3	..
Pneumonic influenza	11	2
Pneumonia	123	29
Erysipelas	24	..
Puerperal fever (ordinary)	19	2
Puerperal fever (following abortion)	3	..
Eclampsia	3	1
Tetanus	2	..
Hydatids	6	..
Lethargic encephalitis	1	..
Trachoma	1	..
Dysentery	10	..
Totals	941	72

Scarlet Fever.—There has been a very considerable increase in the number of cases notified during the year. The disease has been mild in type, and the incidence has been greatest in the larger centres of population—Wanganui and Palmerston North.

The incidence of cases in relation to the age groups has been roughly—Ages 1–5 years (pre-school age), 21·5 per cent.; 5–15 years (school age), 49·5 per cent.; 15–20 years (adolescents), 10 per cent.; over 20 years, 19 per cent. Of ninety-nine cases over the age of 20, eighty-one were females. The incidence of cases in institutions, boarding-schools, and hospitals has not been so marked as during the previous year. Outbreaks in the Collegiate School and the Technical School Hostel, Wanganui, however, called for some attention.

Owing to some overcrowding at isolation hospitals, the discharge of cases somewhat earlier than the usual six-weeks period was allowed, provided that the consent of the parents to such procedure was obtained and that our Inspector was satisfied that a reasonable measure of further isolation and supervision of the patient could and would be carried out.

Diphtheria.—There has been a very marked decrease in the number of cases notified during the year. Palmerston North continues to furnish the largest number of cases; Wanganui shows a considerable decrease. Outside of these two large centres the other cases have been spread over the whole district, with nothing in the nature of an epidemic showing.

Enteric Fever.—The two deaths reported are attributable to an outbreak which occurred at a Native pa in the vicinity of Taihape late in 1927. The eight notified cases were found after inquiry to be either of an indeterminate nature or due to infection contracted prior to their coming into the district. They occurred in various parts of the district.

Cerebro-spinal Meningitis.—All four cases notified occurred in Wanganui City. Isolation and swabbing of contacts was carried out.

Pneumonic Influenza and Pneumonia.—The number of cases notified shows a slight decrease on the previous year, as does the death-rate. The rates of deaths and notified cases is 24 per cent. An outbreak of influenza and pneumonia was notified during the year at the Huntly Boys' School, near Marton. During inquiry into the outbreak an inspection of the school buildings was made, and requisitions for improvements to the sanitary conveniences and for better bed-spacing in the dormitories were made. These improvements have been erected.

Dysentery.—The cases notified were young children under the age of ten years, living in the Palmerston North and Wanganui–Marton districts.

Sanitation.

Wanganui City.—During the year the balance of the works included in the loan authorized by the Board of Health have been completed, and the Council has sought authority to spend some surplus moneys from such loan on improvements to the various sewer outfalls, sewer-extensions in outlying portions of the borough, and renewal of some defective sewers in the inner residential portions of the city. The necessary authorities have been granted and much of the work has been completed.

The water-supply has undergone a thorough survey; a series of chemical and bacteriological examinations have been made from the present supply and some other sources which were under consideration to augment this supply. The whole question as to how best to conserve the present supply or to so augment it as to meet the increased summer demand is under review.

The provision of a new morgue for the city will be proceeded with as soon as legislation empowering the City Council to make use of a site is put through.

A site for the disposal of the refuse by dumping and covering to serve the Castlecliff–Gonville area of the city was approved of after inspection and is now in operation.

The provision of a boiling-down works at the abattoirs to deal with both butchers' refuse and any by-products from the abattoirs by the Iwell process is fulfilling a very useful function.

Palmerston North.—During the year a contract was let for the laying of an intercepting sewer to serve the north-western portion of the borough. This work, which has been completed, comprised the laying of 144 chains of sewer-pipes. A further contract for the laying of two miles and a half of new sewer has also been let, of which 20 chains has already been completed.

The main reservoir on the water-supply at Tiritea was emptied during the spring and cleaned out, 40,000 cubic yards of silt being removed by sluicing. The town reticulation has been extended by the laying of 180 chains of new 4 in. mains.

Offensive Trades and Cattle-saleyards.

Registration throughout the district is now general, and these places are well kept. Three new offensive trades have been established, and in each case it has been possible to secure that the premises were built in such a way as to provide that the trades would be carried out with a minimum of nuisance. As many local authorities have no by-laws dealing with the construction of buildings to be used for offensive trades or governing the operation of such trades, it might be advisable that some regulation under the Health Act be made as a guide to local authorities.

Pollution of Watercourses.

Complaints are frequently received by our Inspectors of nuisances caused by the pollution of streams and watercourses other than those of "the water-supply of the district of any local authority." The source of pollution is most frequently from the waste water of a dairy factory or industrial plant, such as a freezing-works, fellmongery, or boiling-down works, or occasionally sewerage-treatment works.

In dealing with such matters two necessities arise—the need for some definite standard as to what shall be deemed dangerous pollution, and the need for some knowledge as to how these waste waters can be effectively rendered harmless as far as pollution of streams is concerned. The first necessity might be met by the Department by regulation fixing standards for the effluents from such works; the second is a matter upon which the factories concerned look to this Department for some lead as to efficient methods of treatment. It should be possible for our Department, in conjunction with these factories and one of the technical Departments, such as Industrial Research, to arrive at some methods of treatment which could be authoritatively recommended.

Work under the Sale of Food and Drugs Act.

Milk-sampling.—During the year 196 samples of milk were taken throughout the district. Of this number, seven failed to comply with the standard provided by the regulations. In addition to this sampling, various vendors' milk has been submitted to the sedimentation test for dirt. The application of this test this year in Wanganui has demonstrated to the milk-vendors in no uncertain manner the necessity for an efficient inspection of the conditions under which the production of household milk is being carried out, and the necessity for the Milk-vendors' Association functioning in the direction of endeavouring to secure for themselves a cleaner supply has been brought to their notice.

In addition to the milk-sampling, samples of butter, bacon, and ice-cream have been taken and submitted for analysis. After inspecting the bacon-factories in the district a detailed report on the conditions obtaining throughout the manufacture of this food product was furnished to you.

Sanitation generally.

During the year we have continued to keep closely in touch with the local inspectors and to assist and co-operate with them in carrying out the various duties imposed upon them by the Health Act.

The provisions of the various regulations governing eating-houses, food-shops, cattle-saleyards, and offensive trades, &c., are being given effect to throughout the district, and the by-laws relating to health and sanitation are being effectively administered.

During the year we received your permission to make exhibits at the Palmerston North and Wanganui agricultural shows showing the Department's activities. As showing the interest that is taken in public health, it is worth noting that the request for these exhibits came from the show Committees. The interest taken in the exhibits at both places was very gratifying, and more than sufficient return for the expenditure thereon. We have been asked to repeat the exhibit at this year's Palmerston North show. The co-operation and setting-up and showing the exhibit at Wanganui by the Wanganui City Council sanitary staff indicates that local authorities are interested in and are prepared to co-operate with the Department in this branch of propaganda work if the opportunity is given.

All the departmental Inspectors have continued to do good work, and, as special work involved frequent absences on my part, a considerable amount of the administration work fell on the shoulders of Senior Inspector Gardiner, who performed this work with his usual efficiency. I would like to express my appreciation of this officer's work, his assistance being almost invaluable.

SECTION 6.—WAIRARAPA–NELSON–MARLBOROUGH HEALTH DISTRICT.

Dr. Mercer, Medical Officer of Health.

Inspectors.

There have been no changes of departmental Inspectors in my two health districts. The Sanitary Inspector of the Hastings Borough resigned his position, and Inspector Carroll, of the Christchurch City Sanitary Inspectors' staff, has been appointed in Inspector Fawcett's place.

I wish to express my appreciation of the manner in which all the Inspectors in my health districts have carried out their duties during the year, and my indebtedness to them for the assistance I have been given by them in all branches of their work. Without their close co-operation the many duties of the Medical Officer of Health, including the official correspondence with the District Office, would not have been so satisfactorily carried out.

Infectious Diseases.

The notifications show a very considerable increase as compared with previous years, but this increase is almost entirely due to an epidemic of scarlet fever. There were 759 scarlet-fever cases notified, as compared with 260 (including the East Cape) in 1927. The only other infectious disease in which an increase is noted is pneumonia (including pneumonic influenza). Diphtheria is stationary; pulmonary tuberculosis the same. There has been no epidemic of non-notifiable infectious diseases—*e.g.*, measles, mumps, whooping cough—in any part of the two health districts.

The incidence of infectious disease all round in the Nelson–Marlborough Health District, though greater than in 1927, is still exceptionally low as compared with the Wairarapa–Hawke's Bay Health District.

The disproportion of the incidence—or, at any rate, the notification—of infectious disease as between the Nelson Health District and Marlborough Health District is again most marked. Scarlet fever shows an increase of fifty cases, as against twenty-nine in 1927. There is also a slight increase of diphtheria cases, and a marked increase of pulmonary-tuberculosis notifications, possibly due to the fact that I drew the attention of one or two medical practitioners to the fact that they had failed to notify cases. There were also five maternal mortalities.

Scarlet fever has been prevalent generally throughout the Wairarapa–Hawke's Bay Health District, but more particularly in southern and central Hawke's Bay. The total number of notified cases is 759. The graph for this health district shows that in 1927 there was an increase in the winter of this year. Notifications continued fairly steady through last summer and the autumn of this year (1928) until the late autumn, when there was a fairly rapid rise, and the graph shows an ascending scale to about the middle of August, when for the week ending the 20th August there were forty-eight cases notified in this health district. This peak was followed by a fairly rapid drop, and then another sudden rise at the end of September, followed by a drop to the end of the year. It can thus be generally said that scarlet fever of a very mild type has been epidemic in the Wairarapa–Hawke's Bay Health District throughout the whole of the year, but most markedly during the late autumn, winter, and early spring period.

So numerous were the admissions to the isolation wards of public hospitals that it was necessary to curtail the regulation period of isolation in hospital from six to four weeks at the three public hospitals in the Hawke's Bay District. Care was exercised as far as possible to discharge only "clean" cases at the termination of this shortened period of isolation, and naturally a sharp watch was kept for "return cases." I am pleased to report that the new practice has not produced a higher percentage of "return cases." This is gratifying because it supports the findings and observations of many Medical Officers of Health in England, and it is all the more so because we have not the effective disinfecting plant that English fever hospitals have, nor the accommodation to segregate acute from convalescent cases of scarlet fever. With only one or two slight demurs, the public accepted the shortening of the isolation period in hospital as beneficial all round.

Arising also out of this epidemic a wise practice has been put into operation of, where practicable and convenient, nursing cases at home. This I regard as a most important matter when an epidemic of a mild nature is causing a rush on the available public accommodation. The selection by the Medical Officer of Health and his staff of the suitable case for removal to hospital should be encouraged, because it has come to be regarded as a public necessity that all cases of notifiable infectious diseases, *ipso facto*, be removed from their houses to a public place of isolation. There is no such public necessity in the infectious-disease section of preventive medicine and public health. Sir George Newman's dictum is a sound one, that "admission to hospital must have close regard to the incidence and severity of the disease in the locality."

When the rush on the isolation accommodation of the public hospitals became easier I advised Medical Superintendents to use their discretion about returning to the full six-weeks regulation period, stating that, as the Medical Officer of Health, I was quite satisfied if "clean" cases—*i.e.*, cases which might still be desquamating, but had no signs of any sores or discharges after a careful examination—were discharged after a period of four weeks from acute onset of the disease.

The epidemic of scarlet fever which has been prevalent throughout the year in the Wairarapa–Hawke's Bay Health District has presented quite a number of interesting features, some of which are quite common knowledge, and some which have probably been observed by other Medical Officers of Health:—

(1) The mild type of the disease.
(2) The probability that the incubation period of this mild type of scarlet fever is in some cases longer than the usual text-book one or two to five days.
(3) The onset may be much less acute, and the classical symptoms of headache, vomiting, and sore throat so slight as to make diagnosis quite difficult.
(4) The rash, when observed, seems to be fairly typical for scarlet fever.
(5) Desquamation is quite typical, and, in my opinion, is not always dependent on the severity of the rash—*i.e.*, what has been regarded as a very mild case has desquamated freely. I know, however, some observers disagree with me.
(6) Although the type of the disease has been mild so far as the acuteness of the onset and initial symptoms were concerned, the commoner sequelæ, such as otitis media, mastoiditis, adenitis, arthritis, and nephritis, have been quite as frequent as in a more severe type. This is a most important feature, because it shows that the scarlet-fever organism, if it does not produce a pronounced toxæmia, has sufficient virulence to maintain itself in the tissues and produce after-effects of a very damaging nature.
(7) The cases, when divided into age groups, show a higher percentage of adult infection than is usual in epidemics of scarlet fever. This indicates, possibly, that the immunization of the community against scarlet fever is not high, and that scarlet fever is not merely an infectious disease of childhood, but also of adult life, if the adult had not received an active dose of immunizing antigen in childhood.
(8) There is considerable evidence that a fairly common source of infection is travelling in trains and public vehicles, and that the public do not exercise much care or thought about their movements, so far as the health of the community is concerned. There are instances where sick children have been taken long distances by train and motor-car. One successful prosecution of a parent who neglected either to call in a doctor or notify the local authority was instituted.

Diphtheria.—There has been no marked incidence of diphtheria in any particular town or area in the two health districts.

Typhoid Fever.—Very few cases (ten) of typhoid fever have been reported during the year. The majority of the cases reported were in the Hawke's Bay District, and mainly Maoris. Since the outbreak in Hawke's Bay in 1926, and the inoculation campaign carried out by Dr. Buck, the incidence of typhoid amongst Maoris has been small and there have been no outbreaks of the disease.

Dysentery.—Four cases reported, but bacteriological examinations of stools did not discover presence of dysentery organisms.

Pulmonary Tuberculosis.—The number of notifications (102) received, although not of itself a reliable indication of the incidence of this disease in the community, shows that the disease does not increase, but has probably declined in recent years.

Pneumonia (including Pneumonic Influenza).—One hundred and thirty-one cases were notified during this year, a decided increase on 1927. There was a very marked rise, as shown on the graph, in October (eighteen cases for the week ending 22nd October). These cases were mostly from the Waipawa district, where, following the prevalence of mild influenza, a sequence of pneumonia cases occurred, more in the country than in the town, some of which the doctors said were distinctly of the pneumonic-influenza type. The mortality rate of the 131 cases notified was 12·2, which is not a particularly high rate.

Puerperal Sepsis and Maternal Mortality.—There has been a gratifying decline in the number of cases (nine) of puerperal sepsis notified. This may be, and probably is, due to the fact that with a better understanding of our system of notification of cases of puerperal pyrexia by sisters in charge and licensees of maternity hospitals fewer cases of mild and doubtful sepsis are being notified. I regret, however, there is no diminution in maternal mortalities (eleven). Very few are due to puerperal septicæmia, but other complications of the pregnant and puerperal state—eclampsia and kidney-disease, &c.—are responsible for these maternal deaths.

Tetanus Cases.—There were two cases (both fatal) of tetanus in the Wairarapa–Hawke's Bay Health District, and one in the Nelson–Marlborough District.

Hydatid Disease.—This disease, which originates from infected soil, is probably not as common as it used to be, but it still exists. Eleven cases were notified in the Wairarapa–Hawke's Bay Health District.

General Sanitation.

In the general way one can see distinct progress in all branches of sanitary work. Hastings Borough has installed a destructor, in lieu of dumping, for refuse-disposal, and also improved its water-supply storage and capacity. Napier Borough has completed the water-supply of the Napier South extension—7,400 ft. of 6 in. and 4 in. cast-iron mains have been laid. Plans have been prepared for the sewerage of this extension of the borough and will shortly be put in hand. Sewerage is expensive on the Napier South Plain on account of pumping being necessary, and the erection of pumping-stations. This borough has also carried out improvements in the way of filling in a big area of swamp. Masterton has completed the relaying of defective sewers, and Dannevirke has made considerable improvements in the same way.

The inspection and registration of food-shops, eating-houses, hotels, and private boarding-houses is well looked after by the local-authority Inspectors, who are always most willing to assist our Department and keen to keep up to date in all sanitary matters.

There is one long-standing defect in sanitary engineering that I have referred to in previous annual reports—viz., the matter of the Hastings sewerage-disposal. The borough still discharges its crude sewerage into a non-tidal fresh-water river, thereby causing serious pollution. Continuous appeals from the Medical Officer of Health, supported by strong communications from the Director-General of Health, have failed to move the Borough Council to do anything in the way of improvement. The matter will now come before the Board of Health at the next meeting, and it is to be hoped that an amicable arrangement will be agreed upon and an end made of the dispute which has existed between the Department and the Hastings Borough Council for many years.

Water-Supplies.

Samples have been taken and submitted for analysis of the water-supplies, more especially where surface waters are used, of all towns in the Wairarapa–Hawke's Bay Health District. The results were uniformly satisfactory. There is no necessity in any supply to install mechanical purification treatment plants.

Milk-Supplies.

It is with much gratification that I note everywhere throughout the two health districts improvements in every direction in regard to the supply of milk for consumption. The standard of general cleanliness in the milking-sheds, transport, and delivery of milk is steadily improving, and, compared with conditions a few years back, shows not merely marked improvement, but much more intelligence on the part of the milk-vendors.

Ice-cream.

My remarks on milk-supplies apply equally to the manufacture and sale of ice-cream. The small ice-cream vendors who manufacture ice-cream under very unhygienic conditions are now practically obsolete. They have been replaced by the ice-cream factory with a good sterilizing and freezing plant, which distributes its products in properly insulated vans not only round the various ice-cream shops in the town, but also in the country.

Private Hospitals.

The efficiency of these institutions is steadily improving. A new maternity hospital was opened at Dannevirke at the beginning of the year.

The Soldiers Memorial Maternity Hospital at Hastings, which is under the control and management of the Hawke's Bay Hospital Board, was opened in July. Since its opening the number of admissions amply justifies the building of this public institution.

Nurse Inspectors.

The work carried out by the two Nurse Inspectors, Miss Broad and Miss Lea, in my health districts is excellent. In addition to the periodic inspection of all the private hospitals, the Nurse Inspectors visit the local midwives, maternity nurses, and masseuses, and inspect "beauty-parlours," &c. All this work is carried out in addition to the large amount of office and correspondence work which their duties entail upon them.

SECTION 7.—TARANAKI HEALTH DISTRICT.

Dr. Mecredy, Medical Officer of Health.

Infectious Diseases.

The year was noteworthy for an extensive epidemic of scarlet fever, which was responsible for 583 cases (corrected figures) out of a total of 940 notifications received for all notifiable conditions. Pulmonary tuberculosis, pneumonia, pneumonic influenza, erysipelas, and puerperal fever all show a considerable increase in notifications over the previous year and also over the average for the previous six years.

Diphtheria showed a slight increase on the previous year, but the sixty-eight notifications are far below the average for the preceding six years. The majority of the cases were sporadic, and in no part of the district was an epidemic experienced. The type of the disease was mild as a rule, but two deaths were reported. No "carriers" were discovered, but this may have been due to the fact that swabbing of case contacts was only exceptionally resorted to.

Scarlet Fever.—As predicted in my annual report for 1927–28, an epidemic of scarlet fever was experienced, and still continues into 1929. The epidemic reached its peak in July, 1928, when 156 cases were reported, as against sixty-seven in June and 107 in August. Owing to the large number of cases, it was necessary to arrange for treatment at home for a considerable proportion in order to relieve the congestion in the hospital isolation wards. This was only done where the home circumstances permitted of adequate isolation and nursing. As a result, only just over 50 per cent. of the cases were admitted to hospital. Of 221 of these cases whose history was gone into, 17 per cent. suffered with some complication, which, as a rule, delayed discharge from hospital. Nephritis was found to be present in six cases, and otitis media in eleven of the series. Only two deaths were recorded in the 583 cases notified.

On the whole, it would appear that the epidemic was of low virulence, and few cases of permanent injury should result. It is, however, probable that some of those cases nursed at home or not seen by a doctor will require hospital treatment for complications recognized only some time after the febrile attack. So far as could be ascertained, the discontinuance of terminal fumigation as a routine played no part in the spread of the disease. Fumigation by formalin was desired and carried out in only thirty-four cases. The shortening of the standard period of isolation to four weeks had a marked effect in obviating overcrowding of the isolation wards.

Enteric Fever.—Only eight sporadic cases of enteric fever were reported during the year, as against sixteen for 1927. This is very satisfactory in view of the large number of Maoris in the district, together with the relatively unprotected state of the water-supplies to the boroughs.

Pulmonary tuberculosis was notified as present in thirty-six patients, as against thirty-two for the previous year, and an average for the preceding six years of nineteen. This rise is probably due to the presence of a Medical Officer of Health in the district and the consequent prompter and more regular notification of all cases of the disease.

Owing to the extent of her other duties and district, organized following-up of all child contacts of the cases was not carried out by the school nurse during the year. There are fifty-six school-children and fifteen pre-school children now on the roll of contacts. These children are the contacts of forty-two cases.

Puerperal fever was responsible for seventeen notifications, as against an average of eight for the preceding six years. Five of these proved fatal, including three cases which occurred in a private hospital in New Plymouth. The circumstances of this happening were fully investigated by Dr. Paget, and steps taken to prevent, as far as possible, a recurrence.

Pneumonia and Pneumonic Influenza.—One hundred and sixty-three cases of pneumonia were notified, and twenty-eight of pneumonic influenza. The notifications of influenza from the schools suggested that there was a fairly widespread epidemic in the district, causing a considerable amount of absence from school. The maximum incidence was reached between June and August in most of the larger schools.

Erysipelas was responsible for a considerable increase in notifications from an average of under four for the previous six years to eighteen in 1928. This may have some connection with the epidemic of scarlet fever.

Dysentery.—Three cases of dysentery in one family were also reported.

The district was practically free from other notifiable conditions.

School reports indicated that *measles* was fairly prevalent throughout the year, but the schools affected with epidemics were chiefly located in the country districts. Chicken-pox was present in small epidemics in four schools. Whooping-cough was responsible for a considerable amount of sickness in New Plymouth schools in November and December. Mumps was only present sporadically throughout the district.

Venereal Diseases.

The trial for one year of voluntary notification of fresh cases of venereal disease terminated in August. During the twelve months 114 fresh cases of gonorrhœa were notified, but only six of primary syphilis. These figures suggest that the incidence of syphilis is insignificant in this part of New Zealand. Gonorrhœa is obviously present to a considerable degree, and the cases reported probably do not represent more than half the cases which actually occur, owing to a number of those affected not consulting a physician.

Undoubtedly gonorrhœa is also responsible for a number of cases of pyosalpinx and other diseases of the female reproducing system, which would not, of course, have been reported as fresh cases of the disease.

Water-supplies.

Arrangements were made for the bacteriological examination of samples of water for the presence of *Bacillus coli communis* in the New Plymouth Hospital laboratory, and during the year samples were submitted from all the town water-supplies in the district. The reports received indicated that practically all the sources of supply were contaminated to a greater or less degree as compared with the English standards for a good water.

The Waitara supply consistently gave the poorest results, though the one chemical analysis made indicated a satisfactory water. The Kaponga supply was bacteriologically the best.

Chemical analyses made of the Kaponga, Inglewood, Stratford, Waitara, and New Plymouth (two) supplies all gave satisfactory results. It is probable that some degree of animal, and possibly human, contamination takes place on the watersheds, which in all cases include a varying amount of farm lands in their respective areas. The chemical analyses, however, indicate that this pollution is not very extensive or else is well diluted by the volume of water.

In addition to the above examinations, water-supplies from various isolated hotels, seaside resorts, and camping-grounds were tested. Certain of these were reported on adversely to the authorities concerned.

During the year the ratepayers of New Plymouth approved of a loan being raised for the provision of a retaining-dam on their combined hydro-electric and water-supply scheme. This had been previously approved by the Local Government Loans Board. While I regret that the Borough Council did not see its way to utilize the excellent water from the Kiri River, the safeguards agreed to by them in the combined Waiwakaiho and Mangamahoe scheme should ensure an adequate and safe water-supply for New Plymouth for many years to come.

A water-supply ought to be provided at an early date in Opunake, and investigations of the available sources were commenced with this end in view.

Sanitation.

Waitara and Opunake are the only towns in Taranaki without a sewage-disposal scheme. In both cases trouble has arisen during the year owing to the lack of such a scheme. In the case of Opunake, the want of a water-supply holds up the installation of a sewage scheme.

The New Plymouth Borough sewage scheme was held up pending the agreement of the ratepayers to a loan for the provision of a more adequate water-supply. Now that this has been carried, and the work commenced, it has been possible to finalize the plans for the extension of the sewage scheme to the whole of the borough. Such extension is urgently required in view of the present antiquated and dangerous methods of sewage-disposal in many sections of the town.

Private Hospitals.

The usual routine inspections of private hospitals were made by Nurse Inspector Broad until Nurse Inspector Wise took over the duties in October.

In August the Inspector of Private Hospitals held a special inquiry into the circumstances surrounding the deaths of three parturient women after transfer from a private hospital to the public hospital in New Plymouth. The source of infection was discovered, but its mode of transfer from the first case to the second and third was not definitely established.

During the year Nurse Ellis had a modern eight-bedded maternity hospital built in New Plymouth, while Nurse Paterson had a building reconstructed to form an eight-bedded maternity hospital. Nurse White, New Plymouth, obtained sanction to the remodelling of her house and its opening as a three-bedded maternity hospital. Nurse Cobb obtained permission to open a three-bedded convalescent home in New Plymouth.

The opening of the above new maternity hospitals marks a step forward in the provision of adequate hospital accommodation for maternity cases in New Plymouth. All three hospitals are well equipped and constructed in accordance with modern hospital requirements.

Port Health Inspection.

Twenty-one overseas vessels were inspected during the year and practique granted in all cases. No prohibited or restricted immigrants were reported by the Port Health Officer.

Food and Drugs Act.

Ninety-eight samples of milk taken during the year resulted in two successful prosecutions for added water. No fines were inflicted, but total costs amounted to £2 1s. 6d. Four samples of butter and six of brandy were taken. Six samples of whisky resulted in one successful prosecution for substitution of bottled by draught whisky: fine and costs amounted to £22 1s. 6d. A large quantity of foods was seized during the year as being unfit for human consumption. In this were included 57½ dozen eggs, 64 tins of fish, 25 boxes dried peaches, 24 cases prunes, 79 bags of figs, 21 cases of pears, 24 cases of apricots, and 4 sacks of cauliflowers.

Inspections of Food-premises, Etc.

A number of eating-houses, butchers', bakers', and fish shops were inspected through the year. The standard of cleanliness appears to be improving, except in New Plymouth, where it was again necessary to call the attention of the Borough Council to the need for more adequate supervision of these premises.

The premises in which a number of offensive trades in the district were being conducted were found to be in need of rebuilding or remodelling, and notices to that effect were served on the individuals concerned.

Action taken against six butchers or their employees for allowing meat to be carried without a cover, or conveying meat without a cover, resulted in fines amounting to £10 19s.

Plumbers Registration Act.

Towards the end of the year convictions were obtained against three unregistered plumbers and two of their employers in New Plymouth for breaches of the Act, but no fines or costs were imposed. The Magistrate took the view that, as these were the first cases of the kind in New Plymouth, the cases were to be regarded in the light of a warning that unqualified men must not undertake plumbing-work. In Waitara a similar prosecution resulted in fines and costs amounting to £3 8s.

Camping-grounds and Seaside Resorts.

During the year the Inspectors of Health were instructed to make a careful inspection and report upon all motor camping-grounds and seaside resorts. In addition, personal visits of inspection were paid to the majority of these resorts. As a result of these visits the general standard of hygiene and sanitation was in most instances considerably improved. Advice was also given to certain bodies *re* the necessary buildings for a camping-site. Opunake and Ngamotu beaches experienced considerable trouble from inadequate sanitary systems, and on both beaches matters will require to be improved in order to cope with the very large number of summer visitors.

Inspectors' Districts.

On the 1st May Inspector Coleman was transferred to Whangarei, while Inspector Gooding took over the remains of his district. On the 1st April Sanitary Inspector Hunt took charge of Hawera Borough. From the 1st October Stratford County was taken over by Inspector Sayers, who was already inspector for Stratford Borough. This entailed a further division of the district between Inspectors Swindells and Gooding.

New Plymouth is still urgently in need of an augmented inspectorial staff for sanitary work, &c. I understand that plans are in train for the appointment of a combined building and plumbing inspector, who will act under the Borough Engineer's direction.

Senior Inspector Gardiner paid several visits to the district, and his experience and advice proved most valuable.

General.

The prolonged drought experienced in the summer of 1927–28 had no obvious effect on the health of the district, though several complaints of nuisances created by the effluents from dairy factories had to be investigated. These were practically all caused by the failure of the water in the creeks and rivers concerned.

The appointment of a Nurse Inspector to the district has already considerably diminished the clerical and inspectorial duties which had previously fallen to the lot of the Medical Officer of Health.

SECTION 8.—EAST CAPE HEALTH DISTRICT.

Dr. Turbott, Medical Officer of Health.

Infectious Diseases.

Although this district was not actually constituted until the 16th July, the statistics are for the complete year 1928.

Scarlet Fever.—Number of cases, 113. Rate per 10,000 of population, 21·50. Two deaths.

In many instances the rash has appeared late—from four to seven days after the onset of temperature, sore throat, malaise, &c. The disease has otherwise been true to type, and throughout mild in degree. The rash, often evanescent, has been followed later in the majority of cases by marked peeling. Nephritis has been the most common complication, developing sometimes in the mildest of cases. Control by routine methods is negligible; so far preventive inoculation has not been tried in this district.

Coincident with the rise of scarlet-fever notifications towards the end of the year there developed slight increase in puerperal fever and erysipelas.

Diphtheria.—Number of cases, 164. Rate per 10,000 of population, 31·20. One death.

No immunization has been undertaken since 1927, when 40 per cent. of Gisborne Borough, Cook and Waikohu County children were inoculated. In 1926 188 cases were notified in these areas. A 1927 drop to eighty-six cases after preventive immunization of 40 per cent. of the children was followed in 1928 by a rise to 118 cases. It seems a fair suggestion that this rise could have been prevented had a similar percentage of the young children who started school late in 1927 and during 1928 been immunized. Preventive immunization, to be effective, must be a continuous process among fresh susceptibles.

An interesting case of long-continued Klebs-Loeffler infection was revealed through the occurrence at intervals of three cases of diphtheria, with one death, in a public-school primer class. A girl aged six years who had begun school in 1928 in this class was found to have discharging ears of five and a half years' duration. A swab taken in class was returned positive K.L.B. When aged six months, together with her father and sister, she was an aural diphtheria "carrier." At two years and again at four years the child was treated in hospital for Klebs-Loeffler ear-discharge. The bacillus had persisted and retained virulence throughout this long period.

Typhoid Fever.—Number of cases, forty-three. Rate per 10,000 population, 8·18. Two deaths.

Early in the year a small epidemic in Wairoa was thought to be due to faulty water-main ball valves allowing contamination of the water-supply with surface water. In the latter half of the year three Maori cases near Nuhaka were traced to direct and careless contact with a previous case.

Again, near Gisborne, a Maori child who the year previously had two doses of T.A.B. vaccine contracted the disease. Contact was proven with a man who had been visiting the pa and house and who had had an attack of typhoid fever seventeen years before. From his fæces similar typhoid bacillus was cultured.

The endeavour to trace the source of infection in every case, however, failed. Apart from attention to sanitation, a systematic preventive effort has been applied among the Maoris.

In a few areas in the past, particularly Whakatane and Opotiki districts, regular anti-typhoid vaccination has been carried out. The plan has been extended so that now every Maori child of school age is being inoculated with the triple typhoid vaccine. Reinoculations will be done at two-yearly intervals.

Tuberculosis.—Number of new cases, thirty-three. Rate per 10,000 population, 6·27.

Pneumonia.—Number of cases, forty-nine. Rate per 10,000 population, 9·32.

Acute poliomyelitis did not appear during the year.

Other communicable diseases have a normal incidence.

General Sanitation.

The conditions pertaining throughout the district are satisfactory. Visits of a supervisory nature have been made in each county and borough in company with the Inspector for the area. Endeavour is being made to keep in close personal touch with those concerned with sanitary administration.

Gisborne.—This borough maintains its own Sanitary Inspector, but seriously limits his usefulness by a burden of other work—*e.g.*, noxious weeds, Dangerous Goods Act, &c. There is room for more house-to-house inspection.

Rubbish removal and disposal fairly satisfactory; replacement of an open rubbish-cart is being urged. Better facilities for washing and changing clothes for the sanitary staff are needed.

Storm-water drainage work is making satisfactory progress.

Sewerage system is in need of extension to include growing populous areas.

Water-supply is unsatisfactory in respect to quantity and low irregular pressure. Representations have been made *re* increased storage at the impounding-area, and for the installation of a service reservoir. A loan for the latter is being applied for.

Housing: Four old buildings have been demolished; replacements and new premises are in conformity with regulations.

Wairoa.—Steady improvement is being maintained in this growing district. The large floating population of Public Works Department employees has entailed much work, but health and sanitation have been satisfactory.

Rubbish removal and disposal: A systematic collection is needed in closely-built areas. "Clean-up" week was energetically prosecuted, with good results.

Sewerage system needs renewal and enlarging as soon as finances allow.

The water-supply recently established is proving a great benefit.

Opotiki.—Nightsoil-removal service has been improved by replacing the ten-day with a weekly service.

"Clean-up" week was well organized and effective. A weekly garbage-removal service should be installed.

A sewerage system would be a boon to this low-lying township.

Water-supply is ample and good.

Whakatane.—Rubbish removal and disposal: A weekly collection and disposal service has been inaugurated.

Water-supply has been tested bacteriologically and chemically, and found satisfactory. The chlorine plant fell into disuse during the year. Since the supply has remained good, its replacement has not been urged.

Port Health Inspection.

Four vessels arriving from overseas were given a clean bill of health by the Port Health Officer.

Food and Drugs Act.

Sampling of various foodstuffs, and especially milk, has proceeded regularly, and lead to three successful prosecutions. Seizures of foodstuffs have been necessary from time to time.

Milk-supplies: One firm has established an up-to-date pasteurizing plant in a well-conducted dairy factory, delivering bottled pasteurized milk of very high standard. Supervision over country dairies has improved, with better conditions resulting. Eating-houses and food-shops are all licensed annually and kept under regular supervision. Many improvements have been effected, and measures for the control of flies and rats enforced.

Maori Hygiene.

The Maori is making a steady approach to the standard of living of his pakeha friends. The tendency is to get away from pas. Better houses are being built; tanks are coming into favour for water-supplies; the adoption of privies, general in some areas, is extending rapidly in the remainder. Huis and tangis are conducted in a satisfactory manner, suggestions for the betterment of sanitary arrangements being always attended to promptly.

Administration.

This health district was inaugurated on the 16th July as a medical unit. School work, with its necessary travelling, has meant frequent personal contact throughout the district. Inspectors and nurses, whether controlled through the Department or local authorities, have been brought into closer co-operation for preventive work. This has entailed much work and no little time in meeting various local authorities and Boards, but good team-work should result in future.

SECTION 9.—CANTERBURY-WESTLAND HEALTH DISTRICT.

Dr. Telford, Medical Officer of Health.

The outstanding feature for the year has been the abnormally high incidence of scarlet fever, the number of cases amounting to 2,124, the incidence rate per 1,000 population being 8·08.

There are many factors contributing to this high incidence, the first factor being that in 1927 we did not get a lowering of incidence of this disease in the spring months, as is usual, and cases continued to be reported right through the spring and summer months. With this state of affairs and an abnormally low rainfall, I was able to anticipate an extensive outbreak for the year now ended.

In connection with the incidence, I would draw your attention to several factors in the spread of this disease. The disease was propagated by a considerable number of undetected cases of a mild type, in which the rash was of a transient nature, lasting only an hour of two, and with no marked throat symptoms. A large number of these cases were detected only when they had entered the peeling stage, and prior to this they had ample opportunity of infecting many other children. Even medical men had been in considerable doubt as to the diagnosis in several instances, being confused as to whether the disease, at the time, was one of German measles, slight septic rash, or an influenza accompanied with skin-blush. These cases were treated until the rash disappeared, when they were liberated by their medical attendant; but subsequently, owing to peeling or some other complication of the disease, the true diagnosis of scarlatina was established. With the considerable number of people out of employment, and families not having too much money in hand, they were diffident, in many cases, particularly in the country districts, in calling in a doctor to settle the diagnosis of these children's complaints, with the result that the disease was spread. Another point is that they did not like to incur the expense in connection with their maintenance upkeep in an infectious-diseases hospital, and the ambulance hire to and from their homes.

It is an unquestionable fact that school and other picnics have been a definite means of keeping this disease going to its present extent in the health districts above mentioned. A Medical Officer of Health, not having power under the general provisions of the Health Act to prohibit these picnics and other gatherings for children, is very much handicapped in his control methods.

Diphtheria showed a slight increase, though this is below the mean for the past year. Pulmonary tuberculosis showed a decrease. Influenza and pneumonia both showed an increase for the previous year, being slightly above the mean figures for the nine-years period. Puerperal fever showed a decrease and septic abortion an increase over the previous year. Erysipelas, as was to be expected, showed a marked increase in sympathy with the prevalence of scarlatina. An increase of this disease is always noticeable when scarlatina is prevalent. Eclampsia, tetanus, hydatids, ophthalmia neonatorum, and food poisoning showed a decrease. Poliomyelitis was responsible for twenty-three cases more than in the previous year. One case of actinomycosis was reported.

Sanitation.

The Christchurch Drainage Board's extension scheme has been considerably extended, and the 1924 drainage-extension programme is nearing completion. The Borough of Rangiora, at a poll of the ratepayers, decided upon a sewerage scheme; but this I do not consider would be sufficient from a health point of view, as it is necessary that a high-pressure water-supply be provided at the same time.

The Greymouth Borough Council have decided to take a poll of the ratepayers for an extension to their sewer scheme. This is very much needed.

Water-supply.

During the year the Christchurch City Council has extended their high-pressure water-supply reticulation, and all portions of the city are now provided with an adequate water-supply.

The Mount Pleasant water-supply, in the Heathcote County, was found on chemical analysis to be unsatisfactory, and I called upon the Heathcote County Council to make provision for a new source of supply. A new 6 in. well has been driven at Onecliff Street, Woolston, and this, I have no doubt, when connected up, will provide a water-supply free from suspicion, as it will be from one of the artesian flows.

Offensive Trades.

These, on the whole, have caused very little trouble during the past year. The Christchurch City Council is establishing, at North Linwood, a masticator for dealing with their refuse, and this will be buried in trenches in the sandy loam in the vicinity near to the masticator.

One butter and cheese factory in South Canterbury has been causing trouble with their drainage during the year. The directors of this company have been written to, and I have no doubt that they will endeavour to improve their effluent. The nightsoil-depository at Chaney's has given trouble also.

Food and Drugs.

The usual amount of care has been devoted to this work in general, and food-premises have been inspected from time to time as opportunity afforded.

The Christchurch metropolitan milk-supply has been systematically sampled, with good results, the number of samples not complying with the regulations under the Sale of Food and Drugs Act, 1908, being 6·58 per cent.

The amount of fines recovered from prosecutions under the Sale of Food and Drugs Act, 1908, and offences under the Health Act, 1920, and its regulations, amounted to £355 10s. 2d.

Industrial Hygiene.

Attention has been paid to those trades likely to endanger health, particularly paint-spraying plants and other industries in which dust or sharp particles are likely to be injurious to the worker. Bitumen-mixing plants have also been under observation both in regard to the dust and vapours generated in the mixing process.

St. Helens Hospital.

It was with considerable regret that Dr. Bonar Lindsay's resignation had to be accepted, owing to health reasons. Dr. Hamilton Gould has been carrying on in his stead to date of this report.

In conclusion, it is my pleasure to again record my thanks to my staff, one and all, for the loyal manner in which they have carried out their work; particularly would I instance my Health Inspectors, whose duties were very much increased by the magnitude of the scarlatina outbreak.

SECTION 10.—NORTH AND SOUTH CANTERBURY HEALTH DISTRICTS.

Lieut.-Colonel F. W. W. Dawson, Medical Officer of Health.

Scarlet Fever.

Incidence has been severe, particularly in the vicinity of Christchurch. Oxford suffered heavily in the earlier months of the year. Kaiapoi, Rangiora, Waimate, and Leeston had their outbreaks in the spring. The expected spring drop in the numbers did not occur. The Christchurch carnival week and the picnics during this period helped to spread the disease. Many mild cases are missed. Owing to distance, parents do not call medical aid for these cases. They recover in a few days, and are a source of infection for several weeks. Isolation at home is often unsatisfactory. It is possible that parents dread the expensive ambulance journey, and shirk their responsibility with regard to notifying a doubtful or suspicious case.

Suburban Settlements.

Redruth and Eversley have been included in the Borough of Timaru.

The petition of the Kaiapoi Borough Council to include Willoch Street Settlement in their borough was defeated. The County Council have decided to make the necessary sanitary improvements in the district.

Water-supply.

Geraldine.—A considerable length of race near the road has been piped.

Temuka.—A well has been sunk at Orari. The water is being piped to Temuka. The well is sufficiently high above Temuka to obviate the necessity of pumping. The water is of good quality, and an improvement on the supply taken from the river at Winchester.

Plumbing and Drainage.

The joint by-laws have not yet been adopted by all the counties. A circular letter was sent to all builders asking them to notify us when they were building new premises. They have loyally complied with this request. We have been enabled to supervise and advise on the plumbing and drainage, and an increased quantity of work has been carried out according to the regulations, and with the minimum of inconvenience and the maximum of satisfaction to all concerned. In spite of the extra work involved by scarlet fever, the Inspectors throughout the district have been able to do an increased number of drainage and plumbing inspections. The standard of this work has improved throughout the districts.

Mortuaries.

Mortuaries have been erected at Methven and Temuka. They are both situated in the vicinity of the Magistrate's Court in each town, and are fitted with modern appliances. Arrangements have been made with the local religious bodies to convert them into mortuary chapels when occupied. The local authorities have promised the palls.

Offensive Trades.

The waste from dairy factories and creameries is difficult to treat. The plant requires constant attention, and each one has its peculiar difficulties.

A new series of settling-tanks has been installed in North Canterbury, and has been working well for six months.

SECTION 11.—OTAGO AND SOUTHLAND HEALTH DISTRICT.

Dr. Crawshaw, Medical Officer of Health; Dr. Maclean, Medical Officer of Health.

Notifiable Diseases.

During the calendar year 1928 the notifiable diseases recorded numbered 1,611, as against 632 in 1927 and 867 in 1926, being an increase of 529 as compared with the 1927 figures, and also an increase of 294 in comparison with the figures for 1926.

The disease chiefly responsible for the increase was scarlet fever, some 630 cases having been notified last year, in comparison with 138 the previous year. The following diseases also showed an increase in 1928 as compared with the previous year: Enteric fever, 9 (3 in 1927); poliomyelitis, 3 (none in 1927); septic abortion, 2 (1 in 1927); erysipelas, 53 (32 in 1927); ophthalmia neonatorum, 3 (1 in 1927); influenza, 50 (20 in 1927); acute primary pneumonia, 90 (74 in 1927); eclampsia, 14 (13 in 1927); actinomycosis, 2 (1 in 1927). A decrease was apparent in the following: Diphtheria, 18 (43 in 1927); pulmonary tuberculosis, 250 (254 in 1927); puerperal fever, 19 (23 in 1927); lethargic encephalitis, 4 (6 in 1927); tetanus, 1 (4 in 1927); hydatids, 10 (12 in 1927).

Scarlet Fever.—Generally speaking, the disease was of a mild nature, which fact contributed greatly to its spread. One interesting feature of the epidemic was the late appearance of the rash, as reckoned from the appearance of the first definite symptoms, such as sore throat or vomiting. Taking the first five hundred cases occurring during 1928 in which the information was available, it was found that in 268, or 53·6 per cent., the rash appeared on the first or second day of the illness, while in 232 cases, or 46·4 per cent., the rash appeared on the third day or later. It appeared on the fourth day in forty-seven cases, on the fifth day in sixteen cases, on the sixth day in five cases, and on the seventh day in three cases. Text-book descriptions of the disease are unanimous in stating that the rash occurs on the first or second day, rarely later.

Diphtheria.—This disease has been remarkably scarce considering the prevalence of scarlet fever and the frequency with which these two diseases are associated. There were no cases during the first four months of the year, then ten cases occurred in May and June, and after a further interval of four months there were six further cases in November and December. The cases occurred in eight separate outbreaks, with no apparent connection between them. Four of the June cases occurred in children attending a small country school at Spottis Creek, in Central Otago, in a district that has been free from the disease for a very considerable time. Four "carriers" were found in the school, but further swabbing showed all to be clear within a week.

Enteric Fever.—Of the notified cases of enteric fever, four occurred over a period of five months in the same household. Some months previously two other persons living in the house had died from what now appears to have been enteric. Investigations showed that the source of infection was a boy of sixteen, who was milking for the household. He had had the disease seven years earlier, and his discharges still contained typhoid bacilli at certain times. In the investigation of this outbreak very valuable and willing assistance was given by the medical practitioner resident in the district, Dr. Scrymgeour. The details of the outbreak are given in a special report in the Appendix.

Puerperal Sepsis.—Only isolated cases occurred, and in every instance where private hospitals were concerned the precautions taken were effective in preventing further spread.

Tuberculosis.—With the addition of some thirty new shelters at Waipiata Sanatorium the district is now very well served in respect of accommodation of this nature. Valuable work has been carried out by Nurse Inspector Jeffery in visiting the homes of tuberculous cases and advising patients and contacts as to the precautions to adopt. During the past year special attention has been paid to the child contacts, and short histories have been prepared for the School Medical Officers, giving particulars of illnesses, home conditions, &c.

Food and Drugs.

Food analysed.—During the year 977 samples of various foodstuffs were taken for analysis, and appropriate action was taken where samples did not comply.

The number of food-premises inspected was 2,245, and the number of premises where defects occurred was 259.

Soda-water.—Samples of soda-water have been obtained from every cordial-factory and carbonator in the district and tested for the presence of lead. A considerable number were found to contain lead in varying quantities, and the proprietors have been warned that an overhaul of their plants is necessary. One sample contained as much as 20 parts per million of lead, equivalent to nearly $\frac{1}{5}$ grain of lead per pint, the contamination in this case being due to a coil of lead piping surrounded with ice and used to cool the soda-water.

Milk-supplies.—In Invercargill a retailer has adopted the bottling system, and his results will be watched with interest. He is at present hampered by lack of suitable equipment, but this should be remedied as the business expands.

Water-supplies.

During the year routine examinations have been made of various borough supplies, most of which have been found to be of a reasonable hygienic standard.

Invercargill.—Considerable improvement has been effected by scraping the water-mains to remove the excessive deposits of iron and organic matter. It has been decided to develop the present well supply rather than undertake a gravitation supply, and the Town Engineer has been instructed to report on the possibility of ridding the water of iron. A portion of the old Borough of South Invercargill has been taken into Invercargill Borough, and is now being provided with water from the Invercargill supply.

Queenstown.—The unusually dry summer and autumn of 1928 proved the necessity of increasing the borough water-supply. The additional supply will be from a mountain stream very close to the town.

Gore.—This supply is drawn from shallow wells, situated in the centre of the town, and there is chemical and bacteriological evidence to show that the water must be viewed with suspicion. It is hoped that shortly the local authority will move in the direction of treating the water or providing a fresh source of supply.

Drainage.

Dunedin.—The reticulation of the outskirts of the Dunedin suburban area is being carried out by the Drainage and Sewerage Board in consequence of the extension of building operations. The effectiveness of the storm-water drain recently laid in the Tainui district was tested during the recent heavy rain, when very serious damage was done in several parts of the city through flooding, whereas at Tainui comparatively little trouble was experienced.

Balclutha.—The Borough Council are still carrying out street-channelling and general improvements to various low-lying areas. Over two miles of street-channelling has been completed during the past two years. This has effected considerable improvement in the low-lying residential portion of the town.

Mataura.—The sewerage reticulation has been completed, and house connections are proceeding. This is one of the most progressive boroughs in the district.

Gore.—There is still an unduly large number of houses unconnected to the sewers. This state of affairs is encouraged by the present system of sanitary rating.

Queenstown.—An engineer's report was obtained with regard to a sewage system, but the estimated cost was too large for the ratepayers to face. This improvement in the sanitary condition of the town will have to be made shortly if Queenstown is to retain its popularity as a tourist resort.

Kaikorai Valley.—The matter of the drainage of the Kaikorai Valley is still occupying the attention of the Department. A number of meetings have been held, and reports have been prepared by Messrs. Alexander (City Engineer) and Williams (Engineer for the Green Island Borough). At last meeting the engineers were asked to confer with a view to reconciling their reports. Undoubtedly a great advance has been made towards coming to a final decision.

Nightsoil Services.

The various nightsoil services throughout the district continue to be carried out satisfactorily for the most part. That at Waikiwi, near Invercargill, administered by the Southland County Council, is a model of what such a service should be. The Maniototo County Council have recently installed a service for the Township of Ranfurly, and, in addition, a weekly refuse-collection service.

Private Hospitals.

Nurse Inspector Beswick pays regular visits to all the maternity, medical, and surgical hospitals, cottage maternity hospitals, and training-schools. It is pleasing to report that the equipment of private hospitals continues to show a steady improvement.

Investigations have been made regarding the means of egress from private hospitals in the event of fire. As a result of the Department's representations improved facilities have been provided where necessary.

General.

By-laws.—The counties of Bruce, Tuapeka, and Clutha have adopted a joint set of by-laws. During the year the Queenstown Borough Council adopted a new set of building and sanitary by-laws. A number of the smaller boroughs in the district whose by-laws are inadequate or non-existent are being assisted to prepare a combined set similar to those adopted by a number of counties. The County of Stewart Island is likewise engaged in drawing up building and sanitary by-laws.

Plumbing and Drainage Regulations.—A number of the smaller boroughs have agreed to adopt these regulations, either as they stand or with certain modifications.

Cemeteries.—The control of cemeteries has been efficiently maintained without undue trouble. Some of the smaller country cemeteries are being hampered through lack of funds, and in some instances have obtained grants from their respective counties.

Offensive Trades.—The managements of the various factories where these trades are carried on are alive to the necessity of conducting them so as to prevent as far as practicable any nuisance arising. Messrs. Kempthorne, Prosser, and Co., Ltd., are at present rebuilding part of their works at Burnside, and propose installing a new and up-to-date plant for the manufacture of artificial manure.

Invercargill Abattoirs.—The offal is now being disposed of in a satisfactory manner at the Southland Butchers' By-products Works.

Flock-mills.—It has been necessary to enforce more strictly the proper washing of second-hand clothing and rags before their conversion into flock.

Motorists' Camps.—The establishment of camping-places for motorists is now considered a duty by many Borough Councils, who have provided suitable sites and equipped them with water-supplies and necessary sanitary arrangements. In a number of cases a caretaker is appointed to see that a high standard of cleanliness is maintained. The need for similar provision in some country districts is becoming very apparent, and some camping-grounds are in danger of being spoiled by the careless habits of certain motorists. In some cases the number of people using a particular locality is large enough to pollute it seriously, but not sufficiently large to warrant the expense of installing sanitary equipment and maintaining a caretaker. This is especially noticeable in the neighbourhood of some of the lakes.

Public Works Camp, Hydro-electric Works, Awakino.—The Public Works Department have established a camp at Awakino for the workmen engaged in harnessing the Waitaki River. Between two hundred and three hundred men are now engaged on the work. The camp-site is satisfactory, and the water-supply is ample and of good quality.

Dangerous Drugs Act.—This Act came into force during the year, and circulars were sent to all medical practitioners explaining its purport and the working of the regulations.

Dunedin Flood.—On the 19th March, 1929, considerable damage was done to properties in the northern portion of the city by the Leith Stream overflowing its banks after a period of heavy rain. The southern portion of Dunedin was also affected to a considerable extent. A thorough inspection has since been made of the affected areas, and as a result a number of dwellings have been condemned and structural alterations have been asked for with regard to others. The flood caused breakages in two 12 in. water-mains from Sullivan's Dam, and resulted in a water-famine in part of the city. Until repairs were carried out the Dunedin City Corporation arranged supplies to householders by means of motor-lorries. The flood waters carried large quantities of clay in a condition of very fine suspension into Ross Creek Reservoir, rendering the water unfit for culinary purposes and necessitating the continuance of the supply by means of lorries. Efforts are being made to clear the water in the reservoir by means of precipitants, but so far with only partial success.

Swimming-baths.—The tepid swimming-baths at Invercargill were formerly considerably affected with algæ growth, necessitating frequent changing of water. This difficulty has been overcome by a regular dosing of the water with chloride of lime, after copper sulphate had been tried and found ineffective. The water has now remained unchanged for five months, and a recent bacteriological test showed that *B. coli* were absent in 25 c.c.

PART IX.—SPECIAL GOVERNMENT HOSPITALS AND SANATORIA: EXTRACTS FROM ANNUAL REPORTS OF MEDICAL SUPERINTENDENTS.

SECTION 1.—QUEEN MARY HOSPITAL, HANMER.

Dr. P. Chisholm, Medical Superintendent; Dr. Moller; Miss E. Hodges, A.R.R.C., Matron.

The year has been a comparatively busy one, the number of patients seeking admission having been fairly constant. There has been a considerable amount of activity in reconstruction in respect of the buildings, endeavouring to make the older part of the institution more suitable.

The main hospital has for some time been becoming more and more inadequate, and, owing to its flimsy structure, is showing signs of deterioration. A new floor has been put down in one of the wards, and both lavatory blocks have been reconstructed. The result has been most satisfactory.

Considerable alterations have been made to the heating system. Owing to the gradual extension of the hospital, extra heating systems were installed to deal with each increase, until eventually there were no less than eleven separate heating systems throughout the institution. These have now been scrapped and a central heating plant installed. This is likely to prove very satisfactory, and once it is thoroughly established it should be a definite economy.

The building of the new home for the nurses has been started, and should be completed during the present year.

Female Section.—This section of the hospital has been fully occupied, and there has been a fairly long waiting-list. It will be advantageous to the women's section when the new home is completed for the nurses, as it will free the old hospital, which is at present used as an annexe to the Nurses' Home, for the women, and so relieve us from a certain amount of congestion. The number of women seeking admission continues to increase.

Male Section.—The number of occupied beds remains fairly constant. There is a comparatively equal division between the number of Service and civilian patients. The building will require some further improvement in the near future.

Red Cross.—The Red Cross Society continues to maintain the recreation-rooms for the male patients. This adds very considerably to the comfort of the patients.

Massage Department.—The plans for the new department have now been completed, and I hope that the new building will be completed during the present year. When this is done it will relieve us of many difficulties.

Electric-light Service.—This has been fairly satisfactory, and there has been an increasing demand for power in the village; but this cannot be granted, owing to the limited supply. I anticipate great difficulties in the near future, owing to the need for the increase of power within the institution itself. As far as one can judge at present, this is not available from the present plant.

Water Service.—This service has continued to give very great trouble and difficulty, and is a continual source of anxiety. During the winter, owing to a flood, part of the main pipe-line was washed away, and the hospital and the village were without water for a day, and then only a very limited supply could be obtained for a few days. In addition, considerable damage was done at the head of the waterworks. The Public Works Department had a gang of men repairing and reconstructing on the pipe-line for some four or five months. It is hoped that this will now improve matters, and cause us less trouble.

Garden.—The public grounds and the hospital garden have been well cared for, and the general appearance repays labour involved.

Farm.—The conduct of the farm has been satisfactory. There has been an adequate supply of milk, and sufficient potatoes to last us for the major part of the year. Mr. Bruce, Agricultural Adviser, has visited regularly, and given valuable advice and assistance.

Bathhouses.—These are in a very bad state of repair, but with the building of the new massage department a certain section of the bathhouse will also be rebuilt, and this will give assistance.

Tea-kiosk.—The tea-kiosk serves a useful purpose. I think it would be of great advantage if this kiosk was opened on Sunday afternoons.

Maintenance.—The general fabric of the institution has been well cared for, and presents a satisfactory appearance. I propose during the present year to replace one ward floor with hardwood, and reconstruct a lavatory for men in the public grounds. This work will be carried out by the maintenance staff.

I wish to express my appreciation of the work of the senior staff of the hospital, who have rendered loyal and willing service to the institution.

I beg to thank you for your help and assistance during the past year.

SECTION 2.—KING GEORGE V HOSPITAL, ROTORUA.

Dr. L. A. Lewis, Medical Superintendent; Dr. W. S. Wallis, Orthopædic Surgeon; Dr. R. G. Phillips Turner, Assistant Medical Officer; Miss A. C. Searell, A.R.R.C., Matron.

I have the honour to present the report on this institution for the past year.

Of the 1,032 patients under in-patient treatment during the year, 861 were suffering from general diseases, as distinct from orthopædic conditions. Of the 156 patients treated in the orthopædic section, fifty-six were suffering from the after-effects of infantile paralysis, and had in practically every case been in-patients of this or other institutions previously. Other types of orthopædic conditions dealt with in this department were birth-palsies, congenital deformities, malunited fractures, deformities following septic and tubercular bone and joint disease.

From a review of patients suffering from infantile and birth palsies admitted here, it appears that facilities for after-care are lacking in the Dominion. Manifestly an orthopædic hospital is for the purpose of surgical and corrective treatment. Provision for after-care of patients should be available in the patients' own district, where supervision and schooling should be carried out.

Infectious Diseases.—The accommodation in this section has been taxed to its limit during the year.

Traffic through Hospital-grounds.—During the year it has been found necessary to stop vehicular traffic by the erection of gates on that part of the circular road adjacent to the wards. The noise of traffic has been the cause of serious disturbance to patients.

Theatre.—One hundred and fifty major operations and 281 minor operations were performed during the year.

Maternity Ward.—An extended use has been made of the accommodation provided, twenty-one accouchments being attended during the year.

X-ray Department.—The number of cases X-rayed during the year was 892. Of this number, 145 were X-rayed for outside medical practitioners.

Nursing.—Eight nurses passed the State examination—two with honours—during the year. One of the latter is now proceeding with the post-graduate course for nurses. I desire to place on record my appreciation of the co-operation of the responsible officers and the spirit of loyalty to the institution shown by all members of the staff.

Grateful acknowledgments are made of the voluntary work of the Red Cross, the Women's Club, and the Sunshine League.

SECTION 3.—OTAKI SANATORIUM.

Dr. E. Irwin, Medical Superintendent; Miss Pownall, Matron.

During the year 106 patients were admitted; of these, 2 were under twelve years, 15 under twenty years, 43 between twenty and thirty-five years, 43 between thirty-five and fifty years, and 3 were over fifty; 65 were single women, and 41 married.

Patients discharged, 104. Of these, 43 were able to resume duties; 23 discharged unimproved (of these 2 were chronic cases, 11 advanced, and 10 were admitted with complications—these complications chiefly comprised spinal, nervous, and kidney affection, which were referred for special treatment); 2 were admitted who on examination proved not to be tubercular—(*a*) Bright's disease, (*b*) septic pneumonia. Thirty-six were discharged definitely improved; in many instances the relations wished them nearer when they had so begun to improve.

In regard to advanced cases, I think it is a pity that patients should be put to the inconvenience of travelling, and the expense is not warranted.

In addition to general routine and medicinal and palliative treatment, tuberculin has been tried in a few obstinate adult cases, with doubtful result. Sun treatment only to the extremities has been tried, but the patients appear to do much better during the colder weather. In all cases where a confirmatory X-ray examination was necessary this was undertaken at the Palmerston North Hospital.

In September, 1928, Miss Pownall was welcomed back from her visit to England. The staff have profited by much interesting and instructive information gleaned on her travels.

While no tuberculosis certificates are granted to the staff for service here, the Matron, by frequent addresses, makes their stay profitable; particularly is this so in the case of those proposing to enter the nursing profession. In regard to the patients the work is educative, explanation and instruction being for the most part restricted to their monthly examination-time; and, while advice is given to the patients on discharge, there is a great field and urgent need for follow-up work in connection with them, the subsequent conditions of life in many instances predisposing to a setback.

During the year an address was given to the post-graduate nurses at Wellington Hospital on the various aspects of the general routine and treatment in this Sanatorium. It is to be hoped that next year these nurses will be able to pay a visit to the institution.

Farm.—Under the direction of the Agricultural Adviser, Mr. Bruce, results from the working of the farm have been very satisfactory, the quantity and quality of milk produced being all that could be desired. The mutton supplied from the farm is of excellent quality, and the quantity of fresh eggs and poultry required has been well maintained. An abundant supply of fresh vegetables of good quality was produced from the kitchen garden, and surplus vegetables were sent to St. Helens Hospital, Wellington. The ornamental grounds are quite a feature of the institution, being a source of admiration to the patients. All work has been carried out with efficiency and economy.

SECTION 4.—PUKEORA SANATORIUM, WAIPUKURAU.

Dr. G. Maclean, Medical Superintendent; Dr. H. D. Matheson, Assistant Medical Officer; Miss A. L. Lundon, Matron.

The work of the Sanatorium has proceeded most smoothly in all departments throughout the year, which has proved to be one of further increased activity, particularly in respect of the number of patients treated. It will be noted at once from statistics supplied that this total has risen from 281 in 1927–28 to 310 for the present period under review. A very definite increase in the admission-rate was consequent upon the favourable report upon this institution published by the members of the Tuberculosis Commission, which visited the Sanatorium in June, 1928. I regret that, as in former years, I cannot yet report much improvement in the type of cases referred for treatment, but must admit that, with the increased numbers recommended for admission, there has been retrogression in the matter of selection. I can see no remedy for this unless some system of selection by the Sanatorium Medical Officers can be arranged.

Another regrettable feature which must be noted, particularly this year, is the greatly increased amount of oral sepsis, as well as other focal sepsis, among entrants for treatment. Full extraction has been necessary within the Sanatorium in a great many cases, both Service and civilian. There is naturally much diffidence among the private dental practitioners of the neighbourhood over the handling of these cases, and the work must therefore be done in the Sanatorium.

The proportion of civilian patients is gradually increasing year by year, though the percentage of Service patients has remained steady at 40 per cent. for some years now. The increase in the number of patients treated this year represents, therefore, an increased use of the institution by civilians.

I am glad to be able to report the resumption during the year of vocational training for Sanatorium patients. This is due entirely to the efforts of Mrs. T. H. Lowry and the Red Cross workers of Hastings and Napier, who by organizing a Red Cross gymkana at Hastings in November last have provided money to pay for the service of an instructor in cabinetmaking. The class has been commenced again recently, and patients are availing themselves of the opportunity provided to learn. The idea of the work is not to train pupils to be expert in any trade, but we are content that the tuition they receive gives them occupation for their many enforced leisure hours. Adequate training to become expert enough to earn a livelihood belongs to another phase of treatment of the tuberculous —viz., after-care, &c.—a direction in which we have not yet made any beginning.

One other matter calls for brief comment in this report, and that is the increase recorded in the average individual days' stay in Sanatorium. This has been calculated in a more thorough manner this year by taking the number of patients discharged during the twelve months and dividing the collective days' stay by the number who completed treatment. No account, as in former years, has been taken of the number in hospital at the commencement of the year, nor those remaining in hospital. The result shows that the average period of treatment at this Sanatorium is correctly stated as 146·7 days, as against 131 last year. The period now given, five months of twenty-eight days, is short enough, and still far short of the ideal in treatment that patients should be kept as long as such treatment is indicated. The principal factor shortening this stay in Sanatorium is economic. We might do well to study the Canadian system of maintenance grants for indigent patients.

Staff Changes.—Dr. H. D. Matheson was appointed on the 20th February last to replace Dr. G. M. Scott as Assistant Medical Officer, retired for health reasons. Patients and staff regret Dr. Scott's severing his connection with this institution after so many years' service in the Department, and all join in wishing him many years of good health and happiness in retirement.

Buildings.—No replacements nor extensive alterations have been carried out during the year. I would draw attention to urgent needs outlined again in this year's estimates, such as the concreting of the lavatory-floors, reroofing the shacks in iron to replace malthoid, and the matter of improvement to the entrance to the Sanatorium.

X-ray Department.—The number of films taken during the year has been 336. For the third year the plant has given continuous excellent service without any expenditure, other than films, being necessary.

Dispensary.—The value of drugs used for the year has totalled £262 9s. 7d., a decrease of £29 on last year's figures. In view of the increased number of patients under treatment, this reflects economy in the use of medicines and dressings.

Orchard and Kitchen Garden.—We have received vegetables and fruit to the value of £348 4s. 4d., for which return wages amounting to £415 9s. 3d. are paid to one head gardener and two under-gardeners. Our requirements have not been met again, and £93 16s. 6d. in addition has been expended in supplementing these supplies. The comparison does not represent by any means a payable proposition.

Red Cross Society.—The lives of the patients have been very much brightened, and their stay here made much more enjoyable, by the continued visits of the various ladies' committees of the Red Cross Society. The society, as mentioned elsewhere, has been responsible for the resumption of vocational training in both leatherwork and carpentry classes. The number of patients at present attending the leatherwork and raffia-work classes stands at forty-five, and this is a fair daily average throughout the year. Fourteen men are enrolled as members of the cabinetmaking class. I must again record sincere appreciation of the society's contribution to the welfare of all patients here.

Gifts and Services to the Sanatorium.—I would like to acknowledge also the kindness of many people in this district in supplying valuable prizes for the various sports participated in by the patients. The list includes Mrs. J. D. Ormond, silver cup for bowls; Mr. L. A. Bowen, gold medal for bowls; Mr. J. P. Smith, four handsome gold-mounted buttons as trophies in rink play at bowls; Mr. W. D. McKay, two silver buttons for golf putting; and Mr. D. Cody, two years' subscription to the London *Sphere* and a quantity of records. Mr. J. P. Smith also deserves our thanks for again spending a fortnight at this institution for the purpose of relevelling the bowling-green, for which purpose he kindly supplied his own special apparatus. To the various bowling clubs of Hawke's Bay our thanks are also due for their visits to the Sanatorium and the arrangement of friendly matches with the patients.

In concluding this report I would like to place on record again my appreciation of the staff as a whole for good work performed and loyal co-operation throughout the year.

APPENDIX.

MEDICAL RESEARCH.

PART I.—RESEARCH INTO STILL-BIRTHS AND NEO-NATAL DEATHS.

By C. M. Hector, M.D.

The initial steps in this research were taken in April, 1928. The need for this inquiry is shown by the fact that, whereas the infant-mortality rate shows a steady decline, the still-birth and neo-natal death-rates show a steady rise. This condition is not confined to New Zealand, but is general throughout the world. New Zealand has the lowest infant-mortality rate in the world. The most recent figures relating to the urban rate show a further improvement from 45·12 per 1,000 in 1927 to 41·4 in 1928. The urban still-birth rate, on the other hand, shows during the same period an increase from 27·89 to 30·0 per 1,000. This unsatisfactory state of affairs has been fully brought out in a recent paper by the Government Statistician. In that paper Mr. Fraser points out the great disparity between different countries in the definition and statistical treatment of still-births. He urges that, "If the true incidence of still-births is to be obtained, either still-births should be included in the computation of mortality-rates or note should be taken of the intra-uterine age and two classifications made, all full-time live births to be included in the computation of infant-mortality rates, while all births of infants born prematurely to be classified separately with the still-births and have separate mortality-rates computed for this class. At the present time, while registration of still-births is compulsory, they are included neither in the statistics of births nor of deaths. Thus a child born alive at seven and a half months and dying two weeks later is counted as a birth and as a death, but an infant still-born at eight and a half months is not included either as a birth or as a death."

Mr. Fraser's figures (as also research elsewhere) clearly show that the principal factors leading to still-birth and neo-natal deaths are ante-natal in their action. This being the case, is it not clearly desirable to go further than the registration of still-births—*i.e.*, to the registration of all interruptions of pregnancy (abortions and miscarriages)—with in every case a note of the intra-uterine age? The factors leading to these mishaps must in many cases have a bearing on the problem of still-births and neo-natal deaths. They must be taken into consideration.

In the present inquiry the problem has been approached along two lines—(1) Statistical; (2) pathological.

In connection with the former, a questionnaire embracing most of the circumstances which may be expected to throw light on the problem has been drawn up and printed. Supplies of this questionnaire have been sent to all the St. Helens Hospitals in New Zealand and to the chief maternity hospitals, with the request that one be filled up with respect to every still-birth and neo-natal death which may occur in the institution. This questionnaire is similar to that of the League of Nations, so that the results may be readily comparable.

In connection with the latter, arrangements have been made for the bodies of all still-births and neo-natal deaths to be forwarded to Wellington for post-mortem and histological examination. A complete post-mortem examination is carried out in every case except where maceration is so advanced as to make it worthless; but even in these cases all information which is considered reliable is collected. In every case the aim is to determine from the history and the post-mortem findings the mode and the probable cause of death. To determine the fœtal age a record is kept of the centres of ossification in the femur, tibia, os calcis, astragalus, cuboid, and sternum: these are correlated with the weight and length of the body. A record is also kept of the weights of internal organs and their ratio to the body-weight and to the normal, as far as it is possible to ascertain it. Evidence of the presence or absence of syphilis is sought in—(1) The condition of the epiphyseal line of the femur; (2) the presence or absence of *Spirochæta pallida* in smears of the liver and supra-renal stained by Giemsa's method or with nigrosin; (3) in sections of liver and other organs treated by Levaditi's method. Histological examination is made of the liver, spleen, thyroid, thymus, lung, supra-renal gland, and kidney by various methods. In some cases sections are taken of the pancreas, pituitary, and parts of the central nervous system.

To date thirty-one bodies have been sent in for post-mortem examination. In addition to the questionnaire relating to each of these bodies, other questionnaires relating to bodies not available for examination have been sent in. These will be filed for analysis when a sufficient number have accumulated.

The number of cases examined so far is too small to admit of summary by percentages, but, nevertheless, some interesting facts have emerged. For example, in a case of anencephaly, a condition hitherto ascribed to a mechanical cause—viz., adhesion of the amnion—there was found to be complete absence of the supra-renal glands. Examination of the literature shows this to be a frequent association, so that the condition of anencephaly must be due to a more fundamental cause than adhesion of the amnion. The examination for syphilis, as far as it has gone, tends to show that syphilis is not a preponderating factor in New Zealand.

Again, it is noted that there is a considerable variation in the size and ratios of the various endocrine glands. Lesions of these glands may be an important factor in still-births. For example, hæmorrhage into the supra-renal capsules, which is not infrequent and sometimes considerable, must have far-reaching effects. In some cases of still-birth there is found great enlargement of the thyroid gland. It would appear that in some cases the enlarged thyroid, being wrapped round and compressing the trachea, may have contributed to death (the mode of which was by asphyxia). The normal weight of the thyroid in a full-time child is about 1·2 grammes. In this series thyroids of 7·7 grammes to 12·4 grammes have been found. What is the cause of this large ante-natal enlargement?

Another group of cases requiring consideration is the jaundice and hæmorrhagic group. These cases suggest a toxæmia. The absence of bacteria from blood-films, from smears of the internal organs, and the failure of cultures suggest that the toxin may be derived from the mother.

It is now believed that deficiency of vitamine D permits chronic infections to occur in persons otherwise resistant. Possibly dietetic defects in the mother may be a factor in these cases.

It is hoped that when a sufficient number of cases has been examined the summary and analysis of the post-mortem and histological findings may throw valuable light on the problem.

In conclusion, I desire to express my indebtedness to those who have so willingly assisted me in this inquiry, particularly the staff of St. Helens Hospital, Wellington.

Probable Cause of Death.

Congenital malformation	5	Toxæmia of pregnancy	1
Placental insufficiency	3	Prematurity	1
Prolapse of cord	2	Suffocation by inspired fluids	2
Cord round neck	3	Shock	1
Cerebral hæmorrhage	4	Cause not obvious (maceration)	5
Fœtal anasarca	1		—
Jaundice	3		31

PART II.—SUMMARY OF REPORT ON AN ATMOSPHERIC POLLEN SURVEY, DUNEDIN, SUMMER, 1928–29.

By Morris N. Watt, M.B., Ch.B.

The following report is the outcome of an investigation upon the wind-borne pollens in order to correlate the atmospheric pollen content and hay-fever symptoms, upon the distribution and relative abundance of atmospheric pollens other than grasses which might be influencing factors in the patients in whom desensitization to grasses gives only partial relief, and to determine the factors influencing pollination.

During the months of September, 1928, to February, 1929, inclusive, an intense survey was made of the atmospheric pollens of Dunedin. Prepared plates were exposed eight hours daily, and the pollen-grains upon them counted over a standard area, and as far as possible identified. To make the task of identification possible, frequent observations were required to be made in the field in order to obtain a knowledge of the plants pollinating and their relative abundance, and, further, to obtain and mount for permanent reference and examination samples of all the available wind-borne pollens. Constant meteorological observations were made and correlated with the pollen findings. Further observations were made of hay-fever patients with regard to duration and intensity of symptoms, and the results correlated with the rest of the data. During the grass season investigations were conducted to determine as closely as possible the weight of pollen produced by the more important grasses, so that some knowledge might be obtained not only as to the intensity of pollination, but also as to approximately the area of ground to be sown next year for supplies for prophylactic treatment. In addition to the above, considerable amounts of pollen of the more important grasses were collected for extraction, and also pollen of the abundant early summer trees for future diagnosis and possible treatment.

In all, 688 plates were exposed and examined, giving a total pollen count of 40,500 grains. One hundred and fifty permanent microscopic preparations of the more important pollens have been prepared, and a herbarium established of fifty of the chief grasses of this district.

Factors Influencing Pollination.

It was clearly shown during this investigation that hay-fever symptoms bore a direct relationship to the abundance of pollen (chiefly of grasses) in the air. The chief factors concerning this are: First, abundance of the particular plants; second, the intensity of pollen-production; and, third, the length of season of bloom. These are in their relative order of importance.

The first and most important factor necessitates careful and extensive field survey of any district. The present report shows which plants we have most to contend with in Dunedin; it also shows that similar surveys should be made in other districts, since the most important plants here are certainly not the most important farther north.

The intensity of pollen-production depends on two factors—namely, the individual plant's own capacity, and, secondly, meteorological conditions which hasten or retard this. Accurate meteorological observations were taken throughout the summer, and their bearing on pollination investigated.

Rainfall has two effects on the atmospheric pollen: it first washes the atmosphere clean, so that on wet days and days just after heavy rain the air is almost free of pollen; secondly—and this especially in the case of light rain combined with a high temperature—it causes an increased production of pollen. Sunshine plays a part in pollination, but is dependent on temperature to produce any marked effect. Humidity, solar radiation, &c., play but a very small part, and alone are of little or no importance. Temperature is perhaps the greatest factor of all. All these factors, however, are quite dependent on another; it does not matter how much pollen is produced, it cannot get into the air without the action of the wind. A light wind is all that is necessary; strong winds certainly do produce an enormous concentration of pollen in the air at first, but later tend to clear the atmosphere unless the other factors mentioned above contribute to an increased pollen-production.

The third factor concerning the atmospheric pollen—namely, the length of the season of bloom—necessitates constant field survey. It can be divided into two periods—one, that of most intense pollination, which is the period chiefly concerning hay-fever; and a period before and after this when only odd plants are pollinating or pollination is limited to strictly local areas. The first period is bound to affect the majority of patients, whereas the second will affect individuals only. Experiments showed that the pollen is fairly evenly distributed throughout the atmosphere, though predominant local vegetation must influence the local pollen-cloud.

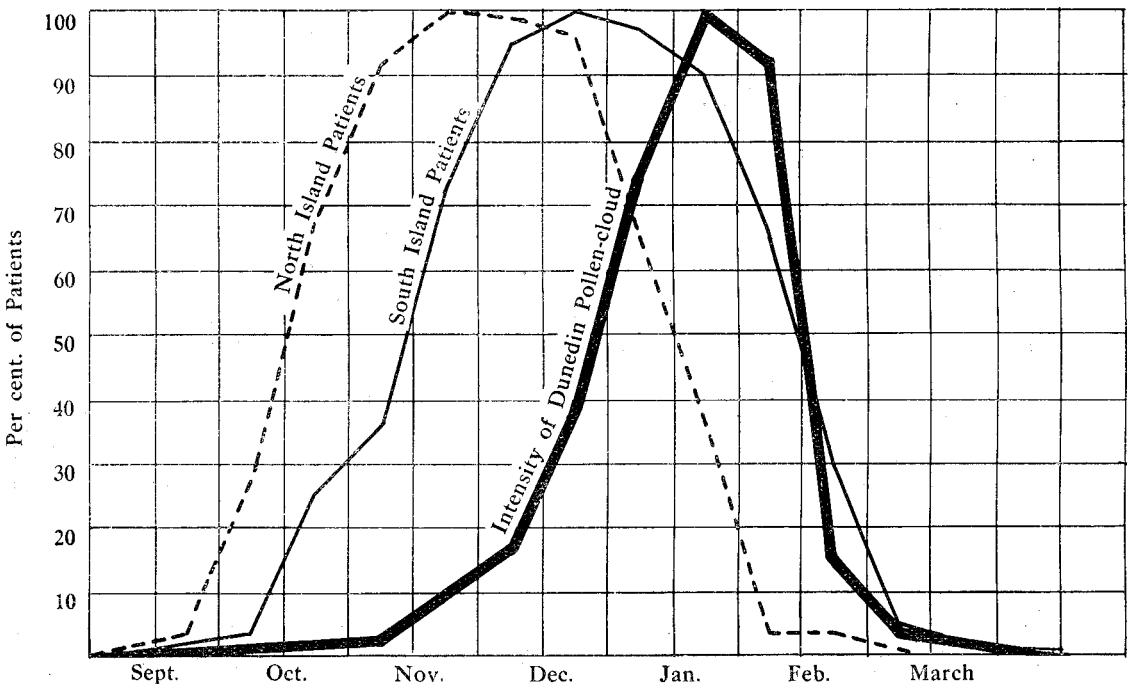
Summary of Findings regarding the Wind-borne Pollens of Dunedin.

The prevailing winds during the period of investigation were those from the north-east (sixty-three days) and south-west (sixty-one days). The greatest pollen-counts were obtained during north-easterly and north-westerly winds. South-westerlies, coming off the sea, and being frequently accompanied by rain, are relatively unimportant from our present point of view.

In September the chief pollens in the atmosphere are those of the pine and macrocarpa families. Poplar is also very abundant. Wattle and pussy-willow, probably quite abundant earlier, are about over, whereas silver-beech is just beginning towards the end of the month. In October pine, macrocarpa, ash, silver-beech, sycamore, oak, and broadleaf are pollinating strongly; and towards the end of the month tutu is almost the predominating pollen upon the plates, our greatest count being on the 28th, when tutu gave 192 grains to the square inch. A few grass-grains appear on the plates during the month, but hardly sufficient to be a potent hay-fever factor, except in strictly limited localities. During November pine, macrocarpa, sycamore, oak, and tutu still predominate in the atmosphere, and the native beeches are shedding their pollen in great quantities. Grass is steadily increasing, sweet vernal, *Poa annua* and *P. pratensis*, and cocksfoot predominating. In December and January the pollen-counts reached their maximum, and were almost entirely due to the grasses, of which the chief in December were cocksfoot, perennial and italian rye, and Yorkshire fog, and late in December and during early January crested dogstail. The native beeches are the chief tree pollen-producers during December. January gives us our densest pollen-cloud; the count on the 5th was 1,396 grains to the inch, 87 per cent. being grass, and practically only brown-top. This latter grass is extremely abundant throughout the district, is a prolific pollinator, and is the only important grass in January and February. February showed a rapid fall in the atmospheric pollen, the grasses practically disappearing in the latter half of the month; owing to this, regular counts were discontinued after February.

Correlation between Hay-fever Symptoms and the Pollen-cloud.

The correlation between patient's symptoms and the atmospheric pollen is shown in the following chart.



Graph of Hay-fever Symptoms (compiled from Eighty-two Patients).

This graph is composed from the observations of eighty-two patients. It is interesting to note that the two curves are almost identical, that for the North Island being approximately one month ahead of the South Island, in accordance with the dates of pollination. The peak in the North Island is during the latter half of November, in the South Island during late December. The atmospheric pollen-cloud for Dunedin, as found during the present investigation, is shown by the heavy line, and it is interesting to note that here the maximum pollen-concentration is during late January and early February, and is, as we have already seen, due almost entirely to brown-top. It

might be considered, therefore, that brown-top, though such an abundant grass and such a prolific pollinator, is not a very potent factor from the hay-fever aspect. In about 5 per cent. of the cases treated for hay-fever at the Medical School this last season the patients give a history of some slight hay-fever during January; probably the addition of brown-top extract to their treatment sets would have prevented their symptoms.

Regarding the toxicity of the various New Zealand grasses, the following figures, derived from the combined number and intensity of 1,941 dermal tests (534 North Island, 1,407 South Island), give an approximate relative estimate.

	North Island. Per Cent.	South Island. Per Cent.
Italian rye	57	56
Cocksfoot	51	58
Sweet vernal	49	53
Timothy	49	36
Perennial rye	47	41
Crested dogstail	41	37
Yorkshire fog	37	39
Poa pratensis	30	33
Poa annua	19	19
Plantago	17	9

It would therefore appear that cocksfoot is a more potent factor in the production of hay-fever in the South Island than it is in the North Island, whilst timothy is of far greater importance in the North Island than it is in the South Island, similarly perennial rye. Plantago is but a small factor in New Zealand. It is unfortunate that brown-top could not be included in the above list, but no supplies of the pollen were available when the tests were being made. During the present investigations, however, sufficient quantities of pollen were collected for future experiment.

Collection of Grass-pollen.

A number of experiments were made during the collection as to the weight of pollen produced by any known number of average grass-heads, and the result was rather astounding.

Weight of pollen produced by 100 average grass-heads: Cocksfoot, 2·68 grammes; perennial rye, 1·50 grammes; italian rye, 2·10 grammes; Yorkshire fog, 0·9 grammes; brown-top, 0·09 grammes.

These are the most abundant pollinators in the district. On the average, in well-planted areas 100 heads can be taken as equivalent to half a square foot of ground. Ten acres of cocksfoot would therefore, for example, yield about 1 ton of pollen.

SPECIAL INVESTIGATIONS.

PART I.—REPORT ON AN OUTBREAK OF TYPHOID FEVER IN A FARMHOUSE.

Dr. Maclean, Medical Officer of Health, Dunedin.

History of the Outbreak.—On the 17th March, 1928, T. W., aged seventeen, a farm hand employed by Mr. A., became ill, and, making no improvement, was moved to hospital on the 26th March as a possible case of typhoid fever. The diagnosis was established by a positive Widal on the 29th March (1/750 dilution), and the case was notified on the same day.

The medical attendant then called attention to two previous cases of undiagnosed illness in the same household.

Mrs. A., the wife of the farmer, became ill on the 14th August, 1927, her symptoms being those of septicæmia, which was thought to be a delayed result of her confinement eight weeks earlier. On the 22nd August she was moved to hospital, and died on the following day.

B. J., aged eighteen, another employee on the farm, became ill on the 9th December, 1927, and was seen by a doctor, who diagnosed influenza. He came down to his parents' home in Dunedin, but received no medical attention until the 29th December, when a doctor was called in and found him emaciated and very ill, with obvious signs of an abdominal abscess. A diagnosis of appendicitis, with perforation, was made, and the abdomen was opened and drained the same afternoon, the patient dying about fifteen hours after the operation. The surgeon now considers, in view of the other cases, that he was in all probability suffering from typhoid fever, with a perforated ulcer. No ulcers were seen at the time of operation, as the patient was too ill for him to do more than open and drain the abscess.

On receipt of the notification of the case of T. W. an extensive investigation was made of the farm household. It then comprised the following persons: Mr. A.; five boys—G. A. (10), J. A. (9), W. A. (8), F. A. (6), F. A. (3); B., housekeeper; C., domestic servant; D., ploughman; K., farm hand (16). D. arrived on the 29th March after T. W. had been taken to hospital.

The usual inquiry was made regarding water-supply, milk, vegetables, shell-fish, &c., but no useful information was obtained. No history of typhoid or other lengthy illness was given by any one. Specimens of fæces and urine were obtained from A. and K.; and blood, fæces, and urine from B. and C., the housekeeper and domestic servant. All these specimens were negative as regards the presence

of typhoid bacilli or agglutinating properties. The family was advised to undergo inoculation, and this was carried out by the local doctor during the latter part of April, the final doses being given on the 3rd May. A vaccine was used containing *B. typhosus*, 1,000 million per cubic centimetre; *B. paratyphosus A*, 750 million per cubic centimetre; *B. paratyphosus B*, 750 million per cubic centimetre. A. and K. received ½ c.c., followed by 1 c.c., and the boys ¼ c.c. and ½ c.c. B. and C. both refused inoculation, and through an oversight D. was not inoculated.

On the 13th June two rabbiters were found to be camping on the property, about a mile from the house, near a small stream from which frequently T. W. had been known to drink. Specimens of blood, fæces, and urine were taken from these men, and all proved negative. The water-supply was fully investigated and found to be an unlikely channel of infection.

On the 22nd June F. A., one of the boys, was taken ill, and sent to hospital on the 2nd July, typhoid bacilli being found in the fæces on the 11th July. As a result of his inoculation the attack was a mild one.

Fresh specimens of fæces were obtained from every member both of this household and the nearest neighbouring household. All were negative as regards the presence of typhoid bacilli.

The housekeeper, B., left the farm on the 1st July and came to her home in Dunedin. As soon as this fact was known a visit was paid to her and further specimens of blood, urine, and fæces obtained, all being negative. As shown later, she was then incubating the disease.

On the 11th July D., who had escaped inoculation, was taken ill. He was seen by a doctor and notified as suspected typhoid on the 16th July, and was removed to hospital on the 17th. The attack was a severe one, and he died on the 1st August.

On the 16th July the domestic, C., returned to her home near Dunedin. She was seen on the 19th and interrogated closely as to previous illness, and further specimens of urine and fæces were obtained. These also proved negative. On the same day three samples of water and one of milk from A.'s supply were sent down for bacteriological investigation, but no suspicious organism was discovered.

On the 23rd July a third visit was paid to the house by a medical officer. The area of investigation was considerably narrowed down by this time. The last two cases of the disease had made it practically certain that Mrs. A. and B. J. had died of the disease, and that there was a "carrier" in the house. Disregarding the small boys, the only persons who had been in the house over the period in question were: B., 5th March to 1st July, 1928; C., 22nd February, 1927, to 16th July, 1928; K., since 1st July, 1927; and A.

The two former were in or near Dunedin and under close observation, and attention was turned to K. and A. The latter's past history furnished no clue. He was inoculated in April and had a fairly severe reaction therefrom. K., who is aged sixteen, was questioned closely. He denied having had typhoid fever, but admitted having been in the Dunedin Hospital for several weeks some years previously—he thought, with diphtheria. He also was inoculated in April, and apparently had only a very slight reaction. He usually milked the cows, and had been living on the farm since about six weeks before Mrs. A. was taken ill. Samples of blood were taken from both of these persons.

On the 25th July A.'s blood was found to agglutinate typhoid bacilli up to a dilution of 1/100, and K.'s blood agglutinated up to 1/1000 dilution. This was taken as fairly conclusive evidence that the latter would have given a positive Widal reaction if tested prior to his inoculation. A search through the Dunedin Hospital records also revealed the fact that he was admitted on the 10th September, 1920, when aged seven, as a case of typhoid fever. Blood taken on the day of admission was found to contain typhoid bacilli. Fæces and urine taken on the 13th September, 2nd October, and 9th October, 1920, were free from the organisms, and he was discharged on the 11th October, 1920, as "cured and free from infection." He was immediately wired for, and admitted to the Dunedin Hospital on the 27th July for a more thorough investigation of his infective condition. Meanwhile a third specimen of fæces taken at the farm on the 24th was found to contain typhoid bacilli. This result was known on the 28th July.

On the 18th July B., who had left the farm on the 1st July, showed the first symptoms of the disease, and her blood gave a positive Widal reaction on the 25th July. She had refused inoculation in April. It is interesting to note that a sample of her blood taken on the 17th July gave a negative Widal reaction. The disease ran an uncomplicated course, and she made a good recovery.

The history of K. from the date of his discharge from hospital in October, 1920, is as follows: He returned to his mother's house in Don Street, Dunedin, and lived at home until June, 1924. The family lived at various addresses, and during 1921 moved to a house in West Road. His mother states that during that time there was no illness in the family.

A search through the notification records during this period shows that there were eleven notifications of typhoid fever occurring in Dunedin during 1921, three in 1922, two in 1923, and two in 1924. Of these, two occurred in 1921 in West Road, and the remainder were all from distant parts of the city. The two cases reported from West Road in 1921 were those of a boy of ten and a girl of six, living in adjacent houses. The boy, Charles M., was admitted to hospital on the 16th March, 1921, the illness having begun on the 9th March. It was definitely proved typhoid. The girl, Roma T., became ill on the 17th April and was nursed at home. The medical attendant diagnosed paratyphoid, but no bacteriological examination was made. It was thought that the first case was the cause of the second, but the time interval between the two makes it more likely that each contracted the disease from the same source. Mrs. T. remembers K.'s family, who lived in a small house opposite at the time that her small girl was taken ill. She states that she did not associate with them in any way, but it is possible that their children played together at times. There is a possibility, therefore, that these two children were infected by K., who was then nine years of age.

On the 25th June, 1924, the boy came under the care of the Child Welfare Officer, and was placed for a short time in the Anderson's Bay Home. There was no suspicious illness in the Home during this period. After a month or two in the Home he was boarded out with a Mrs. X. in one of the suburbs, and here he remained until the 17th September, 1926. Mrs. X. states that during that time there was no sickness of any nature in her house. On the 6th January, 1927, he went to work with Mr. V., a farmer living near Gore, where he remained until the 12th May, 1927. Inquiries were made from Mr. V., who reported as follows: "K. did all the milking during his stay here, and was very clean in his habits. No milk has ever been supplied to neighbours. There has been no illness of any nature in the house. There has been no history of undiagnosed illness among any persons visiting the house so far as is known." K. returned to Dunedin on the 12th May, 1927, and on the 1st July went to work with Mr. A.

This summary of his movements suggests that his infective condition is of a very intermittent nature. During the period October, 1920, to January, 1927, he was possibly responsible for two cases of the disease. Even though he was not handling food as an occupation, there must have been considerable opportunity for spreading infection both when he was at the Home and also at Mrs. X.'s, where several other small boys were living. Again, for a period of over five months on Mr. V.'s farm he was handling milk and yet did not cause any infection.

While in hospital he was advised to undergo excision of the gall-bladder, and this he agreed to, being operated upon on the 3rd September, 1928. Following the operation, a pure culture of typhoid bacilli was obtained from the gall-bladder, and also from a gland adhering to it. During his convalescence six specimens each of urine and fæces were submitted for examination, and were found free from typhoid bacilli. He was discharged from hospital on the 21st September, and since that time twelve specimens of fæces have been examined at intervals and no typhoid bacilli found.

Extent of Outbreak.—Probable cases: August, 1927—Mrs A. (died); December, 1927—B. J. (died). Proved cases: March, 1928—T. W. (recovered); June, 1928—F. A. (recovered); July, 1928—D. (died), B. (recovered).

It is interesting to note that K., while in hospital in 1920, had two specimens of fæces taken during the course of his illness, and a third four weeks after admission. He was discharged four weeks and three days after admission. This shows that the present regulation requiring six weeks' isolation followed by two negative specimens of urine and fæces taken at seven days' interval is not in any way too stringent.

PART II.—MAORI AND PAKEHA: A PRELIMINARY STUDY IN COMPARATIVE HEALTH.

By Dr. Turbott, Medical Officer of Health, Gisborne.

During the latter half of 1928, because of various persistent and seemingly wild statements as to dangerous health conditions among Maoris, it was decided to investigate quietly, and see how Maori health compared with that of his pakeha friend. For this purpose 1,423 Maori children from the whole health district were carefully examined; where they were found, an equivalent number of white children were similarly seen by the same observer—1,569 in all. Thus comparative groups, Maori and white, were constituted, representing the whole area of East Cape. The total number in each group is small. The results below are not stated dogmatically, but given as an indication that the sturdiness of the old Maori warrior is not yet lost in his children. They compare more than favourably with the white child. This study shows that preventive medicine has work before it which, brought to a favourable conclusion, would place the Maori child in undoubted superiority as regards health and physique. Results of the investigation are given as rate per 1,000 seen.

Anæmia was more frequent among white children. Maori, 1·40; white, 11·47.

Heart-trouble was more common in white children. Maori—Organic disease, 4·91; functional disease, 9·14: total 14·05. White—Organic disease, 6·37; functional disease, 22·31: total, 28·68.

Respiratory disease was more prevalent in the Maori group, though still small in amount. Of Maori children, 30·92 were considered to have unhealthy chests; and of these, from history, signs, and symptoms, 5·62 were held to be suffering from pulmonary tuberculosis. Of white children, 12·74 were weak-chested, but none of these were actually diagnosed as tubercular. Bacteriological and X-ray assistance in diagnosis was not possible.

With this respiratory weakness among Maoris a great deal of indigency is associated, with its attendant evils of poor, ill-balanced diet and bad housing, with gross overcrowding and deficient ventilation. Where dairy-farming is being undertaken the children have to work very hard, and overwork becomes a factor. The great danger encountered by the children is the presence in the pa, in some one or more homes, of the advanced active case of phthisis. Continuous supervision with existing staff is impossible, and between visits observance of necessary precautions is often lacking. The wonder is that, with the germ present in suitable environment, more children are not infected,

Physique.—The Maori physique is, on the whole, better than the white.

(*a*) Nutrition: First class—Maori, 469·43; white, 379·85. Subnormal—Maori, 15·46; white, 25·49.

(*b*) Total deformities of trunk and chest: Maori, 39·35; white, 58·63.

(*c*) Poor posture: Maori, 37·24; white, 61·82.

This negative way is chosen to show that satisfactory posture, the ready measure of physical efficiency, was commoner in the Maori.

Pediculosis is all too prevalent among the Maori. The crowded housing-conditions are the factors in dissemination, especially the practice of sleeping often five or six in one bed. Maori, 200·28; white, 16·57.

It is a family affair, the best method of attack seeming education through the school. On a few occasions the severe affection has been met where the occipital and parietal scalp is covered with matted hair, crusts, and exudation, infected with lice, with swollen posterior cervical lymphatic glands.

Skin-conditions, where infectious, affect the Maori more because of his home environment, with its overcrowding and too frequent neglect.

(*a*) Scabies: Maori, 129·30; white, 18·48. There is usually well-established infection in the home. Scratching leads to septic sores and impetigo.

(*b*) Septic sores and impetigo: Maori, 60·42; white, 29·95.

(*c*) Other skin-conditions: Acne, eczema, seborrhœa, ichthyosis, ringworm. These, with the exception of acne, were more often present in the white child. The figures for these troubles collectively, were: Maori, 21·76; white, 31·20.

Vaccination against smallpox is practically non-existent in the Maori group, and negligible in the white one. Maori, 0·70; white, 24·85.

Dental Hygiene.—(*a*) Defects in jaw or palate: Maori, 2·10; white, 8·91.

(*b*) Perfect sets of teeth: Maori—Primary, 73·78; secondary, 172·87: total, 246·65. White—primary, 31·23; secondary, 19·75: total, 50·98.

The Maori has a decided advantage here. It is worth noting that the more closely the Maori copies the diet and addiction to sweets, &c., of his pakeha friend, the more quickly does his dental superiority vanish.

Enlarged Tonsils.—Maori, 275·45; white, 364·55.

Enlarged Cervical Glands.—Maori, 309·20; white, 512·42.

Goitre.—Maori—Incipient, 73·78; small, 4·21; medium, 0·70; large, 0·70: total, 79·39. White—incipient, 314·85; small, 30·59; medium, 5·09; large, 0·63: total, 351·16.

While working up these figures an interesting fact emerged. Two-thirds of the Maori goitre was found in Whakatane County, where the pas are mostly inland. In the rest of the East Cape district the Maoris favour the actual coast-line, shell-fish and fish are readily obtained, and little goitre is evident. This lack of sea-food iodine may be the main factor in causation, for on assessing the amount of goitre in the white children of the group who live in Whakatane County only a slightly higher incidence than in the whole group was found.

Whakatane County children of the group (rate per 1,000): Maori—Incipient goitre, 155·29; total all forms, 167·05. White—Incipient goitre, 347·00; total all forms, 373·12.

Ear-disease.—No significant difference was found in middle-ear disease or deafness. In the Maori discharging ears were usually woefully neglected. Otorrhœa: Maori, 6·32; white, 6·37.

Eye-troubles.—(*a*) Conjunctivitis: Maori, 18·97; white, 3·82. A mild form of trachoma accounts for the increased Maori figure.

(*b*) Squints: Maori, 2·81; white, 4·46.

(*c*) Defective vision: Maori, 74·22, of which nil is corrected with glasses; white, 90·94, of which 11·24 is corrected with glasses.

Hernia.—Maori—Inguinal, 2·10; umbilical, 16·16: total, 18·26. White—Inguinal, 1·27; umbilical, 5·73: total, 7·00.

The increased Maori figure is undoubtedly due to their method of delivery and treatment of the umbilical cord at birth.

Phimosis was more frequent in the white group. Maori, 2·10; white, 11·47.

Vulvo-vaginitis was not found in the white children, but 2·81 was proven bacteriologically in the Maori group to be due to gonorrhœa.

Flat Foot is a racial characteristic in the Maori. Practically no boots or shoes were worn in the Maori group.

(*a*) Sagging arches (one or both feet): Maori, 403·37; white, 231·35.

(*b*) Completely flat (one or both feet): Maori, 132·81; white, 39·51.

PART III.—THE POSTURE OF NEW ZEALAND SCHOOL-CHILDREN.

(Preliminary Report.)

By Dr. Helen Bakewell, School Medical Officer.

Physical education and the study of faulty posture generally have been brought into prominence recently by various investigations and reports. All School Medical Officers are familiar with the problem of postural defect and the importance thereof, and towards the end of the year 1928 a survey was made by Miss Blackburne, Physical Instructress, Education Department, and myself in an endeavour to get some kind of an estimate as to the frequency and severity of postural defects among school-children, the effect of progress through the primary school on such deformities, and to try to ascertain whether the general picture was quite as gloomy as some authorities would lead us to believe. The survey is still incomplete along certain lines, but a description of methods and findings as far as they go may be of interest for discussion.

The correct standing posture is described by an authority as follows (see U.S.A. Department of Labour, Children's Bureau, Publications 164 and 165): "The body is in good mechanical position when the weight of it rests evenly on the heads of the femurs. In this position the head is balanced above the shoulders, the chest is elevated, and the breastbone is the part of the body farthest forward; the lower abdomen is retracted and flat, and the back curves are within normal limits. In the standing position the hip-joints in lateral view are directly in line with the knees and ankle-joints. A perpendicular dropped from behind the ear would fall through shoulder and ankle joints."

It might be pointed out here that this is a description of the ideal posture of the mature adult, and not necessarily normal in an individual still in the developmental stages.

American authorities would divide the average normal child into three groups, according to body types—

(1) The stocky type—heavy, thick-set, short-necked, heavy-looking.
(2) The thin type—slender, elongated, flexible, long neck and trunk; the length in the lumbar region is specially noted.
(3) The intermediate type—a compromise between the two, with characteristics pertaining to either.

The majority of postural deformities in children of any type is considered by them to be due to faulty body-balance (the thin type is therefore more prone to postural defects, owing to length and instability). The primary defect is said to be an increase in the pelvic inclination, a tipping-forward of this bony girdle. This produces, in greater or less degree, a series of maladjustments—viz., lordosis in the lower lumbar region, a compensatory kyphosis in the dorsal region, prominence of the abdomen, with stretching of the abdominal wall and a general tendency to pelvic congestion and ptosis of the abdominal organs. This abnormal pelvic angle also causes the weight of the body to come on the hinder portion of the foot instead of on the ball, and is considered to be an important factor in producing genu valgum, hallux valgus, and flattening of the posterior arch—in fact, the picture appears to be more or less descriptive of the attitude assumed by a large number of school-children up to the age of 12–13 years. Since the crux of the matter is considered to be the increased inclination of the pelvis, an assessment of the fault at that point should be a gauge of the degree of deformity presenting or later to be produced. This is done by measuring the angle that a line drawn between the anterior and posterior superior iliac spines makes with the horizontal. In a normally inclined pelvis this angle is considered to be about 12°.

With these conceptions before us, an examination of about one thousand children was made by Miss Blackburne and myself. The schools were selected in order to be as comprehensive as possible. Clyde Quay School was taken as representative of the town, and as far as possible of a mixed social grade; Carterton District High School as a country-town school; as well a series of small one-teacher schools in different parts of the district—so that the children examined form more or less of a cross-section of the school community.

The following points were taken for observation: The degrees of each deformity were noted as 1, 2, 3, and 4—1 being normal; 2, slight deviation from normal; 3, marked deviation from normal; 4, very marked and fixed deformity.

1. Position of head (forward inclination).
2. Position of shoulders: (*a*) L.R.=left raised; (*b*) R.R.=right raised; (*c*) winged scapula.
3. Spine: 1, 2, 3, 4, according to degree of deformity. (*a*) Kyphosis=K.; (*b*) scoliosis=S.; (*c*) lordosis=L.
4. Chest: (*a*) Flat chest; (*b*) pigeon chest; (*c*) depressed ribs; (*d*) depressed sternum. Note deformity with degree 1, 2, 3, 4.
5. Abdomen: 1, 2, 3, 4. (Degree of faulty position 1=normal.)
6. Knees: (*a*) Genu valgum; (*b*) genu varum.
7. Feet: (*a*) Flat foot; (*b*) deflection of big toe from normal; (*c*) deflection of Tendo Achilles.

These were gauged by inspection by both of us, and our combined opinions recorded. Certain measurements were also taken—height, weight, respiratory index, and the pelvic angle.

Moreover, an attempt was made to class the whole general posture of the individual as A, B, C, and D. (A=correct posture; B=slight deviation from it; C=definite deviation; D=marked deviation, with predisposing cause.) For comparison the results were collected in five age groups—viz., 5–6 years in one group, 7–8, 9–10, 11–12, 13–14–15 years.

The greatest difficulty encountered was the impossibility of making a dogmatic statement about the physical posture of a child—at any rate, up to 11–12 years. The 13–15-year group showed more or less stability of physique, and might be said to have a definite habitual posture; but until one attempts to pigeonhole him one does not conceive the protean quality of the average child and the infinite number of positions which he can assume in the space of a few minutes. For example, by remarking to a child with apparently faulty posture, "Now, are you ready? Stand straight," the picture can be absolutely altered for a variable period, &c. These variations are bound to lead to discrepancies in figures relating to general incidence; nevertheless, there should be some consistency with regard to incidence at different ages and stages in school progress.

At all stages certain very marked deformities were found, classed as 4, which in practically all cases were accompanied by a history of illness which might be considered as the causative factor—*e.g.*, prolonged illness producing scoliotic conditions, paralysis, asthmatical conditions producing chest-deformities, defective vision producing marked angularity of the neck. This class one feels can be ruled out of a discussion on purely postural deformities.

Allowing for such opportunities for error, a comparison of the results of these investigations brings up certain facts which may be worth mentioning.

(1) As to type, the average New Zealand child would appear to tend towards the thin type, mentioned above. The British child, on the other hand, appears to approximate to the stocky type, judging from literature on the subject. It was also noticeable in the survey that most of those definitely of the stocky type were immigrants.

(2) With regard to incidence of deformities, before quoting my figures I want to remark that we purposely set our standard very high, and when I quote figures relating to percentage of defects these include every slight deviation from the set standard, and, after all, in ordinary common-sense view of the situation a certain degree of variation about the normal must be allowed for. Since it has been decided that groups 1 and 2 may be regarded as normal, and that group 4 is made up of children suffering from definite predisposing weakness, it is evident that group 3 alone is to be considered in estimating faulty posture as a school problem.

The figures show that certain deformities tend to increase steadily during the child's progress through the school—*i.e.*, from 5 to 15 years. The two types of defect in which this increase is most definite are the forward inclination of the head and deformities of the feet. Of the former, the 5–6-year group showed 29 per cent. incidence (group 3, 5·4 per cent.); the 13–15-year group showed 59 per cent. incidence (group 3, 17 per cent.) of the latter, the 5–6-year group showed 25 per cent. incidence (group 3, 1·5 per cent.); the 13–15-year group showed 75 per cent. incidence (group 3, 30·5 per cent). On the other hand, deformities of the shoulders, spine, and abdomen show some increase for a period between 5 and 10 years, and then a steady decrease in incidence to 15 years. This suggests that these particular defects do have a common causative factor and tend to occur as a syndrome.

Chest-deformities did not seem to vary to such a degree in the different age groups; if anything, they tend to decrease with age. I found less deformity of the chest than I expected; certainly definite cases were very infrequent.

Genu valgum (knock-knees): This defect is very common in all ages. The 5–6-year group showed 79 per cent. It tends to decrease, or, at any rate, to appear less evident in the 13–15-years group. Nevertheless, it is so prevalent at all ages that it appears probable that the usual standing position for the average New Zealand child is with the feet parallel and a few inches apart.

Difficult as it is to examine young children by inspection, it is infinitely more difficult to take measurements with any degree of accuracy. Among other measurements, we endeavoured to measure the pelvic angle of each child. This was done with a goniometer. Our records varied between 6° and 26°. Allowing for difficulties of accurate measurement, it did appear that they varied between 8° and 15° in a normal spine and that a measurement of over 20° was accompanied by a definite lordosis. The angle becomes more amenable to investigation in the older children. In the younger ones the readings varied from moment to moment as the child changed his posture—in fact, I abandoned the struggle of attempting to measure the angle in the 5–6-year group.

When children are classified into four groups according to posture, it is to be noted that 41 per cent. (Class C) of the whole show faulty posture to a degree requiring remedial measures. The 7–8-year-old group once more includes greatest percentage showing faulty posture.

As a result of our observations I make the following tentative suggestions: New Zealand appears to be producing a type of individual with characteristics more closely resembling those of the "thin" type of the earlier classification—a slender, loose-limbed, perhaps rather ungainly-looking child—compared to the stocky type, in which stability is apparently somewhat sacrificed to mobility. This is borne out by previous investigations, which show that in New Zealand children the standing height is increased compared to sitting height. Granted that this type may not come up to the æsthetic and other standards of the sturdy type, is it for practical purposes so much inferior? It is a common experience to find the "staying-powers" of the thin, lanky child, if anything, superior to those of the stocky type; its resistance to ordinary infections as good or even better; I have noticed often that the chest-mobility and lung-expansion are excellent.

It might be asked to what degree winged shoulders are detrimental to health. They are known to be present in children and adults who have exceptionally good health and powers of endurance. With regard to alterations in spinal curvatures, Kerr states, "four-fifths of the recorded cases of spinal curvature are normal physiological variations due to the human being not being absolutely symmetrical" In fact, it is really rather difficult to define what is exactly the normal posture of a child at a certain age.

My own personal observations—which I will state are still incomplete—have not lead me to any definite conclusions with regard to the pelvic angle. The difficulty of measuring this quantity really accurately makes its value in the investigation of large groups of young children somewhat doubtful. It appeared to my mind that the posture and degree of deformity can be classed accurately enough by a careful inspection of the general attitude and balance of the body. Also, I do not feel absolutely certain that our estimation of the pelvic angle afforded a reliable guide as to the degree of faulty posture generally. While it would seem to be more or less definitely associated with incidence of lordosis, kyphosis, and abdominal defect, it apparently has no influence in such a deformity as faulty position of the head. School life seems to have a definite influence on posture, and, other things being equal, the psychological element as a causative factor probably enters to an appreciable degree. The splendid carriage of the head and neck in Maori children is remarkable, and is often apparent even where the abdomen is unduly prominent according to set standard, and even through illness.

Defective posture and imperfect body-balance may assist in the production of foot-deformities, but the frequency with which normal feet are discovered in the habitual "barefoot" child suggest that the modern footwear is still the prime factor.

(3) This habitual lordosis-kyphosis-visceroprotic posture, which, though it tends to consistently decrease with age, is still of very common occurrence, resembles very closely the normal infantile positions. It is agreed that this particular posture is correct in a young child. In Native races, which might be considered nearest the ideal, it is still more marked. Why should it necessarily cease to be correct after five years of age?

It seems quite feasible to suppose that there is a chrysalis stage when the infantile characteristics are still present, and which, together with growth in height and lack of stability, produce the winged-shouldered rather ungainly-looking child—a kind of tadpole stage of development. This transitional stage need not necessarily coincide with any chronological age, and probably spreads over quite a wide range of years. The mental development has little connection with the chronological age. The ages of children in, say, a Standard III class, all approximately at the same stage of mental development, will range from 7 to 12 years. The physical development probably varies even more, and every child may be more or less a law unto himself as to the age at which he will assume the mature adult posture. Our observations on children above 13 years of age are meagre, most children leaving school at 13 years; but figures supplied from an examination of the Otago High School girls show that the percentage of postural defects continues to decrease consistently from 13 to 18 years.

As to how far school life is responsible for this postural condition, one does not feel qualified to make definite statements with regard to positive influences, but it is possible that over-fatigue, malnutrition, and sedentary life can unduly prolong the chrysalis stage and delay maturity to a harmful degree.

A point also worth consideration is to what extent remedial measures can hasten or assist the correction of deformities which, in the first place, may be the concomitant of the particular stage of the child's physical development, and which nature herself may correct in due course.

Comparison of Postural Deformities in Children at Different Ages.

	Incidence. Per Cent.	Group 3 only. Incidence. Per Cent.
1. Position of head—		
5–6 years	29	5·4
7–8 ,,	37	4·3
9–10 ,,	42	8·1
11–12 ,,	47	11·6
13–15 ,,	59	17·0
2. Position of shoulders—		
5–6 years	53	14·0
7–8 ,,	61	20·5
9–10 ,,	55	15·5
11–12 ,,	38	8·0
13–15 ,,	37	8·9
3. Spine (all deformities)—		
5–6 years	21	8·0
7–8 ,,	41	11·5
9–10 ,,	49	14·0
11–12 ,,	40	12·0
13–15 ,,	30	9·5
4. Chest (all deformities)—		
5–6 years	34	3·1
7–8 ,,	34	7·0
9–10 ,,	28	2·7
11–12 ,,	27	7·0
13–15 ,,	28	7·0
5. Abdomen (faulty position)—		
5–6 years	41	13·0
7–8 ,,	56	17·0
9–10 ,,	50	15·0
11–12 ,,	38	8·0
13–15 ,,	28	8·0
6. Genu valgum—		
5–6 years	79	11·0
7–8 ,,	67	8·0
9–10 ,,	61	5·6
11–12 ,,	65	8·0
13–15 ,,	56	7·0

	Incidence. Per Cent.	Group 3 only. Incidence. Per Cent.
7. Feet (all deformities)—		
5–6 years	27	1·5
7–8 ,,	39	3·7
9–10 ,,	43	4·9
11–12 ,,	60	10·9
13–15 ,,	75	30·5

Classification according to General Posture.

Age Groups.	A.		B.		C.		D.		Totals.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
5–6 years –										
Actual number ..	10	26	29	27	22	14	..	..	61	67
Per cent. ..	16·39	38·81	47·54	40·30	36·07	20·90	..	..		
7–8 years –										
Actual number ..	15	14	44	62	58	61	1	..	118	137
Per cent. ..	12·71	10·22	37·29	45·26	49·15	44·52	0·85	..		
9–10 years –										
Actual number ..	17	14	84	55	65	44	2	..	168	113
Per cent. ..	10·12	12·39	50·00	48·67	38·69	38·94	1·20	..		
11–12 years—										
Actual number ..	22	7	78	58	51	63	3	2	154	130
Per cent. ..	14·29	5·38	50·65	44·62	33·12	48·46	1·95	1·54		
13–15 years—										
Actual number ..	8	6	30	34	32	51	2	4	72	95
Per cent. ..	11·11	6·32	41·67	35·79	44·44	53·68	2·78	..		
Totals—										
Actual number	72	67	265	236	228	233	8	6	573	542
Per cent. ..	12·57	12·36	46·25	43·54	39·79	42·99	1·40	1·11		
Total, boys and girls—										
Actual number	139		501		461		14		1,115	
Per cent. ..	12·47		44·93		41·35		1·26			

Approximate Cost of Paper.—Preparation, not given; printing (1,600 copies, including graphs), £118.

By Authority: W. A. G. Skinner, Government Printer, Wellington.—1929.

Price 1s. 6d.