1945

NEW ZEALAND

DEPARTMENT OF HEALTH

ANNUAL REPORT OF THE DIRECTOR-GENERAL OF HEALTH

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

HON. A. H. NORDMEYER, MINISTER OF HEALTH

REPORT

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 1944–45.

INTRODUCTION

The outstanding features of the year were an epidemic of scarlet fever with a record number of notifications, a rise in the birth-rate, and lower death, infant-mortality, and still-birth rates.

VITAL STATISTICS

(Exclusive of Maoris)

Population.—The mean population of the Dominion in 1944 was estimated to be 1,556,318.

Birth-rate.—There were 33,599 births in 1944, representing a rate of 21·59 per 1,000 mean population. This rate has been exceeded on only two occasions during the last twenty years—in 1941 and 1942. In 1943 it was 19·70.

Death-rate.—The crude death-rate in 1944 was 9·87 per 1,000 mean population, as compared with 10·04 in the preceding year. The death-rate has shown an upward trend in recent years and in 1942 reached a high level—namely, 10·60. Since then it has declined, and in 1944 closely approached the 1941 level (9·84).

Infant Mortality.—The infant-mortality rate was 30·12 per 1,000 live births. In 1943 it was 31·37.

In the five-year period 1940–44, 27·7 per cent. of all infant deaths occurred under one day, 37·3 per cent. under two days, 56·5 per cent. under one week, and 63·2 per cent. under two weeks. Prematurity was recorded as the cause of death in almost half these cases. In 1944 the combined still-birth and infant-mortality rate per 1,000 total births (52·68) was the lowest ever recorded in New Zealand.

Still-births.—The still-birth rate was 23·23 per 1,000 total births, an appreciable decline from the previous year's rate of 26·25, and the lowest recorded since the registration of still-births was made compulsory in 1913.

Maternal Mortality.—The maternal-death rate, including deaths from septic abortion, was 2·65 per 1,000 live births, as compared with 2·21 in 1943. With deaths from septic abortion deducted, the maternal-mortality rate was 2·08 (1·71 in 1943).

INFECTIOUS AND OTHER DISEASES

(Exclusive of Maoris, unless otherwise stated)

Eleven thousand five hundred and nineteen cases of notifiable diseases were reported, an increase of 5,689 on the previous year's figure of 5,830. This increase is more than accounted for by the epidemic of scarlet fever. Other diseases showing an increase were pneumonic influenza (from 4 to 8); puerperal fever, including septic abortion (from 208 to 230); tetanus (from 13 to 18); undulant fever (from 23 to 27); and actinomycosis (from 1 to 6). Other diseases—malaria and dengue—contracted outside New Zealand but developing after arrival numbered 403.

Scarlet Fever.—Notifications rose from 1,196 in 1943 to 7,612 in 1944. In addition, 10 cases were notified in the Maori population. This is the highest number of yearly cases recorded in New Zealand. The last epidemic occurred in 1928, when 6,127 cases were notified. During the period 1932–43 notifications did not exceed 1,000 in any year except 1936 (1,153 cases) and 1943 (1,196 cases); and in 1941 reached a low level of 338 cases. Deaths in 1944 numbered 25, giving a case fatality rate of 0·33 per cent.

Diphtheria.—For the thirteenth year in succession the notifications (693 European, 20 Maori) numbered under 1,000. During this period the notifications annually have fluctuated between 963 in 1933 and 367 in 1940, with an average of 630.

In contrast with scarlet fever, the incidence of diphtheria is greater in the North than in the South Island. On only three occasions in the past twenty-eight years has the South Island had more than its percentage share of cases (1920–21–22). During the past thirteen years, of a total of 8,180 cases, only 858 (10·5 per cent.) occurred in the South Island.

This marked difference between the two Islands cannot be accounted for by immunization, as this has been carried out much more extensively in the North Island. Nor can it be accounted for by any marked difference in the age grouping of the two populations, as the census returns over the period show very little difference in the proportion of the population in each Island under the age of fifteen years.

There were 30 deaths, giving a case fatality rate of 4·3 per cent. During the past twenty-eight years the case fatality rate has remained fairly constant. On nine occasions it has been under 4 per cent. (lowest, 2·8 per cent. in 1933), on seventeen occasions it has been 4 per cent. to 5 per cent., and on two occasions above 5 per cent. (highest, 6 per cent. in 1934).

Dominion-wide publicity was given to the value of immunization for control, if not eradication, of this disease. In this connection the Medical Officer of Health, Whangarei, reports that the public appear to have complete confidence in this method and the medical practitioners have co-operated well. The 11 cases of diphtheria in his district occurred in persons who had not been immunized.

Influenza.—Deaths attributed to this disease (62) were fewer, and the death-rate per 10,000 (0·40) lower, than for some years.

Poliomyelitis.—Forty-five cases were notified, in comparison with 178 in 1943. These cases were the late summer and autumn cases of the minor epidemic experienced in 1943.

Enteric Fever.—Thirty-five cases of enteric fever (24 typhoid, 11 paratyphoid) were notified, with 3 deaths. In addition, there were 50 cases of typhoid fever in the Maori population.

Cerebro-spinal Fever.—One hundred and fifty-five cases were notified (135 European, 20 Maori), as compared with 434 European and 64 Maori cases in 1943.

Whooping-cough and Measles.—Neither of these diseases is notifiable and therefore the numbers of cases are not known. Deaths from whooping-cough (45) were 28 in excess of those occurring in 1943. The last epidemic (1941) caused 68 deaths.

There were no deaths from measles in 1944, as compared with 7 in 1943.

Puerperal Sepsis.—There were 73 notifications of sepsis following childbirth, with 8 deaths, a death-rate of 0·24 per 1,000 live births (0·27 in 1943). Sepsis following abortion was notified in 157 cases, with 19 deaths, a death-rate of 0·57 per 1,000 live births (0·49 in 1943).

The Medical Officer of Health, Wellington, reports:—

"In spite of the almost universal use of sulphonamides on the slightest evidence of sepsis in cases of childbirth or abortion, the figures for puerperal sepsis and septic abortion increased from 16 to 31. Eight of these were from ordinary maternity cases. Twenty-three cases occurred where there had been abortion or miscarriage, and amongst these were the only two deaths. This doubling of the figures in a year, when the use of sulphonamides would have been expected to prevent the major portion of such cases from ever coming to our notice, is, to my mind, extremely arresting, and would indicate that our standard of maternity care cannot be viewed with equanimity. Unfortunately, one feels that the widespread use of the sulphonamides may have been taken as an excuse for diminished care. When one regards the fact that overcrowding in our maternity hospitals is general and the care which can be given to the individual patients is much less, whilst the chances of cross-infection are increased, the position is disturbing. As it happens, however, all these cases were sporadic. Not a single case is known to have arisen by transfer through faults in nursing or medical technique from one patient to another.

"The difference in incidence and death-rate between the cases arising as a result of abortion, compared with those arising following a normal parturition, must again be noted. The incidence was four times greater amongst the former than amongst the latter and the deaths entirely confined to abortion, whilst the rate of abortion and miscarriage, as compared with full-time parturition, is not known. One would hardly expect abortion and miscarriage to be four times as frequent as normal parturition, and this again points to the unsuspected dangers in abortion, undoubtedly where interference takes place."

Tuberculosis.—Deaths from tuberculosis (all forms) were 593, as compared with 572 in 1943. The following table shows the course of the disease for the past five years:—

Year.	Death-rate per 10,000.		
	Respiratory Tuberculosis.	Non-respiratory Tuberculosis.	Tuberculosis (all Forms).
1940	3·24	0·64	3·88
1941	3·19	0·69	3·88
1942	3·18	0·75	3·93
1943	3·09	0·63	3·72
1944	3·12	0·69	3·81

Venereal Disease.—The following tables summarize the work of the venereal-disease clinics in the four main centres for the past five years :—

Number of Persons dealt with for the First Time at each Venereal-disease Clinic and found to be suffering from Syphilis

—	Auckland.		Wellington.		Christchurch.		Dunedin.		Total.		Total.
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
1940	63	37	77	58	12	8	22	8	174	111	285
1941	102	57	96	63	29	17	33	6	260	143	403
1942	70	78	53	71	18	11	20	6	161	166	327
1943	48	95	20	41	17	14	29	3	114	153	267
1944	21	48	14	26	14	10	27	4	76	88	164

Number of Persons seen for the First Time at each Venereal-disease Clinic and found to be suffering from Gonorrhœa

—	Auckland.		Wellington.		Christchurch.		Dunedin.		Total.		Total.
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
1940	474	118	310	53	286	79	78	89	1,148	339	1,487
1941	410	183	373	42	271	72	81	79	1,135	376	1,511
1942	312	286	236	63	181	69	75	73	804	491	1,295
1943	265	441	138	89	122	92	51	15	576	637	1,213
1944	215	470	140	59	139	86	50	22	544	637	1,181

Cancer.—With a purpose of encouraging early diagnosis and treatment of cancer, which ranks second as the cause of death in New Zealand, a series of health advertisements and broadcasts talks were presented to the public.

The clinics established by Hospital Boards in collaboration with the New Zealand Branch of the British Empire Cancer Campaign Society for diagnosis and treatment of cancer in the main centres continue their valuable service.

PRINCIPAL CAUSES OF DEATH

The following table gives the main causes of death, the actual number of deaths therefrom during the year, and the death-rates per 10,000 mean population for each of the last five years :—

Cause.	1944.		1943 : Rate.	1942 : Rate.	1941 : Rate.	1940 : Rate.
	Number.	Rate.				
Heart-disease (all forms)	5,209	33·47	33·68	36·41	31·55	29·52
Cancer	2,170	13·94	14·24	13·07	13·18	12·02
Violence	838	5·38	6·06	5·77	5·64	5·68
Pneumonia	204	1·31	1·41	1·52	1·47	1·60
Pneumonia (secondary to influenza, whooping-cough, and measles)	48	0·31	0·17	0·81	0·38	0·28
Bronchitis	175	1·12	1·39	1·36	0·94	1·12
Broncho-pneumonia	284	1·82	1·67	2·11	1·96	1·79
Tuberculosis (all forms)	593	3·81	3·72	3·93	3·88	3·88
Kidney, or Bright's, disease	434	2·79	2·68	3·19	3·66	3·18
Apoplexy or cerebral hæmorrhage	1,431	9·19	9·97	9·90	8·95	8·45*
Diseases of the arteries	189	1·21	1·21	1·22	1·14	0·98*
Senility	455	2·92	3·17	3·03	3·13	2·63
Diabetes	329	2·11	2·16	2·28	2·21	1·98
Hernia and intestinal obstruction	115	0·74	0·65	0·74	0·73	0·78
Diseases and accidents of childbirth (puerperal mortality)	89	0·57	0·44	0·55	0·77	0·62
Appendicitis	75	0·48	0·47	0·44	0·55	0·58
Diarrhœa and enteritis	99	0·64	0·58	0·50	0·53	0·50
Epilepsy	46	0·30	0·46	0·53	0·43	0·34
Common infectious diseases—						
Influenza (all forms, including pneumonia) ..	62	0·40	0·42	1·61	0·49	0·77
Diphtheria	30	0·19	0·21	0·16	0·11	0·10
Whooping-cough	45	0·29	0·11	0·03	0·44	0·15
Scarlet fever	25	0·16	0·01	0·01	0·01	0·01
Typhoid and paratyphoid	3	0·02	0·02	0·05	0·05	0·04
Measles	..	..	0·05	0·20	0·03	0·01

* Owing to an alteration in the international agreement as to the allocation of deaths to various causes, the figures for these two conditions are not separably comparable with those of earlier years.

REPORTS OF DIVISIONAL DIRECTORS

DIVISION OF PUBLIC HYGIENE

Hygiene and Sanitation

It is not possible to report any material improvements in the field of general sanitation. If anything, there has been some regression in this respect. A lowering of general standards of hygiene is particularly evident in relation to housing, eating-houses and food premises generally, and hairdressers' premises.

There has been a great increase in the installation of swimming-baths in schools, and with the personnel at present available the necessary supervision is lacking.

Quarantine

An amendment to the Quarantine Regulations has been gazetted providing for the effective spraying of aircraft arriving from overseas, to prevent the introduction of live mosquitoes. Special officers have continued to carry out mosquito surveys in the Wellington and Auckland districts. Large numbers of larvæ and adult insects have been collected and sent to the Cawthron Institute for identification. The elimination of potential breeding-grounds in the neighbourhood of ports and aerodromes is also receiving attention.

New Zealand is one of the signatories to the International Sanitary Convention and the International Sanitary Convention for Aerial Navigation as recently amended. This is of considerable importance in view of the great expansion in air transport services that will develop in the future.

Sale of Food and Drugs Act

Considerable progress has been made in consolidating the regulations under the Sale of Food and Drugs Act. This work is now well advanced and the new regulations will be ready for gazetting during the present year. During the year an amending regulation was enacted requiring that metal saucepans should be free from poisonous metals and other poisonous substances, and should be stamped or embossed with the name of the maker. This was done primarily to prevent the manufacture of saucepans from scrap aluminium containing lead, copper, zinc, and other impurities.

Dangerous Drugs and Poisons

Two medical practitioners and a nurse were prosecuted for offences under the Dangerous Drugs Act.

The adequate inspection of pharmacists' records has suffered in certain districts owing to staff shortages.

DIVISION OF HOSPITALS

Five-year Plan

At the instance of the Commissioner of Works, Hospital Boards were asked to indicate their building proposals for the next five years. A rough estimate of the cost of the proposals submitted is £13,000,000. New Zealand already has, so far as is known, more hospital beds per 1,000 of population than any other country. In view of the housing shortage, it is questionable if more than a fraction of this proposed programme of building will be accomplished.

Building-materials

Two years or more ago, Hospitals Boards were urged to build in light structure wherever possible, owing to the critical shortage of reinforcing-steel. The shortage of satisfactory timber is now such that Boards are urged to build in permanent materials wherever possible.

Hospital Beds per 1,000 of Population

The following table is taken from the figures supplied by Hospital Boards and published in successive Appendices to the Department's annual reports.

The totals are those of public and private hospital and chronic beds, including maternity, tuberculosis, and infectious-diseases beds, but excluding beds in mental hospitals and excluding beds in private or religious charitable homes, of which the Department has no record.

—	1936–37.	1937–38.	1938–39.	1939–40.	1940–41.	1941–42.	1942–43.	1943–44.
Number of beds in public hospitals ..	8,876	9,085	9,234	9,816	11,182	11,617	12,118	12,497
Number of beds in charitable institutions under Hospital Boards	1,914	1,907	1,918	1,797	1,102	1,063	977	933
Number of beds in private hospitals ..	2,538	2,633	2,643	2,765	2,875	2,820	2,983	2,842
Daily average occupied beds in temporary hospitals	..	..	..	..	..	..	410	341
Total public, private, and chronic beds	13,328	13,625	13,795	14,378	15,159	15,500	16,488	16,613
Number per 1,000 of population ..	8·4	8·5	8·6	8·8	9·3	9·5	10·1	10·2

Number of Beds per 1,000 of Population which should be provided

It is impossible to lay down a definite figure, as each district is a problem of its own. Among the factors which influence the demand for beds are the habits of the population in seeking to enter hospitals for various types of illness, the availability of medical practitioners, and their habits in sending patients to hospital or retaining them for home treatment.

Housing facilities, the availability of domestic and private nursing or district nursing assistance, and an efficient out-patient department are important factors. Dangerous industries and scattered populations and the prevalence of certain diseases are important, while the efficiency and attitude of the hospital medical staffs are not the least important factor.

Overseas Figures

It is impossible to obtain up-to-date figures for most overseas countries. In 1935 it was stated that the average beds per 1,000 of population in eighteen countries was 3·51, the minimum being 1·5 in Japan and the maximum being 5·8 for Sweden. In Germany at that time there were 5·6, in the United States of America 3·9, in England and Wales 5·3, and in Scotland 3·7.

United States of America.—In 1940 thirty States had from 1·5 to 3·9 beds per 1,000 of population. Seventeen States had from 4 to 5·6 beds per 1,000, Nevada had 6·2, and District of Columbia had 10 beds per 1,000, the latter including large Army and veterans' hospitals.

Canada.—In 1940 the following beds per 1,000 population were available, excluding mental, tuberculosis, and Dominion hospitals:—

Province.	Beds per 1,000 Population.
Prince Edward Island	3·0
Nova Scotia	4·6
New Brunswick	3·5
Quebec	4·5
Ontario	4·3
Manitoba	5·5
Saskatchewan	4·8
Alberta	6·6
British Columbia	7·5

The tuberculosis beds were 8,902 in special hospitals and 2,090 included in the above-mentioned acute hospitals, while the Dominion hospitals provided 9,493 beds.

The population of Canada was 11,489,713, so that the tuberculosis and Dominion beds each add less than 1 per 1,000 to the above table.

England and Wales (population, 39,889,000) had in 1939 the following beds:—

Voluntary hospitals	77,000
Local authorities	70,000
Poor law, chronic, sick, &c.	60,000
Isolation, infectious, and smallpox	38,000
Tuberculosis institutions	28,000

i.e., between 6 and 7 beds per 1,000. To these the emergency scheme added some 50,000 beds during the war, some of which are temporary.

Apart from New Zealand, the two countries which appear to have the highest number of beds are Norway, with rather over 8 beds per 1,000, and Australia, with 8 beds per 1,000, made up as follows:—

——	Population in Thousands.	Government and Subsidized Hospitals.	Private Hospitals.	Beds per 1,000 of Population.
New South Wales	2,822	210	448	7·9
Victoria	1,964	81	338	7·5
Queensland	1,030	117	149	8·7
South Australia	606	53	121	7·9
Western Australia	465	83	60	9·6
Tasmania	240	22	49	8·7
Capital Territory	2	1	1	17·6
Northern Territory	9	4	..	14·6
	7,148	571	1,166	8·0

Last year a Medical Survey Committee set up by the Government of the Commonwealth of Australia adopted as a standard of hospital-bed establishment to be aimed at the following:—

General beds	5·0
Maternity	1·0
Children	0·5
Infectious	0·5
Convalescent	0·5
Subacute	0·5
Chronic	1·0
Total	9 per 1,000, excluding tuberculosis.

The tuberculosis beds should be 2 per annual death. If it may be allowed to translate this figure into 1 bed per 1,000, the total Australian recommendation for all purposes except mental diseases becomes 10 beds per 1,000 of population.

The Department is not aware that any authority has ever recommended more than 10 beds per 1,000 as an ideal.

New Zealand Figures

In the absence of a recent census it is impossible to say how accurate are the figures given for the populations of the various Hospital Board districts. The Appendix to the annual report is nearly a year out of date when published, and considerable changes can occur in a year.

For example, a recent statement by the Chairman of the Wellington Hospital Board shows that it has provided a total of 1,910 beds. To this should be added about 330 private-hospital beds and 33 beds at St. Helens Hospital.

This gives a total of 2,273 beds for a stated population of 176,620, or a ratio of about 13 beds per 1,000 of population. The figure given for population is almost certainly too low, but the figures for beds do not include the Home for the Aged Needy and the Home of Compassion.

While no hard-and-fast rule can be made, it is considered that, in view of the fact that no known overseas authority has ever recommended more than 10 beds per 1,000 of population as an ideal to be aimed at, those hospital districts which already exceed this figure should be required to present a very strong case before consent is given to further extensive building programmes (except where private maternity homes go out of business and have to be replaced), at least during the present acute shortage of houses, labour, and building-materials. Hospital Board districts in this category include Wellington, Palmerston North, Cook, Marlborough, South Otago, Dannevirke, Waipawa, Vincent, Westland, and possibly one or two others. On the other hand, some Hospital Boards have too few beds to treat the population adequately. In some cases this appears to be due to inability of the ratepayers to afford the necessary accommodation, and in other cases it appears to be due to lack of public conscience.

Penicillin

In March, 1944, American penicillin began to be available at the rate of about 5,000,000 units a week, and at a cost of £6 per ampoule of 100,000 units. In June, 1944, regular supplies of Australian penicillin were imported at the rate of 10,000,000 units a week and at a selling-price to hospitals of 33s. per ampoule. The price to hospitals has now fallen to 10s. 6d. per ampoule, and the quantity imported is at the moment 61,000,000 units a week. It is proposed to increase this quantity immediately and, as the demand increases, to increase it further to 100,000,000 units a week, which should be almost sufficient to treat all patients who need penicillin.

At first the distribution was controlled by the pathologists of the four main centres, who, at considerable inconvenience, generously gave of their time in supervising the administration of penicillin and restricting its use to those patients who needed it most.

In March, 1945, distributing depots were established at the hospitals at Hamilton, Gisborne, New Plymouth, Wanganui, Napier, Waipukurau, Palmerston North, Nelson, Blenheim, Greymouth, Timaru, Invercargill, and the four main centres. It is hoped that, in the near future, the Control Order restricting the use of penicillin will be revoked and all hospitals which have refrigeration will be able to order penicillin as they need it, just as they order other medical supplies.

The visit of Sir Howard Florey, who gave two lectures in each of the four main centres and one at Nelson, was a most stimulating experience and of great benefit to those who were privileged to hear him.

DIVISION OF SCHOOL HYGIENE

Nutritional State of School-children

A significant fact evident from the statistics of the medical examination of school-children is that there has been a distinct falling off in their nutritional state since 1940.

Percentage of Children with Subnormal Nutrition

	European.	Maori.
1940	4·23	1·36
1944	9·35	6·33

The effect of the war was scarcely felt in 1940. Thereafter rationing, official and unofficial, has had a cumulative effect. At first, substitute foods were available, but as the war has progressed milk, eggs, cheese, liver and kidney, bacon, green vegetables, and potatoes have been subject to periods of shortages or, in the case of vegetables, to periods of high prices as well. It is not easy for the housewife to maintain a balanced diet. She is often unable to follow the simple dictum, "Make up with milk and vegetables," because of the shortage and price factors. As soon as milk becomes scarce, as it has done the last three winters, school milks are stopped or rationed. In 1944 school milks reached less than half the children in the winter months and in some districts the supplies ceased earlier in the autumn term. Confirmation of the unsatisfactory child nutrition is found in the pre-school figures, where 10·34 per cent. were found malnourished.

Dental State of School-children

As the school-children have become completely serviced with dental clinics, both dental caries and extractions of permanent teeth have diminished and fillings have increased. This is a curative service that has succeeded; the preventive side is not apparent yet, for perfect sets of teeth are getting fewer and fewer.

Goitre

In the period 1920-30 goitre in school-children was a problem ranging from 20 per cent. to 30 per cent. in certain areas and giving a New Zealand average over 20 per cent. The opening year of the "forties" found goitre established at: Europeans, 13·74 per cent.; Maoris, 8·68 per cent. This 1940 figure has been further reduced in 1944 to 9·71 per cent. in Europeans and 5·73 per cent. in Maoris. This would seem to be a success for preventive medicine, as in the two decades and a half concerned the use of iodized salt has steadily risen till most of the population now take the iodized variety of salt.

Immunization

There were 31,210 children given the complete immunization course against diphtheria. Of this number, 15,456 were of pre-school age. Using Phase I Type C Commonwealth of Australia vaccine, 1,460 pre-school children were given the full course of inoculations against whooping-cough. This latter work is being done on request only and is limited to the age group six months to two years.

The Pre-school Child

A total of 8,645 pre-school children were medically examined, but the work of the pre-school clinics is being seriously handicapped by the shortage of staff.

DIVISION OF NURSING

Shortage of Nurses

There has been a general shortage of nurses due to the demands of the Armed Forces and the increase in the hospital-bed rate. However, we may expect some improvement in the position as larger classes

graduate and as nurses are released from service overseas. It was found necessary to use Man-power direction to increase the number of nursing aids, as the demands on the Civil Nursing Reserve far exceeded the supply of nurses available. A subsequent nursing recruiting campaign achieved encouraging results.

Nurses and Midwives Registration Board

Two important matters affecting the Nurses and Midwives Registration Board were—

(1) Revision of the nursing syllabus. (This will be published together with certain recommendations regarding the necessary clinical experience to be followed by pupil-nurses.)

(2) The amendment to the Nurses and Midwives Registration Act, which places the training, examination, and registration of psychiatric nurses under the control of the Board.

The personnel of the Board was increased to include the Director-General of Mental Hospitals, or his Deputy, and a registered psychiatric nurse nominated by the New Zealand Nurses Association.

Provision for Maternity Cases

Hospital Boards have had to assume responsibility for an increased number of maternity beds, due to (1) the majority of births now taking place in hospitals, (2) the number of private maternity hospitals having decreased, and (3) the birth-rate having increased. There is being experienced an acute shortage of midwives, and it will be essential to train more if the standard of obstetrical nursing is to be maintained.

Additional Benefits

The district nursing benefit and the domestic assistance benefit will provide needed service in the homes of the people.

Rehabilitation of Nurses

The Rehabilitation Board has appointed an advisory committee from the members of the Nursing Council and the Voluntary Aid Council to attend to the interests of returned nursing sisters and voluntary aids. Ten returned nurses have been granted post-graduate bursaries in New Zealand and a few have obtained bursaries for overseas courses.

General

A conference of training-school matrons and Nurse Inspectors was held to consider matters of hospital staffing, standard nursing techniques, and the health of nurses. The Nursing Division assisted to draw up a pamphlet on standardized technique for the nursing of tuberculous cases.

Forty-four sisters are attending the post-graduate nurses' school. The dietetic training course is now well established. Bursaries are available to assist suitable nurses to take this course. An Occupational-therapy course has been established at the Avondale Mental Hospital. The tropical nursing service in the Pacific dependencies is being extended.

DIVISION OF DENTAL HYGIENE

Expansion of Service

The work of the Dental Division has continued to expand during the year under review. The School Dental Service now operates at 428 centres, as against 413 at the end of the previous year. As at the 31st March, 1945, the staff numbered 617, including 167 student dental nurses. This represents a net decrease of 18 in the field staff since the previous year, this being accounted for chiefly by the resignation of a number of married dental nurses on the return of their husbands from war service overseas. Further resignations on this account are expected during the next twelve months, but steps have been taken to meet the situation by increasing the annual intake of the Training School from 80 to 100 per year. Additional schools to the number of 18 have been brought within the scope of the Service, making the total number of schools now receiving treatment 2,321.

The number of children under regular treatment is 191,340, an increase of 22,752 during the year. This includes 22,876 children of pre-school age.

The total number of operations for the year was 1,576,170, an increase of 113,766 over the previous year. This number included 817,372 reparative fillings in both permanent and deciduous teeth and 199,918 preventive fillings, a total of 1,017,290 fillings. In contrast with this figure, which represents approximately the number of teeth preserved for useful service, the number of teeth removed as unsavable (or in some cases to relieve overcrowding) was 76,335, a ratio of 7·5 extractions to every 100 fillings.

During the year a full-time appointment has been made to the position of Dental Health Education Officer, thus giving added emphasis to this important phase of the work of the Dental Division. This officer works in close collaboration with and as a member of the Departmental Committee for Health Education, and he acts as the executive officer in the directing of health-education work within the Dental Division. The field staff of the School Dental Service has shown commendable enthusiasm throughout the year, as is shown by the fact that their health-education activities numbered 11,579, an increase of 4,333, or 59 per cent., over the previous year.

The *School Dental Service Gazette*, which is edited by the Dental Health Education Officer, continues to fulfil a most useful function in keeping the widely dispersed staff in close touch with the activities of the Service as a whole, and is invaluable as a means of maintaining the spirit and *morale* of the Service.

The further development of State dental services to the adolescent section of the community has received close attention during the year, with a view to the early inauguration of such a service.

This, together with the growth of the School Dental Service, has necessitated changes in the administrative organization of the Division, including the appointment of a Deputy Director and an Assistant Director (Training). The latter appointment is combined for the time being with that of Principal of the Dominion Training School for Dental Nurses. The officers in control of districts have been given the status of Principal Dental Officers, and appointments in the grade of Senior Dental Officer are to be made to Whangarei, Gisborne, and Wellington. Headquarters of the Wellington Dental District has been transferred from Wellington to Palmerston North.

Dental Bursaries

Additional University bursaries were granted to dental students at the beginning of 1945 to the number of 28. Of the bursaries granted in previous years, 35 were renewed for 1945 and 13 were suspended temporarily.

The National Dental Committee

The National Dental Committee has continued to function throughout the year in connection with the control of dental man-power, the release of dental personnel for service with the Armed Forces, and associated problems.

Rehabilitation of Dentists

The Dental Advisory Committee on Rehabilitation is being called upon to an increasing extent to consider problems in relation to the rehabilitation of dental personnel. On its advice the Rehabilitation Department has authorized the holding of refresher courses both in New Zealand and in overseas countries for dental officers on demobilization. The Department is indebted to those members of the dental profession who voluntarily give their time to the work of this and the National Dental Committee.

Dental Treatment of Returned Servicemen

The Department's organization for providing dental treatment for returned personnel of the Armed Forces has continued to operate smoothly and satisfactorily throughout the past year. The work imposes a considerable strain upon the already busy private dental practitioners who undertake the boarding and the treatment, but nevertheless the response is good and there is general satisfaction with the treatment that is afforded.

The Dental Council

The routine administration of the affairs of the Dental Council of New Zealand has continued throughout the year, and matters arising from the administration of dental legislation have received attention.

DIVISION OF TUBERCULOSIS

The Tuberculosis Register

The prevalence of this disease has been summarized in the past from a study of notifications and mortality returns. The newly established Tuberculosis Register now attempts to classify all notified cases and a clearer conception of the type, form, and extent of the disease is being obtained as workers become more accustomed to provide the necessary information.

The register returns for the year 1944 disclose the known position as at 31st December as under:—

Stated incidence of tuberculous cases, Maori and European in New Zealand as at 31st December, 1944 (figures for 1943 in parentheses):—

——	Pulmonary.	Non-pulmonary.	Mixed Pulmonary and Non-pulmonary.	Classification not Stated.	Total.
In North Island ..	5,038 (4,698)	507 (396)	62	130	5,737
In South Island ..	1,722 (1,398)	259 (181)	13	..	1,994
Totals ..	6,760 (6,096)	766 (577)	75 (109)	130	7,731 (6,772)

New Cases notified to Medical Officer of Health as tuberculous during 1944 are scheduled as under (figures for 1943 in parentheses):—

——	Pulmonary.	Non-pulmonary.	Total.
Europeans—			
North Island	1,027 (1,292)	140 (131)	1,167 (1,423)
South Island	474 (507)	71 (90)	545 (597)
	1,501 (1,799)	211 (221)	1,712 (2,020)
Maori cases: Mostly in North Island	476 (521)	66 (62)	542 (583)
	1,977	277	2,254 (2,603)

Some of these cases have been proved non-tuberculous and deregistered.

	Per 1,000 Population.
The known incidence for Europeans—	
North Island	3·47
South Island	3·47
The known incidence for Maoris—	
North Island	23·24
South Island	25·48
The known incidence for combined races—	
North Island	4·98
South Island	3·59

The European incidence is 9·7 times the annual deaths. The Maori incidence is 5·7 times the annual deaths. The combined-race incidence is 8·0 times the annual deaths.

The incidence in other countries is estimated at 10 times the annual deaths. It would appear that most of the European cases are under supervision but that there is still need for intensification of case finding amongst Maoris if this criteria holds for this race.

Mortality returns for tuberculosis as supplied by the Government Statistician are scheduled as follows (subject to adjustment) :—

	Pulmonary Forms.					Other Forms.					Total Deaths.	
	European.		Maori.		Totals, Pulmonary.	European.		Maori.		Totals, Non-pulmonary.		
	M.	F.	M.	F.		M.	F.	M.	F.		F.	M.
North Island ..	194	106	124	157	581	27	31	41	45	144	358	367
South Island ..	116	69	1	3	189	25	23	..	1	49	233	5
Totals	310	175	125	160	770	52	54	41	46	193	591	372

	Total Deaths, both Races.	Death-rate, per 10,000.
North Island	725	6·81
South Island	238	4·31
Both Islands	963 (919)	5·96 (5·62)

It is of interest to note—

(1) That European *male* deaths from all forms (362) exceed the European female deaths (229).
(2) That Maori *female* deaths from all forms (206) exceed the Maori male deaths (166).
The total number of deaths in 1944 exceeds the deaths in 1943 by 44.
(3) The largest number of deaths from non-pulmonary forms is due to tuberculous meningitis. Age group, 1–5 years.
(4) The age-group statistics for Maoris are also not yet available, but the largest number is in a much lower age group than for Europeans, and this is more noticeable for females.

Sanatoria

During the past year the Boards of the western area and those of the eastern area of the North Island combined into two groups to administer Otaki and Pukeora Sanatoria respectively, and both groups plan to improve and extend the sanatorium accommodation in their areas. The Boards in the Auckland-Waikato-Bay of Plenty area are actively considering a combined sanatorium scheme for their area.

Plans for Future Control of the Disease

The plans for the future control of tuberculosis envisage

(1) Improved "case finding" by better notification, tuberculin testing, and x-ray surveys.
(2) Better classification, and the identification of all active cases.
(3) Efficient treatment and segregation of these active cases in hospitals, sanatoria, and the homes until they are regarded as inactive.
(4) Improvement and extension of institutional accommodation to provide more attractive and homelike surroundings in which treatment and training can be given.
(5) Improvement of housing conditions for European and Maori tuberculous families.
(6) The education of the general public in tuberculosis control in order to create a humane understanding of the tuberculous patient's problems and to provide assistance for his complete recovery and his return to normal standards of life.

Report by the Director, Division of Tuberculosis

A report by the Director, Division of Tuberculosis, in which he sets out the extent of the present problem in New Zealand and the Department's proposals for dealing with it, is printed as Appendix I to this report.

DIVISION OF HEALTH BENEFITS

Three additional benefits have been introduced during the current year :—

The Social Security (District Nursing Service) Regulations 1944 provide for the inauguration of free district nursing services, where such services are afforded by a registered nurse, nursing aid, midwife, or maternity nurse in the employ of any Department of State, any Hospital Board, or any subsidized association.

The Social Security (Domestic Assistance) Regulations 1944 provide the first step towards the inauguration of benefits under the Social Security Act in regard to domestic assistance during the incapacity of the mother for various reasons, or in cases of hardship. In their present form the regulations provide mainly for payments by way of subsidy from the Social Security Fund to approved organizations that have been formed for the purpose of providing domestic assistance in homes.

The Social Security (Hospital Benefits for Out-patients) Regulations have been amended during the year for the purpose of extending the scope of the present regulations to enable Hospital Boards to provide, as out-patient treatment, approved services afforded at some place other than a public hospital. The Minister may approve of arrangements in respect of treatment for any specific ailments or bodily condition, but the principal purpose of the regulations is to enable Hospital Boards to make appropriate arrangements with recognized specialist surgeons in respect of operations for cleft palate and hare-lip.

Cost of Benefits

The following is a statement of the expenditure on the various classes of benefits during the year, the figures for the previous year being shown in parentheses :—

Maternity benefits—			
Public hospitals		£133,946	
Private hospitals		210,675	
Medical practitioners' fees		158,409	
Mileage fees, medical practitioners		5,647	
Obstetrical nurses		11,117	
St. Helens hospitals		10,940	
		£530,734	(£513,939)
Medical benefits—		£	
Capitation fees		42,400	
General medical services		1,161,326	
Special arrangements		23,855	
Mileage fees, medical practitioners		59,442	
		£1,287,023	(£1,179,331)
Hospital benefits—		£	
Treatment in public hospitals		1,689,233	
Out-patient treatment		83,412	
Private hospitals		259,489	
Treatment in approved institutions		56,504	
Mental hospitals		187,942	
Other institutions		54,120	
		£2,330,700	(£2,158,146)
Pharmaceutical benefits—		£	
Chemists		933,490	
Medical practitioners		6,231	
Institutions		40,516	
		£980,237	(£762,198)
Supplementary benefits—		£	
Radiological services		128,842	
Massage		32,152	
Nursing		7,717	
Specialists		1,324	
		£170,035	(£137,823)
		£	
Gross expenditure		5,298,729	
Less credits-in-aid—	£		
Hospital benefits	64,012		
Supplementary benefits	3		
		64,015	
Net total		£5,234,714	

Pharmaceutical Benefits

The cost of this benefit continues to increase, and represents an expenditure of 12s. 3d. per head of the population, as against 9s. per head in the previous year, exclusive of the medicines supplied to in-patients of public hospitals. Part of the increased amount is due to the same cause as operated in the previous year—viz., the extensions of the Drug Tariff, following extensions of the British Pharmacopœia and British Pharmaceutical Codex, and the increase in costs of drugs. Apart from these two factors, the feature which has been in evidence since the inception of the pharmaceutical benefits—viz., the rise in the actual number of prescriptions—is still very marked. This rise has occurred despite any apparent deterioration in general health, and certainly without any increase in population, and is very disquieting. During the year the prescription frequency per head of population was 2·8.

Cases of unnecessary, irregular, and expensive prescribing were brought to the attention of the Advisory Committee, and appropriate action taken on the Committee's recommendation. Disciplinary action has been necessary against certain contractors because of irregularities in connection with the supply of medicines.

Pricing Office procedure was very difficult during the year owing to the impossibility of obtaining suitable and sufficient staff. The position has been very acute in some districts, and has resulted in considerable delay in the adjustment of final payments to contractors. It is possible that staff difficulties will ease considerably during the ensuing year.

Maternity Benefits

The new scale of fees was introduced early in 1945 after discussion between representatives of the B.M.A. and officers of the Department. The new scale provides a separate payment in respect of ante-natal services, together with revised fees for special emergency services, and an alteration in the mileage rates. Maternity-benefit payments are limited by the actual number of births, so that not only can expenditure be accurately forecast, but the necessary financial controls can be easily established.

Medical Benefits Capitation Fees

There has been a reduction in the amount of capitation fees paid this year in comparison with the previous year. This was to be expected, as the capitation scheme has certain disadvantages to both doctor and patient when working side by side with a fee-for-service system. The capitation system, however, is sound in principle, and it has yet to be proved that it is not the most satisfactory form of medical-insurance practice.

General Medical Services

The costs are still rising, and will continue to do so as fresh medical practitioners enter practice.

Special Areas

The special arrangements for medical practice in isolated areas utilizing the services of a salaried practitioner are working very satisfactorily both to the doctors and patients, and demonstrate, in certain rural areas at least, where in the past medical practice has always been difficult or impossible to obtain, that efficient services can be provided at reasonable cost.

Advisory Committees

Various advisory committees set up in connection with the administration of health benefits have functioned satisfactorily and have been of great value in the administration of the scheme.

DIVISION OF MAORI HYGIENE

Vital Statistics

The mean Maori population was estimated to be 99,477, against 96,984 in 1943. The following table enables a comparison between Maori and European vital statistics:—

	Maori.	European.
Birth-rate per 1,000 population	45·32	21·59
Crude death-rate per 1,000 population	16·95	9·87
Infant-mortality rate per 1,000 live births	102·26	30·12
Maternal-mortality rate per 1,000 live births	3·33	2·65
Death-rate, tuberculosis (all forms), per 10,000 population	38·30	3·81

Maori Housing

The Medical Officer of Health, Gisborne, who is a recent arrival in New Zealand, makes the same point as have his colleagues in past years. He writes:—

"A very high percentage of the Maori houses in this district are in very bad repair and are grossly overcrowded and insanitary. From personal visits to Maori houses I am already convinced that no great improvement in Maori health as regards tuberculosis, scabies, or other conditions is remotely possible so long as so many of them are living under such overcrowded insanitary living conditions. It seems clear that the expenditure of effort and money which is being and has been made, as regards treatment of tuberculosis patients in particular, is made, very largely, to little purpose, and that the edifice of health should be built from a foundation of good housing and sanitation. In other words, money spent on improving Maori housing would produce bigger dividends in Maori health."

GENERAL

Industrial Hygiene

Dr. J. M. Davidson, on loan from the Ministry of Labour and National Service, London, reported on the health of the industrial worker in New Zealand and submitted proposals for the development of a system of control. Demands for help and advice will continue to increase with the expanding industrial programme. Of special importance are the medical and engineering measures to prevent health hazards in various industries. The work of Dr. Davidson demonstrated the need for a Nurse Inspector for Industrial Hygiene to co-ordinate the work of the existing industrial nurses in the various centres and generally to guide such nurses in their work and ensure that the maximum benefit was obtained from their efforts. For this position a New Zealand nurse who holds a Diploma in Industrial Nursing, London, and who has had five years' experience in industrial nursing in England prior to her return to New Zealand, was appointed. Dr. Davidson's report appears in full as Appendix H to this report.

Nutrition

Every attempt has been made to maintain the nutritional state of our people. On the educational side there was an intensive campaign by radio, newspaper advertisements and articles, addresses to selected groups, and visits of the Department's mobile health exhibit to spread a sound knowledge of the principles of dietetics. A wartime edition of 10,000 copies of the booklet, "Good Nutrition," was published. It has since been necessary to authorize a reprint of 30,000 copies of this text-book to meet demands of educationists and the general public. A pamphlet, "The Family Food," has been prepared and will soon be available for mothers, for whom it is intended as a guide.

Milk-in-schools Scheme

The total number of pupils participating in the milk-in-schools scheme in 1944 was 235,701. The totals for pasteurized bottled milk, milk for cocoa-making purposes, and malted milk are made up as follows:—

	Pupils.
Pasteurized bottled milk	222,438
Malted milk	8,234
Milk for cocoa	5,029
	235,701

Apples-in-schools Scheme

Apples free of cost were supplied to pupils attending all types of schools during the apple season. Distribution lasted twelve weeks and a total of over 103,000 cases of apples were supplied.

Health Education

There was an all-round increase in the various phases of publicity outlined in the previous report. Railway, bus, and boat advertising and the issue of 10,000 sets of health posters for distribution to primary and secondary schools and for display in suitable places and institutions were new features. The daily press and periodicals and the radio were freely used.

The mobile health exhibit visited a number of centres and stimulated considerable interest in personal and community health. That the health-education programme is fulfilling a wide need is indicated by the rapidly growing demand for the Department's literature and an increasing daily flow of letters from all parts of the Dominion from people who want health advice. A wide selection of reprints of articles of medical interest supplied through the courtesy of the John Macy, jun., Foundation, New York, were distributed to hospital and medical libraries.

Health Camps

The health camps have continued to operate successfully in various parts of the Dominion. Those which were taken over for national needs are now being used for their original purpose. The finances of the camps benefited considerably from the sale of health stamps and from donations.

Boards associated with the Department

The Board of Health, the Medical Council, the Medical Research Council, the Nurses and Midwives Registration Board, the Opticians Board, the Masseurs Registration Board, the Medical Advertisements Board, the Plumbers Board, the King George V Memorial Fund Board, and the Dominion Advisory Board of New Zealand Federation of Health Camps continued their work during the year.

Medical Research Council

A list of the special Committees set up under the Council and some information regarding the researches carried out by the Committees is set out below:—

(1) *Nutrition Committee:*—

- "Interim Report on the Incidence of Rickets in New Zealand Children" (Malcolm).
- "Interim Report on a Rickets Survey" (Buchler, Deem, and Weeber).
- "Comparison of different Methods of Preparation of Rose-hip Syrup" (McLaughlin and Wilson).
- "Use of Fish-meal as a Substitute for Meat-meal in the raising of Chickens" (McLaughlin and Wilson).
- "Vitamin C in Foods sent for Estimation" (McLaughlin and Wilson).
- "Vitamin B_1 Estimation" (McLaughlin and Wilson).
- "Experiment to check Alleged Inferiority of Peameal as a Source of Protein for breeding Rats" (McLaughlin and Wilson).
- "The Vitamin Content of some New Zealand Fish Oils" (Weeber).
- "Toxicity" of Shark-liver Oil and Hypervitaminosis A (Moore).
- "Report on the Commercial Trial of Higher Extraction Flour" (Bell).

(2) *Thyroid Committee:*—

- "Significance of the Basophil Changes in the Pituitary in Thyroxine-deficiency States" (Purves and Griesbach). To be published in *British Journal Experimental Pathology.*
- "Occurrences of Thyroid Tumours in Rats treated with Goitrogenic Substances" (Purves, Griesbach, and Kennedy).
- "Investigations of the Effects of Substituents on the Goitrogenic Activity of the Thiourea Molecule" (Kennedy).
- "Study of Cyclic Derivatives" (Kennedy).
- "The Significance of the Acidolphil Cell Changes in the Pituitary in Thyroxine-deficiency States" (Purves and Griesbach).
- "Extrathyroidal Thyroxine Synthesis in the Rat" (Purves and Griesbach).
- "Effects of Thiourea and Iodide Treatment on Subtotally Thyroidectomised Rats" (Purves and Griesbach).
- "Relation of Thyrotropic Hormone to Thyrotoxicoses and Exophthalmos" (Purves).
- "The Estimation of Thiourea in Blood" (Purves and Kennedy).
- "Protective Action of Potassium Iodine on Thiourea Poisoning in Rats" (Griesbach, Kennedy, and Purves). Published in *Nature*, Vol. 154, No. 3915.
- "Proposals for Standardization of Treatment and Promotion of Clinical Research on Thyrotoxicosis" (Hercus and Kennedy).

(3) *Hydatid Committee.*—Laboratory, field, and publicity work has been carried out. Testing of arecoline efficiency has been steadily proceeding, experimental infections of mice have been continuing, and *in vitro* studies of effects of drugs on cestodes have commenced. The experiment at Styx in hydatid control was continued by the Agriculture Department, and further reports from the Kerwell Experimental Farm received.

(4) *Committee of Clinical Medicine* :—

"Pressor Effects of Amidine Derivatives" (Fastier). Published in *Nature*, Vol. 154, 429, 1944.

"Casual and Basal Blood Pressures: Their Relationships to Supplemental Pressure, with a Note on Statistical Implications" (Smirk). Published in *British Heart Journal*, Vol. VI, No. 4, October, 1934.

Publications in press—

"Effect of the Initial Level of the Blood Pressure upon the Response of the Human Subject to Blood-pressure-raising Reflexes" (Bruce, Martin, Smirk). *Journal of Physiology.*

"Some Properties of Amarin" (Fastier and Smirk). *Journal of Physiology.*

"Renal Function in Essential Hypertension" (McGeorge). *Quarterly Journal of Medicine.*

In the hands of the editors—

"Circulatory Properties of Amidine Derivatives" (Fastier, Smirk, Crawford, and Strang).

(5) *Committee of Neurophysiology and Neuropathology* :—

"Sciatica Research in Dunedin Hospital" (Falconer).

"Research in Physiology Department" (Eccles).

Much work has been done in the design and construction of apparatus for the accurate investigation of patients with sciatica.

Mr. Chapman, the technician, was employed on neurophysiological research. This research is in course of publication.

(6) *Tuberculosis Committee.*—The Committee continued with its work of typing tubercle bacilli from various human lesions.

UNRRA

The Director-General of Health was appointed a member of the Technical Subcommittee on Health for the Far East and attended meetings of the Subcommittee in Sydney.

The Department of Health has been responsible for the arrangements for the medical examination of personnel applying for service with UNRRA.

STAFF

It is with regret that I record the death of Mr. A. J. Hooper while on active service overseas.

Divisional Directors and Medical Officers of Health complain of increasing difficulty in carrying out their duties owing to the rapid expansion of departmental activities and the shortage of staff. It is clear that the Department can no longer handle efficiently the many matters with which it has been entrusted and that, indeed, the position is critical and reaching the stage when a breakdown will occur unless much-needed relief is given by the appointment of more medical and senior clerical officers.

In conclusion, I desire to express my thanks to the members of the staff for their loyal support during the past year.

M. H. Watt,
Director-General of Health.

APPENDIX I.—REPORT ON TUBERCULOSIS CONTROL IN NEW ZEALAND

By C. A. Taylor, M.R.C.P. (London), F.R.A.C.S., Director, Division of Tuberculosis

It should be appreciated that tuberculosis is a disease due to a specific bacterial infection and that it is broadly classified into two main forms :—

(1) The pulmonary or respiratory form.

(2) The non-pulmonary form.

The pulmonary type is almost always due to infection by the human type of the tubercle organism which is disseminated from human "carriers" of this organism. The majority of the non-pulmonary types—namely, those affecting the central nervous system—is also due to the human type of infection, but most of the non-pulmonary cases affected with glandular, bone, or joint lesions are due to the bovine type of organism disseminated from cattle.

A few individual cases of respiratory and nervous system forms of tuberculosis due to the bovine type of organism have been discovered in this country in recent years, but it is still believed that bovine infection is responsible for a very small proportion of cases.

Research into this question is still being undertaken, but the number of cases to date is so few that work for three to four years will be necessary to prove that the incidence of bovine infection in New Zealand is as stated above.

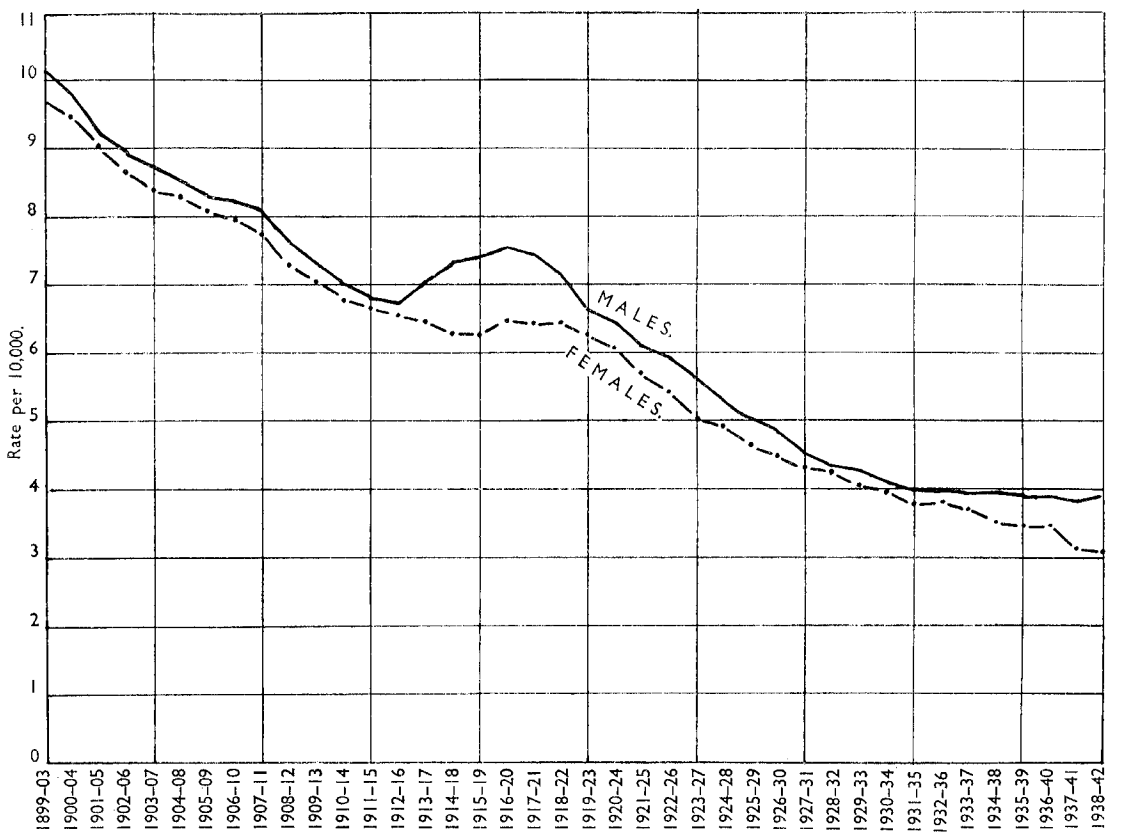
It is felt that the human type of infection produces the great majority of cases, and, as a result, prevention and treatment measures have been largely directed to control this type of infection.

Mortality from Tuberculosis in the New Zealand European Population

The trend of death-rates from tuberculosis is considered in most countries to be the most reliable guide to the probable incidence of disease at any particular time. These rates are compiled by the Government Statistician from death certificates made available by the Registrar-General. These can be presumed to be the only form of accurate information available.

Trends of death-rates for Europeans in New Zealand are shown in the following graph, and it is considered that the falling tendency, together with the results in later years, compare not unfavourably with other countries throughout the world.

European Deaths from Tuberculosis (all Forms) in New Zealand—Graph of Five-yearly Moving Averages: Standardized Death-rates per 10,000 of Mean Population, 1899–1942



The returns for 1944 of deaths from tuberculosis of all forms give a total of 593 deaths for Europeans with a crude death-rate of 3·81 per 10,000 population, compared with previous years' figures: 1942, 3·93; 1943, 3·72. The figures and rates for 1944, however, are subject to final check.

It is to be noted that the gradual falling tendency as shown by the graph of death-rates (standardized with rates based on the English and Wales census, 1901, to allow comparison with other countries) shows a reduction of two-thirds the rate at the beginning of the century, with the exception of two periods:—

(1) In 1918, when there was a slight rise, followed in successive years by a continuation of the progressive fall.

(2) In 1938 onwards, when there appeared to be a stationary effect on the male rate. This tendency appears to be continuing.

The general falling tendency is undoubtedly due to the gradual application of new methods of treating the disease and the gradual raising of the standards of living.

The apparent rise in the rate for males, particularly in 1918, is most likely due to the fact that many of the healthy male population were overseas at this time in the Armed Forces rather than due to a definite increase of the incidence of the disease.

The stationary effect for males as noticed in the 1938 period commenced before the war years and suggests a break in the falling tendency. This is due to the possible factors of increasing urbanization of the population at this time. With a large number of men leaving the country in the later years, the expected rise due to this factor would appear not to have materialized to any great extent. Nevertheless, the stationary or gradual rising tendency in the graph should give cause for an intensification of effort to improve control.

Tuberculosis Mortality Returns in the Maori Population

Death-rate trends as for Europeans for Maoris cannot be shown in graph form as it has only been in recent years that certification of causes of death in this race has been sufficiently accurate to allow application of accurate statistical method. It is believed that the death-rate for Maoris has been stationary at a high figure for many years.

The returns for 1944 of deaths from tuberculosis (all forms) give a total of deaths for Maoris of 372, with a crude death-rate of 37·40 per 10,000 of Maori population (figure for 1943, 36·6). This rate is one of the highest when compared with other countries, but with the recent intensification of early case finding by the Department and hospital clinics, new methods of treatment, and an improvement of Maori housing, the coming years should show a reduction in this high figure.

It has been found from the 1944 returns that—

(1) European deaths of males from all forms of tuberculosis are 362
These exceed the deaths of females, which are 229
in a male and female population of approximately equal proportions.

(2) Maori female deaths of all forms are 206
And exceed Maori male deaths, which are 166

The total number of deaths in 1944 for both races is 963, exceeding the number for 1943 (919) by 44.

Age-group statistics for deaths of both races in 1944 are not yet available, but the previous year's figures show—

(1) The largest number of deaths for females is in the age group 20–23 years.
(2) The largest number of deaths for males is in the age group 45–65 years.

The largest number of deaths from non-pulmonary forms is due to tuberculous meningitis, which is chiefly caused by the human type of infection (age group 1–5 years).

The age-group statistics for Maoris are also not available, but the largest number is in a much lower age grouping than for Europeans, and this is more noticeable for females.

Tuberculosis has been for many years the highest single cause of death in females in the age group 20–29 years and is responsible for 30 per cent. of the deaths from all causes in this group.

Approximately 4 per cent. of all deaths in New Zealand have been for some years due to tuberculosis.

Deaths from non-pulmonary forms of the disease in 1944, as furnished by the Government Statistician, are—

Europeans	106
Maoris	87
Total	193

The Present Known Incidence of Tuberculosis Disease in New Zealand

The probable incidence in other countries is estimated at a figure ten times the annual number of deaths. On this basis it would appear that New Zealand, with a declared number of deaths for 1944 of 963, has a probable number of tuberculosis cases or 9,630.

A register of all notified tuberculous cases is now being compiled. Eight tuberculosis areas approximately of similar numbers in population have been defined, in which the local Medical Officer of Health supervises general social welfare activities, domiciliary control, and a " case finding " scheme. Hospital Tuberculosis Officers supervise diagnosis and treatment in these respective areas.

All tuberculosis workers in these areas are now attempting to classify all patients and to register the respective numbers of those who are suffering from the various forms of the disease, the various types (bovine or human), the various degrees of activity, and the degree of involvement of various organs.

The Tuberculosis Division of the Health Department co-ordinates the activities of all hospital officers and the departmental workers in the field.

The National Tuberculosis Register discloses the present known incidence of cases under supervision at the 31st December, 1944, as follows (1943 figures in parentheses):—

Race.	Pulmonary Forms.	Non-pulmonary Forms.	Mixed Pulmonary and Non-pulmonary Forms.	Unclassified.	Totals.
Europeans	4,906	551	69	74	5,600 (4,853)
Maoris	1,854	215	24	38	2,131 (1,919)
Total for New Zealand ..	6,760 (6,096)	766 (567)	93 (109)	112	7,731 (6,772)

New tuberculosis patients notified to Medical Officers of Health during 1944 (1943 figures in parentheses):—

Race.	Pulmonary Forms.	Non-pulmonary Forms.	Totals.
Europeans	1,501 (1,799)	211 (221)	1,712
Maoris	476 (521)	66 (62)	542
Total for New Zealand	1,977	277	2,254 (2,603)

It would appear that 332 of the total 2,254 must have been found to be non-tuberculous and deregistered during the year. Allowing for 963 deaths in 1944 and this presumed figure of 332 cases deregistered, the final accretion to the total register cases as a result of the year's work can be estimated at 959.

It must be realized that there are many difficulties in the compilation of the Tuberculosis Register, but as departmental and hospital workers gain further experience, greater accuracy will be obtained. Further details in the register returns disclose information which can be taken as near to the true position as it is possible to attain. These are as follows:—

Racial Distribution

The known incidence rates of tuberculosis:	Per 1,000 Population.
In Europeans—	
North Island	3·47
South Island	3·47
In Maoris—	
North Island	23·24
South Island	25·48
In combined races—	
North Island	4·98
South Island	3·59

The New Zealand European incidence is 9·7 times the annual deaths. The New Zealand Maori incidence is 5·7 times the annual deaths. The New Zealand combined race incidence is 8 times the annual deaths.

Taking the generally accepted formula of ten times the annual deaths as being correct, it would appear that most of the actual European cases have been found, but there is still need to pursue the active measures, introduced in recent years by the Department, to find all Maori patients and have them placed under adequate supervision and control.

Sex Distribution

Further register details show a New Zealand incidence of cases—

In males, both races, as 4,230.

In females, both races, as 3,501.

Progress of Notified Cases

Number of cases returned with disease as deteriorating or stationary	1,445
Number of cases returned with disease as improving	1,321
Number of cases returned with disease as "quiescent" or "arrested," but still under supervision	2,374
Number of cases classified as apparently cured during 1944 and deregistered	381
	5,521
Number of cases whose accurate classification has yet to be determined	2,201*

* It is to be regretted that such a large number of cases still exist in the country whose classification has still to be determined. This is due in some areas to the inadequacy of tuberculosis clinic staff or to the imperfect liaison between hospital clinics and the departmental staff. It is realized that amongst this number there must be some active cases with positive infection that are a menace to others. Attempts are being made to have this figure reduced.

Degree of infection as ascertained from the bacteriological investigation of known pulmonary cases	6,760
(*a*) Number declared to have tubercle bacilli present in the sputum	708
(*b*) Number declared to have no tubercle bacilli present in the sputum	1,323
(*c*) Number declared as having no sputum available for examination or not investigated	4,729†

† The large number in (*c*) is being investigated, and it is expected that with more intensive searching more positive active cases will be found. The lack of skilled laboratory technicians and a deficiency of facilities are mainly responsible for this figure.

Disposition of cases notified (all forms), 31st December, 1944 (1943 figures in parentheses):—

Supervised in hospitals	1,114	(954)
Supervised in sanatoria	661	(577)
Total in institutions	1,775	(1,531)
Supervised in homes	5,308	(4,707)
Supervised in hutments (Maoris)	182	(106)
Supervised in boardinghouses or nomadic	466	(400)
	7,731	(6,772)

Compared with the 1943 figures, it will be noted that numbers of tuberculosis patients supervised in institutions have increased and that 76 extra hutments, mostly for Maoris, are in occupation. The remainder of the cases are supervised at chest clinics or by visiting District Health Nurses, with the exception of 247 cases who appear to be under no medical or nursing supervision.

Incidence of non-pulmonary and mixed pulmonary and non-pulmonary forms stand at 859 cases (of which 239 are Maori patients).

In this total there are 351 cases which show an affection of the bone and joint systems, and these are distributed proportionately between the North and South Islands as is the general population. A proportion of glandular, bone and joint, and intestinal tuberculosis is due to bovine infection. The remaining cases are undoubtedly due to the human type of infection.

The workers in Auckland and Dunedin who are typing available specimens from these cases will not be able to give us the respective incidence of bovine and human types until a sufficient number of cases has been examined. The work is long and laborious and needs special skill. Moreover, every case does not provide the requisite specimen for testing. Surgeons have been requested to notify every non-pulmonary case and also to send all available specimens for typing either to Auckland or Dunedin.

The known incidence rates at 31st December, 1944, in two groups of certain tuberculosis control areas with predominanting European or Maori populations are compared with New Zealand average incidence rates as follows:—

Area.	European Incidence Rate per 1,000 Population.	Maori Incidence Rate per 1,000 Population.
(*a*) Predominating European-populated areas		
Wellington Metropolitan	5·84	44·3
Auckland Metropolitan	4·08	30·45
Northern half, South Island	3·73	25·8¾
South half, South Island	3·25	24·7
(*b*) High Maori-populated areas		
North Auckland	1·47	10·43
South Auckland and Bay of Plenty	2·3	15·43
East coast, North Island	2·8	22·22
West coast, North Island	3·87	59·58*
New Zealand average incidence rates (December, 1944) (1943 figures in parentheses)	3·47 (3·20)	24·36 (19·60)

* The intensification of tuberculosis control in the western area is largely responsible for the high figure quoted in the Maori incidence rate. It indicates the likely Maori incidence that may be obtained when case finding in the other areas is up to the same standard as pertains in the western area.

It is to be noted that Wellington Metropolitan Area has the highest European incidence rate, and it is also found to have the highest European death-rate, 6·7 per 10,000.

The Maori Factor as a Cause of High Incidence Rates

The marked differences in particular areas of tuberculosis incidence rates is undoubtedly due to their higher Maori population. With the far too common deficiencies in his housing and the inability to control infection, the Maori "carrier" easily infects the immediate members of his family. With the Maori mode of life the resistance of the family to infection is low. Disease quickly supervenes in the younger members and rapidly progresses to a fatal termination. The behaviour of these "carriers" is the main factor in producing a pool of active tuberculous infection that persists in a community. It is believed that the Maori, given good home conditions and sufficient health education, has no less a resistance to infection than Europeans.

Urbanization Factors

It is found that European incidence is higher in the main towns than in the country areas. The majority of cases come from conditions where poor housing, overcrowding, and malnutrition exist in any marked degree.

Climatic Factors

Within New Zealand it is believed that climate plays little, if any, part in causing a high incidence and also plays no part in regard to the success of treatment and control.

In this connection the low incidence rate, 3·25/1,000, and a low death-rate, 4·3/10,000, in the southern half of the South Island compares favourably with the comparable incidence rate of 4·08/1,000 and a death-rate of 4·86/10,000 for the Auckland Metropolitan Area.

The success of treatment depends more upon the availability of accommodation for giving instruction in preventive measures, medical and surgical treatment, good housing, and graded sheltered employment for the recovering "quiescent" or "disease arrested" case than upon any virtues of a good climate alone.

Our methods in dealing with tuberculosis patients are based on the following ideals:—

(1) To find every case.
(2) To classify every case into those that are (*a*) active spreaders of infection; (*b*) inactive cases.
(3) To segregate and control the active cases in hospitals and sanatoria or in their homes and, where possible, at their place of work.
(4) To teach individual patients how to prevent the spread of their infection to others.
(5) To review at constant intervals all inactive cases at a hospital tuberculosis clinic to ascertain if a relapse of activity has occurred.
(6) To attempt to rehabilitate the quiescent or arrested case into a graded and suitable form of employment.

(1) The finding of cases is by—

(*a*) Notification by doctors of all cases suspected or found to have tuberculous disease and by reviewing the family or working contacts of these cases. Notification by general practitioners and hospital medical officers has improved. (On receipt of a notification of a case, District Health Nurses visit the patient in his home and endeavour to trace the hidden source of the infection, and attempt to find amongst the "contacts" of the patient any one who has contracted the disease by having them brought to the nearest chest clinic for diagnosis. Members of the patient's family are the first people surveyed. "Contacts" at the patient's place of work, if considered desirable, are also surveyed.)

(*b*) *X-ray Surveys of Selected Groups of People.*—This work is being performed by hospital radiologists, but deficiencies in the numbers of trained x-ray technicians and the difficulty in obtaining x-ray equipment precludes the introduction of mass surveys of the population for some time to come. As an instance of this difficulty, the Taranaki mobile x-ray unit, which was ordered over three years ago, has not yet come to hand.

(*c*) *Tuberculin Testing of Special Groups of Children and Adolescents, followed by Diagnostic Measures in all Positive Reactors.*—A positive reaction to this test indicates that the patient has experienced a tuberculous infection. A subsequent x-ray in the positive reactor may disclose evidence of tuberculosis disease. Negative reactors do not need an x-ray examination. Tuberculin testing is offered by the chest clinics and medical officers of the Department to the contacts of active tuberculous cases, and it is intended to introduce tuberculin testing to the pupils of secondary schools.

(2) *Classification.*—This is becoming feasible with the recent reorganization and extension of hospital tuberculosis clinics. Many of the clinics could, however, do more work if their staff and x-ray and laboratory services were extended.

(3) *Segregation.*—It is considered that the segregation of active cases should be voluntary, except in a very small minority of recalcitrant cases :—

(*a*) *Hospital accommodation* should be used, chiefly, for diagnosis, surgical treatment, and the segregation of "long stay" advanced cases.

(*b*) *Sanatorium accommodation* should be reserved for cases with the most favourable prognosis—*i.e.*, those that are approaching the "quiescent" or "inactive" state.

In number of established beds, New Zealand compares favourably with other countries, but the accommodation here is mostly old and difficult to work. By virtue of the high Maori incidence in certain areas and the higher incidence of European cases in the larger towns, more accommodation is needed to provide adequate control.

Many Boards have plans in hand to improve and extend their hospital accommodation. In certain areas such as North Auckland, where there are relatively large numbers of Maoris, the Government has agreed to meet the cost of hospital accommodation for tuberculosis patients.

During the past year the Boards of the western area and those of the eastern area of the North Island combined into two groups to administer Otaki and Pukeora Sanatoria respectively, and both groups plan to improve and extend the sanatorium accommodation in their areas. The Boards in the Auckland - Waikato - Bay of Plenty area are actively considering a combined sanatorium scheme for their area.

Home segregation has been improved by an augmentation of the district health nursing service, and an attempt is being made to ensure that only those active cases who are willing to fully co-operate with the District Nurse and obey instructions be allowed to return to their homes. The Medical Officer of Health has power to order a non co-operative patient to return to hospital.

It is realized, however, that better results are procured by obtaining understanding and co-operation of patients by teaching than by resorting to rigid compulsory measures, which tend to drive the disease underground.

The success of home segregation will depend upon the completion of the housing programme, when recovering tuberculous patients on their discharge from an institution will be able to obtain homes readily and where they can sleep in their own rooms, have the usual home comforts, and have available essential sanitary conveniences.

The improvement of housing for the Maori is recognized as an important factor in producing a decrease in the incidence of the disease in this race, and much can be expected from the increasing effort that is being made in this direction. As a temporary measure an increasing number of hutments are being supplied to suitable and co-operative Maori cases.

The supervision of cases that persist in working at their place of employment is difficult. At the least hint of the possibility of tuberculosis in an employee it is found that undue fears are expressed by the healthy members of the staff, and often the patient, although declared by a doctor as quite safe in many instances to work, is forced to leave his employment and fall back on invalidity benefit in order to maintain his family. More understanding on the part of the employer and employees is necessary to prevent these unfortunate and too frequent incidents.

The Medical Officer of Health has power to send a known active case to hospital for treatment, but has no power to force such a case to leave his work if the hospital is unable to admit the patient.

The geographical features of New Zealand, with its sparsely populated areas, makes it impracticable for tuberculous patients to be segregated in "colonies," as is done in more populous countries.

The Department considers that a combination of hospital treatment and adequate supervision of cases in the home will create the happiest solution for the patient and a minimum hazard for others.

(4) *Teaching Tuberculosis Control.*—Hospital and sanatorium medical officers have been urged to teach patients the principles of preventive methods while they are in-patients so that on discharge from an institution they can reduce to a minimum any possible danger to others.

(5) *The Frequent Review of Out-patients.*—The District Nurses see that patients attend tuberculosis clinics at prescribed intervals so that a relapse into the active state can be detected at the earliest possible moment and treatment prescribed.

(6) *Rehabilitation of the Quiescent and Arrested Patient.*—No organized facilities are available for this purpose at present, but it is hoped that by the establishment of lay tuberculosis associations and the co-operation of the Rehabilitation Officers of the Rehabilitation Department there will be an agency in existence which can be called upon by the "arrested" case for help in vocational guidance and the chance of obtaining a graded form of sheltered employment.

The plans for the future control of tuberculosis envisage—

(1) Improved "case finding" by better notification, tuberculin testing, and x-ray surveys.

(2) Better classification and the identification of all active cases by more medical staff and improved diagnostic, laboratory, and x-ray facilities.

(3) Efficient treatment and segregation in hospitals, sanatoria, or in the homes of these active cases until they are regarded as inactive.

(4) Improvement and extension of institutional accommodation to provide more attractive and homelike surroundings in which treatment and training can be given.

(5) Improvement of housing conditions for European and Maori tuberculous families.

(6) The education of the general public in tuberculosis control in order to create a humane understanding of the tuberculous patient's problems and to provide assistance for his complete recovery and his return to normal standards of life.

The war years have set back the full introduction of these plans by five to ten years, but in the meantime such control that the available staff, building, and equipment will allow will be exercised to the full.

APPENDIX II.—REVIEW OF INDUSTRIAL HYGIENE IN NEW ZEALAND AND THE HEALTH OF THE INDUSTRIAL WORKER, WITH PROPOSALS FOR THE DEVELOPMENT OF THE SYSTEM OF CONTROL

By J. M. Davidson, M.D., D.P.H.*

CONTENTS

Memorandum to the Director-General of Health

The Director-General of Health.

I submit herewith a report based on my recent survey of conditions of work in New Zealand factories.

During the past few months I have visited and inspected over 200 factories in New Zealand, situated in the main centres of population and elsewhere. These factories were chosen in some cases at random; in others, because they were thought to be in some respects typical or unique, or because the occupiers were recognized as in need of advice in virtue of the known existence of a particular health hazard, or because special requests or complaints had been received from workpeople or employers. The firms visited were concerned with the trades or industrial processes listed below†, and gave employment to nearly 15,000 males and over 4,000 females. I have therefore seen and inspected closely a typical cross-section of the conditions under which the factory worker in New Zealand is required to earn his living. In the course of my work I have come to the conclusion that a series of problems exist, and in the following pages these problems, and some suggested solutions, are discussed.

A report of this nature is inevitably critical, and at times may appear unnecessarily harsh. In case such is the impression left by this report, I should like to forestall criticism by placing on record the fact that I have seen in the course of my survey some factories in which the conditions of work were all that could be desired—but the report deals mostly with the others.

I wish to express my appreciation of the help so freely given to me in making this survey by yourself and other colleagues at the Department of Health, and at the same time to render thanks to Mr. Moston, of the Department of Labour, and his staff for their ready co-operation at all times in every district which I have visited. My thanks are due also to employers, managers, and others for having accepted with a friendly tolerance, where they have not actually invited, much frank criticism.

INTRODUCTION

1. Viewed impartially, the various activities undertaken by a State Health Department are devised with one end in view—viz., to reduce the amount of invalidity among the public at large. But the State must know what it is fighting against before it decides how to fight, and up to date insufficient attention appears to have been paid in New Zealand to industrial employment as a cause of ill health. This is not surprising since the Dominion has not been, and is not now, a highly industrialized country, but the process of industrialization has started, and is growing in importance. It behoves us, therefore, to take stock of the position. The wise physician when he sees a patient considers carefully not only the biological processes which appear to have caused a breakdown in health, but also the relation of the individual to his environment. But the complexities of modern life make it increasingly difficult to do this. We know less than we did of how our neighbours live. The average physician knows little of conditions at his patient's place of work, and yet his patient generally spends about half his waking hours there, and his environment may have much to do with his ill health.

* One of His Majesty's Medical Inspectors of Factories, at present serving with the Department of Health by arrangement with the Ministry of Labour and National Service, London.

† Engineering—general, electrical, automobile, aircraft, railway, constructional, and marine; ship-building; lead-smelting and accumulator-manufacture; smelting of other metals; dry batteries; baking; butter and cheese manufacture; milk foods, cooked foods, chocolates, food-canning, ice-cream manufacture, other food-factories; freezing-works; boot and shoe manufacture; felt and bedding manufacture; general clothing, ladies' wear and millinery; woodworking; laundries; electroplating; cotton-bleaching; flax-milling and wool-milling, weaving; brewing and aerated waters; tobacco; munition-manufacture and shell-filling; paint and lacquer manufacture; brick and pottery manufacture; india rubber; plywood-manufacture; stone-quarrying and monumental masonry; painting, lacquering, and luminous paints; wallboards; galvanizing and tinning; iron and steel foundries; non-ferrous metal founding and finishing; fellmongering and tanning; soap-manufacture; gas-production; fertilizer-manufacture; light chemicals, industrial and pharmaceutical; mirror-making and glass-bevelling; timber felling and milling; cement-manufacture and asbestos cement; toys; plastics; printing, publishing, bookbinding, and stationery; waterproof textiles and other textiles; plumbing; motor-body building; manufacture of zinc oxide; dry-cleaning; surgical appliances; milk-distribution, &c.

2. As far as life in New Zealand is concerned, one can say with confidence that only a very small number of persons are directly exposed, as a result of their work, to deadly poisons; but, on the other hand, many thousands are employed in work which is hot, dusty, laborious, dirty, or merely monotonous and uninteresting, and they, too, may be exposed to environmental dangers the effects of which, although less immediately disabling, are none the less real. These less specific health hazards, and the annoying and fatigue-producing inconveniences which a man or woman may encounter at work, are well worthy of attention, for they may have much to do with the maintenance of health. The former have been studied by medical men in Britain, privately and with State aid, for over one hundred years, and elsewhere for shorter periods; while the systematic study of the latter was first undertaken, also in Britain, during and just after the last War, when the Industrial Fatigue Research Board was created in 1918 as a result of the findings of the Health of Munition Workers Committee, which had been set up in 1915. This Board, starting off with investigations into fatigue and other causes of labour wastage in industry, found itself inevitably obliged to study the health as well as the ill health of the industrial worker, and in due course it changed its title to the more appropriate one of Industrial Health Research Board.

3. Industrialization, unless suitably controlled, is prone to induce a worsening of working as well as of living conditions, and statistics of occupational mortality help to give us a clear mental picture of the need for attention to industrial hygiene. Recent official British figures of occupational mortality among men have shown that sand-blasters, metalliferous-mine workers, stevedores, slate-miners, glass-blowers, kiln and oven men in the pottery trade, and a few others have all a death-rate of more than 50 per cent. over the average, while the lowest death-rate (less than 70 per cent. of the average) is that among agricultural-machine workers on farm-work. The risk in most of these trades is dust. Potters' deaths from bronchitis, for example, are about three times the normal, while glass-blowers have the highest death-rate from cancer viz., 225 per cent. of the normal. Leather-dressers, furriers, tin and copper miners, gas-producer men, and kiln and oven men also have high rates for cancer deaths. Some of the commoner causes of occupational cancer in Britain, such as shale-mining, are disappearing, but others, such as the manufacture of patent fuel and of synthetic dyes, are becoming commoner. Much has already been achieved in most highly industrialized countries as a result of improved hygiene in industry and attention to the health as well as the ill health of the factory worker. Most of the older well-known occupational diseases are now fairly well under control, and the decline in their incidence is illuminating. In Britain not only are "lead palsy" and mercury "shakes" seldom seen now, but such diseases as "miners' phthisis," "grinders' rot," "potters' asthma," and "the shivers" among brass-founders are rapidly disappearing. In 1900, for example, 1,058 cases of lead poisoning were notified; in 1941, only 59 cases were notified, and, in addition to this great reduction in number, the cases occurring now are much less severe than formerly. Similarly, the incidence of anthrax—"wool-sorters' disease"—fell from 51 cases in 1910 to 22 in 1941. Even more striking, because more vital to the war effort, is the fall in the incidence in Britain of toxic jaundice due to the handling of T.N.T. and its compounds. T.N.T. is absorbed into the body not through being swallowed, but mainly through the skin, and via the lungs, as dust and fume. Once this was discovered, preventive measures followed rapidly, with the result that while there were well over 400 cases between 1916–18, with a mortality of 33 per cent., during the present war (when we may assume that the number of persons at risk is at least not less) there have been, during the corresponding three years (1940–42), only 85 cases. How has all this been achieved? Partly by reason of the greater attention paid by managements to public hygiene in factories, and partly by the exercise of continuous skilled supervision of industry on behalf of the State by a trained factory inspectorate which includes on its staff its own medical officers. Obviously this is a subject well worthy of close study if New Zealand is to benefit to the full from the lessons learnt elsewhere.

4. What is the leading principle involved in the application of hygiene to industry? Simply this: that every man is entitled to the benefits at work of good ventilation, sufficient lighting, adequate warmth, a clean workplace, comfort, and freedom from exposure to harmful or unpleasant dust, gases, fumes, or radiations. The extent to which these things are lacking in a country's industry is a measure of the need for the services of a skilled industrial hygienist and a trained team of inspectors.

THE POSITION IN INDUSTRY IN NEW ZEALAND TO-DAY

5. New Zealand appears to have entered an era of industrial activity, and although heavy industries such as steelmaking have not so far been established, there is already a surprising diversity of light industry. Part of this is no doubt a mushroom growth resulting from the war, but it is probable, also, that a large part will remain and flourish as part of the permanent economy of the Dominion. It is worth noting, also, that modern methods of mechanization and of canning, &c., have so transformed the "primary" industries—milk, butter, and cheese production—that they, too, are now carried on in factories not very different basically from those housing "secondary" industries, and conditions of work in both may be very similar. What I have seen of these conditions during the past few months leads me to think that more careful planning and supervision will be required in future than has been allotted to this subject in the past if secondary industries are to attract labour and provide healthy, safe, and congenial employment. Conditions of work are too often unsatisfactory, and yet informed public opinion on this matter appears to have lagged behind that of some other countries in that there seems to be no general recognition of that fact. A short description of conditions encountered in New Zealand factories to-day, together with a comparison between current New Zealand and British factory legislation, will help to illustrate these points. Most of the New Zealand legislation quoted is that laid down in the Factories Act, 1921–22, as amended by the Factories Amendment Act, 1936. The corresponding British Factories Act is dated 1937. It should, of course, be borne in mind, in making such a comparison, that the British Act of 1937 emerged only after long years of discussion as to the needs of modern industry, and represents a valiant effort to bring up to a reasonable standard, in matters affecting the health, welfare, and safety of workpeople, those firms and industries which persistently lagged behind best current practice. A new Factories Act was by 1937 long overdue, the previous Factory and Workshops Act having served since 1901. To-day New Zealand is in much the same position as Great Britain was prior to 1937, in that the Dominion is trying to make do with a Factories Act which is largely out of date.

I. Factory Hygiene

Size of Units

6. Much the greater part of New Zealand industry is carried on in what would be considered elsewhere small factories, and this fact is important. Such factories frequently require relatively more State supervision and attention to safeguard the health of workpeople than would normally be accorded to larger concerns. It is partly a matter of finance; merely to keep a factory clean costs money, and the small firm has less to spare for what are too often regarded as unremunerative frills—hygiene and æsthetics. There is all too often among those responsible for the running of the smaller factories a failure to realize that the maintenance of good hygiene and a healthy personnel is a sound investment.

Fabric of Buildings

7. A large proportion of factories are built of relatively non-durable material—wood, galvanized iron, and asbestos-cement sheeting, &c. This has advantages in that it favours replacement in conformity with the progression of modern ideas, and so should prevent outmoded factories from becoming slums, but a policy of "scrap and replace" operates freely only when trade is booming; at other times constant supervision is needed to maintain a uniformly high level, and this is doubly difficult to achieve when factories are of light construction and times are hard.

Lighting

8. In a country enjoying its wealth of sunshine so much as does the Dominion it is strange to find that the people do not demand the maximum of daylight in factories. Poor natural lighting is very common in factories throughout New Zealand. I have seen more than one new factory or workshop, not yet taken into occupation, in which natural lighting has been cut down to an extent which renders the premises positively dingy, and in one such case the only reason given was that in the past boys broke windows. Artificial lighting is also poor, although modern appliances are neither unknown nor lacking. There is little appreciation of the guiding principles of good lighting—viz., that general lighting should be of sufficient brightness and evenly distributed, that close attention should be given to the avoidance of glare and of shadows, and that local lighting must be of a high order and well shaded.

Existing legislation is weak on the subject of lighting in factories. Under the Health Act, 1920, section 26 (*g*), a nuisance is deemed to be created where a "factory [*or*] workroom . . . is so badly lighted . . . as to be *dangerous to the health* of the persons employed therein"—a poor criterion of adequacy; and under the Factories Act, 1921–22, section 44 (*g*), an Inspector of Factories may by requisition require a workplace to be "properly lighted," this term being not further defined.

The British Factories Act, 1937, requires (section 5 (1)) provision to be made in all factories for "securing and maintaining sufficient and suitable lighting, . . . in every part of a factory in which persons are working or passing," and this has been supplemented by regulations (the Factories (Standards of Lighting) Regulations 1941 (S.R. and O., 1941, No. 94)) prescribing in detail standards of sufficient and suitable lighting.

Note the requirement as to maintenance. The British Act further specifies (section 5 (4)) that "all glazed windows and skylights used for the lighting of workrooms shall . . . be kept clean on both the inner and outer surfaces."

Ventilation

9. *General.*—There is insufficient appreciation, both among employers and employed, of the need for good general ventilation in all factories, and still more of the need for applied local exhaust ventilation where gases, fumes, dust, or other impurities are generated in the course of processes carried on. Louvred roofs are not nearly so common as they should be, and it is unusual to find, in a factory where hot processes are carried on, that the layout has been scientifically planned to help in the provision and maintenance of good natural ventilation. Thus in foundries, for example, instead of advantage being taken of powerful upward convection currents arising from melting-pots by placing these in the middle of the floor under central roof louvres, it is almost the rule to find furnaces and pots, &c., tucked away in corners and against outer walls. Similarly, where much steam arises from, say, a cooking process little effort is made by means of screening to allow it to escape by the shortest possible route—namely, through the roof directly overhead. When resort has been had to mechanical ventilation the end-result is frequently unsatisfactory, and cases can be seen where two fans within a few feet of each other pull against each other, where heavier-than-air gases are lifted high overhead for removal and where heated fresh air is introduced 30 ft. or 40 ft. above ground-level and allowed to escape unused through neighbouring roof-louvres. There would appear to be an excellent opportunity awaiting the engineering firm which first takes up the serious study of ventilation in industry.

10. *Local.*—I have found throughout my visits a regrettable persistence of the outworn tradition that when a harmful or noxious gas, fume, or dust is generated in the course of an industrial process the proper remedy is to shut up in respirators any workpeople likely to be affected. It seldom seems to occur to any one—and, strangely enough, least of all to the employed person—that the proper course to pursue is to shut up the process or, if that is impracticable, to capture all such fumes, &c., at the point of origin and either neutralize them or convey them safely to the exterior. Such applied local exhaust ventilation aims at completely preventing contact between the workman and the noxious substance. General ventilation, however good, deliberately condones such contact. Respirators and other breathing-appliances should never be regarded as other than a second line of defence.

Legislation regarding ventilation is not lacking. The Factories Act, 1921–22, requires (section 44 (*d*)) that a factory "shall be ventilated in such a manner as to provide a sufficient supply of fresh air, and to carry off and render harmless, as far as practicable, all gases, fumes, dust, and other impurities arising in the course of the work carried on in the factory." But note that only *general* ventilation is required: there is nothing to prevent the exposure of work people to noxious gases, &c., *before* these are removed. The Health Act, 1920, section 26 (*g*), includes as a "nuisance" the case of a factory which is "so badly ventilated as to be *dangerous to the health* of the persons employed therein" or in which there is failure to provide "appliances so as to carry off in a harmless and inoffensive manner any fumes, gases, vapours, dust, or impurities generated therein" *i.e.*, the Health Act requires, at least by implication, the *local* ventilation of a process in which there is evolved any fumes, gases, &c.

The British Factories Act, 1937, is more specific than either, requiring both the provision of satisfactory general ventilation and the prevention of ingress into the ambient atmosphere of any employed person of any substantial quantity of dust, fume, gas, &c. Section 4 (1) lays down that "effective and suitable provision shall be made for securing and maintaining *by the circulation of fresh air in each workroom* the adequate ventilation of the room, and for rendering harmless, so far as practicable, all fumes, dust, and other impurities that may be injurious to health generated in the course of any process or work carried on in the factory."

This is supplemented by section 47, which is even more specific in its requirements, viz.:—

"In every factory in which, in connection with any process carried on, there is given off any dust or fume or other impurity of such a character and to such an extent as to be *likely* to be injurious or *offensive* to the persons employed, or *any substantial quantity of dust of any kind*, all practicable measures shall be taken to protect the persons employed against inhalation of the dust or fume or other impurity and to prevent its accumulating in any workroom, and in particular, where the nature of the process makes it practicable, *exhaust appliances shall be provided and maintained*, as near as possible to the point of origin of the dust or fume or other impurity, so as to prevent it entering the air of any workroom."

Cleanliness

11. While I have seen several well-planned, clean, and obviously well-managed factories in New Zealand, it is a regrettable and significant fact that the leading impression which I have carried away from a disappointingly high proportion of those visited is one of bad housekeeping—overcrowding of plant, poor lighting, dirty windows, and badly stained walls; accumulation of disused material, scrap, and rubbish, and unswept floors and untidy benches. Untidiness and dirt go hand in hand, and an easy tolerance of the one leads to a philosophic acceptance of the other. The present system of granting extra payment as "dirt-money" for the performance of certain routine unpleasant work unfortunately militates against the improving of working-conditions. Dirt is degrading, demoralizing, and disease-producing in the factory as much as in the home, and the employer who sees nothing wrong in a squalid, dirty, and ill-kept factory does not deserve to prosper. Still less does he deserve to be entrusted, as he is at present, with the training of the young. It must be emphasized that the conditions referred to above apply to some food-factories in New Zealand as well as to others, particularly the smaller factories manufacturing condiments and table delicacies, &c. And yet I have visited one such factory which, set in a beautiful garden, is one of the most attractive which I have seen in New Zealand or elsewhere.

The Factories Act, 1921–22, section 44 (*a*), requires that a factory "shall be kept in a cleanly state and free from any smell or leakage arising from any drain, privy, or any other nuisance"—a somewhat primitive requirement with which it should not be difficult to comply. No reference is made in this Act to wet floors. The Health Act, 1920, section 26, includes under the definition of "nuisance" creation a case in which "any factory or workroom . . . is not kept in a cleanly state, and free from offensive effluvia from any drain or sanitary convenience"—again a somewhat loose and unsatisfactory attempt to secure a reasonable standard of cleanliness.

The British Factories Act, 1937, deals boldly and unequivocally with this problem. The opening sentence of the Act (Part I, section 1) is, "Every factory shall be kept in a *clean* (not merely "cleanly") state . . . "; and without prejudice to the generality of the foregoing provision it is further laid down that—

"(*a*) Accumulations of dirt and refuse shall be removed *daily* by a suitable method from the floors and benches of workrooms and from the staircases and passages:

"(*b*) The floor of every workroom shall be cleaned *at least once in every week by washing* or, if it is effective and suitable, by sweeping or other method."

A further requirement is that all inside walls and partitions and all ceilings or tops of rooms and all walls, sides, and tops of passages and staircases shall be lime-washed, colour-washed, or washed at least once in every fourteen months.

Section 6 of the Act requires that "where any process is carried on which renders the floor liable to be wet to such an extent that the wet is capable of being removed by drainage, effective means shall be povided and maintained for draining off the wet."

The most recent British legislation therefore represents an attempt to secure a higher standard of general cleanliness in all factories than present New Zealand legislation requires even in food-factories.

Sanitation

12. The standard of sanitary accommodation in New Zealand factories, even in those which are modern and in built-up populous areas, is not high. All too often sanitary conveniences communicate directly with workrooms or, if there is an intervening space, it is not separately ventilated. Lighting of conveniences is frequently very inadequate and, as might well be expected under these circumstances, the standard of cleanliness maintained is low. It is common to find that an alert but unimaginative management has denied users the privacy afforded by a door in the vain hope that they will thereby prevent sanitary conveniences from being used for other than legitimate purposes, and a similar lack of realism is presumably responsible for the common failure to provide toilet-paper. Apparently, too, no objection is raised to urinals so placed as to be freely visible from other parts of a factory where persons work. It is unusual to find a hand-basin, soap, and towel conveniently placed for washing after use of the lavatory.

Factory law in New Zealand (Factories Act, 1921–22, section 44 (*b*) and the Factories Consolidating Regulations 1937, section 20) requires merely "proper" privy and "adequate" urinal accommodation in accordance with a fixed scale, with due arrangements for separation of the sexes. The Health Act, 1920, requires (section 37) the provision of "sufficient" privy accommodation, separate for each sex.

The British Factories Act, 1937, section 7, requires the provision of "sufficient and suitable" sanitary conveniences, and requires further that such accommodation shall be "maintained and kept clean" and that "effective provision shall be made for lighting the conveniences." Further, the Secretary of State has made regulations (the Sanitary Accommodation Regulations 1938 (S.R. and O., 1938, No. 611)) determining what is "sufficient and suitable," and in these regulations it is laid down, among other things, that "every sanitary convenience shall have a proper door and fastenings, shall be sufficiently ventilated, and shall not communicate with any workroom except through the open air or through an intervening ventilated space."

II. Health of the Industrial Worker

13. The present war, like the last, has been responsible for a much-needed stimulation of interest in the health of the industrial worker, and for a growing realization that much can be done in the factory to safeguard that health. The result has been that in the more highly industrialized countries the study of industrial medicine and hygiene has received a tremendous impetus, and strenuous efforts have been made to provide satisfactory industrial health services.

Specific Health Risks

14. Because of the types of industry which have established themselves in New Zealand, specific industrial health risks of a toxic nature are relatively few, but such as there are assume an added importance because they have, up till now, frequently passed unrecognized. Various poisonous substances and proprietary products, some of the latter of undisclosed composition and dangerous to handle, are to be found in use, and even where overseas manufacturers have taken the precaution to enclose with their products concise and informative cautionary literature, insufficient attention is paid to the health risks involved. This is no doubt unintentional as far as the user is concerned, and to some extent inevitable, but these very facts make it all the more necessary that Factory Inspectors should be given every possible opportunity of acquiring knowledge regarding, and exercising close supervision over, processes involving specific health risks. It must be emphasized, however, that the risks which arise from exposure at work to toxic substances would almost all disappear if the level of general hygiene in industry were as high as it should be. Much the commonest and most dangerous route of absorption of poisonous substances in industry is via the lungs, and it is obvious that when industrial hygiene attains the level at which *all* dusts and *all* fumes generated in an industrial process, whether toxic or not, are captured at their point of origin, it will not matter a great deal whether the noxious agent is harmful in a concentration of 1 in 1,000,000 or 1 in 1,000. And if first-class washing facilities are immediately available, substances which are poisonous or irritating to the skin will lose much of their danger.

It is unnecessary to record here evaluations made of specific health hazards met with during this survey, since details of these are now available in departmental records, but it is worthy of note that the following types of health risk, among others, were encountered: metallic poisoning (lead, mercury, arsenic, manganese, cadmium); exposure to asphyxiant gases (carbon monoxide, carbon dioxide, hydrogen cyanide, &c.) and to other fumes and gases (hydrofluoric and other acid fumes, benzol and other coal-tar derivatives, petroleum distillates, alcohols, chlorinated hydrocarbons, &c.); exposure to various dusts (organic and mineral, some of the latter, such as silica and asbestos, capable of causing specific chest-diseases); exposure to a variety of skin irritants (acids, alkalis, mineral oils, &c.), some capable of causing skin cancers (arsenic, pitch, &c.); and, finally, exposure to x-rays and radio-active substances capable of causing severe burns, blood and bone changes, and occupational cancers. The *variety* of risks noted is interesting.

Medical Supervision

15. There are already in New Zealand a few factories in which progressive and far-seeing managements have installed trained nurses in well-appointed ambulance-rooms, and a smaller number in which part-time medical officers attend regularly at the factory to examine, advise, and treat workpeople. Here we have the nucleus of a medical service for industry. But it is not yet sufficiently recognized that there is a greater need in industry for a health service than for a medical service. The system of social security in force in New Zealand aims at providing outside the factory whatever form of medical treatment a person may require, but makes no *ad hoc* provision for the supervision of the health of the industrial worker at work. The result is that while employers contribute large sums to help provide for the treatment of their employees, they find that if they wish to make provision for medical supervision at work which aims at keeping their workpeople well, they have to provide this at their own further expense. It is not surprising, therefore, that few works doctors have so far been appointed, and that where a doctor has been appointed his duties are directed towards curative rather than preventive work. Only a very few firms, and these not the largest, have made any individual arrangements for medical supervision; the others, both large and small, have not yet appreciated the advantages which accrue from regular, even if infrequent, skilled medical supervision. Industrial health is a wide subject requiring special study, and its maintenance calls for the intelligent application of the newer knowledge in matters of hygiene, toxicology, nutrition, epidemiology, psychology, &c. This is the purpose of medical supervision—to ensure the provision of satisfactory environmental conditions at work; to maintain physical and mental health at full efficiency; to prevent sickness and alleviate its consequences; and to minimize the effect of injury and promote rehabilitation. But this is, to practically all New Zealand medical men and nurses, a new field, and so far little has been done to train these people or to encourage industry to make use of their services. This, however, is not the main reason why industry has failed to appoint works medical officers. The main reason is the failure to disseminate the required knowledge among industrialists. There is much that a medical man (or woman) can do in a factory without special training. There is the early detection of actual disease as well as preventive measures to limit its spread, medical examination of entrants, and periodic medical examination of other workpeople (including perhaps routine x-ray chest examinations), teaching of first aid, and education of workpeople in matters of general and personal hygiene, liaison with outside medical services, &c. Then there is the keeping of proper health records and their analyses, which can be very helpful in the detection of unhealthy and dangerous processes, &c. Case finding is the first step in trying to eradicate any particular type of illness, and accurate record-keeping is the first step in recording ill health.

The Factories Act, 1921–22, does not require the provision of medical supervision anywhere in industry. Even the statutory so-called "certificate of fitness" required by section 29 of the Act before a boy or girl under the age of sixteen may be employed in a factory is granted by a *lay* Inspector of Factories. A start has, however, been made by requiring (under the Accumulator (Lead Process) Regulations 1940, No. 212) the periodic medical examination of persons engaged in "lead processes" and (under the Spray Painting Regulations 1940, No. 83) the keeping of a Health Register for persons employed in "spray-painting."

Although the British Factories Act, 1937, does not require the universal provision of medical supervision, numerous codes of regulations (such as the India-rubber Regulations 1922 (S.R. and O., 1922, No. 329)) made under this and previous Acts require periodic medical examination at stated intervals. Further, under section 11 of the Act the Secretary of State may, under certain circumstances, make special regulations requiring arrangements to be made for the medical supervision of persons employed at a factory or at any special class or description of factory. But in Britain to-day there is such a widespread voluntary medical supervision of industry by numerous whole-time and many more part-time medical men and women, as well as close State medical supervision, that compulsion has not been found necessary.

Health Committees

16. Health committees do not apparently exist in New Zealand industry as such, but there are a few factories in which a works council or joint production committee takes an interest in and assumes some responsibility for matters affecting the health of the workpeople. One would like to see more of this sort of thing, since it is desirable that all workpeople should be not only well informed on health matters in general, but should have a recognized forum for discussing such matters with managements in a co-operative spirit. Such committees, if well organized, can fulfil very useful functions in helping to disseminate knowledge on health matters, keeping a watchful eye on working-conditions, and taking steps to secure and maintain careful compliance with the law in all matters affecting health, welfare, and safety.

III. Welfare of the Industrial Worker

Cloakrooms

17. There is widespread provision of individual lockers in factories in New Zealand, but wooden lockers are frequently of a design which does not readily permit of cleaning and which renders difficult the drying of garments put off wet. Further, it seldom happens that there is a routine emptying and cleaning of lockers, and it is not surprising, therefore, that changing-rooms almost invariably have a disagreeable musty odour. Too often home-going and working clothes are hung up together, even when the latter are heavily contaminated with poisonous materials. The present Factories Act still does not require the provision of cloakroom accommodation in factories in general, but this omission has been rectified in part by the Lead Process Regulations 1925 (made under the Act and under the Health Act, 1920), Regulation 2 (5) of which requires the provision of a dressing-room with facilities for the storage separately of working and home-going clothes of persons engaged in a "lead process." Similarly, Regulation 13 of the Accumulator (Lead Process) Regulations 1940 requires the provision for persons engaged in a "lead process," as defined, of accommodation for the separate storage of working clothes as well as of adequate facilities for the storage and drying of home-going clothes.

The British Factories Act, 1937, section 43, applying to all factories, specifies that—"there shall be provided and maintained for the use of employed persons adequate and suitable accommodation for clothing not worn during working hours; and such arrangements as are reasonably practicable . . . shall be made for drying such clothing."

Further, under various codes of regulations and welfare orders made under the Act and governing individual processes, separate and suitable accommodation must be provided for protective clothing worn at work.

Temperature Control

18. While prolonged spells of very cold weather are uncommon in New Zealand, the winter is sufficiently cold, and spells of inclement weather are sufficiently frequent at other times, to necessitate the heating of factories at certain seasons. The fact that heating is required for only a small part of the year is widely used as an excuse for failure to install permanent and suitable heating-appliances. The result is the ubiquitous coke brazier which vitiates the atmosphere at all times (and which in a confined space may be even a danger to life), although there are now a sufficient number of combined unit heaters and air-circulators in use in New Zealand to demonstrate the practicability and satisfactory nature of this means of heating. Cooling of the atmosphere is less often required, and when necessary can usually be attained by the circulation of fresh air, supplemented perhaps by the application to the roof and roof lights, &c., of a suitable reflecting paint.

There is no existing legislation requiring the maintenance of any particular temperature in factories, although under the Factories Act, 1921-22, section 44 (1), an Inspector of Factories may require the provision of "such heating appliances as the Inspector thinks necessary for the comfort of the persons employed."

The British Factories Act, 1937, is more helpful. Section 3 enacts that "effective provision shall be made for securing and maintaining a reasonable temperature in each workroom, but no method shall be employed which results in the escape into the air of any workroom of any fume of such a character and to such an extent as to be likely to be injurious or offensive to persons employed therein"; and, further, that "in every workroom in which a substantial proportion of the work is done sitting and does not involve serious physical effort, a temperature of less than sixty degrees (Fahrenheit) shall not be deemed, after the first hour, to be a reasonable temperature while work is going on, and at least one thermometer shall be provided and maintained in a suitable position in every such workroom."

In addition, separate and special provision is made (section 55) for the regulation of temperature and the maintenance of a healthy atmosphere in laundries.

Seating Accommodation

19. There is no provision made in New Zealand legislation for seating accommodation in factories, and the facilities provided are seldom of a high standard. Where a job must be done sitting, it is highly desirable that a suitable seat should be available; an up-ended box is a poor substitute, and an ill-designed seat of inappropriate height, &c., and with no back-rest is not much better. But it is not only the person who of necessity works sitting who deserves a good seat. Any person who normally works standing should be given reasonable facilities for relaxing in a sitting posture when opportunity presents and work permits. Such periodic relaxation, if it be only at meal-times, conserves energy and promotes continued efficiency.

The British Factories Act, 1937, section 44, reads: "There shall be provided and maintained, for the use of all female workers whose work is done standing, suitable facilities for sitting, sufficient to enable them to take advantage of any opportunities for resting which may occur in the course of their employment."

Washing Facilities

20. Although few industrial workers in New Zealand are exposed in the course of their work to handling poisonous materials, many handle substances which irritate or damage the skin, and a still larger number are condemned to work which is hot, strenuous, or merely dirty. All deserve good washing facilities to enable them to wash after work, after using the toilet, and before eating. What comprises "good washing facilities"? I should suggest at least a washbasin or trough with a suitable glazed surface and kept clean, a supply of hot and cold water (or a constant supply of warm water) laid on, soap, and clean towels or other means of drying. But such facilities are sadly lacking in New Zealand factories. Washing facilities are scanty or wholly absent. When available, they are almost invariably of a low order—a poor pattern of basin or trough, ill-kept, with only cold water laid on,

and neither soap nor towels provided. Even in food-factories, in which New Zealand is so rich, it is unusual to find really high-class or even adequate facilities available, a condition of affairs which is surely an æsthetic if not a statutory offence. It is gratifying to find that the provision of shower-baths in factories is not uncommon but it is rare to find such facilities at all elaborate or kept in clean and inviting condition and with soap and towels provided. It is not thus that one can hope to educate workpeople, and especially the young, in cleanly habits. It is no use employers deploring the faulty habits of their workpeople unless at the same time they accept willingly their moral responsibilities as employers and make available all desirable amenities.

The law at present requires the provision of complete washing facilities, including a supply of hot water, nail-brushes, soap, and towels, only for those employed in spray-painting (the Spray-painting Regulations, 1940, Regulation 39) and certain lead processes (the Lead Process Regulations 1925, Regulation 3 (5), and the Accumulator (Lead Process) Regulations 1940, Regulation 13 (*f*)). Regulations (H. 125) made under the Health Act, 1920, to prevent the contamination of food during manufacture require also that "an adequate supply of hot and cold water shall be provided for use in . . . ablution-basins" for the use of persons employed in bakehouses, butchers' shops, and in the handling of milk, ice-cream, &c., but even here there is no obligation imposed upon the employer to provide and maintain a supply of soap and clean towels.

The British Factories Act, 1937, section 42 requires that in *all* factories "there shall be provided and maintained for the use of employed persons adequate and suitable facilities for washing which shall include soap and clean towels or other suitable means of cleaning or drying, and the facilities shall be conveniently accessible and shall be kept in a clean and orderly condition."

In addition, various codes of regulations and welfare orders of some years' standing require the provision of washing facilities and specify details required.

Feeding Arrangements

21. While it is usual to find in New Zealand factories that a dining-room is provided for the use of employees, it is uncommon to find the dining-room brightly lit, attractively furnished, and kept scrupulously clean, and only in rare cases is a substantial cooked meal made available. To be of maximum value a meal must be not only nutritious, but attractively served and eaten in comfort. Even quite good food is liable to be incompletely utilized and to cause digestive disturbance if it is hastily consumed in sordid surroundings. While opinions may vary as to the need for, or desirability of, a substantial cooked meal in the middle of a working shift, there can be no two opinions about the desirability of providing bright, clean, and comfortable quarters in which to enjoy a snack.

Legislation on this matter might with advantage be tightened up. While the Factories Act at present requires (section 25) the provision and equipping of a dining-room when more than six women and boys are employed, and the matter is referred to also in some of the awards made by the Court of Arbitration to certain classes of worker such as "concrete and pumice goods workers," there is no general requirement that dining-rooms shall even be kept clean; and in the award referred to above, while it is laid down that "suitable accommodation shall be provided for workers to take their meals and change their clothing," no provision is made to ensure that *separate* rooms for each purpose are made available.

The British Cement Works Welfare Order 1930 (S.R. and O., 1930, No. 94) may be taken as the British counterpart of the award quoted above. In this Order it is laid down (section 4) that "the occupier shall provide and maintain . . . suitable and adequate messroom which shall be furnished with (*a*) sufficient tables and chairs or benches, and (*b*) adequate means of warming food and boiling water. The messroom shall be placed under the charge of a responsible person and shall be kept clean."

The British Factories Act, like the New Zealand Act, does not require the universal provision of dining-rooms or canteens, but under a recent Order (the Factories (Canteens) Order 1943, No. 573) the Chief Inspector of Factories is empowered to require in any factory in which more than 250 persons are employed the provision of a canteen. Actually, almost all factories of the size referred to, and many smaller ones, are equipped with canteens.

IV. Safety of the Industrial Worker, and First Aid

Safety

22. The prevention of accidents in factories has received much attention of recent years in all highly industrialized countries, and a wealth of literature on this subject is now available. In Britain the State issues serial pamphlets on "How Accidents Happen," and various associations such as the Royal Society for the Prevention of Accidents issue illustrated cautionary placards and other literature, while bodies such as the Association of British Chemical Manufacturers publish periodic "safety summaries" on particular types of accident. Notwithstanding all this, it is rare to find in New Zealand factories effective poster displays or other literature, and safety committees are virtually unknown. The common attitude of occupiers of factories towards accident-prevention appears to be that it is the workers who should be more careful, and I have several times seen dangerous machines in use unguarded, the occupier naively explaining that, while he was satisfied that a machine was highly dangerous, he was awaiting official confirmation of his view by the Inspector of Machinery. Meantime it was up to the workpeople—including, on occasion, boys of fourteen—to handle the dangerous machine with all due caution!

23. It is unfortunate that the responsibility for accident-prevention in factories is divided between the Department of Labour and the Marine Department, since such division of responsibility makes for inefficiency. Responsibility for accident-prevention in the widest sense lies with the Factory Inspectors of the Department of Labour, whose duty it is, among other things, to check poor housekeeping, and draw attention to other potential causes of accidents such as the use of defective hand tools, machine tools, ladders, lifting gear, &c. But the Inspectors of Factories are given next to no opportunity of acquiring specialized knowledge of the sort required, and I am told have, indeed, a working arrangement whereby all machinery accidents are referred for technical investigation to the Marine Department. The Inspectors of Factories of the Department of Labour admittedly investigate all reported accidents, but the investigation may be largely from the aspect of wages or compensation, and may be carried out by a junior Inspector. The Inspectors of Machinery of the Marine Department, on the other hand, are qualified engineers who may reasonably be expected to have a sound knowledge of machinery of all sorts. They assume responsibility for advising on the guarding of all new machinery and all machines which have caused accidents. But safety engineering is a special subject,

and at times the man (or woman) with no engineering qualification but well trained in accident-prevention is the more scrupulously careful in assessing danger. This is not to decry either the competence or enthusiasm of the present Inspectors of Machinery; far from it: I would merely point out that both the Inspectors of Factories and the Inspectors of Machinery are at present denied effective all-round training in accident-prevention work, and while the one is more interested in the financial aspect of an accident and the other in the technical details, neither may have any intimate knowledge of the connections between lighting and accidents, between age and accidents, between time of day and time of occurrence, or of the many other factors, including the psychological, which have a bearing on the incidence of accidents.

24. My impression, in brief, is that insufficient attention is paid to accident-prevention in New Zealand, that systematic training of Inspectors could be improved, and that education by pamphlet and poster is neglected. In the factories, house-keeping is frequently poor; training in accident-prevention, and safety committees, are virtually non-existent; training of new, and maybe youthful, employees on dangerous machines is cursory; the provision of protective footwear is uncommon; and too much reliance is placed on the provision of other safeguards which require for their operation the intelligent co-operation of the workman. Many, indeed most, employers still continue to reiterate the doleful tale that "the men won't co-operate," having never accepted the melancholy truth that, where safe working is concerned, until the employer has done almost everything, the workman can do almost nothing, or digested the axiom that a precautionary measure which depends for its success on the full co-operation of the workman is almost bound to fail. What is needed to prevent eye injuries from flying particles is not goggles, but a fixed screen to prevent the particles flying. Welding operations require screening not the provision of goggles, to protect persons in the vicinity; and splash-guards afford better protection than aprons. Good ventilation, both general and local, is a surer preventive of gassing accidents, say, in a retort house, than any respirator, and thermostatic temperature control is more effective than endless warnings against overheating.

First Aid

25. The standards of first aid and of first-aid equipment in New Zealand factories are low, and even where reasonably good equipment is provided and a person trained in first aid is available it is uncommon to find a suitably placed "first-aid post" where washing facilities, &c., are available, although in some of the larger factories ambulance-rooms are now provided. First-aid equipment, when there is any, consists usually of cotton-wool, perhaps some dirty, much-handled boracic lint, a bottle of antiseptic of some sort, and a stray bandage, the whole contained in a dirty box, clothes-locker, or cupboard, probably along with a teapot or perhaps a pair of working-boots. Individual sealed sterile dressings are unknown, and I have more than once seen wounds dressed in factories where the only materials available were far from aseptic. This is all the more surprising when one considers how the paramount importance of good first-aid has been stressed over and over again during the war years. There is also a tendency to refuse first-aid treatment at work for wounds or injuries sustained elsewhere than at work, and this applies even in the largest engineering works in the country. It is not surprising, therefore, that much working-time is lost unnecessarily as a result of attending at hospital or doctor's rooms for the treatment of minor injuries, or for sepsis, the result of neglecting such injuries. And there is little record kept of such lost time, except for purposes of wage-regulation. Record-keeping on health matters is as much neglected in large factories as in small, and even where there is medical supervision record-keeping is faulty. Frequently no record at all is kept of first-aid rendered. (This matter is referred to further in para. 39.)

26. This is not the place in which to enter into details regarding appropriate types of first aid, but the prevalence of eye injuries and the extent to which these are ill-treated is worthy of special comment. As noted above, it is unusual to find that any available first-aid equipment has been placed specifically in charge of a person well trained in first aid, but there is generally available some one who, although without special qualification, accepts responsibility. Such a person may do much good work, but may be an out-and-out menace where eye injuries are concerned. At an engineering-works, for example, I found that one man, although quite untrained, assumed responsibility for rendering first aid. On my inquiring as to his treatment of eye cases, I found that he very modestly referred all such to a fellow-worker (equally untrained) "who specialized in that line." The "specialist" operated with a dirty match-stick which he kept handy, stuck in the electric-light flex above his head. At another similar factory the weapon used was a sharpened razor handle. It is not surprising that the average weekly number of industrial eye accidents attending hospital in the City of Auckland was found on inquiry to be in the region of 40.

27. The law on this matter is very weak. Regulation 21 of the Factories Consolidating Regulations 1937 reads: "The Inspector may require the occupier of any factory to provide such first-aid appliances for use in case of accident as he considers necessary, having regard to the number of workers employed and to the nature of the industry." Is it fair to ask an Inspector, himself untrained in first aid, to assess the needs of any particular factory? In some of the awards made by the Court of Arbitration—*e.g.*, the New Zealand Timber Workers' award—there is further reference to first aid, but here also the specification is loosely phrased and ineffective. In the award referred to it is laid down that "an approved first-aid medical outfit shall be provided and maintained"—but "approved" is not defined.

The law on this subject in Britain is much more exacting. Section 45 of the Factories Act, 1937, which applies to all factories, reads:—

"(i) There shall be provided and maintained so as to be readily accessible a first-aid box or cupboard of the *prescribed standard*, and where more than one hundred and fifty persons are employed an additional box or cupboard for every additional one hundred and fifty persons.

"(ii) Nothing except appliances or requisites for first-aid shall be kept in a first-aid box or cupboard.

"(iii) Each first-aid box or cupboard shall be placed under the charge of a responsible person who shall, in the case of a factory where more than fifty persons are employed, be *trained in first-aid treatment*, and the person in charge shall always be readily available during working hours. A notice shall be affixed in every workroom stating the name of the person in charge of the first-aid box or cupboard provided in respect of that room."

It should be noted, too, that "prescribed standard" is meticulously defined in the First Aid in Factories Order 1938 (S.R. and O., 1938, No. 486), where three standards are laid down for factories of various sizes up to those employing 150 or more persons. In all cases the boxes provided must contain a prescribed number of *sterile* dressings of assorted sizes.

V. Child Labour and Juvenile Employment

Child Labour

28. I have been surprised to find children under school leaving age working full-time in various factories during school vacations and, in isolated cases, during school terms. Children of thirteen, and even twelve, can be seen working whole-time—and sometimes overtime—in factories which in many cases are very ill-kept and in some of which highly poisonous chemicals or dangerous machinery are in use. Such employment is generally illegal, but during the war years at least has apparently been condoned by Inspectors of Factories, and this presumably accounts for the nonchalance with which employers admit during an inspection that they have such young persons in their employment. There is still nothing to prevent the whole-time employment of a child of thirteen in any factory during school vacations. All that is needed to legalize such employment is an "authorization" from an Inspector of Factories, and such authorization is not lightly withheld—if, indeed, any application is made. The position regarding employment in industry during school terms of children under the age of fourteen is somewhat different. The most recent legislation on this subject, the Education (School Age) Regulations 1943 (No. 202) still makes provision for the issue to parents of certificates exempting certain children under school-leaving age from the obligation to be enrolled as pupils at any school. Any child so exempted may, if he or she is thirteen years of age or more, find whole-time employment from then onwards in a factory—*i.e.*, for up to forty-four hours per week in some cases—provided only that the usual authorization is granted by an Inspector of Factories. Moreover, once a child of thirteen is legally taken into employment in a factory, the employer may under existing legislation be granted permission to work that child for periods of overtime amounting to three hours in any one day and twelve hours in any week. *It is still possible, therefore, for a child of thirteen* to be legally employed in a factory under very poor conditions for periods up to eleven hours per day (excluding meal-times) and for fifty-six hours per week.* While such legal employment is bad enough as it affects the child who has left school for good, it is even more to be deplored that departmental practice has tolerated (at least during the war years), and public opinion apparently approves, the whole-time employment of small children of twelve and thirteen years of age during their vacations from school—vacations granted because they are thought to be necessary on grounds of health.

The remedy lies not in tightening still further the restrictions relating to the school-leaving age, but in an amendment of the Factories Act prohibiting the employment in factories under any circumstances of children under the normal school-leaving age.

In Britain restrictive legislation prohibiting the employment of children under fourteen in factories under any circumstances whatsoever has for many years been rigidly enforced (see the Education Act, 1918 (8 and 9 Geo. 5, c. 39, section 14), the Employment of Women, Young Persons, and Children Act, 1920 (10 and 11 Geo. 5, c. 65, section 1 (1)), and the Factories Act, 1937, section 143.

Juvenile Employment

"A boy or girl under sixteen years of age shall not be employed in any factory unless the occupier holds from the Inspector [of Factories] a certificate of fitness relating to the boy or girl."—New Zealand Factories Act, 1921–22, section 28 (*a*).

29. The first thing which strikes the observer here is the fact that the onus of granting a certificate of fitness is thrust upon a non-medical Inspector. There is a prescribed form for this certificate—form F. 10 (Factories Consolidating Regulations 1937, Regulation 24 (x) and Second Schedule—which restricts the Inspector to certifying that he is satisfied that a boy or girl is "fit for employment in the factory of ....., in the trade of ....., or *in any other factory in the same line of trade.*" That is, to take an extreme case, an Inspector in, say, Wellington may grant a certificate of fitness which will enable the boy (or girl) concerned to be legally employed on transfer in the firm's factory in, say, Auckland—*i.e.*, in a factory which the Inspector granting the certificate *may never have seen.* No statutory form exists in which an Inspector may certify that he is *not* satisfied as to the fitness of any given boy or girl. No official record is kept, therefore, of such refusals—if any—to grant a certificate of fitness. This unfortunately makes it impossible to survey the reasons advanced—again if any—by Inspectors for refusing to pass boys or girls as "fit for employment." Is it to be wondered at that Inspectors tend to treat the granting of a certificate of fitness as a mere formality? If there are no refusals to grant certificates, and certificates are issued free in all cases, what is gained by this practice?

In Great Britain similar certificates of fitness are called for and granted in respect of young persons under the age of sixteen, but with very great differences of procedure. Certificates there are granted—

(*a*) Only by the "examining surgeon" in person, who is statutorily appointed for the purpose.
(*b*) Only in respect of one factory, or, rarely, more than one factory in the occupation of the same occupier and in the same examining surgeon's district.
(*c*) Only after detailed medical examination—which, when more than three young persons under sixteen are employed, must be carried out *at the factory concerned.*
(*d*) Only by entry in the Factory Register.
(*e*) Subject to conditions as respects the nature of the work in which the young person concerned is to be employed.
(*f*) Subject, if the examining surgeon thinks fit, to a condition that the young person shall be re-examined after an interval specified in the certificate.

Further, every local education authority must arrange to furnish an examining surgeon on request with such particulars of a young person's school medical record, &c., as he may require to carry out his duties effectively (see British Factories Act, 1937, section 99, and the Young Persons (Certificate of Fitness) Rules 1938, (S.R. and O., 1938, No. 535)).

THE MAIN PROBLEMS

30. Briefly, I have formed the opinion that there is a marked need in New Zealand industry for both a higher hygienic and a higher aesthetic standard. The problem in general is how best to secure for the industrial worker healthy, safe, comfortable, and congenial working-conditions. Only by such attention to environmental factors can we hope to lay a sure foundation for future health, happiness, and efficiency. But the old saw, *mens sana in corpore sano*, still has a meaning: the body itself is part of the environment of the mind, and the prime requisite is a healthy body. What is needed, then, is a

* The Factories Act, 1921–22, sections 27 (*a*) and 29 (*f*), as amended by the Statutes Amendment Act, 1944, section 23 (i) and (ii), now prohibits the employment in a factory at any time of a boy or girl under the age of fourteen.—J. M. D.

health service for industry, a service which will be educative as well as administrative, and which will include in its ambit both personal health and environmental hygiene. The essential needs mentioned above—higher hygienic and higher æsthetic standards throughout—are not likely to be satisfied until there is made available as part of a health service a sufficient number of suitably trained hygienists who combine with a sound knowledge of their job an appreciation of the special problems of industry and a measure of missionary fervour. I consider that the most pressing need is better education of employers, managers, foremen, charge hands, and all others responsible for the health, safety, and welfare of the industrial worker—education first and foremost in the elements of hygiene, good housekeeping, and safe working. In my opinion, the work which most urgently requires doing, while of a specialized character, is not beyond the competence of a team of lay workers well trained in sanitary science as applied to industry, and guided by a medical man who himself combines with a sound knowledge of hygiene an interest in industry and a healthy curiosity as to how the other fellow earns his living. Admittedly some special training and experience are necessary for both the medical and lay personnel of such a health service—experience of industry in all its phases, training in industrial toxicology and accident-prevention, and at least a bowing acquaintance with the allied problems of industrial psychology and industrial sociology—but the care of the industrial worker at work requires as a prerequisite and more than anything else the intelligent application to industry of the broad principles of social and preventive medicine.

SUBSIDIARY AND RELATED PROBLEMS

31. The problems which confront those who assume responsibility on behalf of the State for the health, safety, and welfare of the industrial worker at work may be conveniently classed in four groups.

(*a*) Problems relating directly to the health of the individual and to environmental hygiene, physiology, and toxicology—*i.e.*, problems connected with individual health and with cleanliness of workplaces, avoidance of pathological strains and stresses and of contact with dangerous, noxious, or offensive materials, &c. These are essentially problems requiring for their elucidation and solution guidance which can accrue only from sound medical knowledge and experience of industry.

(*b*) Problems concerned with the nature of the work (as seen by the worker), prescribed modes of working, and hours of employment, &c., in so far as these attract unconsciously the behaviour and therefore the efficiency of the worker. This particular field, "the study of the conduct of those who exchange the work of their hands and brains for the means to live," is the main sphere of activity of the industrial psychologist.

(*c*) Problems which are essentially matters of conscious human relationships—the relation of the worker to his fellow-workers, foreman, employer, &c. This is the sphere of the industrial sociologist.

(*d*) Problems of accident-prevention. These were at one time regarded vaguely as problems to be solved only by those with special knowledge of engineering, but a very cursory examination of accident statistics shows that, of all lost-time accidents occurring in factories, only a very small proportion—usually less than one-fifth—are directly due to machinery, and the British system of making accident-prevention in industry the concern of the District Inspectors of Factories, only a few of whom are engineers, works well.

32. Of the above four groups of problems, all but the first can safely be left to suitably trained non-medical men and women, but, at the same time, it is worthy of emphasis that a medical background helps to give its possessor a more lucid insight into many aspects of all the others. But problems of conduct—groups (*b*) and (*c*) above—are matters having as a rule no immediate and direct bearing on the health, safety, and welfare of the industrial worker. The vagaries of human conduct are reflected more clearly in output than in health, except, of course, where a particular course of action results in an accident. As such these problems are not properly within the province of an industrial hygienist. Accident-prevention, on the other hand, is so linked up with health and hygiene that it can hardly be regarded as a separate subject. A gassing "accident," for example—*i.e.*, a sudden occurrence—is as much a matter of injury to health as slow injury by gassing over a longer period. Supervision on behalf of the State of the health, safety, and welfare of the industrial worker at work would appear, therefore, to be best undertaken by one team of specialist Inspector-Teachers, guided and advised by a skilled medical industrial hygienist. Such a team would do much of its work in a field seldom trodden by other persons interested in the public health, and so could, up to a point, function independently of other health services. This has been the position in Britain for nearly half a century, and the system has worked well. Nevertheless, there is much to be said in favour of a close integration of all health services in one Department, and this is particularly the case in a country such as New Zealand, where the population is small and the safeguarding of the public health has remained largely a function of Central Government. It is to be remembered, also, that the modern trend is towards the immediate supervision of the health and welfare of the industrial worker at work by a nurse or part-time works medical officer appointed and paid by the employer, and both will the more readily maintain a close liaison on health matters with the Department of Health than with, say, the Department of Labour or the Marine Department.

THE DEVELOPMENT OF THE SYSTEM OF CONTROL

33. While a combination of restrictive legislation and organized labour opposition has long since abolished for the industrialist the purely selfish enjoyment of prosperity, it still seems at times as if he were determined not to see the evils around him. As noted above, there is a need for higher hygienic and æsthetic standards in factories throughout New Zealand. One has only to remember that the average factory worker spends about half of his waking hours in the factory to realize that industrial hygiene is an important component of public health, and when one recalls the great variety of harmful materials to which the industrial worker may be exposed, sometimes unwittingly, in the course of his work, the importance of industrial hygiene is even more obvious. Industrialists have realized more clearly during the war years the weight of the burden placed on industry by absenteeism due to

sickness and accident, but while something has been achieved by industry in the way of accident-prevention, little has been attempted so far in the way of sickness-prevention, and the time is ripe to take stock of the position. Both the employer and the State have obligations in the matter of the health of the industrial worker, but, on the other hand, he himself has also a part to play, and it is only by the active co-operation of all three that the best results can be achieved.

I. The Responsibility of the Employer

34. Industry can help by providing good working-conditions; by contributing a measure of medical supervision at work so as to ensure a really comprehensive care of the health of the workman, and an equally comprehensive survey of the position when he is ill; and by assisting in the training of young persons.

Factory Hygiene

35. The employer should recognize the advantages which accrue from well-built, adequately lighted, and freely ventilated factories kept comfortably warm, the benefits of good housekeeping, and the need for more cleanliness. More attention should be devoted than has been the case in the past to the minor amenities which mean so much to the workpeople, and which contribute not only to their well-being but also to their efficiency—cloakrooms, dining-rooms, and washing and recreational facilities. Good seating, too, is no mere philanthropy: it pays. All of these matters, in fact, affect production; but, quite apart from this, the astute employer will realize that it pays to attract and retain the best type of worker, to train his workpeople, especially the young, in habits of orderliness, tidiness, and safe working, and to keep his workpeople as fit as possible.

Medical Supervision

36. Medical supervision in industry means a great deal more than a glorified casualty service. It should imply, as well as the organization of a sound first-aid service, the close supervisin of the health of the individual worker at work, careful attention to his environment with control of specific and other health hazards, health education amongst employees, and an acceptable liaison between the factory and outside health services. Industry has at all times a moral obligation to employ the partly fit as well as the fully fit, and skilled medical help is required not only to guide the rehabilitation of ex-servicemen after war, but to ensure at all times that the new entrant to industry is employed only within, but at the same time up to, the limits of his capacity. It is not only the large firm which requires, or can afford, medical supervision. The need is even greater in the case of the small firm, and it is not going too far to say that all firms, however small, should try to provide some measure of medical supervision, even if it were no more than a quarterly visit from a medical man with some knowledge of industrial organization and special experience in industrial medicine and hygiene. But the medical man must have that knowledge and experience which can be gained only from a close and intelligent study of actual working-conditions. To have a doctor "on call" is not enough. What is wanted is supervision of the supposedly fit workman at work, and of the conditions of work.

Industrial Nursing

37. Industry offers an absorbing career to the well-trained nurse with experience of public health work. Where there is a sufficient number of employees to warrant full-time employment, a nurse may be able to do a great deal more good than a part-time doctor. This is particularly the case where many women are employed or where the majority of the employees are women. Elsewhere and in smaller factories suitably trained visiting nurses might usefully be employed.

First Aid

38. There is urgent need for an improvement in the standard of first aid rendered in factories, and I should suggest that the provision of first-aid outfits of a prescribed standard be made compulsory in all factories, however small. It would be an advantage, also, if such first-aid appliances were entrusted only to responsible persons or, better still, in the case of the larger factories, to persons trained in first-aid treatment.

Records

39. It is a great pity that industry does not keep better sickness and accident records. Records should be kept as nearly as possible on a uniform basis to enable comparison to be made as between one period and another, one factory and another, and one industry and another. Proper records of time lost through sickness and accident, and of the kinds of sickness and accident incurred, are valuable in helping managements, workpeople, and Inspectors alike to spot unhealthy or dangerous processes and deal with the causes. Health records should consist of, at least—

(*a*) A daily record of every first-aid treatment rendered for accident or illness, with details of the treatment given.

(*b*) Statistical records of sickness absence. These should form the basis of any research undertaken to determine the nature and extent of any local causes of ill health. In addition, where there is a medical officer there should be kept—

(*c*) Records of medical examinations and individual case histories. These personal records should, of course, be treated as confidential, as between doctor and patient. There can be no argument about that; but a medical officer may, of course, provide information from them, on general lines, to the management.

40. With the decay of the apprenticeship system only a minority of young persons leaving school take up work requiring specialized and prolonged training. The majority are snapped up by industry for relatively non-skilled jobs. Their hours of work are limited by the Factories Act, and there are certain prohibitions as to the nature of the work which they may do. But what of their continued education, their health, and their general welfare? Here there is an unfortunate gap in the social services which the employer can help to bridge. The boy of fourteen becomes overnight a wage-earner. He puts aside childish things, and tends to arrogate to himself forthwith an independence and responsibility which, while at times amusing, carries its own dangers. He becomes resentful of authority, at least of the type which he associates with home and school, and likes to think that he has at last his

destiny in his own hands. At this critical phase of his career the thoughtful employer can do much to help him. It is useless to deny that a reasonable amount of work *under satisfactory conditions* is as beneficial for young persons as for adults. Work generates a feeling of responsibility and enhanced self-esteem, and the enthusiastic activity of the healthy youngster at work is indeed a pleasing sight, but the work must be suitable and the conditions satisfactory if the young person is to benefit. The employer has a moral responsibility in this matter. He ought to do what he can to ensure the health, welfare, and happiness of the young person, as well as his training in personal hygiene, manual dexterity, and safe working.

I recommend that this matter be given more careful and widespread attention.

Works Councils

41. As noted in para. 16, cases have been noted where works councils take an interest in health matters, but such cases are few. The formation of works councils should be encouraged, but it must constantly be borne in mind that to be wholly successful such a council requires a skilfully drawn constitution, a wise and firm chairman, and sober-headed members wisely informed regarding the interests they set out to serve.

Self-inspection and Accident-prevention

42. By this is meant the routine inspection of a factory by one of the firm's employees—not of managerial grade—who is encouraged to specialize in accident-prevention and given facilities for doing so. Such self-inspection by a "safety officer" is a valuable method of control at present neglected.

II. The Responsibility of the State

43. The State can best co-operate with the employer and the workpeople by amending as necessary existing preventive legislation, and supplementing this with the creation of suitable educational facilities for those interested in industrial health, hygiene, and accident-prevention; by providing for skilled inspection of factories and the training of Inspectors; and by itself undertaking education in health and safety matters and encouraging research. In planning a health service for industry it would, in my opinion, be well if the State restricted its activities to planning a framework such as the above within which a measure of individuality can flourish. The State must itself accept responsibility for inspection and control, but it need not, and should not, limit individual experiment and effort in the way of medical and nursing supervision, &c. Rather should it offer industry what inducement and encouragement it can to provide its own medical service. The idea of an industrial health service is still new in New Zealand, and now is the time to link it up firmly, but not too rigidly, with existing health services.

Legislation

44. I am of the opinion that industrial legislation in New Zealand, including the various awards made by the Court of Arbitration, has grown to such an extent that some codification and simplification is now called for, and that there is a need also for a general tightening up of existing restrictions and the adoption of new standards more in keeping with what is best in current practice elsewhere. While, as would be expected, the better firms have gone beyond the bare requirements of the Factories Act, 1921–22, and existing special awards made by the Court of Arbitration, and shown thus what is both practicable and profitable, others either conform only to the letter of the law and ignore the spirit or frankly try to evade their statutory obligations.

I suggest that in future much more attention be given to legislation affecting the health and welfare of the individual worker; that no proposed award should be submitted to the Court until it has been skilfully drafted after careful checking by a competent industrial hygienist; and that much that is at present included in individual awards should be applied to all industries by means of an amended Factories Act.

The Young Person in Industry

45. *Children.*—The young person in industry has been a special problem ever since the end of the eighteenth century, when spinning machinery which could be operated by children was invented, but during the present century a further awakening of the public conscience has resulted in a succession of restrictive enactments designed to keep children out of industry for as long as possible. This desire was focused sharply at general conferences of the International Labour Organization of the League of Nations at Washington on 28th November, 1919, and at Genoa on 9th July, 1920, when certain conventions were adopted. One of these fixed the minimum age for the admission of children to industrial employment (as distinct from commerce and agriculture) at fourteen. Great Britain immediately passed an Act to give effect to these and other conventions—the Employment of Women, Young Persons, and Children Act, 1920 (10 and 11 Geo. 5, c. 65). New Zealand did not ratify these conventions, and now, twenty-five years later, the employment of children under the age of fourteen in industry is still sanctioned.*

I suggest that children under the age of fourteen years should not be employed in any public or private industrial undertaking other than an undertaking in which only members of the same family are employed, and that no exceptions to this rule should be considered.

46. *Young Persons over Fourteen.*—In Great Britain the Factories Act of 1844 gave Factory Inspectors power to appoint certifying factory surgeons to grant the required certificates of age for young persons entering industry. For the last hundred years the practice, started then, of having young persons entering industry *medically* examined has continued. In New Zealand, as noted in para. 26, Inspectors of Factories are still obliged to grant certificates of fitness, which they cannot but regard as a tedious formality.

I suggest that New Zealand can no longer afford so to lag behind in a matter affecting closely the health and welfare of the skilled and unskilled worker of to-morrow.

* *Vide* footnote, page 27.

Education

47. Education is essentially a function of the State, and there is an increasing demand for the better education of those responsible for the health, welfare, and safety of the industrial worker as well as of the industrial worker himself. Such education can be disseminated effectively only by those with an intimate knowledge of their subjects, acquired as a result of personal experience of work in industry. And it must be education, not merely technical training. The recipients must be taught to think, and not merely fobbed off with glib phrases and much learning. Facile propaganda and an ultra-modern jargon have combined of recent years to popularize the newer approaches to industrial efficiency at the expense of the old. There is no short cut to success in this matter. The primary need is for education in hygiene and safe working and, following that, systematic instruction in industrial psychology. New Zealand is fortunate in having already functioning under an able Director a Division of Industrial Psychology, but instruction in psychology must be clearly recognized as a means, not an end, whereas improved hygiene, increased safety, and better welfare are surely worthy of being considered ends in themselves. These, then, should be the goal. The fact that these also pay dividends in the form of increased production is incidental but important.

Accident-prevention

48. The State has a responsibility in the matter of accident-prevention transcending mere inspection of machinery. Accident-prevention, including safety engineering, is a large subject requiring very special study, and particularly since there is not in New Zealand any voluntary association undertaking such work a responsibility devolves on the State to provide the necessary education for its Inspectors, for firms' safety officers, and for employers, while encouraging membership of overseas organizations issuing up-to-date cautionary literature, posters, &c.

49. Accidents occurring to young persons are particularly distressing. Most of them are avoidable. The British Factories Act, 1937, forbids the employment of young persons on certain dangerous machinery without special training, and prohibits the employment of a young person under the age of eighteen to "lift, carry, or move any load so heavy as to be likely to cause injury to him."

Similar restrictions might with advantage be introduced in New Zealand.

Inspection Standards

50. I consider that the standard of inspection in New Zealand factories is too low, having regard to the health, safety, and welfare of workers, and especially of the young. I attribute this defect to four main factors:—

(*a*) The present "career value" of factory inspection—*i.e.*, the standards adopted in recruitment, the attributes regarded as qualifying for promotion, salaries paid, and as a corollary to these, the status accorded in the inspectorate by industry and the State.

(*b*) The fact that men appointed as Inspectors of Factories to administer the Factories Act, 1921-22, automatically become at the same time Inspectors under the Industrial Conciliation and Arbitration Act, 1925, Inspectors under the Shops and Offices Act, 1921-22, Inspectors under the Share-milking Agreements Act, 1937, Inspectors under the Annual Holidays Act, 1944, Inspectors having duties under the Workers' Compensation Act, 1922, and may, in addition, be called upon for duties under the Apprentices Act, 1923, the Agricultural Workers Act, 1936, and the Fair Rents Act, 1936, &c.

(*c*) The fact that the very few women recruited as Inspectors of Factories are in practice restricted in their activities to factories in which mostly women are employed, and to women's affairs.

(*d*) Lack of training of Inspectors in industrial hygiene, industrial psychology, toxicology, and accident-prevention.

51. An Inspector of Factories to be fully efficient must not only have had a liberal education and special training; he must also know his subject and, equally important, he must appear to know it. He must have confidence. He must aspire to be regarded by industry as a consultant rather than a policeman, and must have the capacity to elicit from industry the appropriate response. But while he labours, as at present, under a multiplicity of extraneous duties the Inspector of Factories cannot attain that enviable state, and with the best will in the world he could not in any case specialize in such subjects as toxicology or psychology without a teacher. *I am unalterably convinced that so long as Factory Inspectors have any concern with wages and other financial rewards or monetary compensation paid to labour, just so long will their status remain what it is.* An Inspector of Health and Hygiene should have no concern with "dirt-money." His job is to ensure the provision of clean and healthy working-conditions, not extra payment for unsatisfactory conditions. What is needed, then, is (*a*) careful selection of Inspectors; (*b*) training of Inspectors by medical men, psychologists, engineers, chemists, &c.; and (*c*) opportunity for and inducement to Inspectors to specialize in factory inspection as a career.

Recruitment of Inspectors

52. With regard to recruitment of Inspectors I should suggest that, while retaining the possibility of entry from the ranks of cadets in the Department of Labour as at present, the career value of factory inspection be so stepped up as to attract (*a*) trained men and women Inspectors serving in other Departments of State—*e.g.*, Health Inspectors—and (*b*) mature men and women of graduate standing and with scientific training, and that this latter method of recruitment should be ultimately the method of choice. I recommend, further, that trained and experienced Inspectors as they become sufficiently senior should be given charge, as Factory Inspectors only, of large areas of the country in which at present numbers of insufficiently trained Inspectors of Awards carry out with difficulty their multitudinous duties, leaving these Inspectors to carry out the more efficiently their other duties.

53. The recruitment of suitable women as Factory Inspectors, but with no reduction in their favour of any new standards adopted for recruitment, would do much to raise the standard of hygiene and æsthetics, but it would be essential that such women should not be hampered in their work by any outworn convention which threatened to restrict their activities to "women's factories." There can be no doubt as to who would demand the higher standard of cleanliness—*e.g.*, in bakehouses and food-factories generally—a well-trained woman or the average male Inspector.

Training

54. If Factory Inspectors are to be recruited and trained on the lines suggested above—*i.e.*, if educated men and women are to have a chance of acquiring the special knowledge necessary for the adequate performance of their duties as Inspectors of Factories and advisers to industry—competent teachers will be required. Tuition in general hygiene, sanitary science, and safety engineering might well be given by experienced Inspectors of the Department of Health and the Marine Department. Effective training in industrial toxicology could be given only by an experienced medical specialist. Facilities for training in modern industrial psychology and personnel-management are already provided by the Industrial Psychology Division of the Department of Scientific and Industrial Research. Thus trained, Inspectors of Factories might with advantage take over some of the duties at present carried out in factories by the Inspectors of Machinery. All round training of the type visualized could readily be provided in the form of set courses of instruction held at a central Institute of Public Health, where, too, a small "industrial museum" housing models and other topical exhibits would be a helpful asset.

55. The Inspectors of Machinery in such a scheme would continue to be regarded as, and to act as, consulting engineers in the matter of safeguarding of machines, advising as to practicability and design. They would continue to carry out personally the more technical work involved in boiler inspections, &c., and might profitably undertake, as the country's experts, research in machine-guarding, &c. The prevention of machine accidents is of particular importance, because more often than not such accidents involve serious injury, and because in the future development of secondary industries in New Zealand it is inevitable that there will be a constant intake into industry of inexperienced workers, including women, boys, and girls who not only lack training for their job, but are not even accustomed to working in factories at all. This will render even more necessary special vigilance and close supervision if accidents are to be prevented as fully as possible.

Publicity

56. This is an essential factor in modern education and, properly used, an effective weapon with which to counter opposition and overcome the inertia of the reactionary. But despite the newer and more spectacular techniques, example is still more effective than precept. If the State wishes to raise the general standard of hygiene in industry it cannot afford for itself the luxury of resting comfortably on the standards of a quarter of a century ago, secure in the knowledge that since its factories are not open to inspection they cannot be criticized. Why are they not open for inspection? I consider that State factories, far from being inviolate in this respect, should be made subject to the Factories Act in order that the managements may no longer be denied the benefits of skilled inspection and dispassionate advice. State factories could then the more readily assume their rightful place as models of what factories should be like. In addition to serving as teaching models, they might well serve also as institutes for field research in machine-guarding, &c. Other means of education such as the press, radio talks, discussion groups, films, &c., could all be utilized. In this connection it is worthy of note that the Publicity Section of the Department of Health is already succeeding in making health "news," and that such an existing organization might well be expanded to include industrial health and hygiene.

Staffing

57. To carry out a scheme such as that outlined, some regrouping of staff, and probably a small increase of staff, would be necessary. If it were decided to create a factory inspectorate concerned solely with the health, welfare, and safety of the industrial worker in factories, and competent, as a specialist body, to advise as well as instruct industry in its obligations, a nucleus would first have to be formed from the present staff of the Department of Labour and, possibly, from the health inspectorate of the Department of Health. As has been indicated, considerable facilities already exist for the training of an inspectorate on the lines indicated, but I am of the opinion that a new factory inspectorate would not readily become fully efficient until it included on its own staff at least one qualified engineer, one man (or woman) with special knowledge of chemistry, and one medical industrial hygienist. These specialist Inspectors might at first be seconded from elsewhere for service as required with the factory inspectorate—*e.g.*, one or more experienced medical officers of the Department of Health might function, *inter alia*, as part-time Inspectors of Factories. It would be a very great advantage if there could be arranged the loan for a few years from, say, the British Factory and Welfare Department of a well-trained Inspector experienced in district work and with an engineering qualification. Such an Inspector, acting in a senior capacity, could be made largely responsible for the training of junior staff in the principles and practice of industrial hygiene and accident-prevention.

Administration

58. The purpose of a factory inspectorate is to ensure, as far as possible, the health, welfare, and safety of the factory worker. Bodily injury is but a special form of injury to health, and the ensuring of safety at work is but a branch of the maintenance of health. The health of the industrial worker is one and indivisible, and in a population the size of that of New Zealand all matters directly touching his health should be dealt with by one authority—viz., the Department of Health. Dual control leads to dereliction of duty, and the present cleavage of responsibility whereby the Department of Health has control of environmental health services outside the factory and the Department of Labour controls those inside should be abolished. For the better integration of health services inside and outside the factory it is desirable, as noted above, that tuition, exhibitions, and research should all be centralized at an Institute of Public Health functioning under the ægis of the Department of Health, on the lines already under consideration in other connections. I should suggest, therefore, that consideration be given to the formation within the Department of Health of a Division of Industrial Hygiene to include the factory inspectorate, relieved of all other duties and to administer those parts of a new Factories Act and such other legislation as is concerned only with the health, welfare, and safety of the industrial worker. Such a Division with its own Medical Director would automatically become the focal point

on which would be converged health problems affecting all industries, including those not at present handled by the Department of Labour, such as railways, mines, quarries, &c. A Division of Industrial Hygiene in any Department of State other than the Department of Health would lack the stimulus of close association with other public health activities and its development, as well as its prestige, would almost certainly suffer thereby.

III. The Responsibility of the Employed Person

59. The employed person can best play his part by taking a live interest in all matters which make for the promotion of better health; by using to best advantage, and not misusing, appliances and amenities provided for his health, welfare, and safety; by assuming some responsibility for training the young and the newcomer to industry in all that they should know of matters affecting their health and safety at work; and by taking an intelligent interest in the obligations imposed upon himself, as well as in those imposed upon his employer, by legislation enacted for his welfare.

SUMMARY OF RECOMMENDATIONS

General

1. An effort should be made to raise the general hygienic and æsthetic standards in factories throughout New Zealand to a level consonant with what is best in current practice elsewhere (paras. 6–12, 17–21, and 35); to provide greater safety from accidents (paras. 22 27 and 42); and to improve, in particular, the conditions under which young persons are employed in factories (paras. 28, 29, and 40).

The Responsibility of Industry

2. More care should be devoted to the planning of new factories in accordance with the process to be carried on (para. 5).

3. Employers should realize that a much higher standard of hygiene is called for in New Zealand factories than is at present maintained (paras. 6–12 and 35).

4. Arrangements should be made for the provision of medical and nursing supervision in factories (paras. 15, 36, and 37.)

5. A higher standard of first aid should be set, and good records kept of cases treated (paras. 25–27, 38, and 39).

6. Boys and girls employed in factories should receive special training at work, particularly before being employed to operate dangerous machinery (para. 40).

7. Industry should appoint its own "safety officers" to carry out "self-inspection" as a means of reducing the incidence of accidents and dangerous occurrences at work (paras. 24 and 42).

8. The benefits to be drived from joint works councils should be further explored (paras. 16 and 41).

The Responsibility of the State

9. Some simplification and codification of industrial legislation in New Zealand is called for (para. 44).

10. Present restrictions governing the employment in factories of boys and girls should be tightened up (paras. 28, 29, and 49.)

11. Prohibition of the employment in factories of children under the age of fourteen should be absolute, except in the single case of factories in which only members of the same family are employed (para. 45).

12. All young persons under the age of sixteen should be medically examined before being employed in factories (para. 46).

13. The State should provide better facilities than at present exist for the education of factory managements in matters touching industrial hygiene and the health of the industrial worker (paras. 47 and 48).

14. Higher standards of inspection are required in factories, and to facilitate the adoption of such there should be a curtailment of the present functions of Factory Inspectors. In particular, they should be relieved of all duties involving consideration of the monetary aspects of employment and compensation for injury (paras. 50 and 51).

15. There is need for an improved system of recruitment for Factory Inspectors (para. 52).

16. There should be an increase in the proportion of women Factory Inspectors, but with no reduction in their favour of the standards set for recruitment and no limitation of their opportunities of acquiring the same all-round experience as male Inspectors (para. 53.)

17. Existing facilities should be co-related, and others made available as required, for the training of Factory Inspectors by experts in industrial health and hygiene, industrial toxicology, industrial psychology, sociology, accident-prevention work, &c. (para. 54).

18. Inspectors of Factories, when suitably trained, should be made responsible for all routine work in connection with the guarding of machinery, but should continue to be guided in such matters by the Inspectors of Machinery (paras. 54 and 55).

19. The application of the Factories Act should be extended so as to include factories belonging to, or in the occupation of, the State (para. 56).

20. There should be included in the factory inspectorate at least one Inspector with special knowledge of engineering, one with special knowledge of chemistry, and one with a medical qualification (para. 57).

21. Consideration should be given to the formation within the Department of Health of a Division of Industrial Hygiene, which would take over from the Department of Labour responsibility for the care of the industrial worker at work in so far as his health, welfare, and safety—but not remuneration—are concerned. The factory inspectorate, renewed in the manner suggested above, should be attached to this Division (para. 58).

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