Report of the Director-General of Public Health, New South Wales.

1928.
(SECOND SESSION.)

LEGISLATIVE ASSEMBLY.
NEW SOUTH WALES.

REPORT

OF THE

DIRECTOR-GENERAL OF PUBLIC HEALTH

NEW SOUTH WALES,

FOR THE YEAR 1927.

Printed under No. 7 Report from Printing Committee, 8 November, 1928.

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OBITUARY.

Eustace William Ferguson.

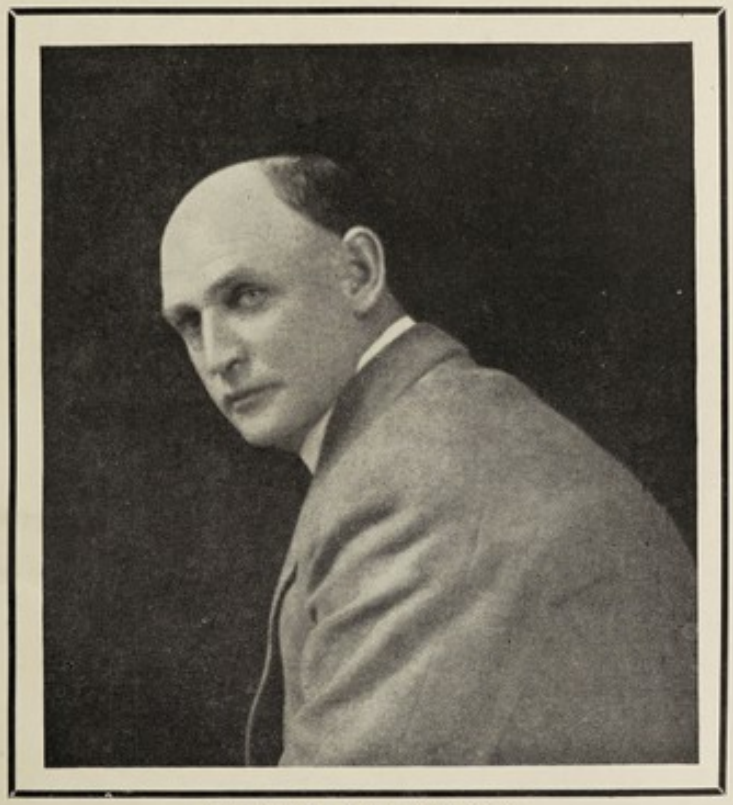
Eustace William Ferguson, the Principal Microbiologist of the Department of Public Health, died on the 18th July, 1927, after a prolonged and severe illness.

A son of the late Rev. John Ferguson, he was born at Invercargill, New Zealand, in 1884. He received his education in Sydney and graduated with honours in medicine at the Sydney University in 1908. During his course he won Professor Haswell's prize for Zoology, the Collie prize for Botany and Professor Anderson's prize for Logic. For two years he was a resident medical officer at Sydney Hospital, and during this period he contracted the renal lesion which afterwards caused his death. In 1911 he joined Dr. Walton Smith in private practice which, however, he relinquished in 1912 to take up duty as a medical officer at the Rydalmere Mental Hospital. In 1913 he was transferred to the staff of the Microbiological Laboratory, which at that time was under the control of Dr. J. B. Cleland.

In 1915, after being twice rejected, he was accepted for military service, and served with the Australian Imperial Forces in England, France and Palestine, where he attained the rank of major.

In England, while attached to Harefield Hospital he was charged with the detection of contacts during an outbreak of meningitis; in France, in addition to general medical work, he acted as a pathologist and dealt largely with wound infections; in Palestine he was in charge of the Anzac Field Laboratory, where his knowledge of entomology proved of great value in studying the problems of malaria and other tropical diseases.

He returned to Australia in 1919, and in 1920, on Dr. Cleland's acceptance of the Chair of Pathology at Adelaide University, Dr. Ferguson was appointed Principal Microbiologist, which position he held till his death.



The Late Dr. E. W. FERGUSON.

Though he knew his tenure of life would be short he determined to utilise as fully as possible the years of activity granted him, and this is reflected in his contributions to science.

Eustace Ferguson was a keen naturalist all his life and even during his student days his close-observation and careful, accurate work attracted the attention of entomologists of that time. His first contribution dealt with the Phaladusine weevils, a group which had long proved a stumbling block to systematic entomologists, and one which he monographed with eminent success. He later turned his attention to medical entomology, and besides becoming a recognised authority on the Diptera, also published work on fleas and ticks. His work on the Tabanides was as thorough as that on the Amycterides, and he was engaged on a similar revision of another difficult family, the Syrphidæ, at the time of his death.

He contributed largely to the Annual Report on pathology and bacteriology.

His ninety-seven published papers form a fitting monument to his industry and enthusiasm.

That his work was appreciated was shown by his election to various offices in a number of scientific societies in Australia, as well as by the high esteem in which he was held by scientists abroad. He was a member of the council of the Linnean Society of New South Wales from 1921, and president for the session 1926–27; member of the council of the Royal Zoological Society of New South Wales, of which he was president in 1922–23; associate member of the Australian National Research Council; member of the Great Barrier Reef Committee; member of the Royal Society of New South Wales, and Fellow of the Royal Society of Tropical Medicine.

He was a most lovable and kindly man, always sympathetic and considerate to his colleagues and all who worked with him. His uncomplaining attitude towards his lot was a revelation even to his most intimate friends, and all who knew him unite in offering their deepest sympathy to his wife and family.

Offices of the Director-General of Public Health, 93 Macquarie-street, Sydney.

Legislative Enactments.

The Minister of Public Health is charged with the administration of the Acts noted hereunder, execution of which is left to the Director-General of Public Health and the staff working under his control:—

Cattle Slaughtering and Diseased Animals and Meat Act, 1902.
Dairies Supervision Act, 1901.
Diseased Animals and Meat (Amendment) Act, 1910.
Food Preservation by Sulphur Dioxide Enabling Act, 1920.
Noxious Trades Act, 1902.
Private Hospitals Act, 1908.
Public Health Act, 1902.
Public Health (Amendment) Act, 1915.
Public Health (Amendment) Act, 1921
Public Health (Night-soil Removal) Act, 1902.
Pure Food Act, 1908.
Closed Cemeteries and Exhumation of Bodies for the purpose of re-interment, &c.

Divisions, Branches, and Institutions controlled by the Director-General of Public Health:—

Maternal and Baby Welfare.
Tuberculosis Division.
Industrial Hygiene.
Government Medical Officers for Sydney.
Medical Officers of Health, Metropolitan, Newcastle, and Broken Hill Districts
Microbiological Laboratories, Sydney and Broken Hill.
Chemical Laboratory
Pure Food Branch.
Dairies Supervision and Cattle Slaughtering Inspection Branch.
Epidemic and Sanitary Inspectorial Branches.
Executive and Clerical Staffs.
Publicity Branch.

State Hospitals and Homes, Convalescent Homes, and Sanatoria, including:—

Coast Hospital, Little Bay, and Prince of Wales Auxiliary (Randwick), for General and Infectious Cases.
Leper Lazaret.
David Berry (General) Hospital.
Montrose Maternity Hospital, Burwood.
Fernleigh Rest Home (Pre- and Post-Maternity), Ashfield.
Lady Edeline Hospital for Babies, "Greycliffe," Vaucluse.
Strickland Convalescent Home for Women, "Carrara," Rose Bay.
Denistone Convalescent Home, Eastwood.
Waterfall Sanatorium, Waterfall (for Men and Women), and Randwick Auxiliary (60 beds) (Men).
Rookwood State Hospital and Home (Men).
Liverpool State Hospital and Home (Men).
Newington State Hospital and Home (Women).

Parramatta Homes:—
(*a*) Macquarie-street Home for the Blind, and for Men suffering from Defective Sight and Senility.
(*b*) George-street Home for Aged and Infirm Men.

Members of the Board of Health.

Dick, Robert, M.B., Ch.M., D.P.H., Director-General of Public Health (President).

Paton, Robert Thomson, C.M.G., F.R.C.S., Edin., M.D. Brux., Member, Board of Health.

Robinson, Augustus Frederick	Member, Board of Health.
Purser, Cecil, M.B., Ch.M.	do do
Chairman, Chamber of Commerce (G. A. Parkes, Esq.)	do do
The Chief Civic Commissioner (E. P. Fleming, Esq.)	do do
Fegan, The Hon. J. L., to 30/9/1926; succeeded by Plunkett, J. G., from 1/10/1926	do do
Armstrong, Wm. George, M.B., D.P.H. ...	do do
Wall, The Hon. Frank Edgar, M.D., M.L.C.	do do
Maincke, Mrs. Euphemia Jean	do do

Head Office Staff.

Dick, Robert, M.B., Ch.M., D.P.H. ...	Director-General of Public Health.
Morris, E. S., M.D., Ch.M., D.P.H. ...	Senior Medical Officer of Health and Director of Maternal and Baby Welfare.
Purdy, John Smith, M.D., D.P.H. ...	Medical Officer of Health, Metropolitan Combined Districts.
Wallace, H. G., M.B., B.S., D.P.H. ...	Medical Officer of Health, Hunter River Districts.
Suckling, Frank Martin, M.B., D.P.H.	Assistant Medical Officer of Health.
Palmer, Arthur Aubrey, M.B., Ch.M. ...	Government Medical Officer for Sydney.
Gibbes, Alexander Edward, M.B., Ch.M.	Second do do
Mackay, Robert Mitchell, M.D. ...	Third do do
Tooth, Frederick, M.R.C.S., L.R.C.P....	Medical Officer.
Baret, Henri Victor David, B.A., M.B.	Director, Division of Tuberculosis.
Badham, Charles, B.Sc., M.B., Ch.M., D.P.H.	Medical Officer for Industrial Hygiene.
Neely, Thomas Henry	Secretary.
Kench, Arthur	Chief Inspector, Pure Food Act.
Blomfield, Thomas Valentine	Chief Dairy Inspector.
Cresswick, Ernest Albert	Chief Sanitary Inspector.
Potter, James Julius	Chief Clerk.
Watt, Cecil James	Accountant.
White, Adolphus George	Publicity Officer.
Wearne, Florence Stuart	Librarian.
Boyle, John James Valentine	Inspector of Hospitals and First Clerk.

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Section IV.

Report of the Director-General of Public Health to the Honorable the Minister of Public Health.

Sir,

I have the honor to furnish herewith my report for the year 1927. The activities of this branch of the Department of Public Health continue to expand year by year as will be readily seen by reference to the detailed statments of the work of the various sections of the branch which accompany this report.

The policy of the branch has been to sectionalise its principal activities into divisions under the immediate control of specialised officers, and already there have been constituted divisions of Maternal and Baby Welfare, Industrial Hygiene, Tuberculosis, Laboratories, Sanitation, and Pure Food. Steps are now being taken to set up a division dealing with venereal diseases. The formation of these additional divisions, which are necessary in order that these very important public health fields may be adequately covered, has brought prominently to the surface the absolute necessity which exists for the provision of increased accommodation for this branch of the Health Department. The building in which the branch is located was first occupied about the end of 1897, and at that time and for a number of years subsequently it contained sufficient accommodation to house adequately the various activities of the branch. Of recent years, however, with the great expansion of the work of the Department, with necessarily increased staffs consequent on the increased population of the State which it serves, there has come about such an overcrowded condition of the building that it is utterly impossible to house more staff with any degree of comfort or safety. Owing to this overcrowded condition it is necessary to rent at a cost of £300 per annum sufficient accommodation away from the head office to house the Sanitation, Pure Food and Dairy Inspection staffs, whilst the Division of Tuberculosis has to be accommodated in a portion of Richmond Terrace in the Domain. The separation of these sections from head office hampers the work, and is also inconvenient to members of the public who have business with the Department.

As it is proposed to increase the staff of the Maternal and Baby Welfare Division by appointing an Assistant Medical Officer and several supervising nurses, and as a division of Venereal Diseases with necessary staff is likely to be set up in the Department at no distant date, the provision of additional accommodation for this increased staff outside head office will have to be arranged for. It is becoming increasingly urgent that early steps be taken to provide proper accommodation in a suitable building for the whole of the staff of the branch and its various activities.

The action which was begun three years ago in the direction of providing a Medical Officer of Health for the Broken Hill district to carry out public health duties and to conduct a public health laboratory has now been brought into effect. Arrangements have been made whereby the departmental medical officer, who is also the medical officer of the Bureau of Medical Inspection, shall control the public health laboratory and, with the aid of an assistant medical officer, carry out the usual public health and school medical officer's duties in the Broken Hill district. This arrangement should prove both an economical and efficient method of providing for the public health needs of this important centre.

The Department has for many years past urged the desirability of arranging for the appointment of whole-time medical officers of health and the provision of a public health laboratory to serve groups of districts in the State. Two such whole-time appointments were made in 1898, following the passing of the Public Health Act, 1896, one officer being appointed to the Metropolitan area and the other to the Hunter River district. An interval of about thirty years has elapsed since those two first appointments were made. The recent appointment of a medical officer to the Broken Hill district makes the third appointment of its kind so far as this State is concerned. It is highly desirable that the arrangement which has been brought about at Broken Hill should be adopted in appropriate areas throughout the State.

In the Hunter River district the need of a properly equipped public health laboratory is keenly felt The various public health and hospitals authorities in that district are very anxious that such a laboratory should be made available, and have taken action in the direction of urging on the Minister that it be provided as early as possible and that it be controlled by officers on the staff of this Department. Plans have been prepared for such laboratory in a building proposed to be erected in connection with the Newcastle Hospital, and it is hoped that it will be possible to arrange for its establishment at no distant date.

Investigation of Public Health Problems Overseas.

During the year I had the very great privilege of receiving through the Federal Director of Health (Dr. J. H. L. Cumpston) an invitation from the International Health Board of the Rockefeller Foundation of the U.S.A. to visit, as a guest, that country in order to study various public health activities.

I left Sydney on 2nd July, 1927, and arrived at San Francisco on 21st July, 1927. Before my arrival in America the authorities of the Rockefeller Foundation had been advised by the Federal Health Department, Melbourne, of the various public health activities which I wished to observe, and on reaching San Francisco I received from them an itinerary setting out the various centres which were to be visited on the way across the continent to New York.

This section of the tour extended over the period 21st July to 19th August, 1927. The following eight days were occupied in New York, during which time I visited various institutions and associations dealing with health matters.

On 28th August, 1927, I left New York on a tour through several of the New England States, following an itinerary made out by the Foundation medical officers. This tour lasted ten days, and I returned to New York on 7th September, 1927, and left on the following day—8th September, 1927—on the final tour, following a schedule arranged by the Rockefeller officers. This tour traversed several of the Southern, Central,

and Eastern States. I returned to New York on 4th October, 1927. During the period 4th October to 12th October, 1927, further visits were made to various public health institutions in New York City and to the authorities of various associations dealing with public health and allied subjects, and on 13th October, 1927, I left New York for London, England.

The following cities were listed by the authorities of the Rockefeller Foundation as being suitable centres in which the various public health activities in which I was interested might be seen in operation. These centres were visited in the following order between the dates 21st July and 12th October, 1927 :—

San Francisco, Los Angeles, Chicago, Lansing, Ann Arbor, Detroit, Olean, Toronto (Canada), Syracuse, Albany, New York, Hartford, New Haven, Providence, Boston, Raleigh, Durham, Charlotte, Montgomery, Birmingham (Alabama), Indianola, Louisville (Kentucky), Berea, Cincinnati, Columbus (Ohio), Washington (D.C.), Baltimore, Philadelphia, New Jersey, New York.

In carrying out my investigations into State, county, or city activities, the usual procedure was to interview the Commissioner of the State Board of Health or the health commissioners for the county or city as the case may be; then the directors of the divisions or bureaux into which the work of the corresponding health department was divided were interviewed. From these various sources detailed information was obtained of the organisation and administration of the respective branches of that health department's activities and discussions took place on points of interest that arose. The different branches of the department were inspected, and visits were made to hospitals, clinics, laboratories, or other activities which were in operation in the particular centre being visited, and which it was considered would furnish useful information. Of the numerous publications issued by the various health departments, copies of those which prove of service were freely supplied to me.

The time allowed for visiting some of the centres was rather short and in consequence I was unable to make as full inquiries into some matters as I should have liked.

In addition to the programme set out in the schedules arranged by the Rockefeller Foundation authorities, I made use of the limited time available to visit some additional places and I inquired into various matters of public health interest which I considered might furnish useful information.

The period of my stay in the United States of America covered twelve weeks. The centres which were visited were spread over a very wide area and this necessitated considerable railway travel, amounting to several thousand miles.

I left New York on 13th October, 1927, for London and arrived there on 24th October, 1927. During the period 25th October to 9th December, 1927, my time and attention were almost wholly occupied on inquiries into various public health matters and in visiting various institutions dealing with health activities in London, Manchester, and Edinburgh. I also visited Berlin (Germany) and Amsterdam (Holland) for the same purpose.

A day or two after arrival in London I called at the Ministry of Health, Whitehall, and interviewed several of the principal medical officers on the staff and discussed with them various public health subjects. I also visited various institutions, clinics, &c., where activities in connection with several of these subjects were in operation. In Edinburgh and Manchester the general public health administration was inquired into and visits made to various clinics, &c.

My visit to Amsterdam (Holland) was primarily to inquire into the training of maternity nurses and in Berlin (Germany) I was more particularly interested in the measures for the control of venereal disease. I left London for Australia on 10th December, 1927, and arrived at Sydney on 19th January, 1928.

I wish to record my grateful thanks to the Rockefeller Foundation for the extremely valuable opportunity it afforded me to make this study tour of the U.S.A., as its guest. I feel sure that the fund of valuable first-hand information which I have been enabled to gain abroad (in the United States of America and elsewhere) will be of great advantage to the Department and to the State.

I should like to add that I received great courtesy and consideration from all the people in the United States with whom I came in contact and that everything possible was done by the Rockefeller Foundation and by the various health authorities whom I met to make my visit both instructive and pleasant.

Vital Statistics.

The review by the Government Statistician (Mr. T. Waites) of the Vital Statistics for 1927, for the whole State, will be found on p. 10.

It will be noted that the deaths from cancer continue to show steady increase year by year, and this applies also to deaths from heart disease. An interesting graph is appended showing the rise in the number of deaths from these two causes, and the steady decline in deaths from tuberculosis.

The epidemics of whooping cough and scarlet fever led to an increased number of deaths, much above the average. In the case of scarlet fever the fatality rate was higher during 1927 than it has been for many years past.

The number of deaths (335) resulting from motor accidents calls for remark.

Metropolitan District :—The vital statistics for the metropolis and the extra-metropolitan district are commented on by the medical officer of health (Dr. J. S. Purdy) in his report for the year (p. 118).

Hunter River District :—The vital statistics for Newcastle and the surrounding municipalities and shires which form the Hunter River Combined Sanitary districts are reviewed by Dr. H. G. Wallace, medical officer of health, on p. 141;

REPORTS OF SECTIONS.

Chemical Laboratory.

Milk Examinations.—The Government Analyst in his report (p. 14) points out that the value of the systematic inspection of the milk supply of the State is evidenced by the low percentage of adulterated milks found during the year. 14,103 samples were analysed, of which 423 (3 per cent.) contravened the requirements of the Pure Food Act. Of milks collected in the Metropolitan area, 2·6 per cent. were below standard; and in country districts 5·2 per cent.

A report on the testing of milk from 122 suburban dairies for tubercle bacilli and bacterial count is contained in the Microbiological Section (p. 197).

Foods other than Milk.—1,188 samples were examined, of which 32 per cent were adulterated (see list, p. 14). Dr. Cooksey points out the high percentage of adulterations is partly accounted for by the illegal dusting of meat with preservative powders, and use in sausages of excessive amounts of a permitted preservative. In all 570 samples of meat, including sausages, were obtained; 206 samples had been "dusted" with preservative, and prosecutions were undertaken in every case.

Investigational work undertaken in the Laboratory during the year comprised :—

(1) *Bread.*—Estimation of (*a*) specific gravity of crumb as a guide to quality ; (*b*) Determination of acidity (p. 17).

(2) *Tomato Sauce, &c.*—Determination of non-sugar organic tomato solids, etc. (p. 18).

(3) *Dried Fruits.*—Loss of sulphur dioxide during process of cooking (p. 19).

(4) Lead in urine: Electrolytic estimation of (p. 20).

Pure Food Act, 1908 (p. 21).

In the report of the Chief Inspector on the general administration of the Pure Food Act for 1927, particulars are given of the articles comprised in the 288 tons of assorted foodstuffs seized and destroyed during the year. The seizures included 162 tons of flour; 10 tons of fruit pulp; 13 tons of general groceries; 54 tons of vegetables; and 425 pieces of chipped crockery from restaurants.

Only for the vigilance exercised by officers of this branch considerable quantities of the deteriorated foods mentioned would be sold to the public.

Details of foods collected for analysis and the adulterants used are given in the report of the Government Analyst (p. 16).

The Pure Food Act has been in operation since 1910, and during that time fines to the value of £31,000 have been imposed for breaches of its provisions.

Abattoirs and Meat Inspection.

The necessity for improvement in the present system of meat inspection for the larger centres of population outside the Metropolitan, Newcastle and Broken Hill abattoir areas has been continuously urged by the Department. The Local Government Act makes provision for the establishment of abattoirs for municipalities and shires. Although several local authorities, *e.g.*, Orange, Casino, Maitland, Goulburn, have, at various times, considered the question of providing abattoirs for their districts, in no single instance so far has there been definite action taken in this connection. It would appear that one of the main difficulties in the way is the provision of the necessary capital for the construction of abattoirs. Some simple scheme appears to be needed whereby the necessary capital can be made available to local authorities for this purpose.

Sanitation (p. 26).

Investigational Visits to Country Towns.—A very important section of the Department's work is carried out by officers attached to the Chief Sanitary Inspector's Branch.

These officers make systematic inspections of country towns throughout the State to ascertain the efficiency or otherwise of the local administration of public health regulations and ordinances. Where any defect or laxity is found, recommendations are made for remedial action and reinspections are subsequently made to ascertain that measures necessary to safeguard the health of the district have been taken.

In extreme cases of neglect on the part of a local authority, the Board of Health has power to supersede it. In the thirty years the Public Health Act has been in operation, in only two instances has it been necessary for the Board to actually set aside the local administration.

The fall in the incidence of typhoid in this State from 3,302 cases and 387 deaths with a population of 1,323,130 in 1898, to the very low rate of 460 cases and 68 deaths with a nearly doubled population (2,402,884) in 1927, can be largely ascribed to the very thorough investigational work of this branch in rural districts.

"*Better Farming Train.*"—As an adjunct to its efforts for improvement of rural sanitation, the Department arranged with the Agricultural Department for provision of a health demonstration exhibit on the "Better Farming Train" inaugurated in March, 1927. A departmental officer was placed in charge of the exhibit, and special attention was devoted to septic tanks installations, sanitary fittings and appliances ; fly and mosquito destruction, &c. A section was also devoted to Infant Welfare, an experienced nurse being in charge of the work.

Theatres and Picture Halls.—The Chief Inspector reports that the 117 inspections and reinspection made during the year disclosed that noticeable improvements have been effected.

Investigational work carried on as to the efficiency of ventilating plant installations at some of the larger theatres (*vide* Annual Report for 1926, p. 49) was continued during the year, and a short report appears on p. 111.

PRIVATE HOSPITALS ACT, 1908 (p. 29).

The officer in charge of this Act (Dr. F. M. Suckling) reports that there were 609 licensed private hospitals in the State in 1927, a decrease of 28 compared with the previous year. Dr. Suckling points out that the decrease is due to some extent to the provisions of the Nurses Registration Act, which necessitated some uncertificated nurses (hitherto holding conditional licences) to relinquish their business as they were not registrable under the Nurses Registration Act.

The effects of the Nurses Registration Act on the administration of the Private Hospitals Act are discussed by Dr. Suckling. He points out that a certain amount of overlapping occurs in the duties cast upon midwifery nurses, and expresses the opinion that much of the administration of the two Acts, *e.g.*, inspection of hospitals, supervision of nurses, investigation into notifiable diseases common to both Acts, could be co-ordinated under a common staff. It is hoped that this will be arranged in the near future

Sepsis connected with pregnancies.—It is a requirement under the Private Hospitals Act that sepsis connected with pregnancy shall be reported. Dr. Suckling is of opinion that the 17 cases notified do not accurately represent the total cases of puerperal sepsis which may have occurred in private hospitals in 1927. As use of the term "septicæmia" may raise a doubt as to whether a case comes within the meaning of that term, an amendment of the regulation is under consideration.

Community Activities.—The practical interest taken by the Bush Nursing and the Country Women's Associations for establishment of hospitals in remote districts and for provision of country maternity hospitals is greatly appreciated by the Department.

GOVERNMENT MEDICAL OFFICERS FOR SYDNEY (p. 32).

Hospital Admission Depot.— Dr. Palmer reports that 18,115 persons were dealt with by the Depot staff in 1927, and sent for treatment to one of the Metropolitan hospitals, or to one or other of the State Hospitals and Homes.

Other medical examinations carried out at the depot included 302 candidates for admission to the public service; 758 applicants for the police force; and 4,682 young persons requiring medical certificates of fitness for factory employment; 102 probationary constables were re-examined after twelve months' service.

Medico-legal Work.—Work for the Coroner's Court comprised the external examination of 199 dead bodies, and the carrying out of 179 internal post-mortems. Evidence was given at 88 inquests. In several instances evidence had also to be given at the criminal courts.

The medical officers attached to the Branch are on duty at all hours, and are liable to be called upon at any time for expert evidence.

INFECTIOUS DISEASES (p. 50).

The outstanding features of the year were the very low incidence of typhoid fever and the occurence of an epidemic of scarlet fever.

Typhoid Fever cases numbered 460 and 68 deaths. This is the smallest number of cases recorded in this State, the year next lowest being 1925, when 533 cases and 80 deaths were notified.

The great progress made in the reduction of typhoid fever is shown by the tabulated return on p. 58, which gives the yearly return of cases and deaths and the progressive increase in population from 1898, when notification was first made compulsory. In that year when the population was only 1,323,130 there were 3,302 cases of typhoid fever and 387 deaths.

Scarlet fever was present in epidemic form during the year, 8,369 cases and 113 deaths being notified compared with 4,755 cases and 53 deaths in 1926. After five years of comparatively low incidence, the number of cases gradually increased from 1923 and the height of the epidemic was reached about September–October, 1927. The fatality rate from scarlet fever has increased during the last two years; in 1926 it was 1·1 per cent., and in 1927, 1·3 per cent., compared with an average of ·78 per cent. for the preceding five years.

During the year the Commonwealth Serum Laboratories supplied the Department with a limited amount of material for testing purposes in scarlet fever cases.

The material consisted of serum for the Schultz Charlton test, concentrated antitoxin for treatment, and two samples of toxin for Dick testing. The Principal Microbiologist (Dr. E. L. Morgan) reports on the use of this material on p. 194 Only a limited amount of concentrated antitoxin for treatment was available and this was used in severe cases at the Coast Hospital. The Medical Superintendent (Dr. R. J. Millard) considered the serum of decided value, but is desirous of obtaining further supplies before giving a definite opinion as to its efficacy.

The *Schultz Charlton* test was applied to about 50 patients at the Coast Hospital, and Dr Keith Kirkland found it of considerable value in diagnosis.

Dick immunising tests were carried out at Newcastle, the Royal Prince Alfred and Lewisham Hospitals, and tended to show that by this process outbreaks of scarlet fever can be quickly controlled in restricted communities such as hospitals or institutions. It is not likely, however, to be extensively advocated or used for public immunisation owing to the short duration of the protection which it confers.

Diphtheria.—There was continued prevalence of diphtheria throughout the year, 4,059 cases and 179 deaths being notified, compared with 3,579 cases and 147 deaths in 1926. The fatality rate from this disease has remained comparatively low, having been 4·4 per cent. in 1926 and 4·1 per cent. in 1927.

Bundaberg Tragedy.—The greatly to be regretted calamity associated with the immunisation campaign against diphtheria which was being carried on in Bundaberg, Queensland, has resulted in the cessation of the employment of this method of prevention for the time being. In New South Wales the Department had proposed to embark upon an active campaign in this connection, having become equipped with suitable films and other propaganda material. The lamentable results following the accident at Bundaberg has, however, made it impossible to proceed along these lines for the present, and the steadily increasing amount of work carried out by the Department in this field has been allowed to lapse.

It is hoped that the sad happening at Bundaberg will not result in the abandonment of the use of this proved method of prevention in the case of diphtheria. It should be mentioned that in Great Britain this form of preventive work is becoming widely used without any ill effects; for example, amongst a total of 53,000 persons of all ages immunised recently no known serious harmful effect—still less a fatality—resulted, though a total of at least 300,000 injections had been given. Similar harmless results have been experienced both in the United States and Canada, where this method of immunisation is carried out very extensively.

Encephalitis Lethargica was proclaimed as an infectious disease in April, 1926. Three cases only were notified in 1927; but, as the Government Statistician's returns show 27 deaths under this heading, an investigation is being made in reference to non-notification of the cases.

For conformity with the requirements of the International Sanitary Convention of 1926, *cholera typhus fever*, and *yellow fever* have been added to the list of notifiable diseases. All the Australian States are now uniform in this regard.

Seasonal Prevalence of House Flies (p. 205).

It was considered desirable that accurate information concerning the seasonal variation in numbers of house flies should be available for the purpose of ascertaining whether there is any relation between the prevalence of these insects and certain bowel diseases, notably gastro-enteritis of children.

An investigation was undertaken by Dr. I. M. Mackerras into the prevalence of house flies in the Sydney district, and during twelve months a weekly record was kept in ten widely separated areas surrounding Sydney. During the period 38,654 house flies were counted.

Graphs have been constructed showing the seasonal variation in the flies in each of the areas and also for the Sydney district as a whole.

Tuberculosis Division (p. 64).

In reviewing the problem of tuberculosis in New South Wales, Dr. Baret refers to the yearly loss of 1,100 lives from this infectious disease—a loss greater than is due to all the other epidemic, endemic, and infectious diseases combined.

Although the death-rate from tuberculosis continues to fall steadily year by year, it is still a very real menace among the killing diseases, claiming, as it so usually does, its victims at those age periods which are the most useful and productive.

The preventive measures decided upon by the recently appointed Board of Control are set out on p. 53. The co-ordination of the work under one body has permitted of classification of cases and utilisation of existing sanatorium and hospital accommodation to the best advantage.

The Board finds that 200 additional beds are necessary. These are needed for advanced cases and particularly for female patients.

A further urgent recommendation made by the Board is that all forms of tuberculosis should be made notifiable over the whole State. When compulsory notification merely leads to an accumulation of statistics it is of little value, but with the system now inaugurated of training and caring for patients by means of visiting nurses, full and State-wide notification is necessary, for by this means numbers of patients will be brought under observation who otherwise would escape notice until too late to prevent spread of infection. At present only the pulmonary form of tuberculosis is notifiable, and that only in the Metropolitan, Newcastle, and Blue Mountain districts.

In the report emphasis is laid on *prevention* as the only satisfactory solution of the problem, and that it must be inculcated that tuberculosis is an infectious disease, quite easily passed on to close contacts if no care is taken; but that by continuous education and the segregation of tuberculous persons through sanatoria and hospitals the effective control of the disease will be brought about.

An important problem confronting the Board of Control is the provision for the family of the consumptive while he is at the sanatorium or hospital. The fear of leaving his family without adequate means no doubt keeps many from seeking advice until the disease is so advanced that it is beyond sanatorium treatment, and even in favourable cases anxiety to provide for the family forces many patients back to work again long before they are fit to leave the sanitorium. Information is being collected by the Board of Control on which to base definite recommendations to the Government for maintenance of dependents of tuberculous patients in necessitous circumstances. The Commonwealth Royal Commission on Health in 1925 recommended amendment of the Invalid Pensions Act to allow of payment of adequate sustenance to the dependents of patients suffering from infective tuberculosis while they are undergoing treatment in sanatoria or hospitals.

It is becoming more and more evident that tuberculosis is a community problem, and that it is in the interests of national economy and health for the community to maintain the dependents of infectious patients while they are undergoing treatment in a hospital or sanatorium rather than to risk spread of infection to many others.

It is considered by the Federal Health Council that Australia offers an exceptionally favourable opportunity for materially increasing the rate of decline in the incidence of, and mortality from, tuberculosis, and the Council resolved at its Second Session that as a first step in an organised campaign, tuberculosis dispensaries should be established to which should be referred every case of tuberculosis, every member of the family concerned, and every child reserved by the school medical officers for further examination by reason of a suspicious degree of malnutrition. The Council urged the State Governments to establish a sufficient number of such clinics without delay, and urged the Commonwealth Government to extend the principle of subsidising State Governments to provide for the establishment and maintenance of such clinics.

Venereal Diseases Act, 1918.

Five thousand six hundred and seventy-four notifications of venereal disease were received during 1927, a decrease of 327 compared with 1926, when 6,001 cases were notified.

Attention is directed in the report to the difficulties met with in carrying out the provisions of the Act, particularly in reference to non-notification of cases by medical attendants, and to the failure of persons to continue under treatment until cured. In 1927 the names of 1,210 defaulting patients were reported; of these 482 could not be traced, 304 resumed treatment, and in 424 cases follow-up proceedings were still in progress at the end of the year.

The question of patients failing to continue under treatment until cured or free from infection is one of the most unsatisfactory features in connection with the problem of the control of venereal disease.

The most effective remedy appears to be the provision of ample clinics, and one of the most important immediate requirements is a thoroughly up-to-date clinic to function continuously in the metropolis.

Owing to the limited number of sessions, and the unsatisfactory accommodation available at the clinics it is impossible to give the patients the individual personal attention which, in my opinion, is essential, if they are to be attracted to and kept under regular treatment until rendered free from infection.

At the Rachel Forster Hospital, where it has been possible to institute a full-time clinic directed by women medical officers of the Department, it has been found that relatively few cases fail to follow out the full course of treatment. At this hospital it has been possible also, in many instances, to arrange for examination of contacts of infected persons, and for investigation of children in cases where transmission of the disease has been suspected. This is a most important development in venereal disease clinic work, and will be extended to other clinics as opportunities offer.

Other measures in progress in this important field of preventive medicine are outlined in the report (p. 59).

Great assistance in propaganda has been given by the Racial Hygiene Centre and the Father and Son Welfare Movement. A number of films have been obtained dealing with venereal diseases, and these have been widely shown.

Campaign against Cancer.

The Cancer Research Committee, the activities of which are closely linked up with the University of Sydney, has carried out a considerable amount of preliminary work during the year preparatory to the establishment of treatment centres. At the same time a certain amount of cancer research work has been carried on.

Hookworm Campaign.

The Government continued to co-operate with the Federal Health Department in the survey of the residents of the North Coast Districts of the State in order to ascertain the incidence of hookworm disease. This work has been carried on during recent years by Federal medical officers. As soon as the survey is completed it is proposed that the State shall carry on the work, which will require constant attention if this disabling disease is to be eradicated. Arrangements are being made for the State Health Department in conjunction with the Department of Education to take over the work during 1928.

Division of Maternal and Baby Welfare (p 34).

The report of the Director of Maternal and Baby Welfare (Dr. E. Sydney Morris) traverses the main points of the problems facing the Division and demonstrates the difficulties and obstacles to be overcome, but nevertheless shows satisfactory progress in many directions.

The questions of abortion and illegal operations are social problems of the first magnitude which are intimately related to that of maternal mortality generally.

The increasing incidence of deaths from illegal operations not only among single mothers, but also among married mothers, must cause grave concern to all. The difficulty, one might almost say the impossibility, of controlling this factor must increase the anxiety of all who are associated with endeavours to reduce maternal mortality.

The lines which it is intended to follow in an endeavour to prevent septic infection, puerperal albuminuria and eclampsia and other causes regarded to some extent as preventable are outlined in the report.

This action will be taken as soon as the necessary staff has been made available.

The pitfalls in the use of international statistics as a basis for comparison of different countries are briefly dealt with. Statistics must always be used with discrimination, and it is unjustifiable to utilise figures which are strictly speaking incomparable in order to deprecate our position which, in common with most other countries, is recognised as capable of improvement.

The plea for ante-natal care and supervision needs every support, and it is hoped in the near future to make larger provision for these essential requirements.

The improvement in the infant mortality rate which is gradually being brought about is very satisfactory. The work of the Baby Health Centres is slowly but surely coming to fruition, and the achievements of the past year give every justification for the belief that these results will be progressive in the future.

The great difficulty in educating mothers who are indifferent and apathetic to their responsibilities is emphasised. This can only be overcome by the gradual pressure of an educated public opinion. To this end every opportunity is being taken, as can be seen by a reference to the Director's report.

Industrial Hygiene.

The Division of Industrial Hygiene is under the charge of Dr. Charles Badham, who has associated with him a physicist and an engineer. Dr. Badham is also medical referee for industrial diseases, and has carried out the investigation of all cases of industrial disease which have come before the medical boards of the Workers' Compensation Commission. During the year he has been appointed to the medical authority of the Silicosis scheme.

Activities in the Sandstone Industries.—The Industiral Commission of New South Wales have made the duty of testing the ventilation of the city railway tunnels and other excavations in sandstone a care of this Division. The Railway Commissioners have set aside a full-time officer to sample the air in these workings under the direction of Dr. Badham.

At the request of the Industrial Commission this Division investigated the dust exposure axial of water-feed drillmen. The average dust exposure of men using axial water-feed drills in tunnels with varying degrees of ventilation has been determined at 110 particles per cubic centimetre.

In this report in a monograph—"Studies in Industrial Hygiene No. 12, Dust Sampling in Sydney Sandstone Industries," (p. 74), a review of the dust sampling work is given and several investigations into special problems of dust sampling have been detailed.

The results of routine dust sampling are summarised and show that the average dust exposure at the present time in these tunnels is approximately 50 particles of less than 10 microns per c.c., as determined by the Owens' jet dust-counting apparatus, using the method of counting introduced by this Division.

A special investigation of the dust exposure of Sydney sandstone masons was made and it has been shown that with good natural ventilation this group is exposed to an average dust concentration of 4·2 milligrams per cubic metre equivalent to 420 particles per c.c.

The dust standards of South Africa and Broken Hill (N.S.W.) are mentioned and compared with the standard adopted by this Division for the Sydney sandstone industries, which requires not more than 200 particles per c.c. of less than 10 microns of sandstone dust as determined by the Owens instrument. These standards are for one particular field, and do not apply generally for other kinds of dust.

Activities in the Lead Industry.—Over one hundred cases of suspected lead poisoning were investigated, and 47 cases were diagonsed as lead poisoning. Forty of these workers came from accumulator manufacturing plants, four were painters and three came from miscellaneous trades. Regulations dealing with the hazard of industrial lead poisoning have been gazetted, and it is hoped that these regulations will tend to decrease the incidence, especially amongst workers in accumulator plants.

Activities in the Sphere of Ventilation.—Following upon the report of this Division, "On the Index of Comfort in the Ventilation of Theatres in Sydney," the amendment of the regulations governing the ventilation of theatres is under consideration.

In this report is published, "Notes on the Ventilation of Cinema Theatres," Studies in Industrial Hygiene, No. 14 (p. 111). It is recommended that regulations dealing with these theatres should provide for—

(*a*) An air movement depending on the dry-bulb temperature and absolute humidity.
(*b*) An air supply depending on the outdoor temperature.

At the request of the Chief Secretary's Department the ventilation of three new theatres was investigated.

Other Industrial Activities.—Minor inquiries have been made into many industrial activities, including pyroxylin spray painting, benzol poisoning, the sulphur-dioxide hazard in refrigeration and chemical works, tetanus in the wool industry, the dust hazard in ore-crushing mills, the dangers from nitrous fumes in the manufacture of sulphuric acid, dermatitis amongst wood workers and french polishers, and a close supervision has been kept on the incidence of dermatitis in the rubber workers.

Many working places and conditions have been inspected which were alleged to cause disease among workers where complaints have been dealt with by the medical officers of the Workers' Compensation Commission.

At the request of the Chief Medical Officer of the Department of Education, this Division reported on the efficiency and safety of an unvented gas-steam radiator.

In this report also is included Studies in Industrial Hygiene No. 13, "Notes on a Fine Type of Fibrous Pneumonokoniosis produced by Silicates and other Minerals." (p. 102).

The aetiology is discussed of the fine fibrosis which is not uncommonly found in metalliferous and coal-miners and some workers in other industrial activities in New South Wales.

It is considered that this fine type of fibrosis can in most cases reasonably be assumed to be caused by various silicates.

The term "Silicatosis" is suggested for the fine fibrosis caused by silicates, and the term "Siliconosis" for a fibrous pneumonokoniosis of a mixed type.

Dr. Badham has described the types of fibrosis occuring in workers exposed to orthoclase basalt, coal-miners, copper-miners, and miners in Broken Hill, Western Australia and Tasmania, iron miners, asbestos and cement workers.

The compensation laws of New South Wales relating to pneumonokoniosis are summarised and it is concluded that all fibrous pneumonokoniosis not due to dust containing over 70 per cent. of quartz should come under the Workers' Compensation Act, 1926, and the Workers' Compensation (Silicosis) Act, 1920, which provides compensation for diseases caused by silica dust should apply only to workers who are exposed to dust containing over 70 per cent. of quartz.

Section II.—Reports of Medical Officers of Health.

1. *Metropolitan District.*—In his report (p. 118) on the health of the metropolitan district for 1927, Dr. Purdy again directs attention to the heavy toll of deaths due to the group, diseases of the heart. The incidence of these diseases has shown a progressive increase for several years, and the percentage has more than doubled since 1903, when diseases of the heart formed 8 per cent., and in 1927, 17 per cent. of the total deaths. Dr. Purdy advocates periodical medical examinations, particularly for persons over 40 years of age, as a means of protection against degenerative changes that may be in progress; and issues a warning against over-fatigue either in work or in play in persons over 50.

The recorded deaths in the metropolis from all causes in 1927 was 10,418, equivalent to a rate of 9·60 per 1,000 of the population; the infantile mortality rate was 56·4 per 1,000 births.

The report directs attention (p. 131) to the problems arising in connection with housing and overcrowding, and to the measures necessary to remedy existing conditions.

The question of the provision of sufficient parks, open spaces and playground areas is interestingly dealt with on p. 136.

Mosquito Extermination.—Conferences between entomologists and various local authorities and bodies were held during the year for the purpose of co-ordinating measures for mitigating the mosquito nuisance throughout the metropolitan area.

2. *Hunter River District.—Dr. Wallace* (p. 141) *reports on health matters in the Newcastle District.* In 1927 an active Schick testing campaign was carried out, the test being applied to 967 children at Cessnock, Singleton, and other centres.

An outbreak of dengue fever occurred at West Maitland in March, in which it was estimated that about 90 per cent. of the residents were affected. As a result of the epidemic much valuable work has been done towards mosquito eradication.

Dr. Wallace again points out that the facilities for treating venereal diseases at the important seaport of Newcastle are still extremely inadequate.

3. *Broken Hill* (p. 148).—The position of medical officer of health at Broken Hill was still vacant at the end of 1927; inspectorial visits in connection with Baby and Maternal Welfare and the general sanitation of the municipality being made by the head office staff.

As mentioned on p. 1 arrangements have now been made for the linking up of health and medical services at Broken Hill.

Vital statistics supplied by the Broken Hill Council are incorporated in the report (p. 148).

SECTION III.

Reports on State Hospitals and State Hospitals and Homes.

Detailed reports on the fourteen Hospitals and Homes administered by the department are included in this section.

Coast Hospital (p. 150).—There was an average daily number of 710 patients under treatment at this hospital during 1927.

An important development was the opening in April of two wards each of 30 beds at the Prince of Wales Hospital, Randwick, formerly used for military patients. These wards (Auxiliary Branch of the Coast Hospital) are staffed and administered from the main hospital, and have been kept fully occupied by transfer of convalescent and chronic male patients. It is proposed to take over a number of additional wards at an early date.

Another development at the Coast Hospital during the year was the provision of an additional 50 beds for male venereal cases.

Waterfall Sanatorium (p. 175).—969 patients were treated in 1927. Of the 387 cases discharged during the year, 22 were classed as "arrested" 109 as "much improved" 223 as "improved, and 33 as "unimproved."

Sanocrysin Treatment.—Supplies of sanocrysin were obtained during the year, and sixteen specially selected patients were placed under treatment. The Medical Superintendent (Dr. H. W. Palmer) reports that, unfortunately, no improvement was noticeable in the cases that received treatment.

State Hospitals and Homes.—The difficulties experienced at the general hospitals as regards pressure on their bed accommodation is shared in a much more pronounced degree by the State institutions, particularly Lidcombe and Liverpool. The pressing need for increased accommodation at these Hospitals and Homes has been urged on numerous occasions. It might have been expected that one of the results of the Old-age Pensions Scheme would have led to a lessening in the number of persons seeking admission to the State institutions. This has not proved to be the case.

There is another factor which has not been taken into consideration, namely, that the population of the State has increased by one million during the past twenty-five years, and naturally there has been an increasing number of old people requiring shelter and treatment in the State institutions; but there has been no corresponding increased accommodation made available for them. Then, again, as the expectation of life has increased considerably during the last quarter of a century for both men and women, there are nowadays a greater proportion of old persons in the community, and these must be provided for to a greater extent than was formerly the case. If due consideration is given to these important points it should be plain that further accommodation must be provided for the aged and infirm.

Shortage of Hospital Accommodation.

The rapid growth of population in the Metropolitan area and the changed conditions of housing, in that increasing numbers of people are becoming flat-dwellers, make it all the more necessary that increased hospital accommodation be furnished to cope with the increasing demand for treatment in these institutions. Attention has been drawn in previous annual reports to this important subject. Not only is the accommodation available for general cases much below requirements, but the number of beds provided for the treatment of cases of infectious disease is inadequate also. A section of the Coast Hospital acts as the main infectious disease hospital for the Metropolitan area. The 311 beds provided thereat do not suffice to deal with all the cases seeking admission, and during epidemics practically only the more serious cases can be admitted.

Owing to the demand for further beds for infectious cases it has been necessary to take over for the purpose an additional fifty beds in one of the main wards commonly used for general cases at the Coast Hospital. This action has consequently restricted somewhat the admission of general cases to this hospital,

although the opening up of sixty beds in that section (Coast Hospital Auxiliary) of the Prince of Wales Hospital, Randwick, has tended to ease matters to some extent, in that semi-convalescent general cases are moved as early as possible from the Coast Hospital to the Auxiliary, and thereby the beds at the main hospital are kept as much as possible available for the reception and treatment of acute cases. Further accommodation for cases of infectious diseases should be made available as soon as possible in the Metropolitan area. This extra accommodation could best be met by providing a hospital in the western suburbs. There is a suitable site available for the purpose, and it is recommended that accommodation for fifty beds in a simple type of building be provided to begin with.

Enquiries are being made into the question of setting aside a site for an infectious disease hospital to serve the Northern Suburbs, it being appreciated that in view of the prospective large increase in population in that section o fthe metropolis, the need for such accommodation will be felt more acutely in the course of a few years.

Section IV.—Microbiological Laboratory (p. 188).

The Principal Microbiologist, Dr. Eustace William Ferguson, died on 18th July after a prolonged and severe illness, and throughout the year the work was in charge of Dr. E. L. Morgan.

The work of the Laboratory continued to steadily increase, there being 36,558 examinations in 1927 compared with 31,033 in 1926.

Included in the investigational work undertaken was the testing of material for the treatment and prevention of scarlet fever, details of which are given on p. 194, and an enquiry into the seasonal prevalence of flies in different areas of the metropolitan district, results of which are shown by tables and graphs (p. 205).

Examinations of suburban milk for tubercle bacilli and for total bacterial content were continued. In all 220 samples were collected from 121 dairies, and in no instance was evidence of tuberculosis found from examination of sediment and post-mortem examination of guinea-pigs.

A test was also made of the keeping qualities of bottled milks. Details of these tests are given on pp. 197–204.

Federal Health Council.

Amongst the recommendations made by the Federal Royal Commission on Health in 1925 was one to the effect that a permanent Federal Health Council should be instituted to meet regularly for the purpose of devising measures for the co-operation of the Commonwealth and States and of State with State for promoting uniformity in legislative administration where advisable in matters concerning the health of the people. The State Governments endorsed this recommendation after it had been considered by a conference of Ministers of Health of the States. Thereupon the Commonwealth Government appointed a Federal Health Council and defined its functions.

The Council is composed of three officers of the Commonwealth Department of Health and the Chief Health Officer of each of the States. The Director-General of Health of the Commonwealth is chairman, and presides at all meetings of the Council, which is to meet at least once a year.

The first meeting of the Council took place in Melbourne in January, 1927, and occupied four days. The report of the Royal Commission on Health was taken as a basis for consideration, and the recommendations contained in that report were carefully examined. It was appreciated that permanent and progressive improvement is likely to be made only after careful consideration of each of the public health problems dealt with in the report, and as the Council has been established as a permanent body each problem can be examined in a continuously progressive manner from session to session, action being taken by the interested parties when such action is practicable.

A very wide range of subjects was dealt with at the meeting, and after full consideration, resolutions were passed in regard to each of the items, and these resolutions, together with a report of the proceedings, were communicated to the individual States.

I have no doubt that through the medium of the Federal Health Council a vast amount of good will accrue to the States and the Commonwealth as a whole, so far as health is concerned.

Proposed Establishment of a School of Public Health at Sydney University.

The Royal Commission on Health appointed by the Commonwealth Government in 1925 expressed the opinion (p. 18) that the Commonwealth Government could be of great assistance to State and local authorities by providing a training school where prospective medical officers of health could receive post-graduate training in different fields of health administration, and where inspectorial staff or other personnel could also be trained.

In furtherance of the proposal an investigation was recently made by the Commonwealth Government into establishment of a School of Public Health in connection with the Sydney University.

When in America and Britain recently I made a point of inquiring into the schools of hygiene in those countries. Establishment of these schools has been brought about as a result of the recognition of the need for providing larger and better opportunities for training and investigation in the science and art of hygiene and public health. As an example of such schools, of which there are several in the United States and Canada, reference may be made to The Johns Hopkins School of Hygiene and Public Health which was established in Baltimore following on a conference in 1914 of leading authorities in public health work to consider the general question of the training of qualified sanitarians and public health officials. The main objects of the school are to carry on courses for the training of qualified persons for public health work, to promote investigational work in hygiene and preventive medicine, and to provide opportunities for the training of research workers in these subjects. The work of the school is organised under a number of departments. Facilities for field work are provided through co-operation with State and city departments of health and various unofficial public health organisations.

The London School of Tropical Medicine and Hygiene owes its origin to a report issued in 1921 by a committee appointed by the English Minister of Health. This committee pointed out that the teaching of public health to post-graduate students was in an unsatisfactory state; and it suggested the concentration of instruction in all branches of preventive medicine at one institution. A central school, affiliated to the University of London and fully equipped, would, it was considered, provide for the needs of men proceeding to degrees and diplomas in public health.

The consensus of opinion at the inquiry held by the Commonwealth Committee was that the Australian School of Public Health should be located at Sydney and be associated with the University. Sydney is a large seaport with an extensive traffic to the Pacific Islands and eastern ports. The city itself presents many problems in public health; it is a large industrial centre, and the study of industrial diseases, it is presumed, will be one of the activities of the school. Splendid opportunities are also offered for co-operation in public health administration. The teaching should be by persons actively engaged in the work of preventive medicine. The establishment of the school would be a real benefit to the community, and, through research work, to the world at large.

The importance of preventive, as against curative, medicine is every year becoming more emphasised. Preventive medicine is a science or art by which it is hoped to lessen the need for hospitals and other institutions which dispense curative medicine.

The spread of knowledge in preventive medicine will, no doubt, lessen the need for the practice of curative medicine, and schemes are in operation in most civilised countries for the spread of such knowledge. The opinion is gaining ground that the subject of preventive medicine should figure much more largely in the medical curriculum, for it is becoming recognised that the general practitioner is in the best position by means of instruction and advice to prevent disease.

Propaganda for Better Health.

The publicity campaign began in 1926, was actively pursued throughout 1927 by means of press articles, lectures, radio talks, and films dealing especially with maternal and baby welfare; the prevention of tuberculosis; and the menace of venereal diseases. The "Better Farming Train" was availed of for health demonstration purposes in country districts. Well-equipped sections on Baby Welfare work and rural sanitation were fitted up on the train in charge of trained departmental officers.

For the purpose of impressing on the public the importance of milk and fruit in the diet, local films were prepared and widely shown. Notable overseas films and posters dealing with health problems have been obtained, and are in constant use in connection with Health Week displays.

A copy of the excellent booklet, "Health makes the Commonwealth," issued by the Metropolitan Health Week Committee, should be in every household.

Appreciation.

Thanks are once more tendered to the Crown Solicitor, the Commissioner of Police, the Government Statistician, the Public Works Department, and other branches of the Public Service for assistance rendered throughout the year in various directions affecting the public health.

I desire to express my appreciation to all the officers of the Department for their loyal co-operation in carrying out the multifarious activities associated with public health progress.

I was absent from the State for the latter half of the year, the Department having granted me special leave for the purpose of enabling me to take advantage of the invitation received from the International Health Board of the Rockefeller Foundation to visit the United States of America in order to study public health problems in that country.

During my absence from the State, Dr. E. Sydney Morris, the Senior Medical Officer of Health, filled my place, and, as acting Director-General, carried out the duties of the position in a highly efficient manner.

T. H. Neely,
Secretary.

ROBERT DICK,
Director-General of Public Health.

Extract from the Report of the Government Statistician, Mr. T. Waites, on the Vital Statistics of New South Wales for 1927:—

Vital Statistics.*

Population.—The population at the end of 1927 was 2,401,884, of whom 1,224,847 were males and 1,177,037 females, the proportion being 104 males to 100 females. During the year the population increased by 52,483, or 2·23 per cent., of which 31,088 was due to the excess of births over deaths, and 21,395 to the excess of arrivals over departures. The mean population was 2,374,264.

Marriages.—The number of marriages was 20,052, corresponding to a rate of 8·45 per 1,000 of the population. The rate is 3·8 per cent. above the average of the previous five years. In the Metropolis the rate was 9·96, and in the remainder of the State 7·17 per 1,000 of population.

The proportion of males married who were under 21 years of age was 7·01 per cent., and of females 26·36 per cent. The proportion in both cases is above the average for the previous five years.

*From the Report of the Government Statistician (Mr. T. Waites), Vital Statistics for N.S.W., 1927.

Of the marriages, 18,800 were celebrated by the clergy and 1,252 by registrars. The largest number, 8,525, was celebrated according to the forms of the Church of England; then followed the Roman Catholic Church with 4,296, the Presbyterian with 2,705, the Methodist with 2,186, and all others 1,088.

Births.—The total number of births was 53,858, equivalent to 22·68 per 1,000 of population, which is 6·4 per cent below the average of the previous five years. Of this number 27,805 were males and 26,053 females, the proportion being 107 males to 100 females.

Dividing the State into the Metropolis and remainder of the State, there were 20,588 births in the former and 33,270 in the latter, corresponding to rates of 18·97 and 25·81 respectively.

The number of ex-nuptial births was 2,693, equal to 5·0 per cent. of total births, which is 0·4 per cent. above the quinquennial average. In the Metropolis the proportion was 5·8, and in the remainder of the State 4·5, per cent. of births. Proportionately to population, ex-nuptial births represented 1·13 per 1,000, which is 6·0 per cent. below the average of the last five years.

Deaths.—The deaths during the year numbered 22,770, equivalent to a rate of 9·59 per 1,000 of the population. This rate is 2·9 per cent. above the average of the previous five years.

The total includes 12,978 males and 9,792 females, equivalent to rates of 10·72 and 8·41 respectively per 1,000 of population. The rate in the Metropolis was 9·60 per 1,000, and in the remainder of the State 9·58.

Of the 22,770 people who died during the year, 4,011 were under 5 years of age, 10,278 were aged from 5 to 64, and 8,468 were 65 and over. The ages of the remaining thirteen adults were not specified. The rates per 1,000 living in the main groups, under and over 5 years, were 15·50 and 8·86 respectively as compared with 16·28 and 8·41, the average of the previous five years.

Infantile Mortality.—The number of children under 1 year of age who died was 2,960, equal to 54·96 per 1,000 births. To this total the Metropolis contributed 1,161, or 56·4 per 1,000 births, and the remainder of the State 1,799, or 54·1 per 1,000 births. The rate for 1927 is 4·2 per cent. below the average of the previous five years. Of the deaths under 1 year of age, 1,212, or 41 per cent., occurred under 1 week, 1,599, or 54 per cent., under 1 month, and 2,016, or 68 per cent., under 3 months.

Causes of Death.—Of the deaths during the year, the most important causes were as shown in the following statement, which, for purposes of comparison, also gives the average number of deaths during the preceding five years, due allowance having been made for increase in population:—

Causes of Death.	Number, 1927.	Average Number, 1922-26.	Increase (+) or Decrease (−) in 1927.	Causes of Death.	Number, 1927.	Average Number, 1922-26.	Increase (+) or Decrease (−) in 1927.
			per cent.				per cent.
Typhoid Fever	68	98	− 31	Bronchitis	471	443	+ 6
Measles	20	66	− 70	Pneumonia	1,929	1,641	+ 18
Scarlet Fever	113	28	+ 304	Other Diseases of the Respiratory System	314	287	+ 9
Whooping-cough	211	152	+ 39	Diseases of the Stomach†	221	186	+ 19
Diphtheria and Croup	179	187	− 4	Diarrhœa and Enteritis (under 2 years)	512	838	− 39
Influenza	231	309	− 25	Diarrhœa and Enteritis (2 years and over)	219	218	...
Plague	...	2	...	Appendicitis	201	190	+ 6
Erysipelas	46	33	+ 39	Hernia, Intestinal Obstruction	173	225	− 23
Infantile Paralysis	4	8	− 50	Cirrhosis of the Liver	116	112	+ 4
Lethargic Encephalitis	27	30	− 10	Other Diseases of the Digestive System	324	295	+ 10
Epidemic Cerebro-spinal Meningitis	10	28	− 64	Bright's Disease (Acute and Chronic)	1,140	1,131	+ 1
Other Epidemic Diseases	50	58	− 14	Other Genito-Urinary Diseases	390	380	+ 3
Tuberculosis, Respiratory System	1,056	1,174	− 10	Puerperal Septicæmia	103	83	+ 24
Tuberculous Meningitis	54	55	− 2	Other Puerperal Diseases	249	226	+ 10
Other Tuberculous Diseases	77	78	− 1	Malformations	279	251	+ 11
Cancer	2,210	2,150	+ 3	Congenital Debility	241	303	− 20
Diabetes	318	293	+ 9	Prematurity	812	926	− 12
Leucæmia, Anæmia, Chlorosis	204	227	− 10	Other Developmental Diseases	299	302	− 1
Other General Diseases	535	506	+ 6	Senility	1,048	1,154	− 9
Meningitis	156	166	− 6	Suicide	262	262	...
Cerebral Hæmorrhage	1,060	828	+ 28	Accident	‡1,415	1,134	+ 25
Insanity	120	136	− 12	All other Causes	300	495	− 39
Convulsions of Infants	46	70	− 34				
Other Diseases of the Nervous System	681	649	+ 5				
Diseases of the Heart	3,785	3,046	+ 24				
Diseases of the Arteries, Atheroma, etc.	413	563	− 27				
Other Diseases of the Circulatory System	78	95	− 18	Total	22,770	22,117	+ 3

† Includes ulcer of the duodenum. ‡ Includes 335 from motor accidents.

Epidemic Diseases.—The deaths from epidemic diseases numbered 959 as compared with an average of 999 during the previous five years, a decline of 4 per cent. The deaths from scarlet fever numbered 113, an experience which was 304 per cent. greater than the average of the previous five years.

Tuberculosis of the Respiratory System was the cause of 1,056 deaths in 1927, the rate, ·44 per 1,000 living, being 10 per cent. below the average of the five years 1922–26. Speaking generally, the death-rate from tuberculosis has been declining for some years past. The deaths of males numbered 649, and of females 407, and the rates per 1,000 living were ·54 and ·35 respectively. The mortality from other tuberculous diseases was 2 per cent. below the average.

Cancer.—The deaths from cancer numbered 2,210, equal to a rate of ·93 per 1,000 living, and 3 per cent. above the average of the preceding quinquennial period. The deaths of males numbered 1,169 and of females 1,041 the rates for each sex being ·97 and ·89 per 1,000 respectively. The death-rate from this disease has been increasing steadily for a number of years.

Cerebral Hæmorrhage.—To cerebral hæmorrhage and apoplexy during 1927 were ascribed 1,060 deaths, of which 524 were those of males and 536 of females. The rate was ·45 per 1,000 living, or ·43 for males and ·46 for females. The higher rate for this disease, viz., 28 per cent. above the average, may be attributed to the fact that during 1925 a revised manual of joint causes of death, based on the 1920 International List was adopted. In this manual cerebral hæmorrhage as a cause of death receives greater weight than was formerly the case—notably when stated in combination with diseases of the arteries, atheroma, etc.

Diseases of the Heart were the cause of 3,785 deaths, the rate being 1·59 per 1,000. The apparent increase in these deaths during the last twenty-five years is probably the result of the greater attention given to pathological diagnoses. The rate in 1927 was 24 per cent. above the average of the preceding five years. Of the total deaths, 2,162 were of males and 1,623 of females, the corresponding rates per 1,000 living of each sex being 1·79 and 1·39.

Bronchitis and Pneumonia.—Bronchitis with 471 deaths, equal to a rate of ·20 per 1,000 living, showed an increase of 6 per cent., and pneumonia with 1,929 deaths, or ·81 per 1,000, an increase of 18 per cent. as compared with the experience of the previous five years.

Of the deaths from bronchitis, 245 were of males and 226 of females, or ·20 and ·19 per 1,000 living respectively. Of the persons who died from pneumonia, 1,143 were males and 786 were females, and the rates were ·94 and ·68 per 1,000 living of each sex.

Bright's Disease.—During 1927 there were 1,530 deaths due to diseases of the genito-urinary system, of which 1,140 were caused by acute nephritis and Bright's disease. The rate for nephritis (acute and chronic) was ·48 per 1,000 living: for males ·55 per 1,000, and for females ·40 per 1,000. In 1927 the rate was 1 per cent. more than the average of the previous five years. The general tendency of the rate has been to increase.

Senility.—The deaths from this cause numbered 1,048, equivalent to a rate of ·44 per 1,000 living, or 9 per cent. less than the average during the years 1922–26. Many deaths formerly attributed to senility are now ascribed to some form of heart disease, with the result that deaths from senility, so described, have shown a considerable decrease.

Of the total deaths from senility, 592 were males and 456 females; the corresponding rates per 1,000 living were ·49 and ·39.

Diseases of Infants.—The principal causes were prematurity 812, other developmental diseases 785, diarrhœa and enteritis 394, pneumonia 375, whooping-cough 142, bronchitis 61, and convulsions 42

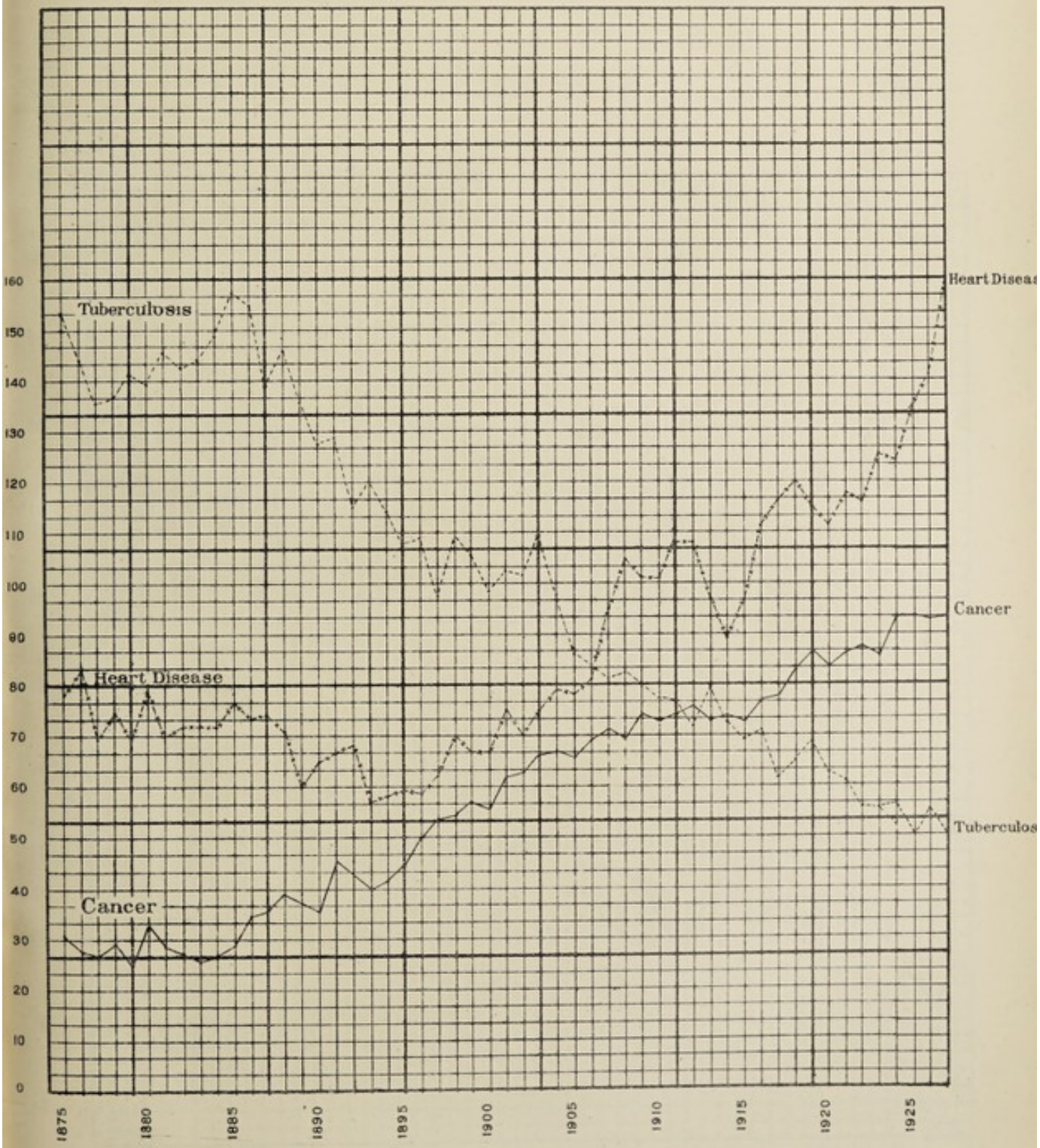
The following statement shows the causes of deaths of children under 1 year of age per 1,000 births, during 1927, in comparison with the preceding five years:—

Causes of Death.	Males.		Females.		Total.	
	1927.	1922-26.	1927.	1922-26.	1927.	1922-26.
Epidemic Diseases	4·0	3·0	4·3	3·1	4·1	3·1
Tuberculous Diseases	·1	·3	·4	·3	·2	·3
Syphilis	·3	·2	·3	·3	·3	·3
Meningitis	·7	·7	·7	·6	·7	·7
Convulsions	1·0	1·1	·5	·8	·8	1·0
Bronchitis	1·2	1·1	1·0	1·1	1·1	1·1
Pneumonia	7·4	6·0	6·5	4·9	7·0	5·4
Diarrhœa and Enteritis	7·5	12·8	7·1	10·0	7·3	11·4
Premature Birth	16·1	17·6	14·0	14·5	15·1	16·0
Other Developmental Diseases	15·8	17·0	13·1	12·1	14·5	14·6
Other Causes	4·2	3·8	3·5	3·2	3·9	3·5
All Causes	58·3	63·6	51·4	50·9	55·0	57·4

CANCER, TUBERCULOSIS, AND HEART DISEASE.

ANNUAL DEATH RATE PER 100,000 OF POPULATION IN NEW SOUTH WALES, 1875-1927.

HEART DISEASE INCLUDES PERICARDITIS, ENDOCARDITIS, ORGANIC DISEASES, AND ANGINA PECTORIS.
PRIOR TO 1886 SYNCOPE IS INCLUDED.

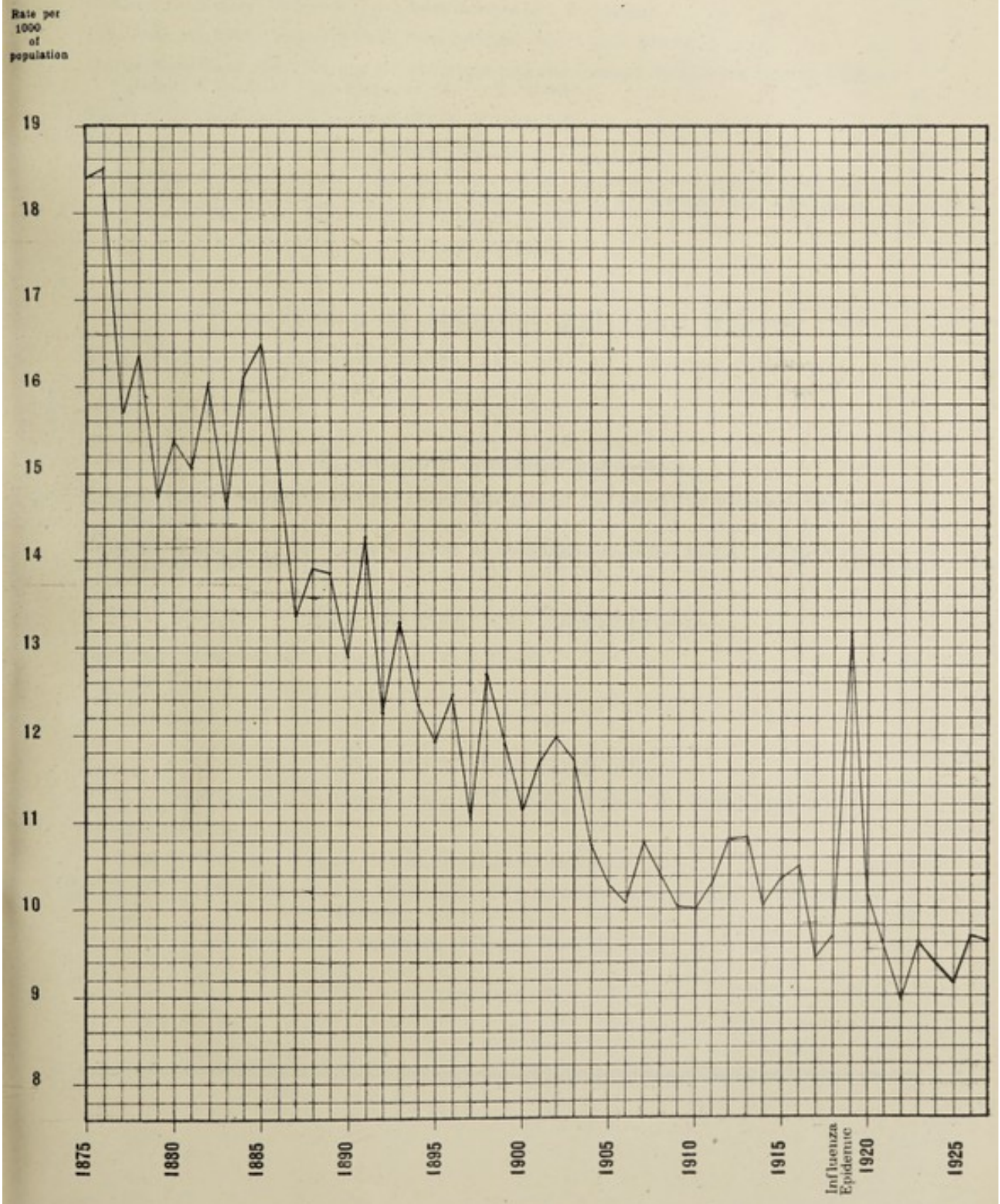


ANNUAL DEATH RATE PER 1,000 OF POPULATION

IN

NEW SOUTH WALES,

1875-1927.



SECTION I.

A.—Public Health Administration.

B.—Division of Maternal and Baby Welfare.

C.—Communicable Diseases.

D.—Division of Tuberculosis.

E.—Industrial Hygiene.*

(Fifth Report of the Medical Officer for Industrial Hygiene, Dr. Charles Badham.)

* Nos. 1-11, see p. 73.

A.—PUBLIC HEALTH ADMINISTRATION.

CHEMICAL LABORATORY.

REPORT OF GOVERNMENT ANALYST FOR THE YEAR ENDED 31ST DECEMBER, 1927.

Staff.

Government Analyst: Thomas Cooksey, Ph.D., B.Sc., F.I.C., F.A.C.I.

Second Government Analyst: William M. Doherty, F.I.C., A.A.C.I.

Senior Assistant Government Analyst: Sidney G. Walton, F.A.C.I.

Assistant Government Analyst: Harold B. Taylor, M.C., D.Sc., F.I.C., F.A.C.I.

Analysts:
Arthur D. Dibley, A.S.T.C., A.A.C.I.
Robert G. O'Brien, A.S.T.C., A.A.C.I.
Isabel M. Knight, B.Sc., A.A.C.I.

Laboratory Assistant: Frank M. Armer.

Laboratory Assistant: Victor Williams.

Junior Laboratory Attendant: Arthur G. Fletcher.

Clerk: Grace McGlynn.

Shorthand-writer and Typist: Nellie Armstrong.

The work in the Chemical Laboratory during the year 1927 involved the examination of 17,646 samples, representing 15,409 samples collected under the provisions of the Pure Food Act, and 2,237 samples submitted in connection with the Public Services of the State.

Milk was again the chief subject of analysis under the Pure Food Act, a total of 14,103 samples having been analysed during the year. Of this number 426 (3 per cent.) contravened the requirements of the Pure Food Act, 1·40 per cent. of the total examined being deficient in milk-fat, 1·40 per cent. in solids-not-fat, and 0·37 per cent. in both milk-fat and solids-not-fat. The only other adulterations consisted of three samples artificially coloured with annatto. The value of the systematic inspection of the milk supply of the State is evidenced by the low percentage of adulterated milks reported. The number of milks collected in the metropolitan area which fell below standard amounted to 2·6 per cent. of the total city milks analysed, while 5·2 per cent. of the country milks were reported against.

The number of samples other than milk examined for the purposes of the Pure Food Act amounted to 1,306, including 1,188 foods and 118 drugs, patent medicines, &c.

The proportion of adulterated food substances was found to be 32·1 per cent. of the total examined. This is heavier than previously recorded for some time, but the increase is partly explained by the fact that 136 samples of meat were illegally preservatised and 106 samples of sausages contained an excess of the preservative permitted. The following are the details of the adulterated samples:—

Bread.—2 samples contained excess moisture.

Breakfast Food.—1 sample not labelled in accordance with requirements for mixed meals.

Butter.—2 samples condemned for rancidity.

Coffee and Chicory Essence.—2 samples deficient in caffeine.

Colouring (artificial).—1 sample did not consist of one of the permitted colourings.

Confectioners' Starch.—2 samples were mouldy and unfit for use.

Cordials.—1 sample was in a fermenting condition; 1 contained a prohibited preservative.

Cream.—4 samples were deficient in milk-fat.

Diabetic foods.—2 samples of diabetic bread contained 37 and 45 per cent. of starch, respectively. 3 samples of diabetic flour contained 54, 60, and 62 per cent. starch, respectively.

Essences, Flavouring.—9 samples of "pure fruit" essences contained flavouring derived from other than the fruits specified in the label.

Fats, Edible.—2 samples consisted of a mixture of fats and were not labelled with a statement of the kinds of fats present.

Fruits (dried).—21 samples contained an excess of the preservative substance permitted.

Fruits (tinned).—9 samples were deteriorated and unfit for use.

Ice Cream.—3 samples were deficient in milk-fat.

Infants' Food.—1 sample was rancid and unfit for use.

Jam.—1 sample contained 10 per cent. apple pulp.

Jelly Crystals (fruit).—9 samples contained artificial flavouring.

Macaroni.—1 sample was artificially coloured with a colouring substance not premitted.

Meat—Fresh.—136 samples were illegally preservatised.

Meat—Fresh, Sausages.—105 samples contained an excess of the permitted preservative.

Meat—Sausages, Cooked.—7 samples were artificially coloured; 1 sample contained an excess of the permitted preservative.

Milk—Condensed.—1 sample was deficient in milk-fat.

Milk—Dried.—1 sample was deficient in milk-fat and in solids-not-fat.

Nuts.—29 samples were insect-infested.

Peasemeal.—1 sample contained over 1 per cent. sand.

Pickles.—1 sample was deteriorated and unfit for use.

Spirits.—3 samples were broken down to less than the prescribed standards.

Tomato Sauce.—1 sample contained a farinaceous thickening agent.

Vinegar.—1 sample was deficient in acetic acid.

Special subjects investigated during the year were in connection with the standards for bread, dried fruits and tomato sauce.

In order to give a specific value to the requirements of the standard that bread shall be "properly baked," an effort was made to determine the relationship between the specific gravity of the crumb and the general quality of the bread. The methods for determining the acidity of the crumb were also studied, with a view to providing a quick and reliable method for laboratory use (p. 17).

An application having been made to the Advisory Committee that consideration be given to the question of raising the amount of sulphur dioxide permitted in dried fruits, from 7 grains to the amount permitted under the British Preservative Regulations, viz., 14 grains per lb., the loss of sulphur dioxide occurring during the process of cooking was estimated. As this appeared to be a matter of some general interest, particulars of the methods of cooking and the results of analysis are attached (p. 19).

With the object of fixing a minimum standard for tomato solids in tomato sauce, the majority of the brands sold on the Sydney market were analysed, and a proposed standard method (based on the method given in the A.O.A.C. Official Methods, 2nd Edition) was formulated for the determination of the non-sugar organic tomato solids.

Details of the methods proposed, and of the analyses of the three articles mentioned, will be found at the conclusion of my report (p. 18).

A total of 118 samples of drugs, patent medicines, pharmacopoeial substances, &c., were examined during the year, 21 of which did not conform to prescribed standards. The following are the details of adulteration :—

Camphorated chalk.—1 sample was deficient in camphor.

Hydrogen peroxide.—1 sample was deficient in one or more of the prescribed ingredients.

Patent medicines.—5 samples did not bear a statement on the label of the presence of ingredients requiring declaration.

Nitre, Spirits of.—1 sample was deficient in ethyl nitrite.

Ointment, Zinc.—2 samples were deficient in zinc oxide.

Pills and Capsules.—The presence of a drug requiring declaration was not specified on the label of 1 sample of pills. The contents of one capsule were not true to label.

Soap.—1 sample contained an excess of sodium carbonate.

Wine—Medicated.—1 sample was not labelled with regard to the presence of a drug requiring declaration.

Food Inspectors submitted 13 samples of food for examination in connection with outbreaks of illness believed to be due to the consumption of certain foods. In no instance was any poisonous substance found, the illness evidently being due to bacterial infection.

The number of samples examined in connection with the public services of the State amounted to 2,237. These included 308 samples of foods, milk, medicines, &c., submitted by departmental institutions, subsidised charities and hospitals.

The Government Stores Department submitted 797 samples for examination in connection with the fixing of standards and specifications, and for the control of the articles supplied under contract to the various departments of the State Service.

The Pharmacy Board submitted 28 samples for examination as to the presence of scheduled poisons, in connection with prosecutions taken under the Poisons Act against unlicensed vendors of poisions.

In connection with criminal investigations undertaken by the police, 199 exhibits were examined. These included different brands of petrol for identification in a charge of stealing, miscellaneous exhibits in cases of safe breaking and burglary, pills and medicines *re* the administration of abortifacients, spirituous liquors in connection with sly-grog selling, poison baits used in the destruction of protected animals, miscellaneous exhibits relating to the malicious destruction of property, animal viscera, &c.

Coroners submitted 43 exhibits of human viscera and 4 exhibits of blood for examination in connection with cases of uncertified death. No poisons were found in 27 cases; in 7 cases strychnine was present, morphine in 3 cases, cyanide in 3, and in 1 case each death was due to arsenic, barbitone (veronal) and nicotine. In two of the bloods examined, carbon monoxide was present in sufficient quantity to indicate gas poisoning; in 1 case the difference in the chloride content of the right and left chambers of the heart indicated death from drowning, and in the other case practically no difference was found, indicating that death was due to other causes.

Municipal, departmental, and other authorities submitted 502 samples of water for examination in connection with the provision and maintenance of suitable country water supplies, and 58 samples of sewage for the control of sewage installations and to regulate the discharge of offensive drainage.

A total of 251 exhibits were examined in connection with conditions of industrial employment and the administration of the Workers' Compensation Act. The majority of the specimens consisted of urine and fæces examined for the presence of metallic poisons. A considerable amount of work has been undertaken in connection with the estimation of lead in urine, and an electrolytic method depending on the deposition of metallic lead on the cathode (full particulars of which are attached) was found to possess certain advantages over other methods and to give satisfactory results.

Miscellaneous authorities submitted 43 samples, detailed list of which will be found in Table II.

I append hereto: Tables I and II showing details of all samples examined and notes of the following investigations:—

1. Bread.—Estimation of (*a*) specific gravity of crumb as a guide to quality; (*b*) determination of acidity (p. 17).
2. Tomato Sauce, &c.—Determination of non-sugar organic tomato solids in tomato sauce, etc. (p. 18).
3. Dried Fruits.—Loss of sulphur dioxide during process of cooking (p. 19).
4. Lead in Urine.—Electrolytic estimation of (p. 20).

THOMAS COOKSEY,
Government Analyst.

TABLE I.—SAMPLES examined during the year 1927 for the purposes of the administration of the Pure Food Act, 1908.

Nature of Sample.	Authority submitting.	Samples. Number examined.	Samples. Number Adulterated or Falsely Described.	Nature of Sample.	Authority submitting.	Samples. Number examined.	Samples. Number Adulterated or Falsely Described.
Biscuits	Food Inspectors	1	0	Milk, Fresh	Food Inspectors, Metropolitan District.	7,662	238
Bread	,,	59	6				
Breakfast Food	,,	1	1				
Butter	,,	56	2	,,	Municipal and Shire Inspectors, Metropolitan District.	4,243	72
Camphorated Chalk	,,	1	1				
Camphorated Oil	,,	10	0				
Cheese	,,	3	0				
Cider	,,	4	0	,,	Food Inspectors, Country Districts.	779	74
Cocoa and Milk	,,	2	0				
Coffee and Chicory Essence	,,	15	2				
Coffee and Milk	,,	3	0	,,	Municipal and Shire Inspectors, Country Districts.	1,419	42
Colouring, Artificial	,,	1	1				
Confectionery	,,	3	2				
Cordials and Syrups	,,	13	2				
Cream	,,	34	4	Milk, Condensed	Food Inspectors	6	1
Cream of Tartar	,,	5	0	,, Dried	,,	3	1
Custard Powder	,,	2	0	Nitre, Spirits of	,,	2	1
Diabetic Foods	,,	5	5	Nuts	,,	49	29
Disinfectants	,,	2	0	Olive Oil	,,	12	0
Dripping	,,	1	0	Ointment (Zinc)	,,	13	2
Essences (Flavouring)	,,	17	9	Pastry	,,	13	0
Fats, Edible	,,	2	2	Peasemeal	,,	6	1
Flour	,,	1	0	Pepper	,,	27	0
Fruits, Dried	,,	36	21	Pickled Onions	,,	1	1
,, Tinned	,,	9	9	Pills	,,	7	2
Ginger	,,	12	0	Poisons in Foods (Exhibits re).	,,	13	0
Honey	,,	3	0				
Hydrogen Peroxide	,,	2	1	Powders, Medicinal	,,	2	0
Ice Cream	,,	27	4	Preservative	,,	2	0
,, Thickening Agent.	,,	1	0	Potatoes	,,	1	0
				Salt, Iodised	,,	1	0
Infants' Food	,,	10	1	Soap	,,	3	1
Iodine, Tincture of	,,	12	3	Spirits	,,	3	1
Jam	,,	68	1	,,	Licensing Inspectors.	34	2
Jelly Crystals, "Fruit"	,,	17	9				
Macaroni	,,	1	1	Tomato Sauce	Food Inspectors	39	1
Magnesium Carbonate	,,	2	0	Tooth Paste	,,	1	0
Margarine	,,	5	1	Vinegar	,,	3	1
Meat, Fresh	,,	216	136	Vinegar Growth	,,	1	0
,, Sausages	,,	303	107	Wine, Medicated	,,	1	1
,, Cooked	,,	85	8				
Medicines, Patent	,,	13	5	Total		15,409	828

TABLE II.—SAMPLES examined during the year 1927 in connection with the Public Services of the State.

Authority Submitting.	Nature of Sample.	No. of Samples.	Authority Submitting.	Nature of Sample.	No. of Samples.
Subsidised Charities	Acetylsalicylic Acid	2	Pharmacy Board	Strychnine	4
,, ,,	Bread	15	,, ,,	Soldering Solution	2
,, ,,	Cocoa	1	Police Department	Criminal Investigations	199
,, ,,	Cattle Food	2	,, ,,	Human Viscera	47
,, ,,	Curry Powder	1	,, ,,	Animal Viscera	4
,, ,,	Fur (*re* dermatitis)	1	Municipal and Departmental Authorities.	Waters	502
,, ,,	Maizemeal	1		Sewages	58
,, ,,	Meat	1	Industrial Hygiene Authorities	Air	11
,, ,,	Milk (fresh)	244	,, ,,	Blood	1
,, ,,	,, (human)	27	,, ,,	Confectionery	1
,, ,,	Morphine Hydrochloride	4	,, ,,	Dust	12
,, ,,	Mustard	2	,, ,,	Fruit (Dried)	1
,, ,,	Oatmeal	2	,, ,,	Soda Ash	1
,, ,,	Pepper	2	,, ,,	Wood	2
,, ,,	Sauce	1	,, ,,	Urine	161
,, ,,	Tomato Sauce	1	,, ,,	Fæces	61
,, ,,	Vegetation (poisonous)	1	Miscellaneous Authorities	Acetic Acid	2
Government Stores Department.	Bread	2	,, ,,	Bait (Poison)	1
,, ,,	Blue (laundry)	2	,, ,,	Artificial Food Colouring	1
,, ,,	Candles	2	,, ,,	Condy's Fluid	1
,, ,,	Chicory	74	,, ,,	Diabetic Food	2
,, ,,	Disinfectants	139	,, ,,	Disinfectant	1
,, ,,	Essences (flavouring)	4	,, ,,	Fish	1
,, ,,	Insecticides	3	,, ,,	Fish Paste	1
,, ,,	Linseed Meal	2	,, ,,	Gelatine	2
,, ,,	Linseed Oil	3	,, ,,	Horse dope	1
,, ,,	Lubricants	231	,, ,,	Liquid from Fire Extinguisher.	1
,, ,,	Fuel Oil	3	,, ,,	Meat Block	1
,, ,,	Paints	7	,, ,,	Milk, Fresh	8
,, ,,	Paraffin	1	,, ,,	Food Exhibits *re* Poisons	5
,, ,,	Polish (Metal)	2	,, ,,	Rubber Solution	3
,, ,,	Serge	2	,, ,,	Soil	1
,, ,,	Soap	317	,, ,,	Soldering Solution	2
,, ,,	Turpentine	2	,, ,,	Tomato Paste	1
,, ,,	Wood Preserving Oil	1	,, ,,	Wood Naphtha	2
Pharmacy Board	Arsenic	2	,, ,,	Viscera (Human)	2
,, ,,	Chlorodyne	2	,, ,,	,, (Animal)	4
,, ,,	Lysol	14			
,, ,,	Muriatic Acid	4		Total	2,237

1. BREAD.

ESTIMATION OF (A) SPECIFIC GRAVITY OF CRUMB AS A GUIDE TO QUALITY; (B) DETERMINATION OF ACIDITY.

Some work has been undertaken during the year, with the object of providing a method which would help in determining whether a bread, baked in the ordinary 2 lb. loaf size, is satisfactory in respect to the porosity of the crumb. Usually a bread is classed as heavy or otherwise on its appearance only. It was thought that the estimation of the specific gravity of the crumb, if it could be conveniently taken, would afford a more definite test. After trying several methods, it was found that the estimation of the weight of a sufficiently large volume was the simplest way of carrying out this test. The following is the method used :—

A cube of 3 inches is cut as nearly as possible from the centre of the loaf. A wooden mitre box provided with two vertical slits, exactly 3 inches apart, in the back and front of the box, to guide the knife, is made use of for this purpose. It is found that by exercising care the desired cube can be cut with a variation in size that is negligible in practice. It was ascertained from a number of determinations that the weights of the cubes of bread possessing a moisture content ranging from 40·6 to 43·6 per cent., and which were regarded as satisfactory, varied from 125 to 135 grammes, the average weight being approximately 130 grammes. It was therefore considered that 135 grammes could be taken as a useful limiting figure for the weight of a cube of bread of the size stated, as it was found in all the samples examined that a cube possessing a greater weight than this was an unsatisfactory article.

It is of some advantage to allow fresh bread to remain some time before testing, say from 24–36 hours, provided that the loaf is so wrapped that the loss of moisture is not appreciable. This allows the crumb to be cut more easily and also permits all samples to be tested under approximately uniform conditions. It has been found in practice that where any slight loss of moisture occurred it was compensated for by a corresponding shrinkage, the weight of a definite volume of the crumb remaining practically unaltered. In certain types of loaf, *e.g.*, the long French roll, it is not possible to obtain so large a sample for the determination, and in such cases a cube of 2 inches may be used, the results obtained being reasonably comparable.

Acidity.—The method of estimating the acidity of bread as described in various text-books, in which the bread is allowed to remain in the liquid while titrating, is unsatisfactory owing to the indefiniteness of the end point obtained. The method given in Allen's Commercial Organic Analysis, 5th ed., p. 577, for the estimation of the acidity of flour, gives consistent results, but occupies too much time, it being necessary to shake the sample for two hours. The A.O.A.C. official method for flour has also the disadvantage of requiring at least one hour for the estimation.

The method for the estimation of the water-soluble acidity can be considerably shortened by the following procedure :—

Take 20 grammes of the crumb from the centre of the loaf (preferably 24–36 hours old), place it in a strong glass beaker of 400 c.c. capacity; add 200 c.c. of carbon-dioxide-free distilled water, and by means

of an ordinary egg-beater with reversely revolving paddles, whirl briskly for 1 minute, or until the bread completely disintegrates. The liquid is allowed to stand until the crumb is settled (about 2 minutes); then decant carefully 104 c.c. of the upper liquid and titrate in the ordinary way with decinormal solution of sodium hydroxide using phenolphthalein as indicator. (104 c.c. allows for the approximate 40% of moisture in bread).

Acidity Determination—Comparison with Allen's Method.

Sample No.	Allen's Method (cc. N/10 NaOH for 10 grammes of crumb).	Method given above (c.c. N/10 NaOH for 10 grammes of crumb).
1	1·25	1·2
2	0·9	0·95
3	1·0	1·0
4	1·2	1·25

As the method proposed gives lower results than one in which the crumb is not removed, the standard limit for acidity (2 c.c. N/10 NaOH) should be lowered to (say) 1·5 c.c. N/10 NaOH.

2. TOMATO SAUCE, &c.

Determination of Non-Sugar Organic Tomato Solids in Tomato Sauce, &c.

During the past year an investigation was carried out to ascertain the composition of the various tomato sauces offered for sale in New South Wales, with the object of fixing a minimum standard for the amount of tomato solids to be required. After consultation with manufacturers, a scheme of analysis, including some of the A.O.A.C. official methods, was drawn up, with the object of prescribing a standard method for the determination of non-sugar organic tomato solids. The chief difficulty experienced with the analysis was in regard to the total solids content, and undoubtedly the A.O.A.C. vacuum oven method of drying at 70° C. gives the most satisfactory result, but, to meet the convenience of manufacturers, it was decided, for the present at least, to recommend that the total solids be determined by drying for 4 hours in a steam oven at 98–100° C. In practice, this gives concordant results, but about 6 per cent. lower than those obtained by the vacuum oven method. The following table gives the results obtained from the use of the two methods in question :—

Sample No.	Total Solids.	
	Dried for 4 hrs. at 100° C. in steam oven.	Dried for 4 hrs. at 70° C. in vacuo.
9	28·4 per cent.	30·1 per cent.
10	39·2 ,,	41·9 ,,

Should it be decided to adopt the vacuum oven method a proportionately higher figure for the minimum tomato solids content would have to be prescribed.

The following is the method recommended to be prescribed :—

1. *Preparation of Sample.*—Proceed as directed in A.O.A.C. Methods of Analysis, 1925 edition, Method No. 12, p. 220.

2. *Total Solids.*—Weigh about 5 grammes into a flat bottomed glass dish, having a diameter of approximately 7 c.m. and a depth of 3 c.m. Distribute evenly in a thin layer over the bottom of the dish. If the sample is very thick it is advisable to add 1 c.c. of distilled water to aid the even distribution. Evaporate on steam bath for thirty minutes and dry in a steam oven for four hours at a temperature of 98–100° C. Cool in desiccator and weigh.

3. *Ash.*—Evaporate 5–10 grammes of the sample to dryness in platinum dish on steam bath. Char thoroughly, being careful to avoid loss of salt. Exhaust the char with 25 c.c. of hot distilled water, breaking the material with a glass rod if necessary. Collect the insoluble residue on a 9 c.m. ashless filter paper. Wash the dish and filter paper with successive portions of 15 c.c. and 10 c.c. of hot distilled water. Place filter paper and contents back in dish, dry and ignite at a temperature not exceeding dull redness until free from carbon. Add the filtrate to the dish; evaporate on steam bath; dry to constant weight in air oven at a temperature of 100 to 105° C. Cool in desiccator and weigh.

Sugars.

4. *Reducing Sugars before Inversion—For products containing 10–20 per cent. invert sugar.*—Weigh 10 grammes of the sample. Dilute with about 100 c.c. of distilled water and transfer to a 500 c.c. graduated flask. Clarify, using a slight excess of neutral lead acetate solution; dilute to mark and filter. Remove the excess of lead with dry potassium oxalate. Filter and determine reducing sugar by Method No. 35 A.O.A.C. Methods of Analysis (1925 edition, p. 190), using 50 c.c. of the filtrate.

For products containing less than 10 or more than 20 per cent. invert sugar.—Vary the amount of sample weighed so that the 50 c.c. of the filtrate will give a reduction of about one-half the Fehling's solution used (50 c.c.).

Express the results obtained as percentage of *invert sugar before inversion.*

5. *Reducing Sugars after Inversion.*—Proceed as directed in Method No. 21, A.O.A.C. Methods of Analysis (1925 ed., p. 221), using 50 c.c. of the final filtrate obtained in (4), for the estimation of reducing sugars before inversion.

Express the results obtained as percentage of *invert sugar after inversion.*

6. *Sucrose.*—The difference between the percentages of invert sugar before and after inversion (4) and (5), multiplied by 0·95 gives the percentage of Sucrose (Cane Sugar).

7. *Total Sugars.*—Total sugars are the sum of Invert Sugar before Inversion and Sucrose (Cane Sugar).

8. *Non-Sugar Organic Tomato Solids.*—The percentage of non-sugar organic tomato solids is obtained by subtracting the sum of the percentages of total sugars and ash from the percentage of total solids.

NOTE.—If apple or other fruit is used in the preparation, the non-sugar organic solids are calculated as fruit solids.

If starch or other thickening agent is used, the amount present must be taken into consideration when calculating non-sugar organic tomato solids.

The analyses given hereunder were obtained by the use of the above method. No allowance was made for the small amount of condiments (usually less than 0·5 per cent.) present.

It will be seen from the attached table of analyses that only two samples, Nos. 4 and 10, contain more than 5 per cent. non-sugar organic tomato solids; two contain between 4·0 and 4·4 per cent.; five contain between 3·0 and 3·9 per cent.; and two less than 3 per cent. Two samples prepared with apple contained 3·4 and 3·5 per cent. of non-sugar organic fruit solids, respectively.

As the result of the investigation, it is proposed to fix a standard of not less than 4 per cent. non-sugar organic tomato solids in tomato sauce or ketchup.

TOMATO SAUCE, TOMATO KETCHUP, AND TOMATO CHUTNEY.

Analyses by R. G. O'Brien, A.S.T.C., A.A.C.I. and I. M. Knight, B.Sc., A.A.C.I.

Sample No.	Total Solids (4 hrs. at 100° C.).	Sugars.			Ash.	Chlorine as Sodium Chloride.	P_2O_5.	Acidity as Acetic Acid.	Non-Sugar Organic Tomato Solids.	Non-Sugar Organic Fruit Solids.	Remarks.
		Total.	Invert.	Cane.							
	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	
Sauce 1	25·8	17·2	6·7	10·5	4·6	3·9	0·083	1·3	4·0	.....	No apple present.
Sauce 2	29·0	20·4	12·7	7·7	4·3	3·5	0·074	1·3	4·3	.....	No apple present.
Sauce 3	28·9	21·4	12·9	8·5	3·6	2·8	0·078	1·1	3·9	.....	No apple present.
Sauce 4	33·8	23·9	15·4	8·5	4·0	3·0	0·082	1·5	5·9	.....	No apple present.
Sauce 5	26·8	20·4	10·5	9·9	3·0	2·3	0·067	1·1	3·4	.....	No apple present.
Ketchup 6 ...	28·6	22·6	14·8	7·8	3·2	2·4	0·071	1·0	2·8	.....	Few cells resembling apple present.
Sauce 7	25·3	17·4	11·8	5·6	4·2	3·2	0·088	1·4	3·7	.....	No apple present.
Sauce 8	25·4	19·2	13·1	6·1	3·0	1·95	0·090	1·5	3·2	.....	No apple present.
Sauce 9	28·4	19·4	7·7	11·7	4·2	3·1	0·076	1·3	3·3	.....	No apple present, sample contains approx. 1·5 per cent. starch.
Sauce 10	39·2	29·1	20·0	9·1	4·2	3·6	0·057	2·0	5·9	.....	No apple present.
Chutney 11 ...	25·2	18·8	12·9	5·9	2·9	2·2	0·048	0·9	.....	3·5	Apple present.
Sauce 12	23·8	18·3	13·3	5·0	2·9	2·4	0·044	0·9	2·6	.....	A few cells resembling apple present.
Ketchup 13	28·3	21·9	12·4	9·5	3·0	2·2	0·11	1·1	.....	3·4	Apple present.

3. DRIED FRUITS.

AMOUNT OF SULPHUR DIOXIDE LOST IN THE COOKING OF DRIED FRUITS.

In connection with the request that the question of the desirability of raising the amount of sulphur dioxide in dried fruits from 7 grains to 14 grains per lb. be taken into consideration, an investigation was carried out to determine the loss of sulphur dioxide in the fruit after cooking in the manner recommended by the Fruitgrowers' Association.

The dried fruit was soaked in five times its weight of tap water and allowed to stand overnight (about eighteen hours). This water was strained off, and fresh water sufficient to cover the fruit (about an equal weight of water to the weight of the wet fruit) and sugar added. The whole was brought to boiling point and allowed to simmer gently for five minutes, with the cover off the cooking vessel. The fruit was allowed to cool by standing for ten minutes before analysis.

The sulphur dioxide present was estimated by the volumetric method, all necessary precautions being taken, with the following results:—

Analyses by R. G. O'BRIEN, A.S.T.C., A.A.C.I.

Fruit.	Sulphur Dioxide.		
	In Uncooked Dried Fruit.	Remaining in Fruit after Cooking.	
		Calculated on Original Dried Fruit.	Calculated on Fruit and Syrup as Eaten.
	Grains per lb.	Grains per lb.	Grains per lb.
Apricots	16·9	6·6	1·1
Peaches	1·2	0·4	0·07
Pears	7·6	3·9	0·7

Remarks.—It was found that one-third to one-half of the sulphur dioxide originally present remained after cooking in the manner recommended. The dried fruit absorbed about two parts of water during soaking and cooking, and this, with an equal weight of syrup added, reduced the sulphur dioxide content of the prepared article as actually eaten to from one-tenth to one-sixteenth of the amount originally present.

4. Electrolytic Estimation of Lead in Urine.

(By T. Cooksey, Ph.D., B.Sc., F.I.C., F.A., C.I., and S. G. Walton, F.A.C.I.)

As mentioned in my annual report for 1925, a considerable amount of work has been undertaken with the object of curtailing the time spent in connection with the estimation of traces of lead in urine, and at the same time to, if possible, increase the accuracy of the results.

Methods which rely both on chemical precipitation and electrolytic deposition have been under review. After numerous trials, the electrolytic method described below in detail, which depends on the deposition of metallic lead on the cathode, the work in connection with which was carried out by Mr. S. G. Walton, was decided to be the most satisfactory. It possesses the advantage that it makes use of small quantities of chemical reagents, all of which are easily obtained free from lead, and the actual time occupied in the manipulation is small. The claim that lead is completely precipitated from a pathological urine by this method is supported by the fact that a specimen which had been submitted to electrolysis was further tested by complete destruction of the organic matter by oxidation in the usual way, with the result that no lead could be detected therein.

Details of Method.—Ascertain the acidity of the urine, using methyl red as indicator, and determine therefrom the amount of acetic acid that it is necessary to add to 500 c.c. of the urine (contained in a suitably shaped beaker), so that the total acid present is approximately equivalent to 3 grammes of acetic acid.

The solution is now electrolysed, the strength of current used being ·3—·4 ampere. The platinum electrodes, consisting of cone and wire spiral (see Baird and Tatlock's Catalogue, 1923, A. 4626) should be those used for this purpose, and they should be so connected that the lead is deposited on the spiral. The latter should reach to within 1 centimetre of the bottom of the beaker. It is advisable to select a narrow-shaped beaker, of 500 c.c. capacity, and 11 c.m. high, in order to promote an efficient circulation of the liquid.

When the electrolysis (which can usually be carried out overnight) is finished—after sixteen or seventeen hours—a small amount of phosphate is sometimes found adhering to the cathode. The beaker containing the urine is carefully removed while the current is still passing, and immediately replaced by one of the same height, but half the capacity, containing 250 c.c. of distilled water and 1 c.c. of strong hydrochloric acid. The passage of the current is allowed to continue for two hours. At the end of this time it will be found that all the phosphate has been dissolved. This beaker is now replaced (with the current still flowing) by one of the same size containing 250 c.c. of distilled water, which is allowed to remain for half an hour. It is then removed and the current switched off.

After that part of the cathode which remained above the level of the liquid has been wiped clean to remove adhering spray, the cathode is washed with alcohol and allowed to dry. The lead is dissolved in 4 c.c. of strong, hot nitric acid by pouring the acid over the cathode several times. This solution is transferred to a small glass crystallising dish. The cathode is again treated in the same manner with a hot mixture of 1 c.c. strong nitric acid and 9 c.c. of distilled water, and finally washed, using 5 c.c. of hot water.

The whole is evaporated to dryness over the water bath, 1 c.c. strong hydrochloric added, and again evaporated to complete dryness. The residue is treated with 0·1 to 0·2 c.c. N/1 hydrochloric acid and a few drops of distilled water, warmed to dissolve, 4 c.c. of distilled water added, and again warmed on the water bath to ensure complete solution.

The solution is transferred to a graduated measure and made up to 6 c.c. Take 3 c.c. of this solution and transfer to one of a number of small test tubes which are marked at 3 c.c. Test tubes of the same bore and colour should be utilised. A standard solution containing 0·00001 gramme of lead per c.c. is prepared, and added to a series of comparison tubes in the following amounts: 0·0, 0·5 c.c., 1·0 c.c., 1·5 c.c., 2·0 c.c., 2·5 c.c., and 3 c.c. To each tube is then added the same amount of hydrochloric acid as that contained in the solution to be tested and the volume made up to the 3 c.c. mark with distilled water. 2 c.c. of a *freshly-prepared*, saturated solution of potassium metabisulphite is added to each. The contents of the tubes are well mixed and the tubes corked and allowed to stand one to two hours. The tube contents are again well mixed, and the turbidity of the sample tube compared with that of the standards.

If the lead content is heavy, a smaller quantity than 3 c.c. should be taken for the estimation, and made up to 3 c.c. with distilled water and sufficient hydrochloric acid to preserve the same acidity as in the standards.

As it may occasionally happen that a small proportiox (usually, however, not more than one-tenth) of the lead present is not removed in the first electrolysis, it is advisable to submit the sample and washes to a second treatment. Heat the urine contained in the beaker after electrolysis on the water bath for one hour, cool, and make up to the original volume with distilled water. In the event of a deposit of phosphate forming in the cathode during the first electrolysis, a further 0·5 c.c. of glacial acetic acid is added, and the liquid again electrolysed overnight. The hydrochloric acid wash and the water wash from the first electrolysis are combined and heated on the water bath for one hour, cooled, 1 c.c. strong hydrochloric acid added, and the volume made up to 500 c.c. This solution is used for the first wash of the electrode in the second electrolysis—the current being passed for two hours. The wash is immediately replaced by one containing 250 c.c. of distilled water. The cathode is again treated in the same way as in the first electrolysis. Any lead found is added to that found previously.

It is of advantage to have a considerable reserve of voltage, which is made use of during the washing stages.

For the purposes of checking materials, a blank experiment should be carried out, using the glassware, electrodes, and reagents made use of in the analysis.

Normal urine examined by this method was found to possess a lead content varying from 0·02—0·05 mgm. per litre, averaging 0·04 mgm. per litre. The method as described is intended for the estimation of the very small amounts of lead occurring in urine, and the accuracy of its results compares very favourably with those obtained from other methods in use. Any small error made in the comparison of the lead-sulphite precipitates will necessarily be multiplied in the estimation of larger amounts, but in such cases the method of determination of the amount of lead deposited on the cathode may be varied as found necessary.

As some urines vary very considerably from normal in respect of the solids content it would propably be of advantage to bring such urines, either by evaporation or dilution, to approximately normal conditions before electrolysis.

PURE FOOD ACT, 1908.

REPORT OF THE CHIEF INSPECTOR ON THE GENERAL ADMINISTRATION OF THE PURE FOOD ACT, 1908, FOR THE YEAR ENDED 31st DECEMBER, 1927.

Staff.

Chief Inspector: ARTHUR KENCH.

Metropolitan Inspectors: Senior Inspector CHARLES V. FRANCIS, GUY A. GRIFFIN, WILLIAM H. EILBECK, ARTHUR C. PATTON, WILLIAM ALLISON, PHILLIP C. WILLIAMS, JOHN BOLTON, ROBERT FARLOW, JOSEPH H. SHIEL, FRANK BLAKE, RUPERT CUMMINS.

Country Inspectors: ROBERT HORNE, JOHN C. WILLIAMS.

Assistant: WALTER J. MADGWICK.

I HAVE pleasure in submitting a report of the work performed during the year by officers of the Pure Food Branch. The executive work under the Pure Food Act includes the supervision of all places where food or drugs are prepared, stored or exposed for sale. Particular attention is given to the supervision of the milk supply; to the manufacture of jams, and fruit and vegetable preserving; condiments, smallgoods, and cordials; and to the general conditions of grocery, fruit, vegetable, fish, and meat shops, both wholesale and retail.

Bread Supply.—Special inspectorial work has been carried out in connection with the preparation and delivery of bread and pastry, and many bakeries have been remodelled and repairs effected under the supervision of departmental officers.

Milk Supply.—In connection with the supervision exercised over the milk supply, 8,289 samples were procured by departmental officers, and submitted to the Government Analyst for analysis. Prosecutions successfully undertaken against traders who were defrauding the public by supplying adulterated milk numbered 168, and the fines and costs recovered in connection therewith totalled £752 2s. In addition, 288 samples of milk were procured and submitted to the Microbiological Laboratory for examination for tubercle bacilli and estimation of the bacterial content.

Cream.—Twenty-nine samples were procured, the results of analysis warranting three prosecutions. Fines and costs recovered amounted to £12 4s.

Meat: Use of Preservative Dusting Powders.—The question of preservation of meat has been thoroughly investigated; 570 samples of meat, including sausages, were obtained and submitted to the Government Analyst for analysis; in 206 cases it was found that traders had been dusting the surface of the meat with preservative powder. Prosecutions were undertaken in every case and resulted in fines and costs amounting to £686 12s. being imposed.

Other Foods and Drugs.—A total of 1,449 samples of foods and drugs were submitted for analysis, and 213 traders were prosecuted. The fines and costs amounted to £726 4s.

Premises Used for Preparation, Sale, and Storage of Food.—Inspections were made of 10,729 premises used for, or in connection with, the preparation, sale, or storage of food. Prosecutions undertaken for unclean premises, &c., numbered 84; the fines inflicted totalled £492 16s. In addition, over 814 notices were served on traders requiring structural alterations to premises.

Seizure and Condemnation of Unsound Food.—During the year regular supervision has been exercised over food products in wholesale and retail stores, bulk stores, auction rooms and elsewhere. Over 286 tons of foodstuffs and 105,000 packages of assorted foods were found to be in a damaged and deteriorated condition; these goods were seized and destroyed; 17 prosecutions were instituted and resulted in collection of fines and costs amounting to £93.

Veneral Diseases Act.—At the request of the Commissioner administering this Act special investigations were made concerning breaches of the Act, 9 prosecutions were undertaken and resulted in collection of fines and costs amounting to £77 12s.

Tables are appended showing the nature of the samples taken during the year and the class of food seized and destroyed. A detailed statement of the foods and drugs submitted for examination will be found in Table I of the Government Analyst's report (p. 16).

ARTHUR KENCH,
Chief Food Inspector.

TABLE I.—Summary of Work performed by Pure Food Officers for Year ending 31st December, 1927.

Analysis of Samples of Milk.	Samples taken by—		Total.
	Departmental Officers.	Municipal and Shire Council Inspectors.	
Number of samples taken from all parts of the State	8,289	4,284	12,573
Number of samples below the standard	295	67	362
Number of warnings	127	28	155
Number of prosecutions	168	39	207
Amount of fines and costs	£752	£146	£898

*Foods and Drugs, other than Milk.** (See Table I, p. 16.)

Number of samples taken from all parts of the State	1,449
Number of samples below standard	231
Number of warnings	18
Number of prosecutions	213
Amount of fines and costs	£726 4s.

*Local authorities (municipal and shire councils) do not, as a matter of routine, collect samples of food and drugs other than milk.

Food unfit for Consumption, Seized and Destroyed. (See Table II below.)

Number of prosecutions	17
Amount of fines and costs	£93

Inspection of Premises used for Preparation, Sale, or Storage of Food.

Number of premises inspected in all parts of the State	10,729
Number of notices issued	814
Number of prosecutions	84
Amount of fines and costs	£492 16s.

General Breaches of Pure Food Act and Regulations.*	Departmental Officers.	Municipal and Shire Council Inspectors.
Number of prosecutions	153	.....
Amount of fines and costs	£286 7s.	.....

*Uncleanly habits in preparation, handling, delivery, or storage of food; use of dirty or unsuitable utensils, &c.

Summary of Legal Proceedings for Breaches of the Pure Food Act and Regulations, 1927.

	Prosecutions.	Fines and Costs. £ s. d.
Adulterated milk	168	752 2 0
Adulterated foods and drugs	213	726 4 0
Goods seized and destroyed	17	93 0 0
Unclean premises	84	492 16 0
General breaches	153	286 7 0
Breaches of V.D. Act and Regulations	9	77 12 0
Grand Total	644	£2,428 1 0

TABLE II.—Showing nature of Food, &c., seized and destroyed by Departmental Pure Food Officers for period 1st January to 31st December, 1927.

Goods.	Quantity.	tons	cwt.	qr.	lb.	Prosecutions.	Fines and Costs. £ s. d.
Bacon	...	0	0	1	3	...	...
Baking powder	378 tins		.....			...	...
Barley	...	2	6	1	20	...	...
Biscuits	...	0	3	1	7	...	...
Beer, wine, &c.	73 bottles		.....			...	...
Breakfast foods	...	7	1	0	11	...	...
Butter	...	0	1	3	0	1	3 8 0
Cakes	.....	0	0	1	21	...	...
Cocoa	676 tins	0	6	0	4	...	...
Coconut	...	1	2	0	14	...	...
Coffee	282 tins	0	8	2	21	...	...
Confectionery	1,271 boxes	1	12	2	18	1	5 8 0
Condiments	2,749 bot. 10 gal.		.....			...	...
Cordials	103 bot. 8 gal.		.....			...	...
Cheese	5,018 pk.	0	12	2	21	...	...
Cream	37 tins		.....			...	...
Crockery	425 pieces		.....			4	8 16 0
Eggs	...	0	2	2	0	...	...
Fish	8,607 tins	4	18	2	0	3	6 4 0
Fish & meat paste	180 tins 3,360 jars		.....			...	...
Flour	...	162	12	2	23	...	...
Fruit, dried	701 pk. & tins	2	0	2	0	3	31 4 0
Fruit, preserved	4,218 tins	1	7	0	24	...	...
Fruit pulp	...	10	8	0	23	...	...
Fruit	194 cases 36 doz.	5	3	3	4	1	3 8 0

Goods.	Quantity.	tons	cwt.	qr.	lb.	Prosecutions.	Fines and Costs. £ s. d.
General groceries	1,656 tins 11,172 pk. 493 bot.	13	3	0	2	...	...
Ginger	...	0	0	0	5	...	...
Honey	...	0	5	3	18	...	...
Infants' food	...	0	8	0	25	1	20 8 0
Jam	2,419 tins	0	17	0	9	...	...
Macaroni	28 tins	1	12	1	7	1	5 8 0
Meat	12 tins	0	5	2	26	1	4 8 0
Medicines & drugs	2,059 bot. 56,880 pk. 189 tins	4	8	1	2	...	...
Milk	934 tins 30 gal.	3	10	3	3	...	...
Nuts	...	6	10	2	0	...	...
Olives	...	0	1	3	4	...	...
Rice and sago	...	1	18	2	14	...	...
Soup	...	0	0	1	4	...	...
Salt	...	0	0	2	2	...	...
Sugar	...	0	9	0	13	...	...
Tapioca	...	0	0	3	12	...	...
Tea	...	0	0	2	16	...	...
Vegetables	45 tins	54	4	0	25	1	4 8 0
		288	6	3	9	17	93 0 0

Total—19,661 tins, 8,837 bottles and jars, 76,714 packets and cases, 48 gallons, and 425 pieces of crockery.

TABLE III.

SUMMARY of Work performed by Departmental Pure Food Inspectors under the Pure Food Act, 1908, from 1st October, 1909, to 31st December, 1927.

Annual Number of Milk Samples Collected.

Year.	No. of Samples Collected.	No. below Standard.	No. o Prosecutions.	Amount of Fines and Costs.
				£ s. d.
1909-10	2,155	279	185	860 5 7
1911	1,963	248	152	829 9 6
1912	2,990	436	210	1,124 4 0
1913	3,519	322	144	709 17 0
1914	3,980	291	189	837 11 0
1915	4,338	312	196	803 17 0
1916	3,013	230	115	496 17 0
1917	3,241	268	122	598 15 0
1918	4,015	371	159	774 6 0
1919	3,592	476	178	970 19 0
1920	6,022	536	243	1,697 10 0
1921	7,865	263	146	846 5 0
1922	6,702	399	140	685 12 6
1923	8,485	444	201	1,043 5 6
1924	8,805	327	149	747 13 0
1925	8,640	344	163	744 6 0
1926	9,745	353	186	750 6 0
1927	8,289	295	168	752 2 0
	97,359	6,194	3,026	£15,273 1 1

Samples of Food and Drugs Collected (other than Milk).

Year.	No. of Samples llected.	No. below Standard.	No. of Prosecutions.	Amount of Fines and Costs.
				£ s. d.
1909-10	391	49	41	150 4 0
1911	830	245	171	451 0 6
1912	593	71	71	148 17 0
1913	641	107	72	174 12 6
1914	734	135	71	321 4 0
1915	572	69	31	149 6 0
1916	557	172	50	235 12 0
1917	449	139	58	118 6 0
1918	456	131	25	48 4 6
1919	822	205	41	172 14 0
1920	1,080	207	19	65 15 0
1921	888	169	20	69 2 0
1922	758	121	17	47 3 0
1923	415	168	55	132 13 0
1924	834	166	93	348 2 0
1925	1,082	256	99	317 4 0
1926	1,170	182	154	400 8 0
1927	1,449	231	213	726 4 0
	13,721	2,823	1,301	£4,076 11 6

Return showing number of Premises Inspected annually.				*General Breaches of Act and Regulations.**			
Year.	No. of Inspections made.	Prosecutions for Dirty and Unclean Premises.	Fines and Costs.	Year.	No. of Breaches.	Prosecutions.	Fines and Costs.
			£ s. d.				£ s. d.
1909-10	802	46	94 14 6	1909-10	47	36	63 9 0
1911	929	50	235 12 0	1911	67	26	57 11 0
1912	982	88	305 1 2	1912	72	60	114 8 6
1913	2,600	93	382 7 6	1913	65	40	127 0 6
1914	3,953	152	638 15 6	1914	71	42	167 7 6
1915	3,561	71	284 9 6	1915	80	55	163 15 6
1916	4,731	95	493 1 6	1916	90	21	154 8 6
1917	5,097	166	811 12 5	1917	137	47	376 16 2
1918	5,785	166	686 5 11	1918	200	131	375 12 10
1919	5,330	38	239 3 6	1919	...	60	274 2 8
1920	9,159	107	449 16 6	1920	...	83	368 2 0
1921	10,621	109	574 4 0	1921	...	113	634 10 4
1922	9,246	111	587 12 0	1922	...	72	252 19 0
1923	10 681	159	821 18 6	1923	...	119	293 4 0
1924	12,188	112	701 0 6	1924	...	47	185 1 6
1925	12,196	106	573 11 0	1925	...	66	224 5 6
1926	11,370	70	340 18 0	1926	...	64	197 4 0
1927	10,729	84	492 16 0	1927	...	153	286 7 0
	120,860	1,763	£8,715 0 0		829	1,235	£4,316 5 6

* Includes unclean methods in preparation, handling, or delivery of food; use of dirty or unsuitable utensils; storage of food in sleeping rooms, lavatories, &c.

Summary of Legal Proceedings, 1909 to 1927.

Year.	Prosecutions.	Fines and Costs.
		£ s. d.
1 Oct., 1909–31 Dec., 1910	281	1,168 13 1
1911	379	1,573 13 0
1912	439	1,693 10 8
1913	349	1,393 17 6
1914	454	1,964 18 0
1915	369	1,561 10 0
1916	371	1,457 8 0
1917	513	2,162 17 7
1918	468	2,198 9 3
1919	338	1,896 14 2
1920	452	2,581 3 0
1921	388	2,124 1 4
1922	340	1,573 6 6
1923	562	2,450 11 0
1924	401	1,983 17 0
1925	455	1,948 6 6
1926	499	1,785 0 0
1927	644	2,428 1 0
Total	7,702	£33,925 17 7

DAIRIES SUPERVISION ACT, 1901,

AND

CATTLE SLAUGHTERING AND DISEASED ANIMALS AND MEAT ACT, 1902.

REPORT by the Chief Dairy Inspector on the activities of the Dairies Supervision Branch, Department of Public Health, for the year ended 31st December, 1927.

Staff.

W. A. MACKIE, Senior Inspector, Camden.
S. C. FLOOD, Bangalow.
J. S. LYONS, Grafton.
J. LACEY, Taree.
R. A. FAUNCE, Maitland.
W. G. JOHNSTON, Casino.
F. J. MADDEN, Sydney.
V. M. NEVELL, Kiama.
C. A. JOHNSTON, Lismore.
C. A. MOFFITT, Singleton.
T. W. HANMER Tamworth.
A. H. SMITH, Moss Vale.
C. A. NEPEAN, Wagga.
R. O. CHATHAM, Murwillumbah.
J. KENNY, Bega.
V. L. NEVELL, Kempsey.
N. H. LITCHFIELD, Bathurst.

Number of miles travelled in inspectorial work, 103,810; dairy premises inspected 13,960; dairy cattle inspected, 407,707. Number of dairy cattle condemned for tuberculosis, 489; actinomycosis, 127; cancer, 72; other diseases 18, total, 706. Number of cattle submitted to the tuberculin test, 624; reacted 57.

During the year 4,091 milch cows, and 2,906 dry cows were inspected at Flemington milch cow saleyards. These yards are the principal port of entry into the suburban dairies, thus affording an opportunity for a close examination of all dairy cows which are sold at this centre for the purpose of producing milk for human consumption. The health of the animals consigned for sale was satisfactory, and only one cow in the dry section was condemned for pleuro-pneumonia contagiosa.

Cattle Slaughtering.—631 country slaughtering places were inspected; beef cattle examined, 1,197; number condemned 6, tuberculosis 4; actinomycosis 1; pleuro-pneumonia contagiosa 1.

North Coast Bacon Factories.—Meat Inspectors are stationed at the following North Coast centres:—O. H. Lowe and H. J. Kirkland (Byron Bay); A. J. Clogg (Lismore); G. R. McCredie (Ballina); J. Elliott (Grafton).

The number of animals slaughtered for human food, all of which were subjected to a searching post-mortem by the above staff, is as follows:—bullocks 1,186 (condemned for tuberculosis 13); cows, 1,575 (tuberculosis, 47); pigs, 69,495 (tuberculosis, 2,310); calves, 124 (0); sheep, 4,566 (0).

Prosecutions.—189 prosecutions were instituted for breaches of the Acts governing the work of this Branch, and the defaulting traders were mulcted in fines and costs the sum of £586 17s.

Staff.—During the year the vacancies created by the retirement of Mr. J. G. Bocking, of Maitland, and the death of Mr. A. J. Mackie of Bathurst, and Mr. F. J. Page of Kempsey, were filled by the appointment of Mr. R. O. Chatham to the Murwillumbah district; Mr. J. Kenny to the Bega district; Mr. V. L. Nevell to the Kempsey district, and an additional appointee, Mr. N. H. Litchfield, was allocated to the Bathurst district.

Advantage was taken of Mr. Litchfield's appointment to create a new district on the North Coast with Bangalow as headquarters, thus reducing the unwieldy area supervised by the Lismore and Murwillumbah officers, and Mr. S. C. Flood was transferred from the Murwillumbah district to this new centre.

An outbreak of swine fever occurred at Liverpool State Hospital which necessitated the destruction of the whole herd of pigs. The source of infection was traced to communication with slaughtering premises where an outbreak of swine fever had previously occurred. The drastic remedy involving the slaughter of the whole of the pigs had the desired result, and the piggery is now being restocked without any adverse happening.

As in past years all the cattle kept at the State Hospitals controlled by this Department were subjected to the tuberculin test with most satisfactory results. The manufacture of tuberculin by the Department has enabled a much greater use to be made of this preparation, and its reliability has been well established by frequent post-mortems on reacting animals.

T. V. BLOMFIELD,
Chief Dairy Inspector.

SUMMARY of the number of registered dairymen and milk vendors, and approximate number of dairy cattle on registered premises in New South Wales at 31st December, 1927, compiled from returns supplied by local authorities under the Dairies Supervision Act, 1901:—

District.	Number of Registered Dairymen.	Number of Milk Vendors.	Number of Dairy Cattle on Registered Premises.
Municipalities—			
Metropolitan	346	4,838	9,234
Metropolitan Police	190	17	3,453
	536	4,855	12,687
Country Municipalities	2,373	3,843	61,065
	2,909	8,698	73,752
Police Districts	18,569	314	836,077
Total	21,478	9,012	909,829

REPORT OF THE CHIEF SANITARY INSPECTOR FOR THE YEAR ENDED 31st DECEMBER, 1927.

Inspectorial Staff.—Chief Sanitary Inspector, E. A. Cresswick, M.R.S.I. Sanitary Inspectors: T. A. W. Curry, Cert.R.S.I.; E. M. Jackson, Cert.R.S.I.; G. A. Garrow, Cert.R.S.I.; S. L. Parsons, Cert.R.S.I.; S. R. Stoney, Cert.R.S.I.

Sir,

I have the honor to submit the following report on the year's work of this Branch:—

Routine and General.

Inspection of Country Towns.—During the past year primary inspections of four towns were carried out. Recommendations were forwarded to local authorities concerned to have necessary improvements effected.

Systematic reinspections of seventeen towns and villages were made for the purpose of ascertaining what action had been taken by local authorities to cause improvements previously recommended to be carried out.

Four outbreaks of typhoid were investigated in different parts of the country.

From the investigations made during the year, it is evident that the local authorities are taking a more active interest in sanitation generally. This has resulted in a marked improvement of the conditions found in most of the country towns visited.

In consequence of the smallness of my staff the scope of operations has been restricted, and there are many small towns and villages which have not yet been inspected. During the year one officer was loaned to the Metropolitan Medical Officer of Health, on special duty, for about four months; and another officer was engaged on the "Better Farming Train" for about the same length of time. However, approval has been given for appointment of additional sanitary inspectors.

Sanitary and Garbage Depot Sites.—129 existing sites were inspected, and the suitability of 55 proposed depot sites was investigated and reported on. In some instances the depots were found to be unsatisfactory, and action was taken to improve the conditions. Several offenders were prosecuted for breaches of the Ordinances, and local authorities were requested to have necessary improvements carried out. In practically every case where reinspection was made, considerable improvement was found.

Special investigations were made in connection with seven sanitary and three garbage services in different parts of the State.

Insanitary Buildings.—Inspection was made of 124 insanitary dwellings; of these 41 were in such a condition as to be practically beyond repair, and closing orders were issued to local authorities, who were recommended to close the buildings. In other cases where the dwellings were structurally sound, recommendations for improvements were forwarded to councils for attention and action.

On reinspections being made it was found that in most instances the necessary action had been taken. Many insanitary structures had been demolished, and considerable renovations and repairs effected.

The operations of the Department in regard to unhealthy buildings occupied a considerable amount of time and attention by this Branch in districts where councils do not employ properly qualified inspectors. For this reason, and for the reason that very unsatisfactory sanitary conditions are found in many such areas, it is considered that the appointment of trained inspectors should be made mandatory on all councils, as is the case in other Australian States and New Zealand.

Homebush State Abattoirs.—Sixty inspections were made of the by-product plants and drainage at the Homebush State Abattoirs.

In consequence of the improvements which have been introduced and the new processes which have been adopted, there have been very few complaints during the year. The premises generally have been conducted in a satisfactory manner.

General Inspections.—In addition to the abovementioned matters, inspections and investigations have been made in reference to 87 septic tanks, and septic tank sites; 201 septic tank plans from councils and others; 66 complaints of nuisances; 9 aborigines' camp and other camp sites; 374 noxious trade premises; 29 slaughter-houses; 47 food premises, including butchers' shops; 235 unhealthy building lands; 12 public hospitals; 30 private hospitals (new and existing); 18 public and private schools; 117 theatres and public halls; 10 dairies; 6 cemeteries; 14 barbers' shops; 86 wharves and ferries; 10 ferry-boats; 19 show grounds and racecourses; 5 town water supplies; 10 Government and public buildings; bedding factories; 3 drainage schemes; smoke nuisances; 13 chemical closets (including test of one chemical closet); 2 public baths; 4 disinfections of premises; 55 samples of flock, feathers, bedding, &c.; 2 inspections of wool scours; 2 inquiries *re* suspected leprosy cases; 4 water supplies; 5 railway rest houses; 2 scavenging districts; and 2 lots of dampcourse materials.

Pollution of Harbours, Rivers, and Watercourses.—Many inspections were made in regard to complaints of the pollution of natural watercourses, &c., both in the metropolitan area and the country districts. Action was taken in every instance where there appeared to be danger of the pollution of water, or where a nuisance was being caused.

Plans and Tracings prepared or examined.—This work included the preparation of plans and/or tracings of proclaimed land, septic tanks, proposed sanitary and garbage districts, as well as the examination of building plans of hotels and other structures, submitted by the Licensing Bench, municipal and shire councils, and others.

Theatres and Public Halls.—117 inspections and reinspections were made during the year. Noticeable improvements have been effected in the structures and conveniences, as well as the methods of cleansing and maintenance; and a greater regard is shown for the comfort and convenience of patrons.

Practically all the halls recently erected are of modern design and excellent appointments, and many of the older buildings have been improved.

The investigations have apparently encouraged a greater interest by local authorities and inspecting police officers, more especially in the country districts, where their assistance is of the greater importance.

The ventilating plants of several theatres were tested as to efficiency, and air tests were carried out in public halls during performances to ascertain whether the amount of air change was satisfactory or not.

Recommendations were submitted to the Chief Secretary's Department in relation to the nature and amount of permanent ventilation which should be provided in halls dependent on natural perflation. A report was also submitted indicating the amount of sanitary accommodation which was regarded as reasonable.

Routine Destruction of Rats.—Systematic trapping and poisoning were carried out on the water-front from Woolloomooloo to Blackwattle Bay, by the departmental rat-catchers, and 6,603 rats and 834 mice were caught and examined in the Microbiological Laboratory. None were found to be affected with plague.

The co-operation of the Sydney Harbour Trust with the rat-catchers attached to this Department and the continued structural improvement in buildings and wharves have considerably reduced the amount of rat infestation on the water front during the year.

Prosecutions.

The following prosecutions were instituted and conducted by officers of this Branch:—

Act under which information was laid.	No of Prosecutions.	Amount of Fines and Costs.
		£ s. d.
Pure Food Act, 1908	3	20 12 0
Local Government Act, 1919	16	36 16 0
Noxious Trade Act, 1902	11	40 8 0
Theatres and Public Halls Act, 1908	1	5 8 0

In several other cases where councils were asked to take proceedings, officers attended courts and gave evidence in support of the prosecution.

Health Section "Better Farming Train."

During 1927 (March to October) this Department provided a health section car on the "Better Farming Train," and an officer of this Branch was placed in charge to demonstrate and lecture on matters appertaining to public health.

Lectures relating to hygiene and sanitary appliances were well attended, and from inquiries made at the conclusion of the lectures or demonstrations, it was evident that the country people were eager to acquire a better knowledge of health matters generally. Lectures on flies and other such pests were also given to school children in several of the districts visited.

The care, management, and working of a septic tank were fully explained and lectures on the tank were delivered. For the purpose of giving information in reference to the suitability of sites for septic tanks, or as to the cause of the derangement of any existing tanks, it was frequently necessary to make special visits to various premises.

The section dealt with both personal and public hygiene and created a considerable amount of interest, the exhibits, posters, &c., being the means of encouraging many pertinent questions on matters relating to improved sanitation and health.

Noxious Trades.

The rapid extension of building in the neighbourhood of Sydney has rendered many of the existing noxious trades areas quite unsuitable, and further inquiry has been made in reference to setting apart a special site for noxious trades business beyond the populous areas. Two sites are under consideration, one comprising some 3,000 acres situated to the west of Sydney, and another of about 1,000 acres at the north.

Three hundred and seventy-four noxious trade premises were inspected, and considerable improvement was found in plants and appliances, as well as in the methods of conducting and maintaining premises. Four unregistered traders were located and action was taken to compel them to have their premises registered or to cease trading.

Five hundred and forty-nine licenses were issued. A number of persons ceased trading during the year.

Considerable assistance was given to councils and others in regard to selection of site, layout of plant and appliances, and proper method of maintenance of premises.

Hookworm.

Work done in connection with the hookworm campaign was considerably less than in previous years, but a comprehensive survey of the North Coast districts has been planned for 1928 by the Health and Education departments of this State, in conjunction with the Commonwealth Department of Health.

Mosquito Eradication.

A number of local authorities took some action, and a few did exceptionally good work with regard to the prevention of mosquito-breeding. I have to report with regret that in most cases no action was taken by local authorities and in others the efforts were spasmodic and practically valueless.

Much publicity and advice has been given as to the importance of mosquito eradication in relation to public health, but the results have been disappointing. The adoption of Ordinance 41 is optional on local authorities and many have failed to have it extended to their districts. The provisions of the Ordinance might be made mandatory to all areas, so that some action could be enforced in mosquito-infested districts.

Health Engineers' Conference.

As arranged by the Director-General of Public Health, I attended the first Commonwealth Conference on Public Health Engineering, held in Melbourne in September, 1927, as delegate from this Department.

The conference was well attended by representatives of the various Government Departments and local authorities from all the States, and the programme included visits to various works, water and sewerage schemes, &c. Interest was well maintained over the whole period of nine days that the conference occupied.

The papers submitted were generally very interesting and instructive. The subjects dealt with included schemes for water supply, deforestation, filtration, chlorination, &c., sewerage, house connection practice, sewage purification and treatment works, meat inspection, collection of waste waters from abattoirs, transportation and disposal of municipal and ship refuse, regulation of camping, control of noxious trades, town planning, and ventilation of theatres. Papers were also read on "The Sanitary Engineer" and "The Need for Health Inspection."

I contributed a paper on the control of noxious trade premises, including the disposal of wastes dealt with thereat. This paper was well received and raised numerous inquiries.

General discussion on the various papers was good, and the conference was of considerable educative value to the delegates.

E. A. CRESSWICK,
Chief Sanitary Inspector.

PRIVATE HOSPITALS ACT, 1908.

Report on the Operation of the Act for the year ended 31st December, 1927, by F. M. Suckling, M.B., Ch.M., D.P.H., (Sydney), D.T.M. & H. (Cambridge), Assistant Medical Officer of Health.

For the purposes of this report the State is divided, as hitherto, into two sections :—

(*a*) Sydney district, which consists of the metropolis and certain suburbs and towns, as shown in the map published in the New South Wales railway time-table.

It will be noticed that the area included in such map is of greater extent this year than that published in former years, with the result that certain towns included as "Country" in previous annual reports are now transferred to the metropolitan section, viz., Blacktown, Camden, Campbelltown, Canley Vale, Fairfield, Liverpool, Penrith, Richmond, Riverstone, St. Mary's and Windsor. Such additional suburbs and towns contain fifteen private hospitals.

(*b*) Country districts which comprise the remainder of the State.

At the close of the year there were 609 licensed hospitals throughout the State, showing a decrease of 28 as compared with the previous year.

Of these 609 hospitals, 265 are included in the Sydney district, the remainder, 344, being situated in the country districts.

This decrease to some extent may be attributed to the provisions of the Nurses Registration Act and concomitant amendment of the Private Hospitals Act coming into operation, which necessitated certain uncertificated nurses (hitherto holding conditional licenses on terms as explained in former reports) relinquishing their businesses since they were unable to secure registration under the Nurses Registration Act.

Inspection of Private Hospitals.—This has been carried out as circumstances permitted on lines similar to those indicated in last year's report. It is hoped, however, in conjunction with projected activities under the Nurses Registration Act that this work may be extensively amplified in the near future.

In the routine departmental reinspections of hospitals made during the year, those in the following country towns were reported upon:—Newcastle and suburbs, Broken Hill, Cessnock, Condobolin, Cooranbong, Glen Innes, Gulgong, Kearsley, Kurri Kurri, Lake Cargellico, Lake Macquarie, West and East Maitland, Paterson, Queanbeyan, Raymond Terrace, Singleton, and Werris Creek.

It was ascertained as a result of inspection that structural defects were usually of a minor nature, *e.g.*, lack of impervious floors to bathrooms, insufficiency of air grate ventilators, &c. Many resident managers were found to be still somewhat remiss in entering up their registers in full detail.

Community Activities in connection with Private Hospitals.—It is pleasing to note the continued interest which the Bush Nursing and Country Women's Associations are taking in providing for the establishment of small hospitals in the sparsely populated areas of the State. At the close of the year the Bush Nursing Association was responsible for licensed hospitals at Erigolia, Humula, Jindabyne, Kentucky, Nimmitabel, Pilliga, Tumbarumba, and Ungarie, and others were to be established at Ebor, Finley, Ivanhoe, Reid's Flat, and Urbenville.

The Country Women's Association established a maternity hospital at Hillston, and another is to be opened at Gulargambone.

Exemptions.—Only one hospital had exemption under the Act at the close of the year, viz., that controlled by the Bush Nursing Association at Mount Hope.

Prosecutions.—There were no prosecutions under the Act during the year, although several warnings as to evasions of the Act had to be issued.

Sepsis connected with Pregnancy in Private Hospitals.—Seventeen cases were reported during the year. Twelve of these were notified from the metropolitan area, ten of which were single cases affecting ten individual hospitals, the remaining two being reported from one hospital. The five country cases were notified as single cases from five individual hospitals at Delegate, Gundagai, Gulgong, Yass, and Inverell.

In all instances the nurses in charge were certificated nurses. Of the sixteen hospitals involved, seven hospitals were licensed for the reception of lying-in patients only, the remaining nine being licensed for medical, surgical, and lying-in cases.

Those cases occurring in the metropolitan area were made the subject of special departmental inquiry.

I am of the opinion that the number of cases duly notified does not accurately represent the total number of cases of puerperal sepsis which may have occurred in private hospitals throughout the State. Such a discrepancy may be accounted for perhaps because of the following circumstances :—

(*a*) In a minor degree to ignorance of the regulations dealing with this complaint.

(*b*) To a greater extent because of the doubt whether a case does or does not come within the meaning of the term "septicæmia."

A nurse is usually guided by the medical practitioner in attendance on the patient as to whether she should notify the case or not, and there is always likely to be some hesitancy on the part of the doctor to definitely diagnose a case as one of septicæmia and to inform the nurse with a view to notification, owing to the results which are likely to so accrue. The reputation of both doctor and nurse may perhaps be affected in the community, and the nurse in addition has precautionary restrictions placed on her by both the Private Hospitals and Nurses Registration Acts.

As an example of this difficulty it happened recently in a country town that a nurse failed to report the occurrence of "septic cases" in her hospital (necessitating a special departmental visit and inquiry), and the excuse tendered by the nurse was that the medical attendant had not informed her of the nature of the complaint.

A solution of this problem may possibly be found if "a train of events occurring after confinement with a rise of temperature" rather than a specific disease could be made notifiable both by the medical practitioner in attendance and the nurse concerned, to be called for example "puerperal pyrexia." Such notified cases would then be made the subject of investigation to ascertain the cause of the increased temperature, &c., and the advisability or otherwise of placing an embargo upon the activities of the nurse and hospital concerned.

As this question involves also the activities of the Nurses Registration Act and Maternal Welfare Movement, it is anticipated that at an early date the matter will be taken up departmentally to evolve some scheme which may satisfactorily solve the problem.

Effects of the Nurses Registration Act on the Administration of the Private Hospitals Act.—

(1) A decrease in the number of hospitals has occurred for the reasons previously given at the beginning of this report.

(2) All approved nurse resident managers of private hospitals at the close of the year were duly State registered. No unregistered nurse holding approval under section 10 (d) of the Private Hospitals Act existed as a resident manager. The special section of the Nurses Registration Act which is as follows: "any person attending a lying-in woman who does not reside within 5 miles of a legally qualified medical practitioner or midwifery nurse, or in whose case no such practitioner or nurse is known after due inquiry to be able or willing to attend" was not evoked.

(3) Some overlapping occurs in the duties cast upon midwifery nurses with regard to these two Acts, *e.g.*, double set of registers, dual notification of certain diseases, dual notification of still-births and deaths.

It is realised that much of the administration of these Acts could be co-ordinated under a common staff, *e.g.*, inspection of hospitals, supervision of nurses, investigation into certain notifiable diseases common to both Acts, and it is anticipated that at an early date steps will be taken to provide the necessary officers for such a purpose. It is also proposed to review the regulations under the Private Hospitals Act with the object of securing some improvements, more especially in management and equipment of these institutions, *e.g.*, provision of labour wards, sterilising apparatus, adequate staffing by duly registered nurses, &c.

Private Hospital Accommodation for Infectious Diseases.—This has seemed to be a distinct want in the metropolitan area for many years, but licensees appear to be reluctant to embark on this venture partly owing to difficulty in securing premises suitable for the purpose and partly no doubt for financial reasons owing to fluctuations in the prevalence of these diseases. One private hospital only has provided such accommodation for years past (in a small isolation block), but during the past year a nurse opened a commodious hospital at Ryde for the purpose of accommodating patients suffering from infectious complaints.

Assistance rendered by other Departments.—The thanks of this Department are due to the Commissioner of Police, the Registrar of the Nurses Registration Board and their officers for their ready and able assistance in the administration of the Private Hospitals Act.

Comments on Tables I and II.—

Table I.—As indicated in this table, lying-in hospitals still constitute the greatest proportion of those licensed, being 58 per cent. of the total.

Table II.—The number of hospitals containing from 4–10 beds continues to comprise the largest proportion of licensed premises, being 46 per cent. of the total (a slight increase in this class on that of the previous year, 44 per cent.).

A former table contained in previous annual reports dealing with the number of uncertificated nurses in charge of private hospitals has been now omitted since all such nurses at the close of the year happened to be duly State registered.

In the large majority of the licensed hospitals the licensee and approved resident manager were constituted in the one individual, the exceptions being 52 (Sydney district 15, country 37).

Twelve medical practitioners held the position of resident manager (Sydney district 2, country 10).

TABLE I.—Showing the Classification of Private Hospitals Licensed at 31st December, 1927, according to Nature of Cases received and the total number of beds provided by each class of hospital.

	Medical, Surgical, and Lying-in.		Medical and Surgical only.		Lying-in.		Total.	
	No. of hospitals.	No of beds.	No. of hospitals.	No. of beds.	No. of hospitals.	No. of beds.	No. of hospitals.	No. of beds.
Sydney District	78	1,635	30	547	157	662	265	2,904
Country Districts	126	1,164	17	277	201	816	344	2,257
Total	204	2,859	47	824	358	1,478	609	5,161

TABLE II.—Showing Classification of Private Hospitals with respect to size as signified by Number of Beds available.

	1	2	3	4-5	6-10	11-20	Over 20.	Total.
Sydney District	13	31	37	50	57	42	35	265
Country Districts	17	38	63	66	108	43	9	344
Total	30	69	100	116	165	85	44	609

MEDICO-LEGAL SECTION, &c.; HOSPITAL ADMISSION DEPOT.

REPORT OF THE GOVERNMENT MEDICAL OFFICER FOR SYDNEY FOR THE YEAR ENDED 31st DECEMBER, 1927.

Medical Staff.

DR. ARTHUR PALMER, Government Medical Officer for Sydney; DR. A. E. GIBBES, Second Government Medical Officer for Sydney; DR. R. M. MACKAY, Third Government Medical Officer, Sydney; Dr. Frederick Tooth, Medical Officer.

Depot Staff.

DANIEL FRAZER HEYWARD, Senior Attendant; WILLIAM G. JONES, Depot Attendant; WILLIAM CLARKE, Escort Attendant.

Sir,

I have the honor to present herewith a brief review of the work carried out by Dr. Tooth (on the transference of Dr. Gibbes to the State Insurance Department) and myself during 1927.

MEDICAL WORK AT HOSPITAL ADMISSION DEPOT.

Examination of Indigent Sick Persons.—The Government Medical Officers attend at the Hospital Admission Depot every morning from 9 a.m. to 12.30 p.m. to examine indigent sick persons seeking admission to the various hospitals and institutions. During 1927 18,115 persons were sent to the State Hospitals and Homes, or to one or other of the Metropolitan hospitals or convalescent homes. The sick poor who are unable to attend at the depot are seen at their homes, and arrangements made for their transfer to a suitable institution.

MEDICAL EXAMINATIONS FOR PUBLIC SERVICES, &c.

Examinations for the Public Service Board.—The Hospital Admission Depot is utilised for the examination of some of the candidates for admission to the Public Service, and there were 302 examinees under this heading during the year. Other examinations of public servants were in cases of applications for retirement before 60 years through physical incapacity or other medical reasons, and their re-examination each year; or to ascertain the fitness of officers to continue on duty between the age of 60 and 65 years. Special medical examinations are also occasionally required in connection with other Service matters.

Medical Examinations of Police Staff.—758 persons applying for admission to the police force were examined during the year, and 102 probationary constables were re-examined on completion of twelve months' service. Candidates for appointment to this important service are first examined at the Hospital Admission Depot, and after twelve month's service are re-examined at the office of the Inspector-General of Police. At my rooms in the Police Department members of the police force on the sick list are seen daily, and other matters arising in connection with this service are attended to. During 1927 there was an average daily number of 50 police on sick report as compared with 46 for 1926.

Other Public Services.—Other work for public services included the examination of pilots for the Navigation Department.

Vaccinations.—433 persons were vaccinated at the Hospital Admission Depot; most of these were members of the police force.

Medical Examinations required by the Factories Act are also made by the Government Medical Officers; there were 4,682 such examinations in 1927.

Examinations for Legal Aid Office.—The work of the Legal Aid office carried out at the Hospital Admission Depot has lately decreased—possibly only temporarily.

MEDICO-LEGAL WORK.

Cases of alleged Rape and Criminal Assault.—In these cases it is desirable that the persons concerned should be examined with the least possible lapse of time, and urgent calls by the police are frequent at all hours of the day and night in connection with such charges. During 1927, 54 persons were examined in connection with such cases, and there were 62 examinations of clothes and other exhibits in criminal cases.

Suicides, Murders, and Violent or Uncertified Deaths are medico-legal matters which require immediate attention by this Branch. The work for the Coroner's Court in 1927 in connection with such cases comprised the external examination of 199 dead bodies, the making of 179 internal post-mortem examinations, and the giving of evidence at 88 inquests. In several instances evidence was subsequently given at the Central Criminal Court.

In connection with medico-legal cases, all exhibits of clothing, implements, &c., in cases of murder, rape and assault are submitted to this Branch before being sent on to the Microbiological or Chemical Laboratories for examination.

Medical Examination of Accused Persons.—A number of examinations were made of accused persons under the arrangement by which persons charged with capital or other serious offences are medically examined as soon as possible after arrest.

Examinations had also occasionally to be made to ascertain the fitness of prisoners to travel to Long Bay.

Lunacy Cases.—The Reception House at Darlinghurst was visited daily throughout the year for the purpose of examining persons under detention there, and 942 persons (497 males and 445 females) were certified as insane.

In conclusion, it may be added that the medical officers attached to this Branch are on duty at all hours, and are liable to be called upon at any time by any court of law or department of the State Government for work requiring general medical knowledge.

Workers' Compensation Act.—Two experienced and valued medical officers attached to this Branch (Dr. A. E. Gibbes, second Government Medical Officer, and Dr. R. M. Mackay, third Government Medical Officer) have been engaged for some months on work arising in connection with the Workers' Compensation Act.

ARTHUR A. PALMER,
Government Medical Officer for Sydney.

SECTION I.—B.

Division of Maternal and Baby Welfare.

ANNUAL REPORT OF THE DIRECTOR
(Dr. E. Sydney Morris),
For the Year Ended 31st December, 1927.

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SECTION I.—B.

DIVISION OF MATERNAL AND BABY WELFARE.

Annual Report of the Director (Dr. E. Sydney Morris) for 1927.

PART I.

MATERNAL WELFARE.

There is perhaps no question of public health of greater general interest than that of maternal mortality. This interest is mainly due to the realisation that many maternal deaths are preventable, and also to an appreciation of the fact that these deaths are bound up with infant mortality, particularly the mortality of the first month of life.

This neo-natal mortality has probably focussed attention on the maternal mortality, for it was found that the first month mortality did not decline in the same way as did the mortality subsequent to the first month, and, further, that it resisted all the efforts which have proved successful in the remaining eleven months of the first year of life. The causes of maternal mortality for the years 1926 and 1927 are set out in Table I.

TABLE I.

CAUSES OF MATERNAL MORTALITY.

Causes.	1926.		1927.	
	Married.	Single.	Married.	Single.
Accidents of pregnancy	32	1	40	...
Illegal operations	28	12	28	18
Puerperal hæmorrhage	27	...	31	3
Other accidents of childbirth	25	1	26	2
Puerperal septicæmia	61	6	96	7
Puerperal phlegmasia (alba dolens) / Embolism (sudden death)	21	1	24	...
Puerperal albuminuria and convulsions	53	6	67	3
Following childbirth (unspecified)	1	...	5	...
Puerperal diseases of the breast	1	...	2	...
Total	249	27	319	33

1. *Accidents of Pregnancy.*—Under this term are included abortion (other than criminal abortion or abortion followed by septicæmia), miscarriage, ectopic pregnancy and hyperemesis gravidarum. There is little doubt that many abortions and miscarriages are produced artificially. This problem is a social one which seems to be almost inherent in large centres of population. All available statistics tell the same story that abortion is increasing, and in spite of drastic legislation is apparently not readily amenable to control. The relationship between economic conditions, the higher cost of living, unemployment, and similar factors and the prevalence of abortion would prove an interesting consideration, but would be somewhat out of place in this report. Nevertheless, one must perforce realise that the decreasing birthrate of recent years and the economic pressure towards small families are probably closely associated with this question of intentional interference with the course of pregnancy. Whatever the explanation may be, the fact remains that each year shows in its mortality statistics the result of this practice, not only in regard to abortions themselves, but also and especially in regard to the number of cases which each year are classified, as the result of coronial inquiry, under the heading of illegal operations. In this connection I should like to quote the report of the Medical Superintendent, Coast Hospital, regarding the cases of abortion treated in his institution.

"*Abortion.*—During the year (1925) 497 patients were treated for abortion. The admission for this condition has increased of late years at a startling rate, as indicated by the following figures which show the ratio of abortion cases to all cases treated in successive years, 1919–1925 inclusive.

Year.	Total Patients Treated.	Abortions.	Percentage.
1919	5,941	54	0·91
1920	6,313	193	3·06
1921	6,952	237	3·41
1922	7,339	354	4·82
1923	8,769	381	4·34
1924	8,667	436	5·03
1925	8,935	497	5·56
1926	10,754	620	5·76

"I think it may be taken for granted that in the great majority of these cases, if not in all, the abortion has been artificially produced. The patients were sent to hospital on account of a rise of temperature which raised alarm of sepsis. Of the 497 under treatment in 1925, 7 died from this cause; the others recovered. The situation has thus been created that this hospital is an accessory or cover to the abortionist by admitting and curing any of his victims who show signs of going wrong after the operation.

"This is certainly an improper role to be forced on a Government institution, but so far no remedy has been found. Meanwhile the practice of abortion must be increasing enormously in the metropolis as the patients who seek admission to hospital are probably only a small proportion of those on whom the criminal operation is performed."

Abortion, and especially abortion which has been artificially procured, plays an important part in the production of maternal mortality, and whilst we know of the deaths there is no information regarding the cases who survive but pay a postponed penalty in morbidity and ill-health, or perhaps suffer a fatal complication at the next pregnancy.

It is a well-known fact that abortion is likely to be followed in future pregnancies by many complications, especially septic infection. There is perhaps no more fruitful cause of morbidity than abortion, which apparently is accepted voluntarily by large numbers of women who are ignorant of, or refuse to recognise, the many dangers inherent in this procedure.

The statistics under this heading (Accidents of Pregnancy) do not tell the whole story, since approximately one-third of the deaths classified under puerperal septicæmia are due to septicæmia which follows not full-time childbirth but abortion.

Miscarriage, usually differentiated from abortion by the fact that the foetus has reached a viable stage of development, is generally not the result of artificial interference. Nevertheless it is a potential source of maternal mortality, and especially of maternal morbidity. It has been estimated that the death-rate per 1,000 births among mothers of stillborn children, compared with that among mothers of live-born children is twelve times as great, whilst the incidence of fatal haemorrhage is twenty-one times greater.

The prospect of improving the present position does not appear to be hopeful. Abortion being more a social than a medical problem it is beyond the control of the medical profession. If it be argued that the medical profession is to blame on the ground of unsuccessful treatment, it must be pointed out that treatment of these cases involves in the vast majority admission to hospital. Even the affording of hospital facilities will not necessarily control the situation, because women do not seek admission till complications have arisen. So long as the progress of the case is not alarming, the fact will only come under medical notice at a late date.

Ectopic Pregnancy.—The causes of this condition have not been definitely ascertained, and in the absence of that knowledge there does not appear to be any means available for the prevention of this condition. Ectopic pregnancy produces no symptoms in its early stage, but the process cannot go very far before some inevitable complication must occur. The woman may no sooner recognise that she is pregnant before she faces a fulminating catastrophe which always constitutes an emergency of great magnitude. An immediate operation offers the only hope of saving the patient's life. The urgency with which treatment must be effected, together with, in many cases, unavoidable delay in procuring medical assistance will always imply a certain number of deaths from this cause.

Illegal Operations.—This problem is somewhat allied to that of abortion, but since the cause of these deaths is definitely known, and has been ascertained by a coronial inquiry, they should really not be ascribed to maternal mortality. Elsewhere than in New South Wales deaths from this cause are classified under "Homicide," which appears to be logical, and is in accordance with the International Classification of the Causes of Deaths. The most disconcerting feature of these deaths is the number of married women comprised in the total. One can readily appreciate the attitude of single women faced with an overwhelming trouble, driven to clutch at any straw, but the fact that twenty-eight married women in 1926 and also in 1927 should die from the result of illegal operations is somewhat appalling.

If any single fact were required to emphasise the remarks made in connection with abortion it is supplied here.

Illegal operations constitute the greatest cause of death amongst unmarried mothers—44 per cent. of the total in 1926, whilst in 1927 the proportion was 54 per cent. of the total.

Puerperal Hæmorrhage.—"Puerperal haemorrhage" includes both ante and postpartum haemorrhage, either of which constitutes a grave complication of child-birth. The advent of these complications cannot usually be forestalled. They arise suddenly and call for urgent action, which, in many instances, means much manipulation, with frequently inevitable sacrifice of the child. Only by efficient midwifery can the

mother's life be saved in the vast majority of cases, and even where the immediate danger is averted the mother may still succumb to super-added complications, especially septic infection. Many such cases have to be treated under unsatisfactory conditions, for there is little time for anything beyond preventing the mother from bleeding to death under one's eyes. Hospital care and facilities are of the greatest value, but at all cost the case must be treated on the spot. Nothing will test so severely the ability, resource and knowledge of the doctor and the midwife as the control of serious puerperal hæmorrhage when it occurs in an ordinary home.

There is a close relationship between nephritis with its consequent toxæmia and antepartum hæmorrhage. Efficient ante-natal care and supervision would help considerably in reducing if not entirely averting the deaths which arise from this cause. The knowledge that such an accident is likely to arise would allow the patient to be sent into hospital, which is, perhaps, the most desirable place wherein to face such an awkward eventuality.

Other Accidents of Child-birth.—This classification includes such conditions as Cæsarian section, version, forceps application, difficult labor, rupture of the uterus, &c. It is to be hoped that deaths from these causes will in the future be a diminishing factor in our maternal mortality.

Many of these complications can be foreseen and therefore guarded against. They afford an excellent field for preventive midwifery during the period of pregnancy, and there is every reason to believe that they can be considerably reduced, if not for the greater part eliminated, by adequate ante-natal care and supervision. The time will surely come when these complications will be recognised as capable of being prevented, or, failing this, that they should be managed under the best possible conditions. The fact that such a complication was not anticipated will be considered a reflection both on the patient herself and her attendant. With efficient continuous ante-natal care, the cause of delayed labor will be guarded against, thus reducing the necessity for manipulative interference. Having supervised the patient during pregnancy the medical attendant will know definitely the actual state of affairs, will be able to assess the patient's individual power more or less precisely, and in virtue of knowing that there is no reason for interference, will refrain from using forceps or other adventitious aid. Where an obstetric operation must inevitably be undertaken the patient will have been placed under the most satisfactory conditions, with all factors in the case duly recognised and assessed. In the absence of such knowledge resulting from the lack of ante-natal supervision, a hasty decision must be made urgently, operative procedures often undertaken single-handed, and the patient subjected to many risks which with foresight could have been avoided. Until these considerations are acted upon by the medical profession and the public, we shall have "failed forceps" cases admitted to our hospitals, whilst death resulting from version, Cæsarian section, and similar operations will swell our mortality returns.

Faced with a difficult case it is quite readily understood how delay in labor can be interpreted by the medical practitioner in terms of, say, contracted pelvis. The point is, however, that there is no necessity in the vast majority of instances for such a diagnosis to be made urgently and during the actual process of parturition. If the true cause be contracted pelvis this fact should have been recognised prior to confinement when the condition loses half its terrors. Similar criticism might be urged against Cæsarian section—a very spectacular but dangerous solution of difficult labor. It is one thing to state that in no other way can a woman be delivered, it is quite another to pilot the patient through all the pitfalls and complications inherent in this procedure. With ample time to consider alternatives, to make the necessary preparation and to obtain other opinions, a trial labor would obviate many Cæsarian operations and reduce the occasion when failure would be recorded in our vital statistics.

Puerperal Septicæmia.—This is the outstanding cause of maternal mortality, and the cause which shows the greatest fluctuation from year to year. One-third or more of the total deaths in each year are ascribed to puerperal septicæmia. It must be remembered that many deaths placed in this category are due to abortion, and from statistical investigation it appears that approximately one-third of the "puerperal septicæmia" deaths arise directly from abortion. As previously mentioned, abortion is not amenable to control along ordinary lines, being a social as much as a medical problem. Especially is this the case with septic abortions, which, for the most part, are due to intentional interference with the course of pregnancy.

There appears to be little prospect of improvement along preventive lines so far as these particular abortion cases are concerned, and if the mortality rate for these is to be lowered the only hope seems to lie in the direction of curative treatment. Here, again, difficulty is met with, since these cases are generally definitely septic when medical advice is sought, and the infection runs a notoriously rapid course.

The remaining two-thirds of the cases classified as puerperal septicæmia arise in connection with the birth of a living or, at least, of a viable child.

Theoretically, puerperal septicæmia should not arise provided that the obstetric technique is satisfactory.

From the time of Semmelweiss, Pasteur, and Lister to the present day the analogy between surgical infection and "child-bed fever" has been recognised.

During this interval there has been ample opportunity for the work of these pioneers to have borne its full fruit. Although virulent epidemics of puerperal septic infection have been obviated, the condition still remains in its individual incidence a reproach to medical science. Surgery, at the time when Lister was applying the principles of Pasteur, compared with modern practice, was a science in the stage of development. The danger of septic infection was a constant dread, which effectively prevented liberties being taken and which made certain regions of the body, particularly the serous cavities, an untrodden field so far as the practice of surgery was concerned.

Every forward step was taken in trepidation and nothing in the way of technique was left to chance. Success in any new direction verified the principles underlying the new knowledge and gradually impressed all with the necessity for meticulous care and precision if satisfactory results were to be achieved.

Midwifery, on the other hand, dates back beyond civilisation; it has been with us from time immemorial—as long as the human race has existed. It constituted no new field awaiting exploration and it offered no scope equivalent to surgery for spectacular triumphs. It is probable that since for countless generations millions of births had occurred more or less satisfactorily, neither the profession nor the public imagination was fired with the implication of these new discoveries in the realms of surgery and bacteriology.

With the elimination of gross epidemics of "child-bed fever" the conscience of mankind has apparently been lulled until recent years when the anomaly has been pointed out with progressively increasing insistence.

Certain other anomalies have also tended to perpetuate this state of affairs. If, for example, the delivery of a woman in unhygienic surroundings or if any other breach of the aseptic ritual were inevitably followed by septic infection cause and effect would be permanently associated. Instead we find frequently that the woman delivered in perfect conditions, surrounded by every facility which should make for safe confinement, nevertheless develops septic infection. On the other hand we frequently find that the woman delivered under conditions where by all considerations she should suffer a virulent infection yet remains unscathed. Why this is so constitutes not only a paradox and a problem but also a danger since it mitigates personal responsibility of the medical or the nursing attendant or both. Further it tends to condone defective technique, for the latter does not inevitably exact the penalty for a breach of the rules. The possible sources of infection are extremely numerous, and this accounts in great part for the diversity of opinion regarding its actual origin.

Even where the aseptic ritual is beyond criticism, an inflammatory condition in the nasal antrum of an attendant may act, as shown by Dr. Marshall Allen, as a focus of infection.

The virulence of the organism and the resistance of the patient are two factors which cannot readily be assessed, and yet both must play an important part in the incidence of the infection. Virulence is variable in the same organism under varying conditions, but it is well known that virulence may be greatly enhanced with each successive transfer from one individual to another. It has always seemed to me to be probable that an organism which may produce slight symptoms designated sapræmia in one case could by transfer to another patient have its virulence so increased as to bring about a fatal septicæmia in the last patient. Granting the presence of a virulent organism or an organism with enhanced virulence resulting from transfer from another individual, it is obvious that the result will be most disastrous in a patient whose resistance has been lowered. Such lowered resistance is inevitable in a patient exhausted from hæmorrhage, or operative procedure, which generally means injury to the maternal tissues. The association of trauma with septic infection is an outstanding fact which has long been recognised and which is being more and more insisted upon in recent years. Prolonged and difficult labours which have involved instrumentation or internal manipulation are the type most frequently followed by septic infection, and it is in these cases in which trauma is most frequently a concomitant. The control of this cause of maternal mortality will require coordinated efforts in many different directions. Certain special considerations may be summarised as follows :—

(*a*) *Ante-natal Control of Septic Infection.*—The special value of ante-natal supervision so far as puerperal septic infection is concerned is that by its means many indirect causes of infection may be anticipated and removed. Abnormal presentation, pelvic obstruction or contraction and the numerous obstacles which cause difficult or delayed labour can be modified, controlled or eliminated during pregnancy. In this way one fruitful source of trauma and consequent infection can be considerably reduced. By this means dangerous operative procedures can be reduced to a minimum by timely attention, whilst complications which cannot be prevented can at least be attended under suitable conditions instead of in an ordinary home without adequate assistance or where facilities essential for the safe conduct of emergency operations may be entirely absent.

(*b*) *The Control by Efficient Management of Labour.*—This implies an efficient medical attendant or an efficient midwife or both. The more intensive training of the medical student, which has been effected by the University, will gradually bring about improvement, though it must be remembered that it will require from ten to fifteen years before the effect of such improved training will be reflected in statistics. This is due to the fact that it will take some years for the new graduates to become established in appreciable numbers throughout the State. The extension of the period of training for midwifery nurses will probably be brought about in the future. The main difficulty is to obtain uniformity between the different States and other countries. If one State alone increases the period of training it will not be prepared to allow registration of nurses trained elsewhere for a shorter period. The latter State will retaliate by refusing registration of other than its own trainees on the ground of lack of reciprocity. If the nurses are not to be penalised it is essential that any forward step should be made concurrently in the various States. There is little doubt that the pressure of public opinion will eventually force the recognition of this principle. Granting that the ability of the professional attendants is assured there still remains much to be done at the present moment to overcome the immediate difficulty. We cannot view the present position with equanimity, nor can we await the advent of better conditions without striving to expedite their inauguration. It is for each and every individual assuming professional responsibility for obstetric service to assess the extent of his own efficiency. The old order is passing and before long it will be impossible to satisfy public opinion by pleading extenuating circumstances as a reason for an obstetric fatality. The medical profession itself, both individually and collectively, must take a firm stand against the unreasonable demand of an unthinking section of the public especially when such demand involves any added risk to the parturient woman.

As I have said elsewhere: "The responsibility for undertaking operative midwifery under unsatisfactory surroundings is a very grave one, for, apart from the danger inherent in the operation itself, the subsequent nursing and treatment calls for special consideration. The average practitioner when faced with a surgical emergency does not consider it derogatory to his prestige to obtain the advice and help of a colleague. Yet in the practice of midwifery there seems to be an unwritten law that every medical man who considers himself competent should be prepared to manage successfully, generally single-handed, each and every serious obstetric operation, compared with which from the point of view of danger the majority of surgical operations dwindle into insignificance.

"The practitioner is often summoned purely to meet such emergency, and then finds himself in the difficult position of having to make a decision almost instantaneously. There may be little or no time for adequate antiseptic preparation, and the risk is taken. If his efforts meet with success so much to the good, but unless he is extremely conscientious his obstetric susceptibilities are in consequence blunted, and the standard of an inevitable necessity may become the standard of succeeding practice."

. . . . . .

"From personal investigations among medical men the conclusion has been forced upon me that there is an unhealthy rivalry in the profession in the field of midwifery. It would appear that the pressure of public opinion weighs too heavily against professional judgment.

"A disinclination on the part of the medical man to expedite delivery is apt to be misinterpreted as inefficient midwifery by the patient and her friends. A practitioner is liable to enhance his reputation by the almost universal use of forceps, whilst his colleague, actuated by the highest motives, may suffer in virtue of his reluctance for indiscriminate instrumentation. So long as one competitor adopts the practice, all others must show an equal competence. Attendance upon normal labour should not be an opportunity for the display of legerdemain or any wonderful *tour de maitre*, but rather for the exercise of a discriminating but masterful patience."

(c) *The Management of the Puerperium.*—The period immediately subsequent to the birth of the child is usually regarded as of slight or, at least, secondary importance. Nevertheless inefficient management during this stage may tilt the scales against the patient, and the very best technique during labour may be entirely outweighed by inefficient nursing during this period. Even where no fatality or potentially fatal complication arises a bad nurse may lay the foundation for much morbidity in the later years of the mother's life. It will be seen that any particular factor is inextricably bound up with other factors and it is impossible to isolate one as of outstanding importance. If success is to be obtained the various factors must be dealt with as a co-ordinated whole.

(d) *The Notification of Puerperal Septic Infection.*—This is a central pivot of administration since it allows and implies action for the control of the spread of infection. This matter will be discussed more fully when dealing with 'The Administrative Control of Maternal Mortality.'

Puerperal Albuminuria and Eclampsia.—This group ranks next to puerperal septicæmia as the second greatest cause of maternal mortality. Approximately some 300 cases of severe puerperal toxaemia occur annually, with a mortality between 20 and 25 per cent. Whilst the actual cause underlying these conditions is not precisely known we possess abundant information which will enable us to prevent fatalities therefrom. The only reason why this knowledge is not applied can be summed up in one word—apathy. The apathy of the public is due to ignorance, but one regrets to state that there is also culpable apathy in a certain section of the medical profession. There is every reason to believe that if the urine were examined regularly at monthly intervals during the first five or six months of pregnancy, and at fortnightly intervals during the last few months of pregnancy, these deaths could be reduced more than those from any other cause of maternal mortality.

These deaths stand out, in my opinion, as the greatest reproach in our vital statistics, a reproach which could be avoided by a comparatively small though definite and co-ordinated effort. Australian mothers appear to be extremely susceptible to puerperal toxæmia, and it is difficult to ascertain with any precision the reason underlying this outstanding fact. It is probable that the condition is associated in some way with the national diet of a country. It has been well known for many years that eclampsia has always varied in incidence and in severity in different European countries, being especially marked for its low incidence in countries which have a large peasant population. It was found in certain countries, particularly Austria, which had a very severe experience as the result of the war, that the post-war conditions which involved semi-starvation of great masses of the community had practically eliminated the problem of eclampsia. Apparently, owing to the deficiency of food, expectant mothers could not get the fish or meat which forms so important a part of our diet, and it is probable that these articles of food are at least associated in some obscure way with the prevalence of eclampsia and puerperal toxæmia amongst our own population.

America, which is a country possessing the same abundance of food as this country, shows that its womenkind are just as liable to eclamptic manifestations as are Australian mothers.

The best treatment for eclampsia and allied conditions is prevention, and as the majority of patients have a longer or shorter period of premonitory symptoms, such as albuminuria, œdema, headache, disturbances of vision, &c., there is ample opportunity of forestalling an impending tragedy in the great majority of cases. The fatalities result not so much from lack of knowledge, but from not detecting the danger-signals in an early stage when treatment is most likely to be effective. It is recognised that certain cases will arise which, in spite of every attention during pregnancy, will still become eclamptic. These, however, form a very small proportion of the total, and it is the great bulk of preventable deaths which demand urgent attention. It is hoped that with the gradual education of the public, the stressing of the need for antenatal care and supervision, and the pressure of an enlightened professional opinion, these deaths will be a progressively decreasing factor in our mortality statistics.

GRAPH No. I.

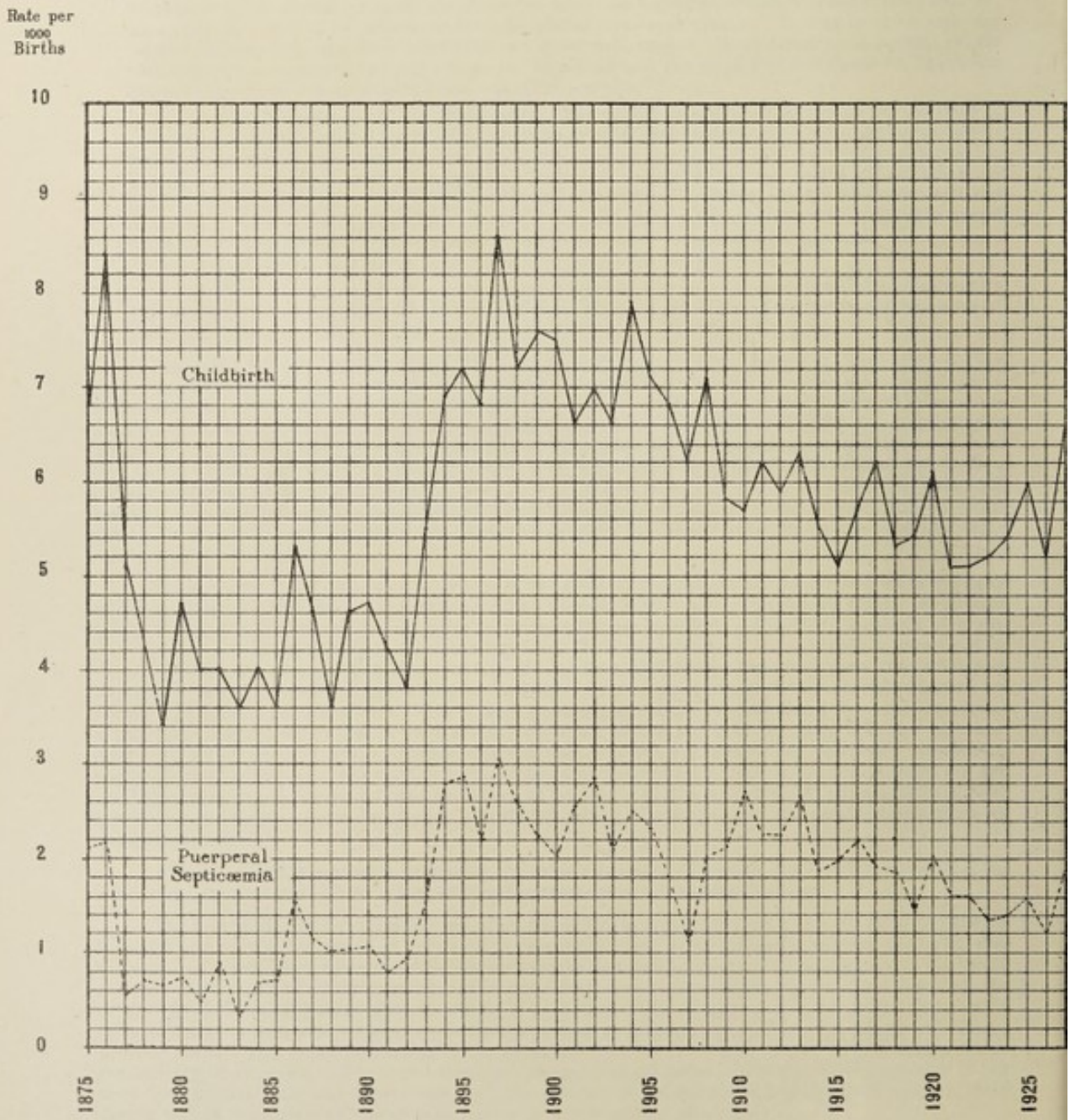
CHILDBIRTH AND PUERPERAL SEPTICÆMIA.

ANNUAL DEATH RATE OF WOMEN PER 1,000 BIRTHS

IN

NEW SOUTH WALES,

1875-1927.



Note.—Since 1905 deaths from "illegal operations" are included in total deaths in childbirth.

Puerperal Phlegmasia, Alba Dolens, Embolus, Sudden Death.—This title includes phlebitis, embolism, thrombosis, syncope, and sudden death associated with the puerperal condition. These conditions call for no special comment beyond saying that the majority usually arise in consequence of or in association with localised pelvic sepsis.

The remarks made under the heading of "Puerperal Septicæmia" apply in great part to these deaths, and it can be confidently anticipated that a reduction in the number of deaths from puerperal septicæmia will bring about a reduction in the number of deaths from the causes now under considerations.

Deaths following Child-birth and Puerperal Diseases of the Breast.—These titles include conditions such as puerperal insanity, mastitis, abscess of the breast, &c. They constitute a minor problem of no outstanding significance compared with the other causes of death previously mentioned.

The Trend of Maternal Mortality.

If we look back over the last quarter of a century it is evident that whilst in successive individual years the maternal mortality rate has fluctuated considerably, there is a slow and gradual, but nevertheless a fairly definite downward tendency.

The graph (1) portrays the rise or fall in individual years, but the general downward trend over a long period can be recognised.

Table 2 shows the same trend numerically.

Table 2.

Year.	Total Births.	Total Puerperal Deaths.	Deaths from Illegal Operations.	Percentage of Total Deaths caused by Illegal Operations.	Maternal Mortality Rate, excluding Illegal Operations.	Ratio.*
1903	35,966	239	...	...	6·6	
1904	38,667	305	...	...	7·9	
1905	39,501	279	13	4·6	6·7	100
1906	40,048	277	17	6·1	6·4	
1907	42,195	263	7	2·6	6·0	
1908	42,525	304	15	4·9	6·7	
1909	43,769	252	8	3·1	5·5	
1910	45,533	261	8	3·0	5·5	85
1911	47,677	279	12	4·3	5·6	
1912	51,993	305	16	5·2	5·5	
1913	52,134	329	10	3·0	6·1	
1914	53,615	296	9	3·0	5·3	
1915	52,885	272	8	3·0	4·9	81
1916	52,575	297	16	5·3	5·3	
1917	52,467	327	22	6·7	5·8	
1918	50,700	267	15	5·6	4·9	
1919	48,528	263	17	6·4	5·0	
1920	53,974	331	27	8·1	5·6	72
1921	54,634	281	33	11·7	4·5	
1922	55,214	279	32	11·4	4·4	
1923	54,112	283	33	11·6	4·6	
1924	53,670	291	32	11·0	4·8	
1925	54,615	325	40	12·3	5·2	73
1926	53,126	276	40	14·5	4·4	
1927	53,858	352	46	13·0	5·6	

* Per cent. ratio of quinquennial averages to average of 1903–7, which is taken as 100.

If the average mortality rate for the period 1903–7 be taken as 100, then the succeeding quinquennial averages show the progressively downward trend until 1923–27, when the ratio rises slightly. This rise is due to the high mortality experienced in 1925 and 1927. This table shows further the importance of illegal operations as a cause of death. Whilst the general trend of the total maternal mortality has been downward the reverse holds so far as illegal operations are concerned. The proportion of deaths caused by illegal operations is constantly increasing and there is every indication that this increase will be still more progressive in the future (see graph No. 2).

Comparative Statistics.

The statistics of New South Wales are not strictly comparable with those of other States or countries, chiefly owing to the fact that we include the deaths from illegal operations, which elsewhere are correctly classified under "Homicide."

Apart from this particular inclusion there are other special factors which must be borne in mind in making comparison between New South Wales and other States or countries. In this State special investigation and inquiry is made by the Government Statistician into the actual cause of death of a female of child-bearing age when the certified cause lends any colour to the possibility that the actual cause of death may have been associated with pregnancy or childbirth. The cumulative effect of this investigation has been in continuous operation since 1893, and whilst it has no doubt produced greater accuracy in classification and in the total number of deaths recorded, it has also tended to increase materially the maternal mortality rate of New South Wales compared with that of countries which do not carry out such investigations.

It is assuredly this investigation which is the underlying cause of the marked increase of the maternal mortality rate which can be seen in the graph (1) for the years subsequent to 1893. Certain other countries carry out a similar investigation, for instance, England and Wales, New Zealand, &c. The other States of the Commonwealth, so far as I am aware, do not make such inquiry.

Still another factor must be taken into consideration. Although it is assumed that all countries which have adopted the International Classification of the Causes of Deaths have comparable statistics, this is not necessarily so. Granting that all the deaths which have been due to, or have been associated with, pregnancy or child-birth are recorded there are still so many differences in the actual compilation of statistics that unless one is conversant with the details of such compilation, erroneous deductions are liable to be drawn from the figures. Whilst one country will calculate the rate as a proportion of live births, another will use both live and still-births. Other countries again, for instance, France, Holland and Spain, not only exclude still-births, but also the births of children who, although born alive, did not survive beyond a certain period which varies in individual countries from twenty-four hours up to three days.

The statistics of England and Wales may be cited as an example where the compilation of puerperal deaths was, prior to 1911, on a different basis to that of the International Classification of Causes of Deaths.

Dame Janet Campbell, in "Protection of Motherhood," makes the following statement:—

> "In 1911 the international list of causes of death was adopted, and this involved some re-classification of maternal deaths, puerperal albuminuria and nephritis being now included among the direct causes of death and not among the deaths associated with child-bearing. Two sets of figures are, therefore, given, one showing the modern and more accurate classification, which only dates back to 1911, the other showing the mortality according to the earlier classification, it being useful to compare the present-day death rates with those from 1890 onwards. The total maternal mortality, which includes deaths associated with (but not directly due to) childbirth, is the same in both classifications, but the most important figure for our purposes is the total puerperal mortality, and this is higher under the modern classification:—

Year.	Classification in use from 1911 onwards.				Classification as in use before 1911.				Total Maternal Mortality.
	Puerperal Sepsis.	Other Puerperal Causes.	Total Puerperal Mortality.	Non-Puerperal Causes.	Puerperal Sepsis.	Other Puerperal Causes.	Total Puerperal Mortality.	Non-Puerperal Causes.	
1891–95 ...	...	...	...	...	2·60	2·89	5·49	...	...
1896–1900 ...	...	...	...	...	2·12	2·57	4·69	...	...
1901–05 ...	...	...	...	...	1·95	2·32	4·27	1·29	5·56
1906–10 ...	...	...	...	...	1·56	2·18	3·74	1·26	5·00
1906–10 ...	...	...	...	...	1·56	2·18	3·74	1·26	5·00
1911–15 ...	1·42	2·61	4·03	0·99	1·50	2·31	3·81	1·21	5·02
1916–20 ...	1·51	2·61	4·12	1·68	1·59	2·29	3·88	1·92	5·80
1921–25 ...	1·40	2·50	3·90	1·14	1·48	2·21	3·69	1·35	5·04
1911	1·43	2·44	3·87	1·04	1·52	2·15	3·67	1·24	4·91
1912	1·39	2·59	3·98	0·97	1·47	2·31	3·78	1·17	4·95
1913	1·26	2·70	3·96	0·91	1·34	2·37	3·71	1·16	4·87
1914	1·55	2·62	4·17	0·95	1·63	2·32	3·95	1·17	5·12
1915	1·47	2·71	4·18	1·09	1·56	2·38	3·94	1·33	5·27
1916	1·38	2·74	4·12	0·94	1·47	2·40	3·87	1·19	5·06
1917	1·31	2·58	3·89	0·95	1·39	2·27	3·66	1·18	4·84
1918	1·28	2·51	3·79	3·81	1·35	2·20	3·55	4·05	7·60
1919	1·67	2·70	4·37	1·93	1·76	2·36	4·12	2·18	6·30
1920	1·81	2·52	4·33	1·13	1·87	2·25	4·12	1·34	5·46
1921	1·38	2·53	3·91	1·09	1·46	2·25	3·71	1·29	5·00
1922	1·38	2 43	3·81	1·35	1·46	2·12	3·58	1·58	5·16
1923	1·30	2·51	3·81	1·01	1·38	2·22	3·60	1·22	4·82
1924	1·39	2·51	3·90	1·16	1·48	2·22	3·70	1·36	5·06
1925	1·56	2·52	4·08	1·07	1·62	2·24	3·86	1·29	5·15
1926	1·60	2·52	4·12	1·02	1·66	2·21	3·87	1·27	5·14

It will be noticed that the English classification differentiates between "total puerperal mortality" and "total maternal mortality," the former excluding and the latter including "deaths of women not classed to pregnancy and child-bearing, but associated therewith."

Dame Janet Campbell draws attention to the "more accurate classification which only dates back to 1911," but states that "the most important figure for our purposes is the total puerperal mortality." Whether such fine discrimination between "total puerperal mortality" and "total maternal mortality" is desirable may be a matter of opinion. The essential fact is—and this requires to be stressed—that only the "total maternal mortality" is comparable with the figures of New South Wales. Our statistics include deaths which in the English statistics are classified as non-puerperal, that is, deaths of women not classed to pregnancy and childbirth but returned as associated therewith.

In 1925 the Registrar-General (England) recorded 759 such "non-puerperal" deaths, which included, *inter alia*, tuberculosis, heart disease, embolism, and thrombosis, pneumonia, chronic nephritis, &c. The statistics of New South Wales have always included these deaths in the puerperal mortality rate. This can be seen from the following table (Table III) published by the Government Statistician for the year 1904, the last year in which, so far as I can ascertain, publication in detail of this table was made.

GRAPH No. 2.

MATERNAL MORTALITY.
DEATHS FROM ILLEGAL OPERATIONS.

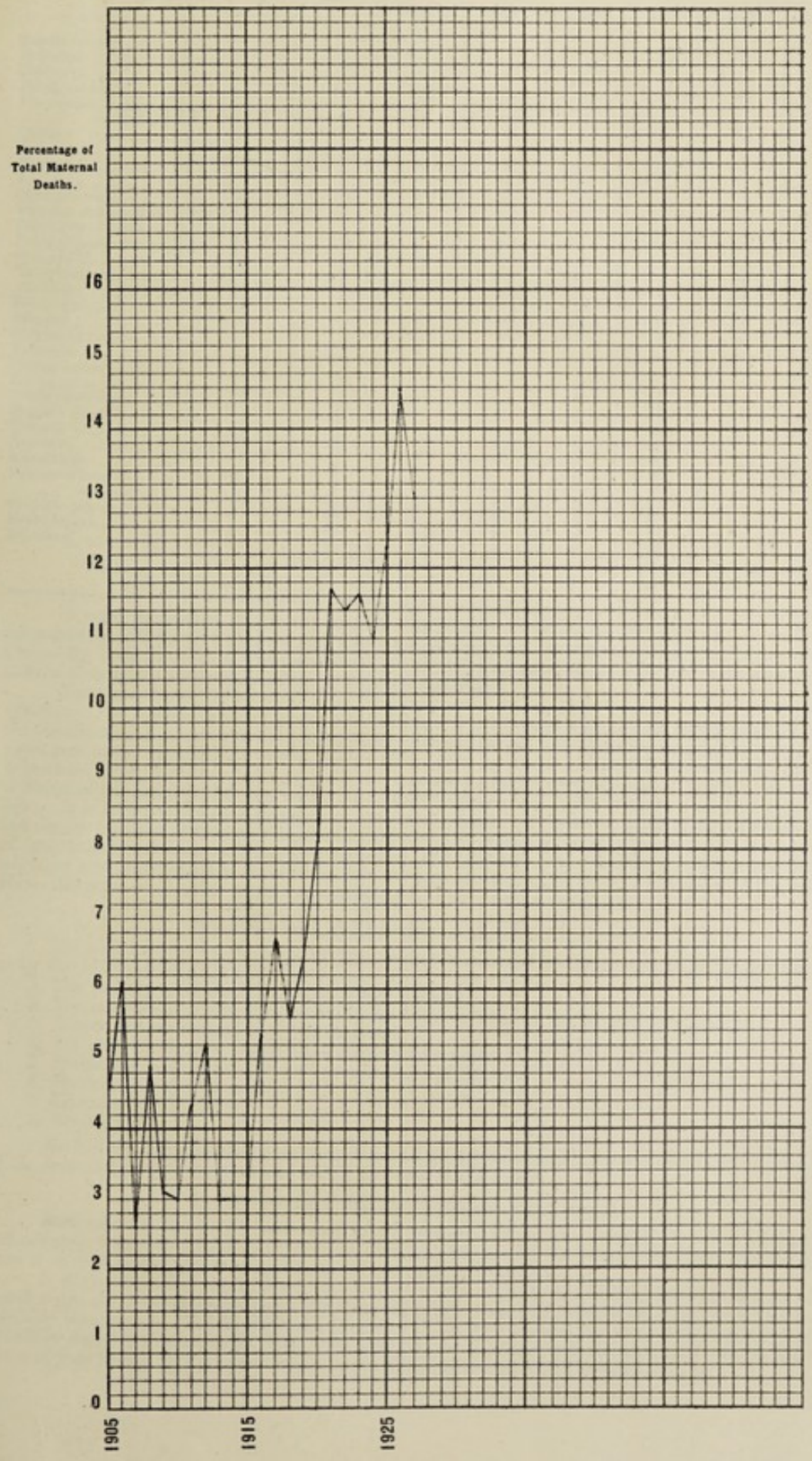


TABLE III.
Puerperal Deaths, New South Wales, 1904.

Diseases caused by or complicating childbirth.	Total deaths.	Age at death.					
		Under 20.	20-24.	25-29.	30-34.	35-39.	40 and over.
Scarlet fever	4	1	...	...	2	1	...
Influenza	3	...	1	...	1	...	1
Diarrhœa	2	...	...	...	1	...	1
Puerperal fever	68	10	15	15	14	8	6
Pneumonia, septic	5	2	1	1	...	1	...
,, undefined	5	1	1	...	1	2	...
Phthisis	4	...	...	1	...	1	2
Anæmia	6	...	1	...	1	1	3
Meningitis	1	...	...	...	1	...	...
Apoplexy	1	...	...	1	...	...	...
Cerebral œdema	1	...	...	...	...	1	...
Valvular disease of the heart	1	...	...	...	1	...	...
Dilatation of heart	2	...	...	...	...	1	1
Fatty degeneration of heart	1	...	...	...	...	...	1
Syncope	13	2	1	...	5	3	2
Embolism	11	1	1	3	1	3	2
Phlebitis	4	...	...	2	1	...	1
Bronchitis	2	...	...	...	...	2	...
Pleurisy	7	...	1	2	1	3	...
Œdema of lungs	1	...	...	1	...	...	...
Enteritis	1	...	...	1	...	...	...
Strangulation of intestine	1	...	...	...	...	1	...
Goitre	1	...	...	1	...	...	...
Acute nephritis	2	...	...	2	...	...	...
Bright's disease	14	...	...	3	6	3	2
Uræmia	4	...	1	2	...	...	1
Abortion	16	1	3	7	2	2	1
Miscarriage	19	1	...	3	7	6	2
Puerperal mania	4	...	2	1	1	...	...
,, convulsions	17	2	2	3	5	1	4
Placenta prævia, flooding	38	...	3	4	11	11	9
Heart failure	28	2	2	4	8	8	4
All others	18	...	4	4	3	4	3
Totals	305	23	39	61	73	63	46

It must be granted that if the English classification is correct our own statistics are not only incomparable with those of England and Wales, but over-estimate our mortality to a considerable extent. Conversely, if the New South Wales classification is the more accurate, then the English statistics seriously under-estimate the puerperal mortality of England and Wales.

There is still one further point which should be noted since it leads to much confusion and unjust criticism. The English statistics are usually published in accordance with the old classification (that is, the classification in use prior to 1911) in order to allow comparison with statistics compiled for very many years previously. The average person accepts these figures as strictly comparable with our own, whereas it has been shown that they seriously under-estimate the puerperal mortality rate of England and Wales. Criticism of our position from this basis very frequently places New South Wales in a most unfavourable light. It is hoped that this explanation of the actual position will assist in avoiding misunderstanding, and obviate incorrect deductions being drawn from available statistics. It is notorious that the comparison of international statistics is frequently misleading, and whilst it is not desired to condone our present mortality rate, it is necessary to point out that the high standard of accuracy of our statistics frequently places this State in an unfair position, and subjects it to an invidious distinction.

THE ADMINISTRATIVE CONTROL OF MATERNAL MORTALITY.

The main avenues for the administrative control of maternal mortality may be briefly summarised under the following headings :—

1. The training of medical practitioners and midwives.
2. The supervision of midwives' practice and indirectly that of the medical practitioner.
3. Control and supervision of private hospitals.
4. Provision of adequate public maternity accommodation.
5. Notification and investigation of puerperal septic infection.
6. Provision of antenatal clinics.
7. Education of the public.
8. Research.

Each of the abovementioned factors will now be discussed seriatim in order to afford some indication of the lines along which our activities will be modelled in the future.

1. *The Training of Medical Practitioners and Midwives.*

Brief reference has already been made to this question and as the training of medical practitioners and midwives falls within the jurisdiction of the University and the Nurses' Registration Board respectively, there is no need to deal with these questions to any extent in this report.

It might be pointed out, however, that marked improvement of the medical curriculum has already been brought about and this must eventually improve our present position so far as the reduction of maternal mortality is concerned. New South Wales is extremely fortunate because out of a total number of 3,440 midwifery nurses registered up to June, 1928, only 293 are registered without possessing training and in virtue of their having been in practice prior to the Nurses Registration Act coming into force.

2. *Supervision of Midwives' Practice.*

Midwives are controlled by the Nurses Registration Act, the Board of which is indirectly connected with the Department of Public Health. The Act has only been in operation for a year or two and most of the time has been occupied in drawing up a syllabus of training, conducting examinations, arranging for the registration of midwives and other nurses, &c. There has been little time or opportunity for bringing about co-ordination between the various branches of this Department, but this is now being arranged.

It is hoped that before long all midwives will be supervised by nurse inspectors directly under my control and that the midwives' work including inspection of their midwifery bags, apparatus, utensils, facilities for sterilisation, &c., will receive the necessary attention. Where necessary, cases or emergencies, which have been reported under the Nurses Registration Act will be inquired into. Where a midwife has been associated with a case of puerperal septic infection special investigation will be carried out.

3. *The Control and Supervision of Private Hospitals.*

The Private Hospitals Act was passed about twenty years ago and a more modern Act is badly needed. The original intention of the Act was not so much to control private hospitals as such, but rather as an attempt to control illegal operations. It is needless to mention that this attempted control has proved futile. There is little prospect of obtaining a new Act because of the pressure of Parliamentary Legislation and the crowding out as a general rule, of legislation dealing with Public Health. Nevertheless a considerable amount of control and supervision can be exerted by the existing Act, and more satisfactory and up-to-date regulations are now being framed to meet the position.

This supervision will of course be co-ordinated with all other avenues of administration so that the whole work can be carried out in an effective manner.

4. *Provision of adequate Public Maternity Accommodation.*

This is a matter which is outside my jurisdiction since it is a special prerogative of the Minister himself.

There is a dearth of maternity beds outside the metropolis and an increase can apparently only be brought about by the demand of local residents who are prepared to assist in the usual way for the provision of such accommodation.

5. *Notification and Investigation of Cases of Puerperal Septic Infection.*

This is the central pivot of administrative control since septic infection is the outstanding cause of maternal mortality. When we are faced with the necessity for a legal definition of the condition which we desire to be notified we find that the term signifying puerperal septic infection is a very elastic one. It masquerades under a number of names such as sepsis, puerperal septicaemia, puerperal fever, &c., and it has been found by experience that no definite conception is universally accepted by the medical profession.

The Private Hospitals Act makes "puerperal septicaemia" a notifiable disease; the Nurses Registration Act uses the term "puerperal fever"; the Public Health Act makes no mention whatsoever of this condition. What one medical practitioner will call "puerperal fever" or "septicaemia" another medical practitioner will record as merely "sapræmia," and will reserve the term "puerperal fever" or "septicaemia" for the cases which are moribund or at least in extremis. On this account notification of "puerperal fever" in States where it has been tried has proved a failure. This is shown by the fact that the deaths recorded from puerperal fever or septicaemia in the annual statistics exceed the number of notifications of the condition received by the Public Health Department. In order to overcome this outstanding difficulty it is essential to formulate an entirely new definition, and this is now under consideration. As soon as the term to be used can be defined it will be possible to have it proclaimed. This means a re-drafting of the regulations under the Private Hospitals Act, the Nurses Registration Act, and a new proclamation under the Public Health Act. It is essential to have the condition notified by both the medical practitioner and the midwife if successful results are to be achieved. Investigation of these cases will not be merely inquisitorial but actuated by a desire to assist, in any way possible, in the interests of the patient. Experience will show in what direction further efforts should be made in order to control this particular cause of death. It is hoped that very shortly both midwives and medical practitioners will be compelled to notify cases of puerperal septic infection and that this will prove effective in reducing the death rate from this cause.

6. *Provision of Antenatal Clinics.*

Antenatal clinics are extremely desirable especially in the Metropolitan Area to supplement those in actual operation in obstetric hospitals at the present time. No doubt difficulty will be experienced in bringing them into existence, since they are a new idea, liable to misinterpretation and on this account viewed with suspicion both by the midwife and the medical practitioner, on the ground that they will divorce the patient from her attendant. It will be necessary to have the nurses associated with these clinics specially and intensively trained in antenatal work.

My present feeling is that they should be part of the Baby Health Centres, a special afternoon or perhaps evening being set apart for this particular function. It must be remembered that our Baby Health Centres are at present able to offer much advice and to supervise to some extent expectant mothers who will take advantage of the facility offered. Last year over 4,000 expectant mothers attended the Baby Health Centres in order to obtain advice and instruction and this work will be extended as expeditiously as possible. It is unfortunate that even those expectant mothers who attended only came on one or two occasions and then extremely late in pregnancy. It was not so much to obtain information about their own welfare, but in order to obtain information concerning their expected baby, to obtain patterns for baby's clothes, a free maternity outfit or something of that nature.

The actual position regarding the facilities for antenatal care and supervision which are available in public institutions in this State has so far not been tabulated. In order to present a summary of the facilities which are available I have endeavoured to supply such information in Table IV. This table has been compiled from information which has been supplied by the authorities controlling the various hospitals mentioned. The thanks of this Department are due to the controlling bodies for their co-operation.

The information is by no means complete, but it affords some slight indication of the activities which have been carried on by the various institutions.

It is probable that some 10,000 women receive antenatal care to some extent in the ante-natal clinics controlled by the various institutions mentioned. The disconcerting point is that these women attend on an average less than twice, which is far below the requirement for adequate care and supervision. It is hoped that in future reports more accurate and comprehensive figures will be available, in order to ascertain the exact position in this State.

7. *Education of the Public.*—Thousands of leaflets dealing with the expectant mother have been issued, apart from other literature dealing indirectly with maternal welfare, but directed especially towards the welfare of infants. Letters are received daily from all over the State, and even from other States of the Commonwealth asking for advice on some aspect of maternal welfare. Considerable expansion of this work will be carried out as soon as adequate assistance is available.

To reduce maternal mortality the public must be reached, and many lines of approach will have to be followed in order to change the general viewpoint.

The average woman is indifferent to the necessity for care and supervision during pregnancy, and yet with the routine examination of the urine alone during pregnancy a great many catastrophes and deaths could be avoided.

As previously mentioned, antenatal supervision can do much to reduce mortality by the early treatment of difficulties such as hæmorrhage, by the detection and rectification of malpresentations and the recognition of any condition likely to lead to delayed or difficult labour. Systematic antenatal supervision will reduce the complications of parturition to a small figure, but it will not reduce maternal mortality to vanishing point. Certain factors require much further research before we are in a position to adopt means for their control. Public interest has been awakened, and though it will take some years, perhaps, before the majority of women will be seized with the necessity for safeguarding their health, the ultimate spread of this knowledge is assured. To this end numerous lectures have been given, films have been shown to thousands throughout the State, school girls are being instructed in the care of infants, so that they will be prepared for guidance, particularly in regard to their own health, at a later date, and in general, every avenue is being exploited to arouse public interest and affect an improvement of the present position.

8. *Research.*—When a complete staff for the work is available it is proposed to investigate every maternal death and the death of every child in the first month of life, as a means of discovering the actual factors involved in each particular case. Beyond this, however, detailed research is required to elucidate such cases where labour has been spontaneous with no traceable interference by doctor, midwife, or other attendant. That there is some factor at present not fully known is quite evident, for septic infection not infrequently occurs in cases in which the child has been born before the arrival either of the doctor or the midwife, and in others in which no internal examination has been made. The elucidation of these and similar problems will require a considerable amount of laboratory and field investigation.

TABLE IV.

FACILITIES for Antenatal Care, &c., available in Public Institutions in New South Wales, 1927.

	Hospital or Institution.											
	Tiboobumra.	Brewarrina.	Grenfell.	Lismore.	South Sydney Women's.	St. Margaret's Hospital for Women.	Women's Hospital, Crown-street.	Montrose Maternity.	Royal Hospital for Women.	"Bethesda," Marrickville.	St. George District.	Royal North Shore.
(1) Are special antenatal clinics held at hospital...	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(2) Are clinics available to—												
(*a*) All expectant mothers	Yes	No	No	No	Yes	Yes	Yes	No	Yes	No	No	No
(*b*) Only except mothers who will be confined in hospital	...	Yes	...	...	...	...	...	Yes	...	Yes	Yes	Yes
(3) Are medical practitioners in charge of mothers who will be confined outside hospital notified of findings of antenatal investigation	Yes	Yes	...	...	Yes	Yes	Yes	No.	Not as a rule.	Yes	No	No
(4) Do midwifery nurses trained in your hospital receive special instruction in antenatal care and supervision	Not a training school.			...	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(5) By whom is the instruction in 4 given	...	...	...	...	Hon.	M.O.	and Matron.		Med. and Matron.	Sup.	Hon.	M.O.'s
Summary of Activities.												
First visit of primiparæ to clinic	...	2	...	...	454	2,000	949	...	...	153	...	78
First visit of multiparæ to clinic	...	1	...	...	396		1,920	...	...	103	...	226
Total visits to clinic	7	5	...	...	850	2,307	4,482	228	...	1,570	...	1,523
Homes visited	...	...	...	...	55	259	193	...	...	...	...	...
Sterilised maternity outfits supplied	...	...	...	...	...	...	...	...		137	...	...
Cases suffering from albuminuria	...	...	...	...	49	83	329	6	Information not available.	34	No records kept.	39
,, pre-eclampsia	...	...	...	...	...	15	116	3		8		6
,, hyperemesis	...	...	...	...	...	4	206	1		12		5
,, hydramnios	...	...	...	...	...	2	28	2		7		2
,, multiple pregnancy	...	...	...	...	...	8	26	4		4		1
,, malpositions	...	...	...	...	...	36	8	5		6		21
,, contracted pelvis	...	...	...	...	...	2	65	...		2		9
,, pruritis vulvæ	...	...	...	...	...	10	198	...	...	4	...	6
,, dental caries	...	...	...	...	...	...	6	...	...	8	...	7
,, gonorrhœa	...	1	...	...	...	4	33	2	...	1	...	1
,, syphilis	...	...	...	...	...	...	21	...	...	2	...	1
,, other abnormal conditions	1	...	...	...	34	...	20	...	...	5	...	21
Result—Abortions	1	...	...	...	...	...	14	...	...	...	...	...
Miscarriages	...	...	...	...	...	...	...	3	...	...	...	...
Premature labour	1	...	...	...	...	25	8	8	...	3	...	6
Still-births	...	...	...	...	...	6	9	6	...	...	...	8
Maternal deaths	...	...	...	...	...	...	2	1	...	...	...	1

PART II.

INFANT WELFARE.

Although the annual fluctuations of the infant mortality rate cannot be regarded as satisfactory or unsatisfactory in themselves it is gratifying to record that the infantile mortality rate for 1927 (54·9) shows a decrease from that of the previous year (57·6). This decline accentuates the general downward trend of our infant mortality rate when viewed over a reasonable number of years. Nevertheless, the loss of approximately 3,000 babies per annum is too great a drain on our small population and warrants every effort which will mitigate this state of affairs.

Factors making for Improvement.

The downward trend of our infant mortality rate can be seen by reference to graph No. 3. From about the year 1904 there commenced a definite downward trend in infant mortality not only in New South Wales, but in every State of the Commonwealth and in New Zealand. Subsequent to that year there were certainly periods of marked fluctuation during which the mortality rate rose considerably, due chiefly to increased prevalence of such conditions as summer diarrhœa, or perhaps as an indirect result of the influenza epidemic. The general decline, however, persisted, and there is every indication that it will gain impetus in the future. If, coincidently with the decline of the infant mortality rate in 1904 there commenced a movement for the welfare of infants we are apt to assume that the one fact was the cause of the other. This "post hoc ergo propter hoc" form of argument is well known as a common fallacy. It has often been stated that the movement in regard to infant life protection which occurred about 1903 in the city of Sydney was the cause or, at least, the main cause of the reduction of the infantile mortality which occurred from about that time onwards.

The problem, however, is not so simple as would appear from these considerations. Whilst not wishing to detract in any way from the value of the work which was initiated at or about this time, there is little doubt that at this period it was only at its commencement and had not been carried on for a sufficient time, nor to a sufficient extent to produce effects of State-wide significance. Further, in other States where infant welfare work had not commenced or was not instituted for some years subsequently, the same downward tendency was noted about 1904 onwards. The decline, therefore, which occurred in this State, in so far as it is related to any local action, cannot be attributed mainly or solely to measures which are peculiar to this particular State. There must be a common factor at work here and elsewhere in the Commonwealth. The most obvious common factor which might have been influential and yet not necessarily the absolute cause is a decline in the birth-rate.

"The fall in the birth-rate," says Dr. Stevenson, "which has largely coincided in point of time with that of infant mortality, naturally suggests itself as one possible explanation. Child mortality in large families as a whole is very much greater than in small ones—so much so that the 1911 census (England) return shows that in some cases the mother's marriage age and the duration of marriage being similar, the proportion of children lost to the largest families was four or five times as great as that of the smallest.

It is to be expected, therefore, that the great decline of fertility which has come to most of the civilised world should be accompanied by a fall in infant mortality.

If the records of a number of countries are compared it is found that on the whole the two movements of a declining birth-rate and a declining infant mortality rate coincides in point of time."

The Chief Medical Officer of the Ministry of Health (England) in his annual report for 1924, commenting on these facts, makes the following observations regarding exceptions to the above general statement:—"During the war the rate of infant mortality in England did not decline so fast as the birth-rate; since the war it has declined faster. Again, in England and Wales the birth-rate has been declining seriously since 1876, but infant mortality has shown steady and continuous decline only since 1902. In Switzerland the experience for the same period was just the opposite; the birth-rate remained stationary from 1881–5 to 1901–5, but infant mortality fell by 22 per cent. during the same period.

In Australia and New Zealand a stationary birth-rate was also accompanied by a rapidly declining infant mortality.

In France the steady decline of the birth-rate during the latter part of the 19th century was accompanied by a rising rather than a falling infant mortality.

An even more striking exception to the relationship between a fall in birth-rate and a fall in infant mortality rate may be found in Ireland, which, in 1901, had a standard birth-rate of 36·1 per thousand as compared with 28·4 for England, but its infant death-rate was only 101 per thousand births as compared with 151 in England.

In other words, although in most countries, there has been a strong correlation in time between the movement of the rate of infant mortality and that of the birth-rate, we are not entitled to say that one change is the cause of the other."

In view of these considerations it is interesting to compare the decline in birth-rate and infant mortality rate of several of the States of the Commonwealth and New Zealand. If we take the quinquennium 1900–4 as a basis, and compare with it the quinquennium 1922–26 we obtain the following interesting results:—

Table V.

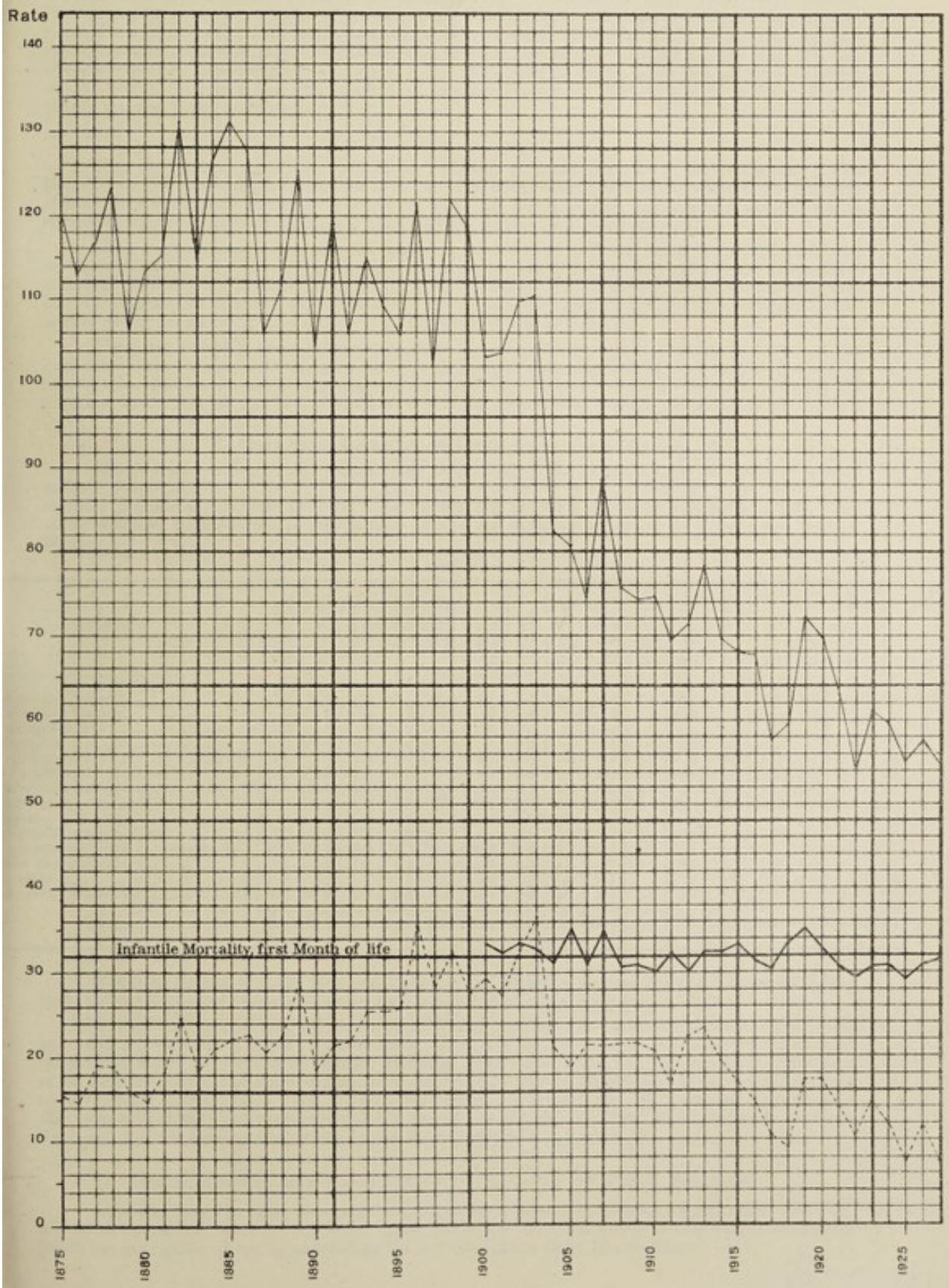
Comparison of quinquennium 1900–4 with that of 1922–6.

	Per cent. decline birth-rate.	Per cent. decline infant mortality rate.
New South Wales	10	43
Victoria	12	40
Western Australia	25	58
New Zealand	17	46

GRAPH No.3.

INFANTILE MORTALITY IN NEW SOUTH WALES, 1875-1927.

Annual Death Rate of Children under 1 Year, per 1,000 Births ———————
Deaths from Diarrhœa and Enteritis of Children under 1 Year, per 1,000 Births - - - - - - - - - -
Infantile Mortality in the 1st Month of Life, 1900 to 1927 „ „ ———————



It is somewhat arresting that New South Wales and Victoria which show the smallest decline in the birth-rate should show also the smallest decline in the infant mortality rate, whilst Western Australia, which shows a considerably greater decline in the birth-rate, shows also the greatest decline in the infant mortality rate, whilst New Zealand remains intermediate in position in regard to both rates. Considerations such as these show the necessity for the avoidance of dogmatism in arriving at conclusions concerning the ultimate causes of the decline of the infant mortality rate. To quote the Ministry of Health Report once more: "Unfortunately in medical history this particularism is ever and again repeated. We read that in such or such a town infant mortality began to decline when an infant welfare centre was established, therefore the welfare centre caused the decline. We have not long to wait before another particularist publishes the statistics of another town where infant mortality declined without the establishment of a welfare centre, therefore welfare centres are valueless. Both conclusions are worthless in logic, yet both are triumphantly paraded by the sectaries to which they appeal. The lesson which other students of social evolution learnt long ago, the lesson of the multiplicity of causes, is one that cannot be too often or too strongly impressed upon the student of communal hygiene. The history of infant mortality affords many instances of its truth."

The Incidence of Mortality.

Very little progress has been made in the reduction of infant mortality in the first month of life. Mortality during this period is usually about 54 per cent. of the total deaths of the whole of the first year of life. This first month mortality is bound up with maternal mortality, and anything which tends to reduce the deaths of mothers will have a beneficial influence on these neo-natal deaths.

Many investigations concerning the causation of neo-natal and still-births have emphasised the paramount importance of birth injuries, especially from the use of forceps and other forms of operative midwifery. Syphilis is universally recognised as a common cause of still-births and of deaths from congenital debility, prematurity and such like conditions. This implies the necessity for adequate treatment of the mother during pregnancy if the mortality from these causes is to be reduced.

There are probably many factors underlying this neo-natal mortality of which we have not the least conception, for even with the most careful and thorough ante-natal care it is not always possible to control such deaths. In the present state of our knowledge, however, our only hope for reducing the neo-natal deaths is in the direction of adequate care of the unborn child through the medium of the mother.

Infantile Mortality in Divisions of the State.

The following table (N.S.W. Official Year Book, 1926–7) shows the number of deaths of infants under 1 year of age from principal diseases per 1,000 births in the principal divisions of the State, based on the experience of the years 1915–24, being the first ten years for which the data are available. The variation shown in the mortality rate is from 49·7 in the Northern Tableland to 103·4 in the Western Division :—

Table VI.

Cause of Death.	Metropolis.	Balance of Cumberland.	North Coast.	Hunter and Manning.	South Coast.	Northern Tableland.	Central Tableland.	Southern Tableland.	North-Western Slope.	Central-Western Slope.	South-Western Slope.	North-Central Plain.	Central Plain.	Riverina.	Western Division.	Total, Country	Whole State.
Epidemic diseases	3·5	3·3	2·3	3·1	2·7	4·2	4·2	5·2	3·2	3·4	3·1	3·2	2·4	3·2	6·8	3·4	3·5
Tubercular diseases	·4	·3	·3	·3	·3	·3	·4	·2	·5	·2	·3	·3	·3	·6	·8	·3	·4
Veneral diseases	·6	·5	·3	·3	·1	·2	·2	·1	·1	·2	·1	·1	·2	·2	·5	·3	·4
Meningitis	·5	·2	·5	·7	·4	·3	·7	·6	·6	·5	·7	1·0	·7	·4	·5	·6	·6
Convulsions	1·0	2·0	2·0	1·8	2·1	1·7	2·1	1·8	2·4	2·4	1·9	·9	2·6	1·1	3·1	2·0	1·6
Bronchitis	1·1	1·2	·9	1·9	1·9	2·5	2·4	2·6	2·1	2·2	1·4	2·9	1·6	1·3	1·9	1·8	1·5
Pneumonia and pleurisy	5·7	4·6	4·6	4·6	5·1	4·0	5·6	4·4	4·7	3·8	4·1	4·1	5·7	5·6	4·5	4·7	5·1
Gastritis and diarrhœa	16·4	10·6	7·8	16·1	9·8	9·0	13·9	14·1	10·9	12·7	10·4	13·5	12·1	10·5	36·0	13·0	14·3
Hernia	·5	·3	·5	·4	·7	·4	·5	·8	1·1	·6	·4	·3	·9	·6	1·0	·5	·5
Congenital malformations	4·4	3·7	3·9	3·3	3·0	4·0	4·4	2·8	4·1	2·6	3·7	2·5	2·4	2·6	4·5	3·5	3·9
Congenital debility & prematurity	24·5	20·6	19·5	25·8	22·2	19·3	25·5	26·8	25·0	23·3	20·8	24·1	29·0	17·7	32·0	23·2	23·7
Other developmental diseases	4·4	3·7	5·6	4·6	6·1	4·9	4·9	6·3	4·6	4·6	4·6	5·5	5·2	5·7	4·0	4·9	4·7
Accident	·5	·8	·6	·7	·7	·3	·6	·8	·4	1·1	·7	1·2	1·5	1·1	1·5	·8	·6
All other diseases	2·3	1·8	2·4	2·1	2·7	2·5	2·6	2·9	1·7	3·1	2·5	1·6	3·1	2·7	2·7	2·4	2·3
Total	65·8	53·6	51·2	65·7	57·8	53·6	68·0	69·4	61·4	60·7	54·7	61·2	67·7	53·3	99·8	61·4	63·1

It will be noticed that the Metropolis, Hunter and Manning, Central Tableland, Southern Tableland, Central Plain, and Western Division are all higher than the average for the State.

It is not easy to ascertain why the various divisions with more or less comparable conditions should have such widely varying infant mortality rates. It is well known of course that a favourable summer rainfall will reduce the liability to summer diarrhœa. This accounts in great part for the low mortality of the North Coast for example. On the other hand, several divisions characterised by agricultural pursuits show markedly differing rates which are somewhat difficult to account for. It is certainly very peculiar that congenital debility and prematurity should show a rate of 19·5 in the North Coast, but in the Southern Tableland the rate rises to 26·8, whilst in the Western Division it reaches 32.

Special Efforts directed towards the Reduction of Infant Mortality.

Although there are many factors concerned in the progressive reduction of our infant mortality which has been noted, there is every justification for the assertion that a considerable part of the success which has been achieved can be ascribed to the activities of the Baby Health Centres.

At the end of the year 1927 there were sixty-one centres in active operation and it is confidently hoped that this number will be increased very rapidly in the future.

The number of nurses engaged during the year was approximately 100. Each nurse appointed must be registered as a General Nurse, but, in addition, she must also possess the certificate of training from the "Tresillian" Mothercraft Training Home.

Preference is always given to a nurse who possesses in addition to the two essential certificates a registrable qualification for midwifery. The aim is to provide as many doubly certificated (general and obstetric) nurses as possible in order to afford every opportunity for the extension of ante-natal care and supervision to expectant mothers. The essential purpose of the centres is to impress on mothers the importance of natural or breast feeding, and to afford mothers and expectant mothers the instruction in mothercraft which makes for the successful rearing of healthy and happy children.

Dr. Hope showed many years ago in Liverpool that "the deaths among children under three months of age, either wholly or partially fed on artificial food, are fifteen times as great as they are among an equal number of infants fed upon breast milk. For instance, investigation has tended to prove that, out of every 1,000 infants under three months of age naturally fed upon breast milk alone, 20 die of autumnal choleraic diseases; but, if the same number of infants at the same age are artificially fed, then instead of 20 dying as many as 300 will die from this cause."

Every child has a right to be well born and to be maintained in as healthy a condition as human knowledge renders possible. Under the complex circumstances of modern community life it is found that the maternal instinct alone is not sufficient equipment for the proper feeding and rearing of babies, but that mothercraft training must be added. Mothers in every grade of life are welcome at the centres, since every healthy baby is equally one of the State's best assets, and any mother may need mothercraft instruction and guidance. In consequence, the mothers who attend the Baby Health Centres are drawn from every class in the community, and the fact that there is no discrimination whatever in the centres emphasises the essential national characteristic of the work. The enthusiasm of the staff is shown not so much by the total visits paid to homes or the number of babies who attend the Centres, but by the results obtained in hundreds of individual cases. A baby restored to full breast feeding, a child prevented from being weaned unnecessarily, a case in which progress is substituted for malnutrition, resulting from incorrect methods of feeding, are regarded as some of the triumphs of the work. Such cases are not only the greatest incentive to the staff in an endeavour to achieve still better results in the future, but also a direct encouragement to mothers to recommend the Centres for their efficiency. It is by such means that the activities of the Centres have been extended, their reputation enhanced and their popularity assured.

The fact that the Centres are coming to be recognised as an asset by the majority of mothers is an indication of their efficiency which is due primarily to the painstaking thoroughness and expert knowledge of the nurses attached thereto.

Table VII shows the summary of activities of the Baby Health Centres for the years 1926 and 1927 It is encouraging to note the progress which has been made in the latter year. In every way the figures show a marked improvement and apparently a growing recognition on the part of mothers of the valuable assistance which the Centres can afford.

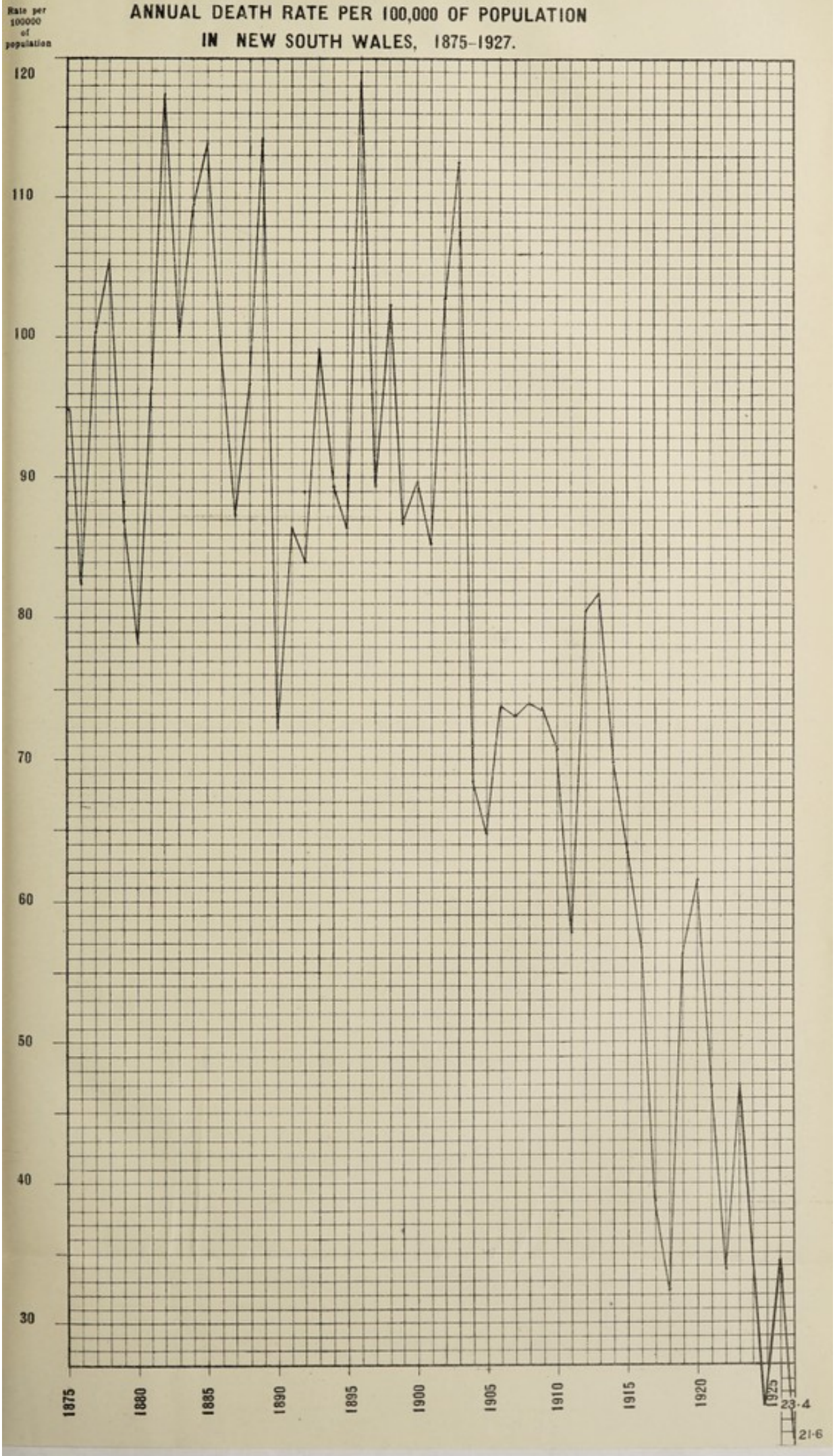
Approximately 20,000 individual babies came under the supervision of the Baby Health Centres during the year, and these infants collectively paid more than a quarter of a million of visits to the different Baby Health Centres. I think it will be granted that these figures are a very fair indication of the growing popularity of the Baby Health Centres, and further, they cause hope for the future progress of the work. On the other hand, it is depressing to be compelled to record that the great bulk of our infant mortality occurs among those babies who do not come under the influence of the Baby Health Centres.

In districts in which a Baby Health Centre has been established for any reasonable time it is found that the vast majority of babies born in that district, roughly about 60 to 80 per cent. of the total, attend the Baby Health Centres or, at least, follow the advice given by the nurses when they visit the homes. It is from the babies who are not brought under the influence of the Baby Health Centres that practically all infant sufferers from gastro-enteric infection, at least in the Metropolitan area, are recruited. Each year tells the same fateful story, and, with few exceptions, one can always conclude that a "gastro enteritis" case was not a Baby Health Centre infant. With the co-operation of the authorities controlling the three main institutions which treat sick babies in the Metropolitan area, namely, the Royal Alexandra Hospital for Children, the Renwick Hospital for Infants, the Lady Edeline Hospital for Babies, Vaucluse, it has been possible to check the names of every baby who was treated for gastro-enteric infection during the summer months in each of these institutions. More than 70 per cent. of these babies had never once attended a Baby Health Centre, another 10 per cent. was comprised by a group classified under the heading of Neglected, Bad Mothering, Inability of Mother to follow instructions, Weaned against Advice, and similar conditions. The remainder attended the Baby Health Centres more or less irregularly, but the characteristic feature of this group was that the mother was feckless, apathetic or indifferent. The total number of babies treated in the above-mentioned institutions for the period under review was 663. This is a very large number of infants to suffer from what is regarded as a preventable condition. Apparently no effort, or very little effort, on the part of the mother was made to prevent such condition from arising. The reasons underlying this indifference or apathy on the part of the mother are very difficult to ascertain, but until this attitude is overcome the infantile mortality from many preventable causes will continue. It is impossible to force a mother to take advice when she does not wish to and unless we can alter the viewpoint of this comparatively small section of refractory mothers it appears that our efforts are going to fall short of the goal which otherwise we could readily achieve. The gradual spread of knowledge will assuredly bring about the improvement desired, and to this end intensive efforts are being constantly made.

GRAPH No. 4

DIARRHŒA AND ENTERITIS (Under 2 years).

ANNUAL DEATH RATE PER 100,000 OF POPULATION IN NEW SOUTH WALES, 1875–1927.



PUBLICITY AND PROPAGANDA.

Publicity Officer.—The Publicity Officer (Mr. White) has been instrumental in obtaining the valuable co-operation of the Press in order to extend the knowledge of the work of this division of the Department. Each week throughout the State some seventy newspapers publish information concerning how to keep the normal baby in normal health. Many encouraging indications of the value of these articles are given from many different parts of the State by mothers who have been interested in reading them.

Mr. White has also been of the greatest assistance in working the cinema projector for the display of our films, very frequently at the sacrifice of his own leisure time.

Radio Talks and Lectures.—The weekly radio talks were discontinued during the present year owing to lack of time, but will be continued in the near future. Many lectures have been given throughout the State and by their means a constantly increasing public is being educated as to the necessity for these activities and the requirements of the work generally.

School Classes.—A series of lectures were given to the girls of the Domestic Science Classes at the following schools—Surry Hills, Paddington, Waverley, Woolloomooloo, Bondi, Leichhardt, South Kensington, Hurstville, Hamilton, Hamilton South, Glebe, Balmain, Burwood, and Rockdale.

The lectures proved to be extremely popular and were much appreciated by the girls. These school classes should prove of the greatest benefit in educating the rising generation so that in the future they will be prepared to seek advice and to value such advice when it is obtained. In this way an enlightened public opinion will gradually be formed and this will be of the greatest advantage for the future progress of the work.

Special Demonstrations for Mothers.—A course of six lecturettes and demonstrations were given at the Surry Hills Baby Health Centre during the year. The talks were given by Dr. Petherbridge and Miss Clarke, Matron of the Women's Hospital, Crown-street, to both of whom the thanks of the Department are offered. After each lecturette a demonstration was given by one of the nurses attached to the centre so that the mothers were able to learn both practical methods and the reasons underlying such methods.

Health Week.—During Health Week every effort was made by the staff of the Baby Health Centres to impress upon mothers the aim and object of Health Week. Lecturettes and demonstrations were given by the nurses to mothers attending the centres and in every way an endeavour was made to encourage the mothers to take an interest in the national ideal. In June, 1927, a Girls' Week Exhibition was held at the Town Hall, Sydney. An exhibit was arranged by the Baby Health Centre Staff and proved to be of great interest and advantage to all who attended the exhibition.

Staff Meetings.—During the year staff meetings were held regularly in the B.M.A. Rooms, Elizabeth-street. These staff meetings are held whenever possible each month, one or more of the Honorary Medical Officers addressing the nurses and the medical staff of the centres on some subject of interest. Each paper is discussed and much useful information and exchange of opinions result from these meetings. They have proved to be of great benefit to each member of the staff and incidently encourage an *esprit de corps.*

Acknowledgment.—In concluding this report, I would like to place on record my sincere appreciation of the efforts of all the various women's organisations in their endeavours to improve our present position in regard to maternal and infant welfare. Especially would I like to thank The Country Women's Association for their assistance and co-operation in opening Baby Health Centres throughout the country districts of New South Wales.

To the staff generally, to the Honorary Medical Officers, and to the Nurse Inspectors (Misses Spencer and Williams) particularly, I express my thanks for their loyal support during the year.

E. SYDNEY MORRIS,
Director of Maternal and Baby Welfare.

Table VII.

Summary of Activities of Baby Health Centres.

Baby Health Centre.	Visits to Individual New-born Babies.		Subsequent Visits to New-born Babies.		Expectant Mothers Advised.		Number of Individual Babies attending Centre.		Total Attendances of Babies.	
	1926.	1927.	1926.	1927.	1926.	1927.	1926.	1927.	1926.	1927.
Alexandria	463	548	1,466	2,440	190	187	.....	590	5,220	4,667
Ashfield	372	502	409	984	14	44	.....	532	1,332	4,490
Auburn	642	678	2,055	1,580	43	47	.....	423	5,586	4,969
Balmain	521	601	1,621	1,756	206	114	.....	689	7,465	7,843
Bankstown	487	412	656	583	45	39	.....	246	1,294	2,154
Burwood	927	868	1,716	1,375	167	138	.....	796	6,436	8,303
Camperdown	270	328	1,914	1,817	57	77	.....	255	2,864	2,880
Chippendale	520	564	1,884	1,837	212	230	.....	455	5,776	5,687
Campsie	523	780	724	890	56	30	.....	484	3,571	5,252
Chatswood	386	476	1,009	570	52	68	.....	557	7,126	7,372
Glebe	377	384	1,699	1,443	57	58	.....	312	4,382	4,617
Granville	460	353	1,206	1,249	82	84	.....	296	3,692	3,685
Hornsby	179	216	1,013	1,095	25	54	.....	312	2,262	3,847
Hurstville	864	731	874	1,116	79	32	.....	423	5,426	5,391
Kogarah	139	447	448	1,249	11	21	.....	234	1,264	3,386
Leichhardt	532	551	1,347	1,734	121	93	.....	612	5,121	5,342
Manly	485	524	2,584	2,550	77	185	.....	443	6,024	9,137
Mosman	341	316	1,513	1,721	28	18	.....	279	3,705	6,283
Marrickville	429	362	1,571	1,511	70	122	.....	311	4,529	4,836
Miller's Point	100	93	1,130	718	21	.....	.....	99	1,490	1,254
Mascot	324	368	830	861	171	265	.....	330	3,576	4,222
Newtown	650	670	1,517	1,451	191	327	.....	718	8,673	10,045
North Sydney	727	769	1,785	1,595	83	75	.....	586	6,491	7,586
Paddington	503	456	2,009	1,746	253	213	.....	527	8,469	8,121
Parramatta	336	497	334	845	27	90	.....	421	1,721	5,216
Petersham	135	282	687	1,035	30	42	.....	527	2,499	4,847
Pyrmont	186	166	1,439	1,337	62	84	.....	250	2,885	2,734
Randwick	346	438	1,006	1,436	15	92	.....	412	3,942	5,547
Rockdale	660	631	1,390	1,213	25	20	.....	435	6,383	6,939
Rose Bay	392	365	1,635	1,472	45	64	.....	432	5,550	7,396
St. Peters	295	293	1,708	1,098	101	53	.....	186	3,868	2,238
Surry Hills	353	369	1,250	922	74	104	.....	385	4,031	4,545
South Kensington	360	494	734	1,395	29	39	.....	402	3,733	3,961
Waverley	571	721	1,339	1,080	61	162	.....	624	6,768	8,616
Woolloomooloo	291	242	1,195	1,306	36	61	.....	391	6,874	6,920
Cessnock and depot	626	556	1,165	1,316	59	95	.....	383	4,375	4,552
Hamilton and depot	674	680	1,446	1,663	40	33	.....	559	6,151	8,424
Bathurst	171	254	481	771	17	24	.....	239	2,067	3,824
Central Broken Hill	269	299	1,213	1,190	41	38	.....	263	3,861	4,169
Railway Town, Broken Hill	140	122	665	736	26	22	.....	122	2,627	3,583
South Broken Hill	82	99	760	832	4	7	.....	92	2,352	2,639
North Broken Hill	158	178	687	847	14	22	.....	101	1,293	2,244
Mayfield and depots	572	670	2,519	1,788	47	38	.....	423	4,764	5,850
Wagga and depots	502	670	1,234	1,219	51	59	.....	275	3,523	4,128
Kurri and depots	291	312	1,168	1,380	94	131	.....	280	4,765	4,419
Lithgow	418	354	1,117	1,185	16	11	.....	248	2,624	3,474
Newcastle and depot	559	723	2,479	2,221	49	51	.....	460	8,142	7,138
New Lambton and depots	471	379	1,741	1,511	7	13	.....	722	4,638	4,611
West Maitland and depots	444	353	2,401	1,251	76	41	.....	308	5,307	3,590
Goulburn	.....	306	.....	1,003	.....	30	.....	350	.....	2,005
Totals	20,523	22,456	64,773	66,123	3,357	3,947	.....	19,797	216,517	254,978

SECTION I—C.

Communicable Diseases.

*70407—D

SECTION I—C.

COMMUNICABLE DISEASES.

1.—NOTIFIABLE INFECTIOUS DISEASES RECORDED IN NEW SOUTH WALES DURING THE YEAR ENDED 31ST DECEMBER, 1927.

(F. S. Wearne.)

The Public Health Act, 1902, Part III.

This Act provides that the Governor may, by Proclamation in the *Government Gazette*, declare that any disease therein-named is an infectious disease. Cholera, typhus fever, and yellow fever were proclaimed on 12th August, 1927, and at the end of the year the ordinarily notifiable diseases under the Public Health Act of 1902 were as shown in the following table :—

	Notifiable from—	Cases and Deaths Notified.					
		1925.		1926.		1927.	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Typhoid fever and paratyphoid	1st January, 1898	533	80	698	80	460	68
Scarlet fever	,,	3,043	27	4,755	53	8,369	113
Diphtheria or membranous croup	,,	3,004	118	3,579	147	4,059	179
Bubonic plague	23rd January, 1900	...	...	...	...	...	...
Infantile paralysis (acute anterior poliomyelitis)	1st February, 1912	57	14	81	21	25	4
Epidemic cerebro-spinal fever (meningococcal meningitis)	11th October, 1915	37	27	32	23	25	10
Encephalitis lethargica	1st April, 1926	...	...	...	33*	3	27*
Cholera	12th August, 1927	...	...	...	...	...	...
Typhus fever	,,	...	...	...	...	...	...
Yellow fever	,,	...	...	...	...	...	...
	Total	6,674	266	9,145	357	12,941	401
	Population at 31st Dec.	2,300,081		2,349,401		2,401,884	

The number of cases of the above diseases notified in each district in 1927, deaths therefrom, and age and seasonal incidence are shown in Tables I-VI, pp. 51–8. Pulmonary tuberculosis is notifiable under the Public Health (Amendment) Act, 1915. (See below.)

It will be noticed that there was a very considerable increase in notifications in 1927 compared with 1926, the rise in numbers being principally due to the prevalence of scarlet fever.

Typhoid Fever (460 cases and 68 deaths) shows the lowest incidence on record, the smallest number of cases and deaths previously recorded being 533 with 80 deaths in 1925.

Scarlet Fever continued in epidemic form, 8,359 cases being notified compared with 4,755 cases in 1926; the increased incidence was mainly in the Metropolitan area.

Diphtheria continued prevalent, 4,059 cases being notified as against 3,579 in 1926.

Infantile Paralysis.—25 cases and 4 deaths were notified, compared with 81 cases and 21 deaths in 1926.

**Encephalitis Lethargica* was made a notifiable disease on 1st April, 1926. Three cases were notified during the year, and 27 deaths from this disease were recorded by the Government Statistician. Enquiry is being made concerning non-notification of the cases.

Dengue Fever occurred in epidemic form in parts of the Hunter River district, vide report of the Medical Officer of Health, p. 114. Dengue fever is not a notifiable disease in this State.

Bubonic Plague.—No case of plague was reported in 1927. Systematic rat-trapping was continuous, and no plague-infected animals were found. Detailed statements in regard to bacteriological examinations of rats and their ectoparasites are given in Part IV, p. 192.

Smallpox.—No case of smallpox was reported in this State during 1927.

Leprosy.—The thirty-seventh Annual Report on Leprosy in New South Wales will be found in Section III (p. 165). At the end of 1927 there were 17 lepers under detention. Medical practitioners attending or becoming aware of cases of leprosy or suspected leprosy are required to notify the cases, in writing, under Part III, Division 2, of the Public Health Act, 1902.

Pulmonary Tuberculosis.—Public Health (Amendment) Act, 1915.

Tuberculosis was made notifiable in the City of Sydney on the 18th October, 1904, under by-laws passed by the Sydney Municipal Council for the purpose. These by-laws required that medical practitioners should notify all cases of pulmonary tuberculosis, occurring within the city area, seen or attended by them. A return of the cases notified within the City of Sydney from 1st January, 1905, and subsequently under the Public Health (Amendment) Act, 1915, is shown in Table VI (p. 58).

By proclamation under the Public Health (Amendment) Act, 1915, pulmonary tuberculosis was made notifiable in the Metropolitan and Hunter River Combined Sanitary Districts from 11th August, 1915; in the Katoomba Municipality and Blue Mountain Shire from 2nd October, 1916; and in the Blackheath Municipality from 17th December, 1920; at present it is not notifiable elsewhere in the State.

A Division of Tuberculosis was established during the year, and the report of the Acting Director (Dr. H. V. D. Baret) will be found on p. 64.

Venereal Diseases Act, 1918.

This Act was passed at the end of 1918; its provisions remained in abeyance until brought into operation by issue of a proclamation on 1st December, 1920. Activities under this Act are recorded in the Seventh Annual Report of the Commissioner (Dr. Robert Dick), p. 59. Total Notifications for 1927, 5,674, a decrease of 327 on the figures for 1926.

TABLE I.—Showing the number of notified cases of, and deaths from, the following diseases:—Cerebro-spinal Fever (Meningococcal Meningitis), Diphtheria and Membranous Croup, Encephalitis Lethargica, Infantile Paralysis (Acute Anterior Poliomyelitis), Scarlet Fever, Typhoid Fever (including Paratyphoid), and Pulmonary Tuberculosis—in the METROPOLITAN COMBINED DISTRICTS for the year ended 31st December, 1927.

District.	Typhoid and Paratyphoid.		Scarlet Fever.		Diphtheria.		Infantile Paralysis.		Cerebro-spinal Meningitis.		Encephalitis Lethargica.		Pulmonary Tuberculosis.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
METROPOLITAN MUNICIPALITIES.														
Sydney, City of	10	1	279	7	209	48	...	2	1	3	1	8	147	87
Alexandria	2	...	37	...	15	...	...	...	...	...	...	...	11	3
Annandale	...	...	78	...	34	1	...	1	...	...	...	...	12	2
Ashfield	5	2	206	1	83	1	...	...	2	1	...	...	34	10
Balmain	2	1	140	1	35	1	...	...	...	...	...	1	23	10
Bexley	...	...	106	...	41	...	...	...	...	...	...	...	5	3
Botany	1	...	29	...	9	...	...	...	...	...	...	...	3	1
Burwood	2	...	92	1	36	...	1	...	...	...	...	...	8	4
Canterbury	13	...	556	2	104	1	...	...	...	...	...	...	40	29
Concord	2	...	78	...	28	...	...	...	...	...	...	...	4	2
Darlington	1	...	10	...	10	...	...	...	...	...	...	...	5	...
Drummoyne	1	...	135	1	44	...	...	...	1	...	...	...	13	7
Eastwood	...	...	19	...	7	...	...	...	...	...	...	...	6	3
Enfield	3	...	72	...	39	...	...	...	...	...	...	1	5	5
Erskineville	1	...	29	...	7	...	...	...	...	...	...	...	6	1
Glebe	6	...	79	...	44	...	...	...	...	...	...	...	12	3
Homebush	1	...	28	...	7	...	...	...	...	...	...	...	7	1
Hunter's Hill	6	...	27	...	6	...	...	...	...	...	...	...	4	6
Hurstville	2	...	123	...	39	...	1	...	1	...	...	...	24	4
Kogarah	3	1	179	...	64	1	...	...	...	...	...	...	21	10
Lane Cove	2	...	76	...	16	...	1	...	...	...	...	...	3	3
Leichhardt	3	1	140	1	43	...	...	...	...	...	...	...	19	10
Manly	4	1	48	...	23	...	...	...	...	...	...	...	1	2
Marrickville	3	1	220	1	75	1	1	...	1	1	...	...	29	9
Mascot	...	...	70	...	18	...	...	...	...	...	...	1	8	2
Mosman	2	1	67	...	24	1	1	...	...	...	...	...	5	3
Newtown	...	...	107	...	75	...	...	...	...	...	...	...	26	4
North Sydney	5	4	199	2	79	...	...	...	2	...	...	2	36	20
Paddington	4	...	82	...	35	...	...	...	...	...	...	...	31	7
Petersham	3	1	113	...	38	1	2	...	...	...	...	...	25	13
Randwick	10	5	162	63	54	15	...	...	2	2	...	1	68	78
Redfern	3	...	89	...	32	...	...	...	1	...	...	...	28	6
Rockdale	3	...	168	...	69	...	...	...	...	...	...	...	14	4
Ryde	8	...	129	1	52	...	...	...	...	...	...	...	12	3
St. Peters	2	...	43	...	27	...	1	...	...	...	...	...	10	5
Strathfield	...	...	57	...	20	...	1	...	...	...	...	...	8	1
Vaucluse	...	...	29	...	5	...	...	...	...	...	...	...	3	1
Waterloo	3	...	58	...	20	...	1	...	...	...	...	1	10	2
Waverley	9	2	190	1	60	...	...	...	...	...	...	...	31	11
Willoughby	4	...	162	4	51	11	...	...	...	2	1	1	18	16
Woollahra	2	1	99	...	44	...	...	...	...	...	...	...	17	9
Shire of Kuring-gai	2	...	122	1	27	...	...	...	...	...	...	1	18	10
EXTRA-METROPOLITAN MUNICIPALITIES.														
Auburn	4	...	153	1	27	...	1	...	...	...	...	...	11	8
Bankstown	...	...	95	...	56	...	...	...	...	...	...	...	7	8
Cabramatta and Canley Vale	...	...	19	...	6	...	...	...	...	...	...	...	3	1
Dundas	...	...	43	1	20	...	...	...	...	...	...	...	6	2
Ermington and Rydalmere	...	...	10	...	...	...	...	...	...	...	...	...	6	8
Fairfield	7	...	67	...	12	...	...	...	...	...	...	1	6	...
Granville	5	...	183	1	25	...	...	...	...	...	...	...	7	3
Holroyd	3	...	88	...	43	1	1	...	...	...	...	...	3	3
Ingleburn	...	...	5	...	4	...	1	...	...	...	...	...	...	1
Lidcombe	4	...	122	...	37	...	...	...	...	...	...	1	83	57
Liverpool	13	...	28	...	21	...	...	...	1	...	...	...	7	1
Parramatta	3	1	105	1	15	1	...	...	...	...	...	3	9	18
SHIRES.														
Hornsby	1	...	122	...	45	1	...	...	...	...	...	...	25	22
Warringah	2	...	21	...	20	1	...	...	...	...	...	...	...	3
Harbour of Port Jackson	4	...	...	...	...	...	...	...	...	...	...	...	5	...
Totals	179	23	5,793	91	2,079	86	13	3	12	9	2	22	988	545

TABLE II.—Showing the number of notified cases of, and deaths from, Cerebro-spinal Fever (Meningococcal Meningitis), Diphtheria or Membranous Croup, Encephalitis Lethargica, Infantile Paralysis (Acute Anterior Poliomyelitis), Scarlet Fever, Typhoid Fever, including Paratyphoid, and Pulmonary Tuberculosis, in the HUNTER RIVER COMBINED DISTRICT, for the year ended 31st December, 1927.

District.	Typhoid and Paratyphoid.		Scarlet Fever.		Diphtheria.		Infantile Paralysis.		Cerebro-spinal Meningitis.		Encephalitis Lethargica.		Pulmonary Tuberculosis.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
MUNICIPALITIES.														
Adamstown	...	...	1	...	16	...	...	...	1	...	...	...	...	1
Carrington	1	...	7	...	4	...	...	...	...	...	...	...	2	1
Cessnock	5	1	36	1	73	...	...	...	...	...	...	...	7	3
Greta	...	...	4	...	3	1	...	...	...	...	...	...	...	...
Hamilton	2	...	31	...	28	...	...	...	...	...	...	...	4	3
Lambton	...	...	6	...	6	...	...	...	...	...	...	...	4	2
Maitland, East	1	...	8	...	16	...	1	...	...	...	...	...	2	1
Maitland, West	5	2	7	...	22	1	...	...	2	...	...	...	2	1
Merewether	2	...	10	...	22	...	...	...	...	...	...	...	...	1
Morpeth	...	...	...	...	5	...	...	...	...	...	...	...	...	...
Newcastle	4	1	18	...	22	7	...	...	1	1	...	...	1	6
New Lambton	...	...	9	...	13	...	...	...	1	...	...	...	4	3
Raymond Terrace	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Singleton	...	...	12	...	17	...	1	...	...	...	...	...	...	1
Stockton	5	...	5	...	15	...	...	...	...	...	...	...	1	4
Wallsend	1	1	13	...	18	2	...	...	...	...	...	...	1	3
Waratah	...	...	29	...	44	...	...	...	...	...	...	...	9	2
Wickham	1	...	12	...	25	...	...	...	...	...	...	...	5	3
SHIRES.														
Bolwarra	3	...	6	...	7	...	...	...	...	...	...	...	...	...
Kearsley	10	...	51	...	86	...	...	...	2	...	...	...	9	7
Lake Macquarie	5	...	21	...	68	...	...	...	1	...	...	...	7	3
Port Stephens	...	...	2	...	12	...	...	...	...	...	...	...	...	...
Tarro	2	1	16	...	24	2	...	...	...	...	...	...	...	3
Harbour of Port Hunter	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	47	6	305	1	546	13	2	...	8	1	...	...	58	48

TABLE III.—Showing the number of notified cases of, and deaths from, Cerebro-spinal Fever (Meningococcal Meningitis), Diphtheria or Membranous Croup, Encephalitis Lethargica, Infantile Paralysis (Acute Anterior Poliomyelitis), Scarlet Fever, Typhoid Fever, including Paratyphoid and Pulmonary Tuberculosis, in the REMAINDER OF STATE, for the year ended 31st December, 1927.

District.	Typhoid and Paratyphoid.		Scarlet Fever.		Diphtheria.		Infantile Paralysis.		Cerebro-spinal Meningitis.		Encephalitis Lethargica.		Pulmonary Tuberculosis.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
MUNICIPALITIES.														
Aberdeen	...	...	3	...	2	...	...	...	...	...	...	...	...	...
Albury	3	1	26	1	17	2	...	...	...	...	...	1	...	3
Armidale	...	...	10	...	4	1	...	...	...	...	...	...	...	1
Ballina	...	...	2	...	3	...	...	...	...	...	...	...	...	1
Balranald	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Barraba	...	...	4	...	...	...	...	...	...	...	...	...	...	...
Bathurst	...	...	91	1	8	...	...	...	...	...	...	...	...	6
Bega	...	...	8	...	4	...	...	...	...	...	...	...	...	...
Berry	...	...	4	...	7	1	...	...	...	...	...	...	...	...
Bingara	...	...	...	...	6	1	...	...	...	...	...	...	...	...
Blackheath	...	...	9	...	6	...	...	...	...	...	...	...	1	1
Blayney	...	...	7	...	2	...	...	...	...	...	...	...	...	...
Bombala	...	...	4	...	1	...	...	...	...	...	...	...	...	...
Bourke	...	...	...	...	...	...	...	...	...	...	...	...	...	2
Bowral	...	...	9	...	...	...	...	...	...	...	...	...	...	2
Braidwood	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Brewarrina	1	...	...	...	...	...	...	...	...	...	...	...	...	25
Broken Hill	62	5	14	...	8	...	1	...	1	...	...	...	...	...
Broughton Vale	...	...	...	...	...	...	...	...	...	...	...	...	...	2
Burrowa	...	...	11	...	1	...	...	...	...	...	...	...	...	...
Camden	...	...	13	...	9	1	...	...	...	...	...	...	...	1
Campbelltown	1	...	4	...	1	...	...	...	...	...	...	...	...	1
Carcoar	...	...	...	...	...	...	...	...	...	...	...	...	...	2
Casino	...	...	...	...	28	...	...	...	...	...	...	...	...	1
Castlereagh	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Cobar	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Condobolin	...	1	11	...	3	1	...	...	...	...	...	...	...	...
Cooma	...	...	6	1	2	1	...	...	...	...	...	...	...	1
Coonamble	...	...	...	...	12	...	...	...	...	...	...	...	...	2
Cootamundra	...	...	14	1	16	3	...	...	...	...	...	...	...	1
Coraki	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Corowa	...	...	22	...	44	2	...	...	...	...	...	2	...	2
Cowra	1	1	6	...	14	...	...	...	...	...	...	...	...	1
Cudal	...	...	...	...	...	...	...	...	...	...	...	...	...	...

REMAINDER OF STATE.—Return showing the number of Cases, &c., from Country Municipalities—*continued*.

District.	Typhoid and Paratyphoid.		Scarlet Fever.		Diphtheria.		Infantile Paralysis.		Cerebro-spinal Meningitis.		Encephalitis Lethargica.		Pulmonary Tuberculosis.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
MUNICIPALITIES—*continued*.														
Deniliquin	...	...	1	...	11	1	...	...	...	...	...	...	...	1
Dubbo	5	...	26	...	9	1	...	...	...	...	...	1	...	4
Dungog	1	...	6	...	9	...	...	...	...	...	...	...	...	1
Forbes	4	...	17	1	...	...	...	...	...	...	...	...	...	4
Gerringong	...	...	...	...	2	...	...	...	...	...	...	...	...	...
Glen Innes	1	1	26	1	26	3	...	...	...	...	...	...	...	1
Goulburn	14	5	83	3	10	...	...	...	...	...	...	...	...	4
Grafton	...	...	27	...	5	...	...	...	...	...	...	...	...	2
Grafton South	...	...	2	...	3	...	...	...	...	...	...	...	...	1
Grenfell	...	...	3	...	1	1	...	...	...	...	...	...	...	...
Gulgong	...	...	3	...	2	...	...	...	...	...	...	...	...	...
Gundagai	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gunnedah	1	...	8	...	2	1	...	...	...	...	...	...	...	1
Hay	2	1	13	...	2	3	...	...	...	...	...	...	...	...
Hillgrove	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hillston	1	1	7	1	4	2	...	...	...	...	...	...	...	1
Illawarra, Central	...	...	23	...	13	...	...	...	...	...	...	...	...	1
Illawarra, North	1	...	29	...	28	...	...	...	...	...	...	...	...	2
Inverell	5	...	8	...	23	...	1	...	...	...	...	...	...	2
Jamberoo	...	...	...	...	3	...	...	...	...	...	...	...	...	...
Junee	...	...	14	1	4	1	...	...	...	...	...	...	...	3
Katoomba	...	...	21	1	3	...	...	...	...	...	1	...	7	16
Kempsey	...	...	6	...	10	1	...	...	...	...	...	...	...	2
Kiama	...	...	2	...	11	1	...	...	...	...	...	...	...	...
Lismore	...	...	18	...	10	2	...	...	...	...	...	...	...	2
Lithgow	6	1	11	...	27	1	...	...	...	...	...	...	...	1
Maclean	1	...	1	...	1	...	...	...	...	...	...	...	...	...
Manilla	...	...	1	...	1	...	...	...	...	...	...	...	...	...
Mittagong	...	...	2	...	2	...	...	...	...	...	...	...	...	1
Moama	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Molong	...	...	3	...	2	...	...	...	...	...	...	...	...	...
Moree	...	...	...	...	1	2	...	...	...	...	...	...	...	6
Moruya	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Moss Vale	...	...	14	...	4	...	...	...	...	...	...	...	...	...
Mudgee	...	...	26	1	20	...	...	...	...	...	...	...	...	1
Mulgoa	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mullumbimby	...	...	...	...	4	1	...	...	...	...	...	...	...	1
Murrumburrah	1	...	1	...	2	...	...	...	...	...	...	...	...	...
Murrurundi	...	...	6	...	2	...	...	...	...	...	...	...	...	...
Murwillumbah	1	2	10	1	5	1	...	...	...	...	...	...	...	3
Muswellbrook	...	...	19	...	17	1	...	...	...	...	...	...	...	...
Narrabri	3	2	2	...	2	...	1	...	...	...	...	...	...	2
Narrabri, West	2	...	2	...	...	...	...	...	...	...	...	...	...	2
Narrandera	1	...	8	...	8	...	...	...	...	...	...	...	...	1
Narromine	...	...	3	...	4	1	...	...	...	...	...	...	...	...
Nowra	...	...	...	...	3	...	...	...	...	...	...	...	...	...
Nyngan	...	...	7	...	1	...	...	...	...	...	...	...	...	...
Orange	...	2	52	...	3	...	...	...	...	...	...	...	...	8
Orange, East	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Parkes	4	2	8	...	10	1	...	...	...	...	...	...	...	...
Peak Hill	3	1	2	...	1	...	...	...	...	...	...	...	...	...
Penrith	2	4	3	...	12	2	...	...	...	...	...	...	...	3
Picton	...	...	5	...	7	...	...	...	...	...	...	...	...	...
Port Macquarie	...	...	...	...	2	...	...	...	...	...	...	...	...	...
Queanbeyan	...	...	73	1	4	...	...	...	...	...	...	...	...	4
Quirindi	1	...	2	...	...	2	...	...	...	...	...	...	...	1
Richmond	...	...	3	...	3	1	1	...	...	...	...	...	...	...
Scone	...	...	6	...	3	1	...	...	...	...	...	...	...	1
Shellharbour	...	...	3	...	4	1	...	...	...	...	...	...	...	1
Shoalhaven, South	...	...	1	...	...	...	...	...	...	...	...	...	...	...
St. Mary's	7	...	3	...	8	...	...	...	...	...	...	...	...	...
Tamworth	...	...	19	...	28	5	...	...	...	...	...	...	...	4
Taree	...	...	1	...	9	2	...	...	...	...	...	...	...	1
Temora	6	2	16	...	1	...	...	...	...	...	...	...	...	3
Tenterfield	...	...	3	...	1	...	...	...	...	...	...	...	...	...
Tumut	...	...	21	...	5	1	...	...	...	...	...	...	...	1
Ulladulla	...	...	...	...	7	...	...	...	...	...	...	...	...	...
Ulmarra	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Uralla	...	...	1	...	3	...	...	...	...	...	...	...	...	...
Wagga	...	1	41	...	16	2	...	...	...	...	...	...	...	9
Walcha	...	...	12	...	...	...	...	...	...	...	...	...	...	...
Wallendbeen	...	...	...	...	2	...	...	...	...	...	...	...	...	...
Warialda	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Warren	...	...	3	...	4	...	...	...	...	...	...	...	...	...
Wellington	3	1	3	...	16	1	...	1	...	...	...	...	...	1
Wentworth	...	...	...	...	...	...	...	...	...	...	...	...	...	3
Wilcannia	...	...	14	...	1	...	...	...	...	...	...	...	...	...
Windsor	...	...	12	...	7	...	...	...	...	...	...	...	...	3
Wingham	...	...	...	...	...	1	...	...	...	...	...	...	...	...
Wollongong	3	...	30	...	19	2	...	...	...	...	...	...	...	...
Wyalong	...	...	4	...	2	1	...	...	...	...	...	...	...	...
Yass	9	1	23	...	5	1	...	...	...	...	...	...	...	3
Young	5	3	8	...	11	...	...	...	...	...	...	1	...	2
Total, Municipalities	164	38	1,110	15	689	61	4	1	1	...	1	5	8	170

REMAINDER OF STATE.—Return showing the number of Cases, &c., from Country Shires.

Shires.	Typhoid and Paratyphoid.		Scarlet Fever.		Diphtheria.		Infantile Paralysis.		Cerebro-spinal Meningitis.		Encephalitis Lethargica.		*Pulmonary Tuberculosis.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
2. SHIRES.														
Abercrombie	...	...	12	...	1	...	...	...	...	...	...	...	...	2
Amaroo	...	...	9	...	...	...	...	...	...	...	...	...	...	...
Apsley	...	...	6	...	...	...	...	...	...	...	...	...	...	...
Ashford	...	...	...	...	5	...	...	...	...	...	...	...	...	...
Bannockburn	...	...	2	...	11	...	...	...	...	...	...	...	...	...
Barraba	...	...	2	...	...	...	...	...	...	...	...	...	...	...
Baulkham Hills	2	...	50	...	18	...	1	...	...	...	...	...	...	2
Bellingen	2	...	7	...	6	...	...	...	...	...	...	...	...	...
Berrigan	...	...	9	...	8	...	...	...	...	...	...	...	...	1
Bibbenluke	...	...	4	...	5	...	...	...	...	...	...	...	...	...
Blacktown	2	...	49	...	20	...	...	...	...	...	...	...	...	3
Bland	4	...	31	...	7	1	...	...	...	...	...	...	...	2
Blaxland	1	...	24	1	29	1	...	...	...	...	...	...	...	2
Blue Mountains	...	...	14	...	4	...	...	...	...	...	...	...	104	22
Bogan	...	...	7	...	...	...	...	...	...	...	...	...	...	1
Boolooroo	1	...	...	...	3	...	...	...	...	...	...	...	...	...
Boomi	1	...	1	...	2	...	...	...	...	...	...	...	...	...
Boree	...	...	41	...	...	...	...	...	...	...	...	...	...	...
Bulli	...	...	37	...	39	...	...	...	...	...	...	...	...	175
Burrangong	7	...	10	...	4	...	...	...	...	...	...	...	...	2
Byron	...	...	9	...	3	...	...	...	...	...	...	...	...	...
Cambewarra	...	...	3	...	...	...	...	...	...	...	...	...	...	...
Canoblas	2	...	14	...	3	...	...	...	...	...	...	...	...	4
Carrathool	...	...	9	...	14	...	...	...	...	...	...	...	...	...
Clyde	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Cobborah	...	...	4	...	14	...	...	...	...	...	...	...	...	2
Cockburn	...	...	11	...	10	...	...	...	...	...	...	...	...	...
Colo	...	...	3	...	7	...	...	...	...	...	...	...	...	2
Conargo	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Coolah	...	...	12	...	1	...	...	...	...	...	...	...	...	...
Coolamon	3	...	3	...	7	...	...	...	...	...	...	...	...	1
Coonabarabran	...	...	42	2	5	1	...	...	...	...	...	...	...	1
Copmanhurst	...	...	3	...	3	...	...	...	...	...	...	...	...	1
Coreen	...	...	5	...	14	...	...	...	...	...	...	...	...	...
Crookwell	...	...	32	...	7	1	...	...	...	...	...	...	...	...
Cudgegong	...	...	25	...	17	...	...	...	...	...	...	...	...	1
Culcairn	1	...	16	...	8	...	...	...	...	...	...	...	...	...
Dalgety	...	...	22	...	3	...	...	...	...	...	...	...	...	2
Demondrille	1	...	...	...	1	...	...	...	...	...	...	...	...	...
Dorrigo	...	...	...	...	1	1	...	...	1	...	...	...	...	1
Dumaresq	...	...	3	...	1	...	...	...	...	...	...	...	...	1
Erina	1	...	31	...	43	1	...	...	...	...	...	...	...	3
Eurobodalla	...	...	1	...	5	...	...	...	...	...	...	...	...	3
Gadara	...	...	15	...	6	...	...	...	...	...	...	...	...	4
Gilgandra	...	...	31	...	15	...	...	...	...	...	...	...	...	3
Gloucester	...	...	7	...	1	...	...	...	...	...	...	...	...	...
Goobang	...	...	1	...	12	...	...	...	...	...	...	...	...	...
Goodradigbee	...	...	13	...	4	...	...	...	...	...	...	...	...	2
Gostwyck	...	...	21	...	5	...	...	...	...	...	...	...	...	...
Gundagai	...	...	3	...	4	...	...	...	1	...	...	...	...	1
Gundarimba	...	...	2	...	1	...	...	...	...	...	...	...	...	1
Gunning	...	...	2	...	1	...	...	...	...	...	...	...	...	1
Guyra	...	...	23	...	3	...	...	...	...	...	...	...	...	1
Gwydir	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Harwood	1	...	1	...	5	...	...	...	...	...	...	...	...	...
Hastings	...	...	1	...	4	1	...	...	...	...	...	...	...	1
Holbrook	...	...	4	...	5	...	...	...	...	...	...	...	...	...
Hume	3	...	8	...	9	...	...	...	...	...	...	...	...	...
Illabo	...	...	8	...	3	...	...	...	...	...	...	...	...	...
Imlay	1	...	4	1	2	1	...	...	...	...	...	...	...	2
Jemalong	...	...	2	...	...	...	...	...	...	...	...	...	...	...
Jerilderie	...	...	18	...	...	...	...	...	...	...	...	...	...	...
Jindalee	...	...	2	...	6	...	...	...	...	...	...	...	...	...
Kyeamba	1	...	11	...	1	...	...	...	...	...	...	...	...	...
Kyogle	3	...	10	...	27	1	...	...	1	...	...	...	...	4
Lachlan	2	...	3	...	1	...	...	...	...	...	...	...	...	1
Liverpool Plains	1	...	2	...	5	...	...	...	...	...	...	...	...	...
Lockhart	...	...	8	...	2	...	...	...	...	...	...	...	...	1
Lyndhurst	1	...	13	...	13	1	...	...	...	...	...	...	...	...
McIntyre	1	...	...	...	1	...	...	...	...	...	...	...	...	1
Macleay	...	...	3	...	5	...	...	...	...	...	...	...	...	1
Macquarie	...	...	3	...	7	...	...	...	...	...	...	...	...	...
Mandowa	1	...	3	...	1	...	...	...	...	...	...	...	...	...
Manning	...	...	1	...	8	...	...	...	1	...	...	...	...	2
Marthaguy	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Merriwa	...	...	8	...	...	...	...	...	...	...	...	...	...	...
Mitchell	...	...	6	...	1	...	...	...	...	...	...	...	...	2
Monaro	...	...	2	...	...	...	...	...	...	...	...	...	...	...
Mulwaree	1	...	17	...	3	...	...	...	...	...	...	...	...	3

* Notifiable only in the Blue Mountain Shire.

REMAINDER OF STATE.—Return showing the number of Cases, &c., from Country Shires—*continued.*

Shires	Typhoid and Paratyphoid.		Scarlet Fever.		Diphtheria.		Infantile Paralysis.		Cerebro-spinal Meningitis.		Encephalitis Lethargica.		*Pulmonary Tuberculosis.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
SHIRES—*continued.*														
Mumbulla	...	...	10	...	5	...	...	...	...	...	...	...	...	1
Murray	...	...	...	...	7	...	...	...	...	...	...	...	...	...
Murrumbidgee	...	...	...	...	2	3	...	...	...	...	...	...	...	4
Murrungal	2	...	7	...	5	...	...	...	...	...	...	...	...	1
Muswellbrook	...	...	3	...	1	...	...	...	...	...	...	...	...	...
Nambucca	...	...	1	...	6	...	...	...	...	...	...	...	...	...
Namoi	...	...	6	...	5	...	...	...	...	...	...	...	...	3
Narraburra	2	...	7	...	4	...	1	...	...	...	...	...	...	...
Nattai	...	...	3	...	11	...	...	...	...	...	...	...	...	1
Nepean	...	...	7	...	6	...	...	...	...	...	...	...	...	...
Nundle	...	...	9	...	1	...	...	...	...	...	...	...	...	...
Nymboida	...	...	2	...	1	...	...	...	...	...	...	...	...	...
Oberon	...	...	8	...	...	...	...	...	...	...	...	...	...	1
Orara	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Patrick Plains	...	...	17	...	24	1	2	...	...	...	...	...	...	...
Peel	1	...	14	...	17	...	...	...	...	...	...	...	...	...
Rylstone	...	...	27	...	8	2	...	...	...	...	...	...	...	1
Severn	2	...	4	...	2	...	...	...	...	...	...	...	...	1
Stroud	...	...	7	...	1	...	...	...	...	...	...	...	...	...
Sutherland	...	...	46	...	18	...	...	...	...	...	...	...	...	2
Talbragar	3	...	13	...	4	...	...	...	...	...	...	...	...	...
Tallaganda	...	...	2	...	...	...	...	...	...	...	...	...	...	...
Tamarang	2	...	1	...	4	...	...	...	...	...	...	...	...	...
Tenterfield	...	...	7	...	4	...	...	...	...	...	...	...	...	...
Terania	...	...	9	...	2	...	...	...	...	...	...	...	...	1
Timbrebongie	...	...	1	...	3	...	...	...	...	...	...	...	...	1
Tintenbar	...	...	6	...	...	...	...	...	...	...	...	...	...	...
Tomki	1	...	...	...	4	...	...	...	...	...	...	...	...	...
Tumbarumba	...	...	12	...	4	...	...	...	...	...	...	...	...	...
Turon	...	...	19	1	1	...	...	...	...	...	...	...	...	1
Tweed	2	1	3	...	14	...	...	...	...	...	...	...	...	...
Upper Hunter	...	...	5	...	3	...	...	...	...	...	...	...	...	1
Urana	1	...	4	...	4	...	...	...	...	...	...	...	...	...
Wade	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wakool	1	...	...	...	6	...	...	...	...	...	...	...	...	1
Walgett	1	...	...	...	1	...	...	...	...	...	...	...	...	2
Wallarobba	1	...	3	...	11	...	...	...	...	...	...	...	...	1
Waradgery	...	...	1	...	1	...	...	...	...	...	...	...	...	...
Warrah	...	...	4	...	...	...	...	...	...	...	...	...	...	...
Waugoola	...	...	5	...	4	...	...	...	...	...	...	...	...	...
Weddin	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Willembong	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Windouran	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Wingadee	...	...	2	...	1	...	...	...	...	...	...	...	...	...
Wingecarribee	1	...	14	1	...	...	...	...	...	...	...	...	...	...
Wollondilly	1	...	13	...	6	...	1	...	...	...	...	...	...	3
Woodburn	...	...	1	...	1	...	...	...	...	...	...	...	...	1
Wyaldra	...	...	...	...	5	...	...	...	...	...	...	...	...	...
Yalloroi	1	...	...	...	1	...	...	...	...	...	...	...	...	1
Yanko	...	...	31	...	32	...	...	...	...	...	...	...	...	...
Yarrowlumla	...	...	2	...	6	2	...	...	...	...	...	...	...	...
Total, Shires ...	66	1	1,157	6	738	18	5	...	4	...	...	...	104	293
COUNTRY POLICE DISTRICTS.														
Balranald	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Booligal	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Bourke	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Brewarrina	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Broken Hill	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cobar	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hay	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Hillston	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Menindie	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mitchell	3	...	2	...	5	...	...	...	...	...	...	...	...	...
Walgett	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wentworth	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wilcannia	...	...	...	...	1	...	1	...	...	...	...	...	...	...
Western Division (not classified)	...	...	...	...	...	1	...	...	...	...	...	...	...	...
Total	4	...	4	...	7	1	1	...	...	...	...	...	...	...
Outside the State—														
Queensland	2	...	...	...	...	...	...	...	...	...	...	...	...	...
Victoria	6	...	17	...	28	...	...	...	...	...	...	...	...	...
South Australia ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	8	...	17	...	28	...	...	...	...	...	...	...	...	...

* Notifiable only in the Blue Mountain Shire.

TABLE IV.—Table showing Age and Sex Incidence, and Mortality, in the Metropolitan Combined District, Hunter River Combined District, and Remainder of State, from the notified cases of Cerebro-spinal Fever (Meningococcal Meningitis), Diphtheria and Membranous Croup, Infantile Paralysis (Acute Anterior Poliomyelitis), Encephalitis Lethargica, Scarlet Fever, Typhoid Fever (including Paratyphoid), and Pulmonary Tuberculosis, for the year ended 31st December, 1927.

Age Period.	Typhoid and Paratyphoid.						Scarlet Fever.						Diphtheria.						Encephalitis Lethargica.						Infantile Paralysis.					
	Incidence.			Mortality.			Incidence.			Mortality.			Incidence.			Mortality.			Incidence.			Mortality.			Incidence.			Mortality.		
	Notified Cases.			Notified Deaths.			Notified Cases.			Notified Deaths.			Notified Cases.			Notified Deaths.			Notified Cases.			Notified Deaths.			Notified Cases.			Notified Deaths.		
	M.	F.	Total	M.	F.	Total	M.	F.	Total	M.	F.	Total	M.	F.	Total	M.	F.	Total	M.	F.	Total	M.	F.	Total	M.	F.	Total	M.	F.	Total
METROPOLITAN COMBINED DISTRICT.																														
All ages	99	80	179	15	8	23	2,075	3,718	5,793	37	54	91	1,026	1,053	2,079	50	36	86	1	1	2	11	11	22	8	5	13	3	...	3
Under 1 year	...	...	...	...	...	...	20	28	48	3	4	7	26	17	43	6	5	11	...	...	...	...	...	...	1	1	2	...	...	...
1— 4	4	5	9	1	...	1	466	535	1,001	16	18	34	453	371	824	36	24	60	...	...	...	...	1	1	3	4	7	1	...	1
5—14	34	24	58	...	...	...	1,057	1,970	3,027	10	16	26	446	459	905	6	6	12	...	...	...	1	1	2	3	...	3	2	...	2
15—24	28	18	46	2	...	2	318	674	992	2	9	11	48	91	139	...	1	1	...	...	...	2	1	3	1	...	1	...	...	...
25—34	7	14	21	2	3	5	114	331	445	3	5	8	30	64	94	1	...	1	...	...	...	2	...	2	...	...	...	...	...	...
35—44	16	9	25	6	2	8	66	116	182	2	2	4	8	31	39	...	...	...	...	...	...	2	2	4	...	...	...	...	...	...
45—54	7	6	13	3	3	6	14	24	38	1	...	1	5	9	14	...	...	...	...	1	1	3	2	5	...	...	...	...	...	...
55—64	3	1	4	1	...	1	4	8	12	...	...	...	1	2	3	1	...	1	1	...	1	...	4	4	...	...	...	...	...	...
65 and over	...	1	1	...	...	...	...	6	6	...	...	...	...	1	1	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...
Age not stated	...	2	2	...	...	...	16	26	42		...	...	9	8	17	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
HUNTER RIVER COMBINED DISTRICT.																														
All ages	33	14	47	4	-2	6	89	216	305	1	...	1	261	285	546	8	5	13	...	...	...	...	...	...	1	1	2	...	...	...
Under 1 year	...	...	...	...	...	...	1	1	2	1	...	1	8	9	17	2	...	2	...	...	...	...	...	...	...	...	...	...	...	...
1— 4	2	1	3	...	...	...	31	52	83	...	...	...	116	128	244	5	4	9	...	...	...	...	...	...	...	...	...	...	...	...
5—14	9	2	11	...	...	...	38	109	147	...	...	...	102	104	206	1	1	2	...	...	...	...	...	...	1	1	2	...	...	...
15—24	11	7	18	1	...	1	10	28	38	...	...	...	15	15	30	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
25—34	1	1	2	...	1	1	8	20	28	...	...	...	12	15	27	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
35—44	7	...	7	3	...	3	1	2	3	...	...	...	2	5	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
45—54	1	3	4	...	1	1	...	1	1	...	...	...	1	2	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
55—64	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
65 and over	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Age not stated	2	...	2	...	...	...	...	3	3	...	...	...	5	4	9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
REMAINDER OF STATE.																														
All ages	141	93	234	28	11	39	754	1,517	2,271	10	11	21	597	837	1,434	41	39	80	1	...	1	3	2	5	5	5	10	...	1	1
Under 1 year	1	...	1	...	...	...	7	9	16	1	1	2	12	12	24	3	4	7	...	...	...	...	...	...	...	...	...	...	...	...
1— 4	6	6	12	...	1	1	185	244	429	6	6	12	252	243	495	30	25	55	...	...	...	...	...	...	3	1	4	...	...	...
5—14	38	32	70	2	3	5	404	834	1,238	2	2	4	217	328	545	8	9	17	1	...	1	1	...	1	2	2	4	...	...	...
15—24	33	28	61	9	3	12	101	250	351	...	1	1	63	118	181	...	1	1	...	...	...	...	...	...	...	1	1	...	...	...
25—34	28	11	39	9	1	10	33	113	146	...	1	1	36	69	105	...	...	...	...	...	...	...	...	...	...	1	1	...	1	1
35—44	20	10	30	4	2	6	8	39	47	1	...	1	11	39	50	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
45—54	8	4	12	3	...	3	5	6	11	...	...	...	3	10	13	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...
55—64	4	...	4	...	...	...	1	6	7	...	...	...	...	5	5	...	...	...	...	...	...	2	1	3	...	...	...	...	...	...
65 and over	1	1	2	1	1	2	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Age not stated	2	1	3	...	...	...	10	16	26	...	...	...	3	12	15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

Age Period.	Cerebro-spinal Meningitis.						*Pulmonary Tuberculosis.					
	Incidence.			Mortality.			Incidence.			Mortality.		
	Notified Cases.			Notified Deaths.			Notified Cases.			Notified Deaths.		
	M.	F.	Total	M.	F.	Total	M.	F.	Total	M.	F.	Total
METROPOLITAN COMBINED DISTRICT.												
All ages	4	8	12	5	4	9	604	384	988	337	208	545
Under 1 year	2	1	3	2	1	3	...	...	...	...	1	1
1— 4	...	2	2	...	...	...	4	8	12	1	2	3
5—14	1	2	3	2	1	3	74	96	170	19	45	64
15—24	...	2	2	...	1	1	109	144	253	62	69	131
25—34	...	...	...	...	...	...	149	79	228	92	47	139
35—44	1	...	1	1	...	1	110	34	144	75	22	97
45—54	1	1	2	...	...	...	32	9	41	39	10	49
55—64	...	...	...	...	...	...	75	9	84	49	12	61
65 and over	...	...	...	...	...	...	32	9	41	39	10	49
Age not stated	...	...	...	...	...	...	51	3	54	...	...	...
HUNTER RIVER COMBINED DISTRICT.												
All ages	4	4	8	1	...	1	30	28	58	24	24	48
Under 1 year	...	...	...	...	...	...	...	...	...	...	...	...
1— 4	1	1	2	...	...	...	...	...	...	...	...	...
5—14	1	1	2	...	...	...	1	...	1	...	...	...
15—24	1	...	1	1	...	1	2	5	7	...	8	8
25—34	...	...	...	...	...	...	4	16	20	5	10	15
35—44	...	...	...	...	...	...	9	4	13	3	1	4
45—54	...	...	...	...	...	...	6	...	6	11	2	13
55—64	...	...	...	...	...	...	2	1	3	4	2	6
65 and over	...	...	...	...	...	...	3	2	5	1	1	2
Age not stated	...	...	...	...	...	...	3	...	3	...	...	...
REMAINDER OF STATE.												
All ages	5	5	10	...	1	1	66	46	112	288	175	463
Under 1 year	1	...	1	...	...	...	...	...	...	...	2	2
1— 4	1	1	2	...	...	...	...	...	...	...	1	1
5—14	1	1	2	...	...	...	...	...	...	...	1	1
15—24	...	...	...	...	...	...	13	11	24	22	42	64
25—34	1	...	1	1	...	1	17	18	35	58	59	97
35—44	...	...	...	...	...	...	15	10	25	73	33	106
45—54	...	...	...	...	...	...	6	1	7	74	10	84
55—64	...	...	...	...	...	...	11	...	11	51	14	65
65 and over	...	...	...	...	...	...	2	...	2	25	11	36
Age not stated	...	...	...	...	...	...	2	4	6	2	...	2

SUMMARY.

District.	Typhoid Fever.		Scarlet Fever.		Diphtheria.		Infantile Paralysis.		Cerebro-spinal Meningitis.		Encephalitis Lethargica.		Pulmonary Tuberculosis.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Metropolitan Combined Sanitary District ...	179	23	5,793	91	2,079	86	13	3	12	9	2	22	988	545
Hunter River Combined Sanitary District...	47	6	305	1	546	13	2	...	8	1	...	...	58	48
Remainder of State—														
Municipalities ...	164	38	1,110	15	689	61	4	1	1	...	1	5	8	170
Shires ...	66	1	1,157	6	738	18	5	...	4	...	...	...	104	293
Police Districts ...	4	...	4	...	7	1	1	...	...	...	...	...	...	...
Total ...	460	68	8,369	113	4,059	179	25	4	25	10	3	27	1,158	1,056

TABLE V.—Showing the seasonal prevalence of Cerebro-spinal Fever (Meningococcal Meningitis), Diphtheria and Membranous Croup, Infantile Paralysis (Acute Anterior Poliomyelitis), Encephalitis Lethargica, Scarlet Fever, Typhoid Fever (including Paratyphoid), and Pulmonary Tuberculosis, in New South Wales for the year ended 31st December, 1927.

	Typhoid Fever and Paratyphoid.								Scarlet Fever.							
	Metropolitan Combined Districts.		Hunter River Combined Districts.		Remainder of State.		Total.		Metropolitan Combined Districts.		Hunter River Combined Districts.		Remainder of State.		Total.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
January	59	5	16	...	53	4	128	9	420	5	40	...	237	...	697	5
February	26	5	6	...	40	6	72	11	381	3	27	...	199	1	607	4
March	29	2	3	...	21	5	53	7	433	4	38	...	259	1	730	5
April	6	2	4	...	24	5	34	7	337	8	28	...	209	1	574	9
May	8	1	5	1	16	2	29	4	296	1	21	...	175	1	492	2
June	6	...	1	...	10	3	17	3	347	4	18	...	122	1	487	5
July	2	...	2	1	6	1	10	2	439	10	20	...	147	1	606	11
August	9	1	...	1	5	2	14	4	669	14	19	1	168	2	856	17
September	7	2	2	...	6	...	15	2	708	17	27	...	195	4	930	21
October	4	2	1	...	10	...	15	2	772	12	24	...	183	4	979	16
November	7	2	2	1	24	9	33	12	589	9	23	...	211	1	823	10
December	16	1	5	2	19	2	40	5	402	4	20	...	166	4	588	8
Total	179	23	47	6	234	39	460	68	5,793	91	305	1	2,271	21	8,369	113

	Diphtheria.								Encephalitis Lethargica.							
	Metropolitan Combined Districts.		Hunter River Combined Districts.		Remainder of State.		Total.		Metropolitan Combined Districts.		Hunter River Combined Districts.		Remainder of State.		Total.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	
January	191	6	55	2	178	10	424	18	...	2	...	...	...	1	...	3
February	199	5	61	1	157	6	417	12	...	2	...	...	...	...	...	2
March	291	15	101	1	221	9	613	25	...	5	...	...	...	...	...	5
April	270	8	87	1	197	8	554	17	...	...	...	...	...	1	...	1
May	250	10	66	...	176	20	492	30	1	2	...	...	...	1	1	3
June	196	8	48	2	106	8	350	18	...	3	...	...	...	...	...	3
July	209	13	22	3	81	4	312	20	...	1	...	...	...	...	...	1
August	127	8	37	1	76	7	240	16	...	1	...	...	...	...	...	1
September	101	1	27	1	72	3	200	5	1	3	...	...	...	1	1	4
October	77	6	12	...	66	2	155	8	...	1	...	...	1	1	1	2
November	104	5	16	1	51	1	171	7	...	1	...	...	...	...	...	1
December	64	1	14	...	53	2	131	3	...	1	...	...	...	...	...	1
Total	2,079	86	546	13	1,434	80	4,059	179	2	22	...	...	1	5	3	27

	Infantile Paralysis.								Cerebro-spinal Meningitis.							
	Metropolitan Combined Districts.		Hunter River Combined Districts.		Remainder of State.		Total.		Metropolitan Combined Districts.		Hunter River Combined Districts.		Remainder of State.		Total.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
January	2	2	...	...	...	...	2	2	2	1	...	...	...	...	2	1
February	2	...	...	...	2	...	4	...	...	...	...	...	1	...	1	...
March	1	...	1	...	1	...	3	...	...	...	...	...	1	...	1	...
April	1	...	1	...	1	...	3	...	2	1	...	...	...	...	2	1
May	3	...	...	...	1	...	4	...	...	...	2	...	...	...	2	...
June	...	1	...	...	1	...	1	1	3	...	2	...	1	...	6	...
July	1	...	...	...	...	...	1	...	2	1	1	...	...	...	3	1
August	...	...	...	...	1	...	1	...	...	2	2	...	1	...	3	2
September	1	...	...	...	...	...	1	...	2	...	...	...	1	...	3	...
October	...	...	...	...	...	1	...	1	1	3	...	...	...	...	1	3
November	1	...	...	...	2	...	3	...	...	1	1	1	...	...	1	2
December	1	...	...	...	1	...	2	...	...	...	...	...	...	...	...	...
Total	13	3	2	...	10	1	25	4	12	9	8	1	5	...	25	10

	Pulmonary Tuberculosis.							
	Metropolitan Combined Districts.		Hunter River Combined Districts.		Remainder of State.		Total.	
	C.	D.	C.	D.		D.	C.	D.
January	85	52	4	2	18	47	107	101
February	62	40	6	3	4	29	72	72
March	102	44	5	7	8	31	115	82
April	58	30	2	4	13	34	73	68
May	67	40	5	3	8	43	80	86
June	63	46	6	5	2	39	71	90
July	73	62	11	3	5	33	89	98
August	95	52	2	3	20	51	117	106
September	78	46	2	8	15	48	95	102
October	99	52	3	4	11	30	113	86
November	118	43	7	5	7	45	132	93
December	88	38	5	1	1	33	94	72
Total	988	545	58	48	112	463	1,158	1,056

TABLE VI.—Showing the number of Cases of Infectious Diseases notified in the State of New South Wales during the years 1898 to 1927, inclusive, and the number of deaths therefrom.

Year.	Population.	Typhoid Fever.		Scarlet Fever.		Diphtheria.		Plague.*		Infantile Paralysis.†		Cerebro-spinal Meningitis.‡		Encephalitis Lethargica.		Pulmonary Tuberculosis.§		Total Deaths from Phthisis in N.S.W.
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.		
1898	1,323,130	3,302	387	6,342	83	1,493	169	...	...	...	...	...	...	...	...	...	...	1,104
1899	1,344,080	2,783	347	1,389	25	741	60	...	...	...	...	...	...	...	...	...	...	1,078
1900	1,364,590	3,442	398	895	9	726	63	303	103	...	...	...	...	...	...	...	...	1,056
1901	1,376,199	2,702	291	1,288	16	922	131	...	...	...	...	...	...	...	...	...	...	1,134
1902	1,397,858	2,624	276	2,010	61	757	74	140	41	...	...	...	...	...	...	...	...	1,123
1903	1,416,879	4,855	475	5,358	87	1,214	134	2	...	...	...	...	...	...	...	...	...	1,235
1904	1,440,919	2,370	249	4,056	50	1,584	156	12	6	...	...	...	...	...	...	146	...	1,156
1905	1,469,153	2,226	239	1,773	21	1,118	102	56	21	...	...	...	...	...	...	128	...	1,037
1906	1,498,609	2,373	271	3,085	42	1,219	100	20	8	...	...	...	...	...	...	118	...	1,007
1907	1,531,980	1,972	189	2,570	26	1,376	133	51	20	...	...	...	...	...	...	161	...	961
1908	1,560,026	2,607	307	2,755	40	2,001	123	6	3	...	...	...	...	...	...	112	...	1,008
1909	1,596,685	2,615	287	7,178	30	2,419	166	24	7	...	...	...	...	...	...	196	...	1,040
1910	1,638,220	2,714	294	1,642	23	4,989	207	...	...	...	...	...	...	...	...	184	...	1,024
1911	1,698,735	1,864	184	2,618	11	4,784	226	...	...	...	...	...	...	...	...	222	...	1,099
1912	1,778,962	2,126	236	662	11	5,440	253	...	...	...	...	...	...	...	...	265	...	1,078
1913	1,832,546	2,187	236	1,120	23	6,380	310	...	...	47	10	...	...	...	...	228	...	1,210
1914	1,862,028	2,284	250	3,207	21	5,831	247	...	...	79	14	...	...	...	...	293	...	1,178
1915	1,868,644	1,941	219	8,335	97	5,838	264	...	...	63	11	50	33	...	...	361	86	1,122
1916	1,846,736	1,742	209	5,759	107	6,588	309	...	...	311	21	309	145	...	...	1,499	666	1,157
1917	1,886,701	1,091	103	2,255	27	5,805	247	...	...	16	12	197	98	...	...	1,319	584	1,017
1918	1,928,174	810	112	1,308	15	5,151	221	...	...	50	12	120	80	...	...	1,308	586	1,093
1919	2,000,173	857	106	959	10	2,826	114	...	...	8	3	28	23	...	...	1,102	678	1,216
1920	2,099,763	1,016	132	937	24	5,043	253	...	...	45	10	34	27	...	...	1,509	674	1,118
1921	2,128,786	949	129	1,060	8	6,854	306	2	1	184	22	30	28	...	...	1,240	791	1,129
1922	2,174,688	706	99	1,153	11	4,094	207	33	9	33	5	21	22	...	...	1,045	517	1,080
1923	2,211,106	873	104	2,623	13	3,480	176	1	1	104	8	27	22	...	...	1,218	657	1,109
1924	2,256,649	768	97	3,421	29	4,364	222	...	...	108	6	29	38	...	...	1,096	730	1,165
1925	2,300,081	533	80	3,043	27	3,004	118	...	...	57	14	37	27	...	...	1,195	617	1,022
1926	2,349,401	698	80	4,755	53	3,579	147	...	...	81	21	32	23	...	...	1,265	705	1,144
1927	2,401,884	460	68	8,369	113	4,059	179	...	...	25	4	25	10	3	27	1,158	632	1,056

* Notifiable from 23rd January, 1900.
† " 1st February, 1912.
‡ " 11th October, 1915.
§ " 18th October, 1904, in the city of Sydney only; and under Public Health (Amendment) Act, 1915, from 11th August, 1915, in the Metropolitan and Hunter River Districts; from 2nd October, 1916, in the Katoomba Municipality and Blue Mountain Shire, and from 17th December, 1920, in the Blackheath Municipality. At time of writing it is not notifiable elsewhere in the State.

GRAPHS.

Annual Death-rate per 100,000 and case rate per 10,000 of population—

Typhoid Fever ... ...
Scarlet Fever ... ... } 1898-1927.
Diphtheria... ... ...

Annual Death-rate per 100,000 of population—

Measles ... ...
Whooping Cough ... ... } 1875-1927.
Diarrhœa and Enteritis (2 years and over) ... ...

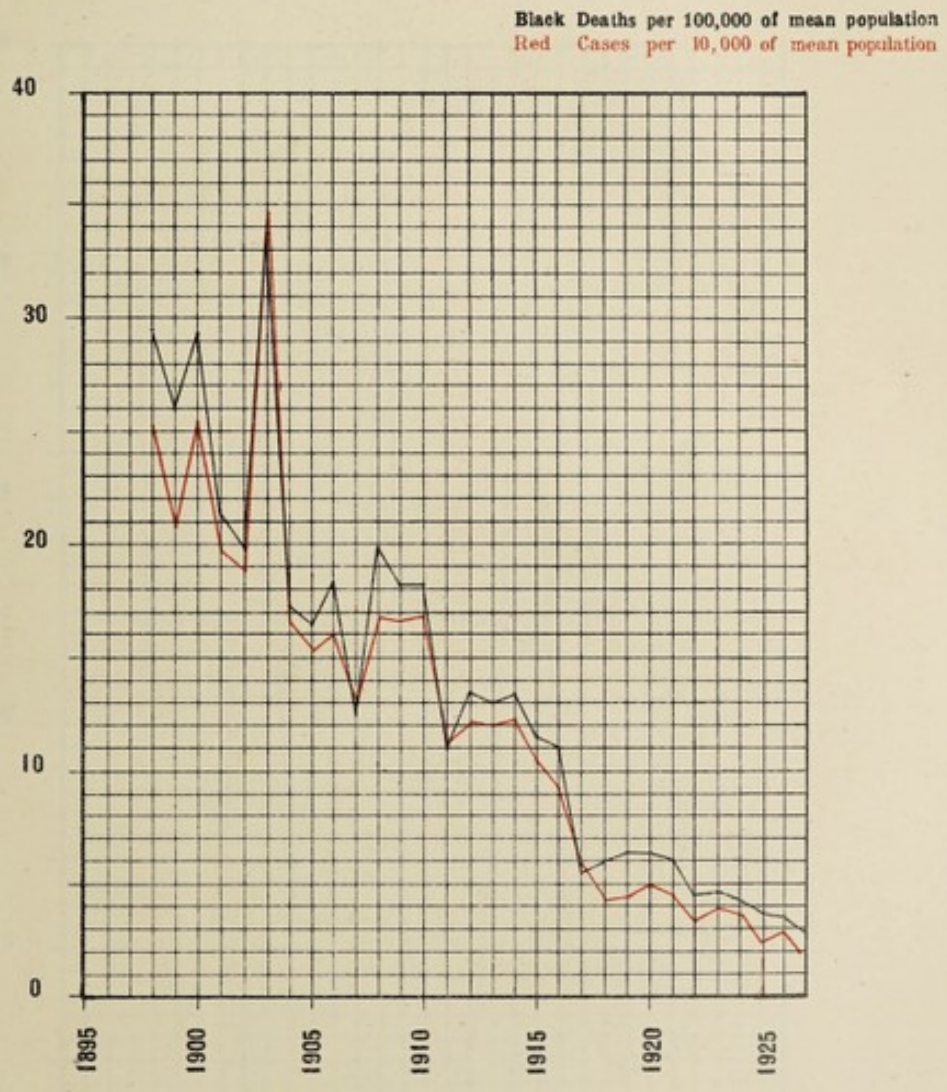
TYPHOID FEVER.

ANNUAL DEATH RATE PER 100,000 AND CASE RATE PER 10,000 OF POPULATION

IN

NEW SOUTH WALES,

1898–1927.



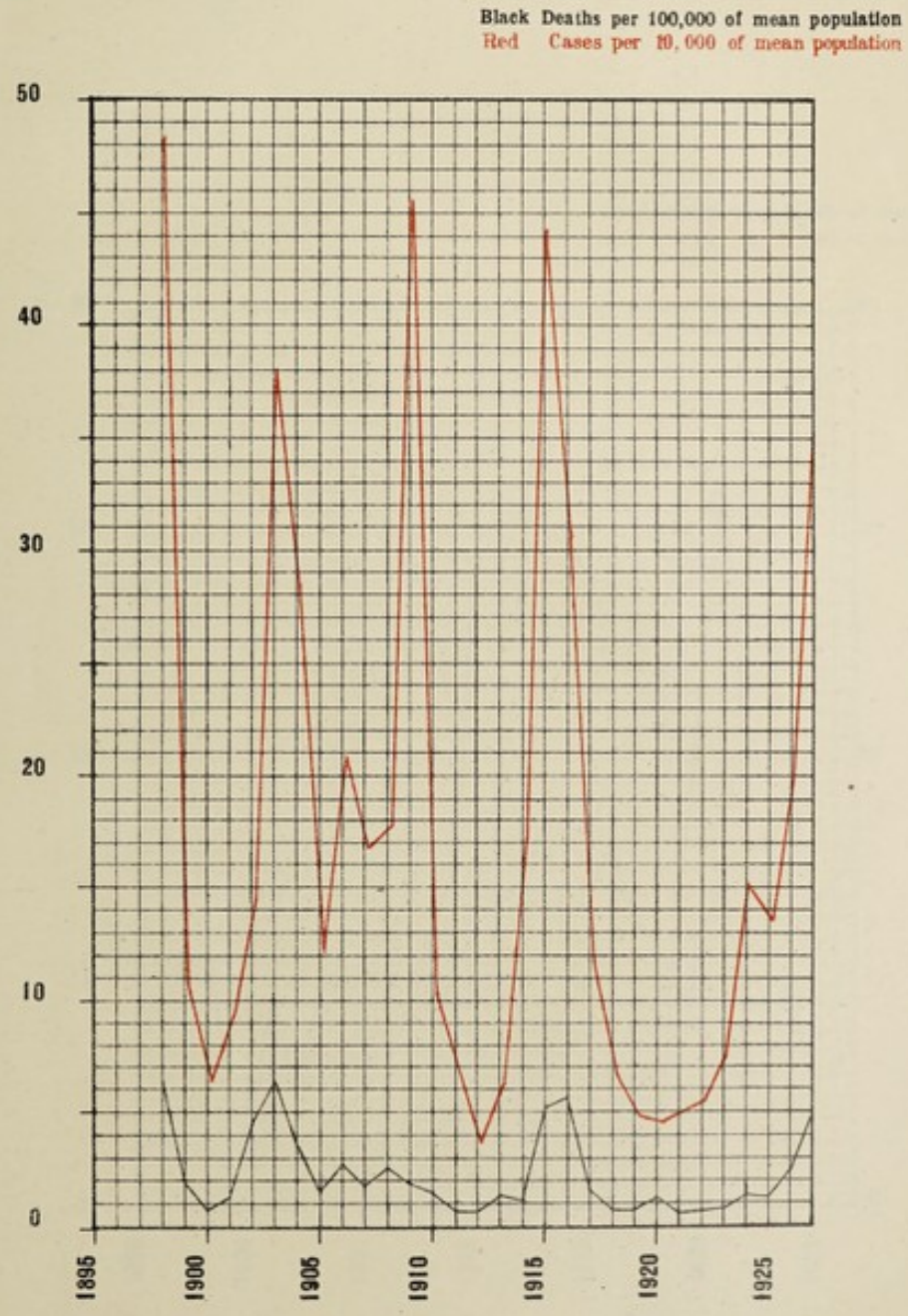
SCARLET FEVER.

ANNUAL DEATH RATE PER 100,000 AND CASE RATE PER 10,000 OF POPULATION

IN

NEW SOUTH WALES,

1898–1927.



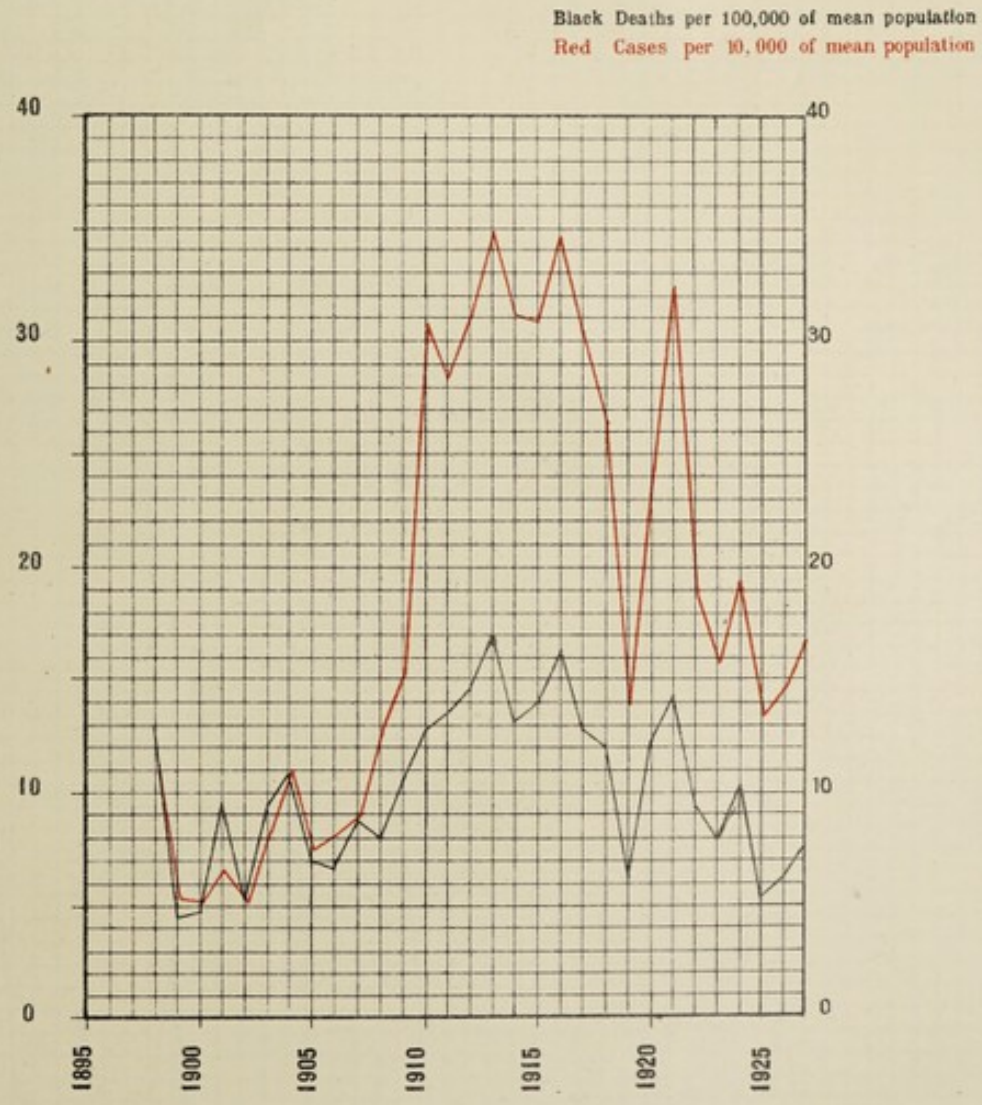
DIPHTHERIA

ANNUAL DEATH RATE PER 100,000 AND CASE RATE PER 10,000 OF POPULATION

IN

NEW SOUTH WALES,

1898–1927.



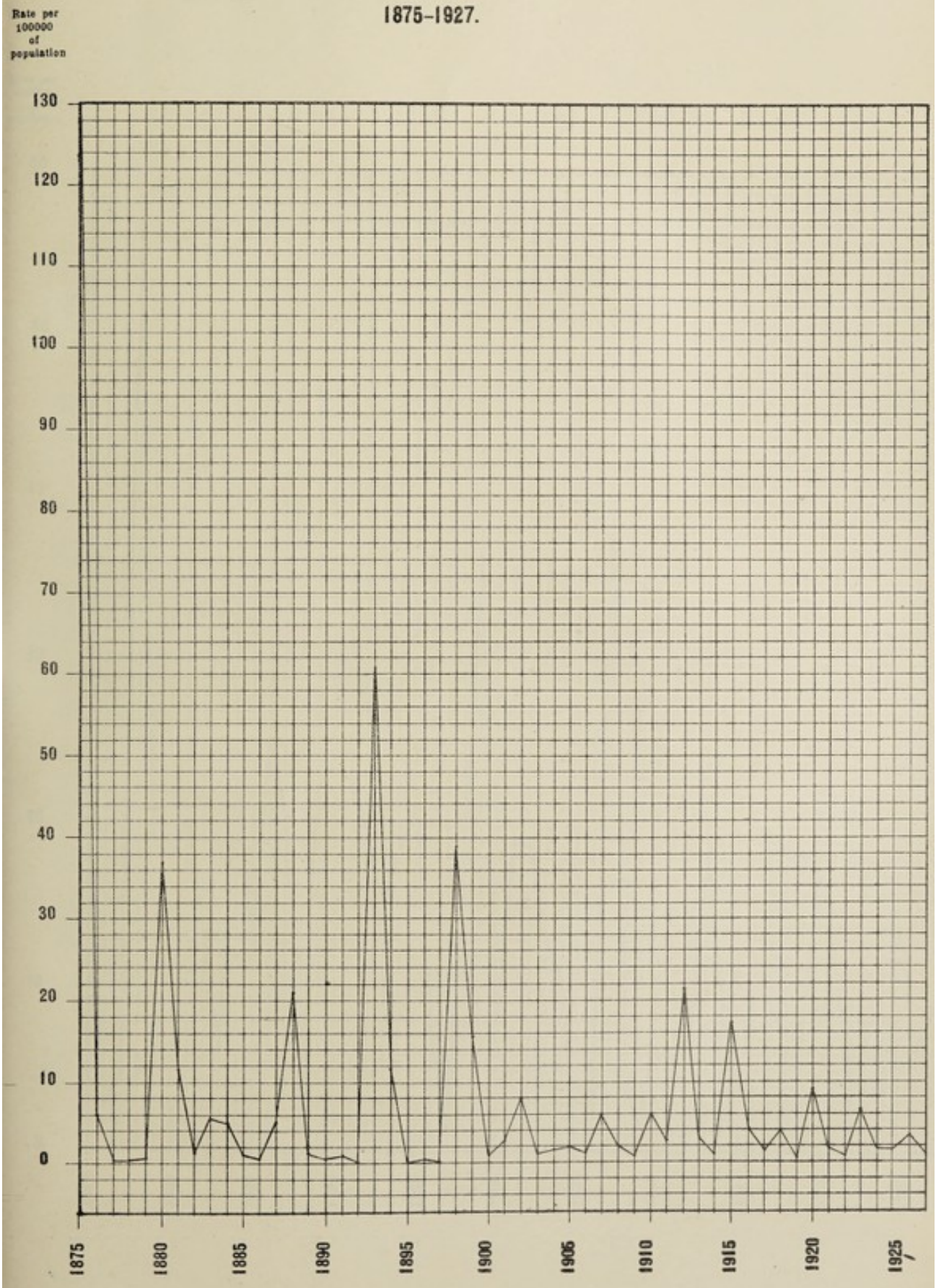
MEASLES.

ANNUAL DEATH RATE PER 100,000 OF POPULATION

IN

NEW SOUTH WALES,

1875–1927.



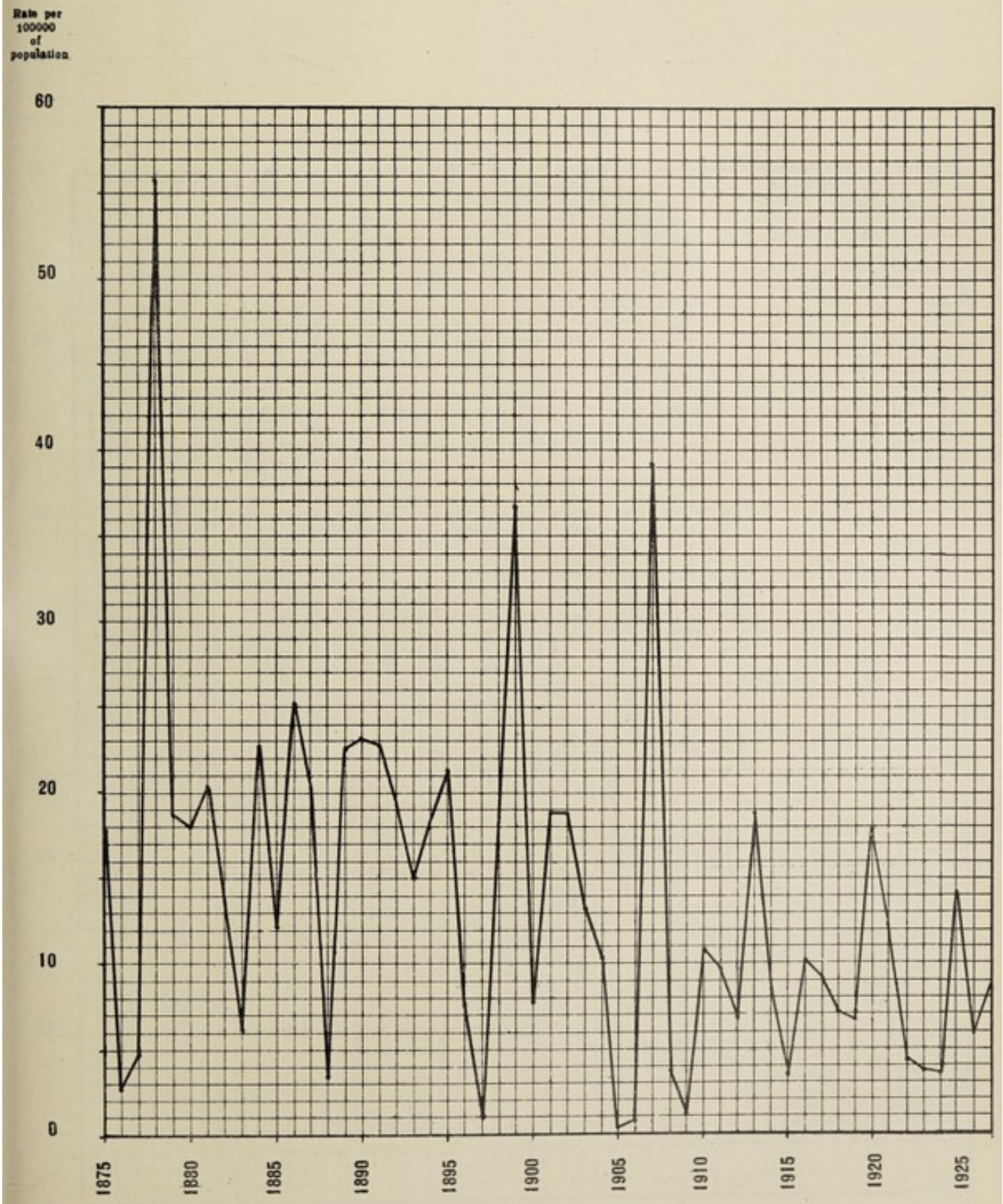
WHOOPING COUGH.

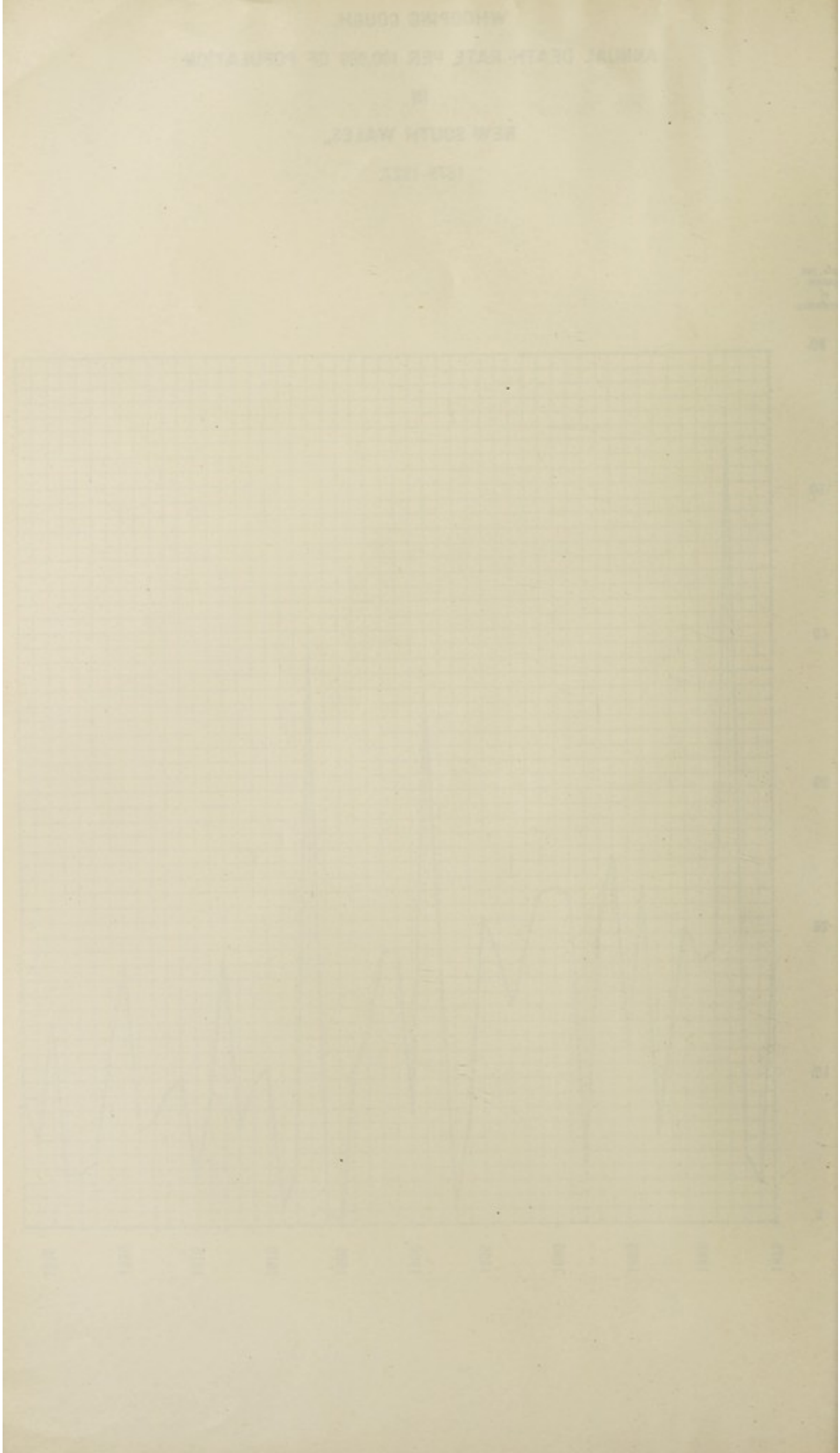
ANNUAL DEATH RATE PER 100,000 OF POPULATION

IN

NEW SOUTH WALES,

1875-1927.





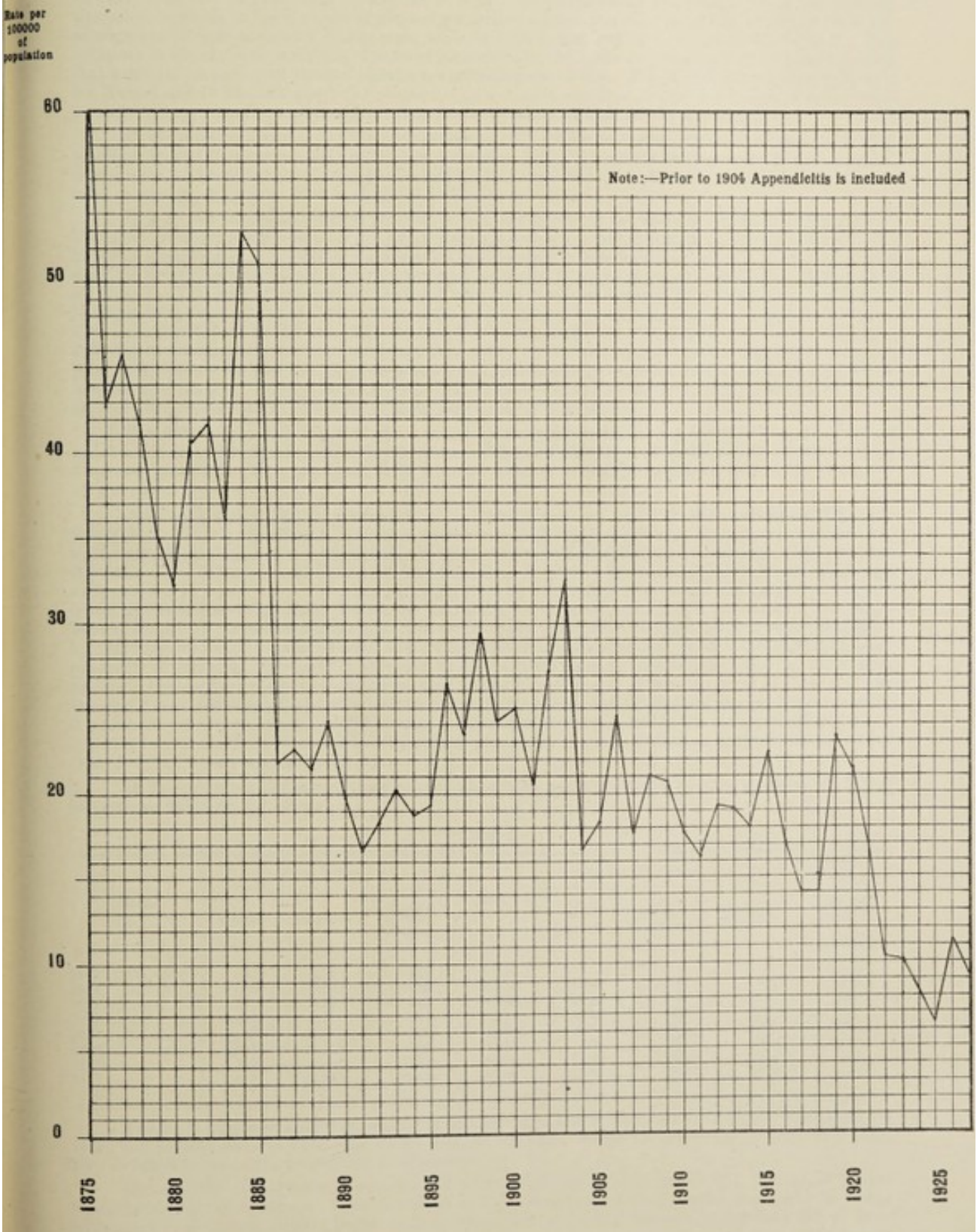
DIARRHŒA AND ENTERITIS (2 years and over).

ANNUAL DEATH RATE PER 100,000 OF POPULATION

IN

NEW SOUTH WALES,

1875–1927.



2. VENEREAL DISEASES ACT, 1918. (7TH REPORT.)

REPORT BY THE COMMISSIONER, DR. ROBERT DICK, FOR THE YEAR ENDED 31ST DECEMBER, 1927.

Notifications.—5,674 notifications of venereal disease were received during 1927, a decrease of 327 compared with 1926, when 6,001 cases were notified.

The 5,674 notifications received in 1927 comprised 1,257 cases of syphilis (males 982, and females 275); 4,134 cases of gonorrhœa (males 3,635, females 499), and 283 cases of other forms of venereal disease (males 281, females 2). During the seven years the Venereal Diseases Act has been in operation, the sex ratio of notified cases of syphilis has averaged about 3 males to 1 female case, the figures being 2·80 to 1 in 1927; 3·55 to 1 in 1926, with an average of 3 to 1 for the previous five years. There has been an alteration, however, in the sex ratio of notified gonorrhœa cases. For the years 1923, 1924, and 1925, the average was 10 male cases to 1 female case, while in 1926 it was 7·84 to 1, and in 1927, 7·3 to 1. This reduction in the sex ratio incidence of cases of gonorrhœa in the past two years gives ground for believing that a greater proportion of infected females are attending the clinics. The Rachel Forster Hospital Clinic for Women and Children is now being conducted as a continuous clinic, and it is anticipated that female patients will more readily seek treatment than formerly, when no such facility was available.

Of the total notifications (5,674) received during 1927, 37 per cent. was forwarded by private medical practitioners and 63 per cent. came from clinics, whereas in 1926 the figures were 43 per cent. and 57 per cent. respectively. There was thus, during 1927, a falling off of 6 per cent. in the number of notifications received from private practitioners. This is shown in Table III (p. 62).

It is known that some medical practitioners do not notify all the cases of venereal diseases treated by them. It is not possible to state the number of such defaulters, but that they do exist is proved by the fact that occasionally information reaches the Commissioner which furnishes definite proof. In these cases the defaulting practitioner is written to under registered post and given an opportunity of explaining his default. Various explanations are tendered, such as: it was understood that compulsory notification had been done away with in the State; that as the patient stated he had been at a clinic some time or other, it was considered that he had been notified by the clinic doctor, and so on. Seeing that it is only occasionally, and that by chance, such information of failure to notify on the part of the medical practitioner comes to hand, it is no doubt the case that there are a number of practitioners who do not comply with the notification provisions of the Act. It may be mentioned that at intervals all the medical practitioners on the State register are circularised and reminded of their duty as regards notification.

This unsatisfactory condition of affairs as regards compulsory notification of cases of venereal diseases is not confined to the State of New South Wales. Wherever this form of notification is in operation in Australia or elsewhere, there are found to be a certain number of medical practitioners who fail to comply with the law.

Objections to compulsory notification of venereal disease are made by both patients and medical men, despite the fact that the notification is almost universally carried out in an impersonal manner—that is, by number only, and not by name, except when the patient defaults in his treatment, and even then the name of the defaulter must be treated confidentially. In certain parts of the United States of America notification is by name only. Whether the notification be by number or by name, one cannot rely on the totals so notified as being indicative of the prevalence of venereal disease in a community. Attempts have been made in certain large cities in Europe and America to ascertain the prevalence of venereal diseases by obtaining the actual number of cases under treatment on a particular date by each medical practitioner practising in the area. The results obtained by this method cannot, however, be relied on for various reasons. Census figures obtained in this manner in the United States of America tend to show that the number of cases attending at the public clinics represent about one-fifth of the total cases in the community in which the census was taken. If this method of computation were applied to the metropolis of this State, it would very probably show a considerably greater prevalence of venereal diseases in the community than that indicated by the notification figures.

In Table I below the annual cases notified since 1920, and the number of cases reported for failure to continue treatment are shown.

TABLE I.

Year.	Cases Notified.			Total.	Cases Reported for Failure to Continue Treatment.			
	Syphilis.	Gonorrhœa.	Other Venereal Diseases.		Total No. Reported.	Letters Returned Undelivered.	Treatment Resumed.	Cases not Finalised at 31 Dec.
1920 (Dec. only)...	683	1,340	215	2,238	.....	.....	.....	.....
1921	2,055	6,667	683	9,405	2,472	1,286	906	280
1922	1,270	4,516	512	6,298	1,992	997	628	367
1923	1,240	5,115	474	6,829	1,749	964	545	240
1924	968	4,628	494	6,090	1,354	651	422	281
1925	1,015	3,933	366	5,314	955	538	241	176
1926	1,179	4,491	331	6,001	1,060	593	280	187
1927	1,257	4,134	283	5,674	1,210	482	304	424

Failure to Continue Treatment.—The Act provides that if a patient has discontinued treatment, his name and address must be forwarded by his medical attendant to the Commissioner in order that steps may be taken to secure the resumption of treatment.

During 1927 the names and addresses of 1,210 defaulting patients (males 971, females 239) were forwarded to the Commissioner. These defaulters were communicated with by letter, but owing to wrong information having been supplied to the medical attendants in the first instance, no less than 482 of these letters were returned undelivered by the postal authorities. Of the remaining 728 defaulters, 304 resumed

treatment, and as regards the balance (424 cases) follow up proceedings were still being carried on, but were not finalised by the end of the year. It will thus be seen that 21 per cent. of the 5,674 patients notified discontinued attendance before completing the treatment. Of the total (1,210) defaulters 25 per cent resumed treatment, and the remaining 35 per cent. had not been finally dealt with by the end of the year.

The question of patients failing to continue under treatment until cured or free from infection is one of the most unsatisfactory features in connection with the problem of the control of venereal disease.

There are many and various causes which result in the failure of patients to continue with their treatment. Amongst these may be mentioned the patient's inability to understand, or refusal to believe that even though all outward signs of his infection have disappeared as a result of treatment, he must still continue treatment if a permanent cure is to be effected. There are some patients who are casual employees, and who are forced at times to go into the country in search of employment in localities where there are no facilities available for treatment.

Then as regards the existing clinics themselves, with one exception (*i.e.*, that at the Rachel Forster Hospital), the clinics are only open one or two days a week, and the sessions are held at night time. Owing to the limited number of sessions, and the unsatisfactory accommodation available at the clinics, the patients attending are herded together, and it is impossible to give then that individual personal attention which is, in my opinion, essential if they are to be attracted to the clinics, and expected to keep up regular attendance, until they are rendered free from infection.

The disabilities associated with practically all the existing clinics are such that it is somewhat surprising that patients attend as well as they do.

During my visit to Great Britain in 1927, I was invited to attend a meeting of one of the Committees of the British Social Hygiene Council at its headquarters in London for the purpose of discussing with the members the results of the operation of the Venereal Diseases Act in New South Wales.

There is no law in force in Great Britain dealing with compulsory notification of venereal disease apart from local and circumscribed powers in this connection acquired by the city of Bradford. In view of the fact that a substantial percentage of the patients who attend the clinics in Great Britain discontinue their attendance at the clinics before having completed their courses of treatment, various local authorities have been considering the question of acquiring legal powers to enable them to compel defaulters to continue with their treatment. In order to aid in this question it is considered that some form of compulsory notification would serve a useful purpose. It was stated that the authorities of two large cities were seeking to promote parliamentary bills which would provide for compulsory notification. I explained to the members of the British Social Hygiene Council the difficulties connected with the administration of the Venereal Diseases Act in this State, and pointed out that even with compulsory notification it had been found impossible so far to ensure that patients could be kept under treatment.

Clinics.

Metropolitan District.—No additional clinics were opened in 1927. At present there are eight free clinics in operation, seven of which are in association with one or other of the public hospitals; at two of the clinics (Coast Hospital) syphilitic males only are treated. The clinic conducted at the Rachel Forster Hospital is for women and children only. This clinic is now open every week-day, and is being conducted by medical officers (female) on the staff of this Department.

From the figures below it will be seen that in comparison with 1926 there was a definite decrease in the number of new patients suffering from gonorrhœa treated at the clinics and a slight increase in the patients suffering from syphilis.

Table II.

New Patients treated at the eight Metropolitan Clinics during the years 1926 and 1927.

Year.	Gonorrhœa.			Syphilis.		
	Male.	Female.	Total.	Male.	Female.	Total.
1926*	1,968	460	2,428	824	258	1,082
1927	1,725	370	2,095	913	235	1,148

Attendances at the male clinics numbered 60,675 in 1927, an increase of 5,456 on the figures (55,219) for 1926; at the clinics for women there was an increase of 2,375, the figures being 1926, 11,487; 1927, 13,862.

The most important item in the programme for dealing with venereal diseases in this State, and which demands attention is, in my opinion, the provision in the metropolis of a thoroughly up-to-date clinic which will function continuously throughout the week. Whether this clinic should form part of one of the general hospitals or be situated in some convenient locality as a separate unit may be open to discussion. But in view of the overcrowded state of the out-patient departments of the general hospitals, it is obvious that they cannot supply the necessary accommodation in their existing buildings. Although an Act of Parliament, the Prince Alfred Hospital (Isolation Block) Act, 1923, authorised the construction of a building for venereal diseases purposes in the grounds of that hospital at a cost of £36,000, nothing has so far been done to carry this project into effect beyond the preparation of plans for the building. In my opinion it would be possible to provide an up-to-date venereal disease clinic at a less cost than that indicated. During my recent tour abroad I had the opportunity of looking over a number of venereal disease clinics in England and the U.S.A. I saw no more serviceable clinic than that at the St. Thomas Hospital where two wooden army huts had been converted into a clinic capable of dealing with several hundred patients a day. I saw several other more substantially built and perhaps somewhat better equipped clinics modelled on the same lines as the clinic at St. Thomas,

It may be mentioned that the small clinic building which has been recently provided at the Rachel Forster Hospital for Women and Children has been arranged on the lines of the St. Thomas Hospital Clinic.

I strongly urge that a full-time clinic be provided in the metropolis as early as possible, the arrangements of the clinic to follow the lines of those referred to above.

Next in importance, in my opinion, to the provision of such a clinic is the appointment of a medical officer (male) with adequate clinical experience in venereal diseases to control this and other clinics, and to act as Deputy Commissioner under the Act. The importance of the subject of venereal disease demands special attention and to enable this to be done the services of a whole-time medical officer are required. This officer would also carry out propaganda work, &c., and practically administer the Act with the Commissioner.

Newcastle.—There has been no improvement in the position as regards clinic facilities at this important seaport centre. The plans which were prepared for a new building to house the out-patient department of the Newcastle Hospital as well as a clinic for venereal disease purposes have been subjected to various amendments and alterations. Finality has been about reached in this regard. The question of funds to enable the building to be erected and so make available this much needed clinic has still to be settled.

It is satisfactory to record that the Federal Government has approved of the principle of subsidising funds used for erection of clinics for venereal disease. Hitherto this Government has only contributed to the maintenance of these clinics. The Federal Government's assistance will be of considerable help in providing a clinic for Newcastle, as it has agreed to pay one-half the cost of construction of that portion of the building which is to be used for this clinic.

Bed Accommodation for Venereal Disease Cases.—At public hospitals and State institutions in the metropolitan area there are 102 beds available for males, 29 for females, and 15 for children. These beds are almost constantly occupied.

At intervals the Department receives requests from country hospitals for admission into its institutions of cases of venereal disease which present themselves for treatment at these hospitals. Unless in very special circumstances, these requests are not complied with. It is the duty of all country hospitals to treat locally any cases of venereal disease presenting themselves for treatment. The Department furnishes necessary supplies of drugs for the treatment of these cases free of charge.

Expenditure, 1927.—£6,462 was spent from the special appropriation towards expenses under the Venereal Diseases Act. Of this amount £2,975 was paid in grants to public hospitals towards the cost of special accommodation for the treatment of patients suffering from venereal diseases, and £1,517 for drugs supplied free by this Department for the treatment of these diseases. The Federal Government contributed £4,500 towards the expenditure incurred in dealing with venereal diseases during the year.

In addition to these amounts there is a considerable outlay in the treatment of patients in the venereal disease wards at the Coast Hospital, and the Liverpool and Newington State Hospitals. In 1927 the cost of maintenance of venereal disease patients at these hospitals amounted to £9,533. The total expenditure during the year in connection with venereal diseases was £28,581.

Pathological Examinations.—Table VII shows the increased use made of laboratory tests for diagnostic purposes, and for checking the results of treatment. In 1927, 15,655 serological tests were made on 7,300 specimens, compared with 11,611 tests on 6,035 specimens in 1926. In addition, 3,928 smears were examined for detection of gonococci, an increase of over 16 per cent. on the figures (3,372) for 1926.

Prosecutions.

There were ten prosecutions under the Venereal Diseases Act during the year, viz.:—

Section 3: A chemist (not being a medical practitioner) was fined £25 and costs for having treated a person suffering from venereal disease.

Section 5: A fine of £1 and costs or in default 14 days' hard labour was imposed on a person suffering from venereal disease who failed to continue treatment.

Section 25: Three persons were successfully proceeded against for:—

1. Advertising the sale of a drug for the cure of sexual impotence. Fined £30 and costs.
2. Publishing a statement for the cure of sexual impotence. Fined £1 and costs.
3. Publishing a statement regarding menstrual irregularities. Fined £3 and costs.

Regulation 3: Five chemists were prosecuted for having sold drugs for treatment of venereal disease, and were each fined £3 and costs.

Educational Propaganda.—The Department has the following films dealing with venereal disease: "Gift of Life," "Social Hygiene for Women," "Waste," "Memories," "The Flaw," "Whatsoever a Man Soweth," "Well-born." These films have been shown extensively in conjunction with addresses and lectures on the subject of sex hygiene. Leaflets are distributed freely and suitable posters are kept displayed in public lavatories throughout the State. Members of the Racial Hygiene Centre, and of the Father and Son Welfare Movement, have helped the Department considerably in organising meetings and distributing literature.

The following Tables are appended:—

Table III.—Notifications received, 1923–1927.

Table IV.—Notifications received arranged in order of notifying district.

Table V.—Return showing forms of disease and age and sex of patients notified during 1927.

Table VI.—Diagnostic examinations, 1920–1927.

Table VII.—Summary of Annual Attendances at Public Clinics, 1920–1927.

TABLE III.—Notifications received 1923, 1924, 1925, 1926, 1927 from Public Hospitals and Private Practitioners.

	Public Hospitals.					Private Practitioners.				
	1923.	1924.	1925.	1926.	1927.	1923.	1924.	1925.	1926.	1927.
Gonorrhœa	2,925	2,196	2,450	2,544	2,539	2,190	2,432	1,483	1,947	1,595
Syphilis	969	751	829	784	984	271	217	186	395	273
Other forms of venereal disease	278	240	53	74	51	196	254	313	257	232
	4,172	3,187	3,332	3,402	3,574	2,657	2,903	1,982	2,599	2,100

TABLE IV.—Notifications received during 1923, 1924, 1925, 1926, 1927, arranged in order of districts.

	Metropolitan Area.					Newcastle District.					Remainder of State:				
	1923.	1924.	1925.	1926.	1927.	1923.	1924.	1925.	1926.	1927.	1923.	1924.	1925.	1926.	1927.
Gonorrhœa	4,774	4,313	3,611	4,160	3,884	43	42	96	48	39	298	273	226	283	211
Syphilis	1,162	896	968	1,128	1,190	36	33	25	9	9	42	39	22	42	58
Soft chancre	95	74	42	50	31	2	...	...	...	...	3	2	1	1	3
Gleet	330	577	290	257	237	11	...	...	...	...	6	9	5	3	3
Venereal warts	16	17	20	12	6	...	...	1	...	...	1	...	...	...	...
Gonorrhœal ophthalmia	2	5	1	5	1	...	...	1	...	1	...	1	3	1	...
Venereal granuloma	8	9	...	2	...	...	...	1	...	...	...	...	1	...	1
Total	6,387	6,090	4,932	5,614	5,349	92	75	124	57	49	350	324	258	330	276
Population, 1927															

It will be seen from the above table that 94 per cent. of the 5,674 cases notified in 1927 were received from the Metropolitan Area.

TABLE V.—Return of cases of Venereal Disease notified during 1927, showing forms of disease, and age and sex of patients.

	0 to 5		6 to 10		11 to 15		16 to 20		21 to 25		26 to 30		31 to 35		36 to 40		40 to 45		45 to 50		Over 50		Age not Stated.		Total.		Total.
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
Gonorrhœa	11	31	8	18	13	29	585	153	1,099	135	777	62	455	28	240	13	169	9	85	7	81	2	12	2	3,635	499	4,134
Syphilis	16	18	9	9	12	7	61	43	160	47	176	45	137	30	130	29	66	23	79	14	128	17	8	2	982	275	1,257
Soft chancre	...	...	...	...	...	...	4	...	10	...	8	...	2	...	4	...	1	...	...	...	3	...	2	...	34	...	34
Gleet	...	...	...	...	...	...	10	...	57	...	67	...	50	...	28	...	14	...	6	...	7	...	1	...	240	...	240
Venereal warts	...	...	...	...	...	...	1	...	4	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	6	...	6
Gonorrhœal ophthalmia	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	2
Venereal granuloma	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1
	28	50	17	27	25	36	661	196	1,330	182	1028	108	645	68	502	33	250	32	170	21	219	19	23	4	4,898	776	5,674

TABLE VI.—Diagnostic examinations for Venereal Diseases made in the Microbiological Laboratory during the years 1920–1927.

Year.	Gonorrhœa. (Smears and Urine.)	Gonorrhœa. (Complement Deviation Test.)	Syphilis. (Wassermann Reaction.)	Syphilis. (Kahn's test.)	Syphilis. (Smears for Spirochætes.)
1920	1,012	.....	2,270	.....	.....
1921	2,196	.....	2,488	.....	.....
1922	1,981	.....	2,537	.....	22
1923	1,919	.....	2,431	.....	25
1924	2,261	1,265	3,674	.....	10
1925	2,487	1,585	5,186	2,060	16
1926	3,372	2,145	6,002	3,464	11
1927	3,928	2,726	7,300	5,629	16

TABLE VII.—Summary of Annual Attendance Returns at Public Clinics for treatment of Venereal Diseases, 1920–1927.

Year Ended.	Attendances.			New Cases.					
				Gonorrhœa.			Syphilis.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
Royal Prince Alfred Hospital.									
31 December, 1920	3,147	1,031	4,178	62	21	83	33	31	64
31 ,, 1921	15,420	4,303	19,723	337	139	476	156	94	250
31 ,, 1922	17,298	4,498	21,796	523	129	652	235	101	336
31 ,, 1923	20,043	4,141	24,184	603	140	743	186	111	297
31 ,, 1924	20,993	4,880	25,873	657	146	803	219	111	330
31 ,, 1925	21,242	4,915	26,157	558	119	677	137	80	217
31 ,, 1926	23,694	3,090	28,784	556	129	685	170	83	253
31 ,, 1927	28,096	6,673	34,769	629	189	818	181	81	262
Sydney Hospital.									
31 December, 1920	2,061	207	2,268	222	...	222	94	14	108
31 ,, 1921	15,565	1,120	14,685	1,335	...	1,335	420	52	472
31 ,, 1922	12,385	493	12,878	1,154	...	1,154	244	12	256
31 ,, 1923	15,265	2,277	17,542	1,412	80	1,492	304	68	372
31 ,, 1924	13,829	2,863	16,692	719	45	764	233	93	326
31 ,, 1925	12,896	2,527	15,423	972	51	1,023	204	60	264
31 ,, 1926	16,075	2,806	18,881	1,264	64	1,328	217	82	299
31 ,, 1927	16,718	2,827	19,545	947	61	1,008	208	62	270
Royal Alexandra Hospital for Children.									
31 December, 1920	Returns not available.								
31 ,, 1921									
31 ,, 1922	...	...	4,143	2	33	35	23	18	41
31 ,, 1923	...	...	4,284	...	41	41	22	23	45
31 ,, 1924	469	2,000	2,469	3	25	28	19	16	35
31 ,, 1925	333	1,742	2,075	...	25	25	20	17	37
31 ,, 1926	361	1,830	2,191	1	42	43	15	21	36
31 ,, 1927	636	1,406	2,042	4	35	39	24	42	66
Royal South Sydney Hospital.									
31 December, 1920	Returns not available.								
31 ,, 1921									
31 ,, 1922	2,049	2	2,051	123	...	123	17	1	18
31 ,, 1923	1,958	21	1,979	127	...	127	23	2	25
31 ,, 1924	1,787	35	1,822	121	...	121	36	6	42
31 ,, 1925	2,355	...	2,355	125	...	125	30	...	30
31 ,, 1926	1,744	73	1,817	91	...	91	18	7	25
31 ,, 1927	1,763	241	2,004	82	1	83	28	14	42
Royal North Shore Hospital.									
31 December, 1920	Clinic first opened in August, 1922.								
31 ,, 1921									
31 ,, 1922	67	18	85	5	...	5	3	9	12
31 ,, 1923	563	366	929	60	...	60	5	15	20
31 ,, 1924	2,663	375	3,038	91	9	100	11	17	28
31 ,, 1925	3,365	707	4,072	88	7	95	9	9	18
31 ,, 1926	4,267	1,421	5,688	56	25	81	13	8	21
31 ,, 1927	4,055	1,315	5,370	63	24	87	24	12	36
Coast Hospital Night Clinics for Syphilis (Men only).									
1. *Hospital Admission Depot, Head Office (Coast Hospital Staff).*									
	Clinic first opened in August, 1924.								
12 August to 31 December, 1924	1,290	...	1,290	...	...	...	229	...	229
31 December, 1925	6,704	...	6,704	...	...	...	595	...	595
31 ,, 1926	7,565	...	7,565	...	...	...	391	...	391
31 ,, 1927	7,936	...	7,936	...	...	...	448	...	448
2. *Coast Hospital, Little Bay.*									
	Clinic first opened 29th June, 1925.						All new cases first seen at Hospital Admission Depot Clinic.		
29 June to 31 December, 1925	699	...	699	...	None.	...			
31 December, 1926	1,513	...	1,513	...	...	...			
31 ,, 1927	1,471	...	1,471	...	...	...			
Rachel Forster Hospital for Women and Children.									
	Clinic first opened in 1923.								
31 December, 1924	...	1,000	1,000	...	73	73	...	33	33
31 ,, 1925	...	1,615	1,615	...	74	74	...	15	15
31 ,, 1926	...	2,237	2,237	...	200	200	...	57	57
31 ,, 1927	...	1,400	1,400	...	60	60	...	24	24
		(+ 426	426 diagnosis only.)						

SECTION 1—D.

TUBERCULOSIS DIVISION.

REPORT OF ACTING DIRECTOR TO 31ST DECEMBER, 1927.

STAFF.

H. V. D. BARET, B.A., M.B., Acting Director. Appointed 1st June, 1927.
G. W. ENNEVER, B.Ec., Clerk. Appointed 22nd August, 1927.
M. E. FLETCHER, Cert. Roy. San. Inst. (Lond.), Nurse Inspector. Appointed 6th December, 1927.
W. E. CUMMINS, Cert. Roy. San. Inst. (Lond.), Nurse Inspector. Appointed 7th November, 1927.
A. C. SCAHILL, Nurse. Appointed 13th July, 1928.
T. BAIN, Nurse. Appointed 1st August, 1928.

REVIEW OF OPERATIONS.

A scheme for the campaign against tuberculosis was decided on at a conference of the organisations involved on 17th May and 14th June, 1926.

The particulars of this scheme are as follows :—

1. INAUGURATION OF CAMPAIGN AGAINST TUBERCULOSIS.

(1) That the control of the campaign against tuberculosis be vested in a Board, constituted as follows, with power—on the recommendation of the Board and subject to Ministerial approval—to add to its number.

(*a*) The Director General of Public Health, Chairman (*ex officio*);
(*b*) A representative of each of the following institutions and organisations :—

Australian Red Cross Society,
Queen Victoria Homes for Consumptives,
National Association for Prevention and Cure of Tuberculosis,
Royal Prince Alfred Hospital,
Sydney Hospital,
Royal North Shore Hospital,
Royal Alexandra Hospital for Children,
The Consumptives Village Settlement Scheme,
British Medical Association, also
Two representatives to be nominated by the Minister for Public Health.

(2) All authorities controlling individual institutions to be subordinate to the Board in all matters of policy.

(3) The Board to decide what are matters of policy. Provided that if any dispute arise between the Board and any institution, or institutions, on any question of policy, such question shall be referred to the Minister, whose decision shall be final.

(4) The domestic (internal) administration of institutions, so far as possible, to be left to the authorities controlling them. Where it is decided by the Board—in order to obtain uniformity of administration—that any particular matter is a question of policy, such decision shall be accepted by all institutions subject to the proviso in clause 3.

(5) In addition to the above, the Board to have the following powers and duties :—

(*a*) Full control, through the special branch of the Public Health Department mentioned below, over all institutions in the matter of admission to, and discharge from, the latter.
(*b*) Arranging with the appropriate organisations or otherwise for the adequate maintenance, &c., of the families of tubercular patients who are totally or partially incapable of supporting those dependent on them.
(*c*) Arranging for carrying out propaganda in regard to the methods of combating the disease, &c.
(*d*) Assisting in collating statistics.

(6) That a special branch of the Office of the Director General of Public Health be formed to deal with :—

(*a*) the admission, transfer, &c., of all patients to institutions, with power to decide to which institution such patients shall be admitted;
(*b*) investigations into home and work-place conditions, &c.;
(*c*) "after-care" and "follow-up" of patients who are discharged from institutions;
(*d*) collection and collation of all statistics in connection with tuberculosis;
(*e*) arrange for propaganda and education of public.

(7) The special branch mentioned in clause (6) to be directly responsible to the Director General of Public Health and indirectly, through him, to the Board.

The special branch of the Office of the Director-General of Public Health referred to in section (6) above was inaugurated on the 1st July, 1927. Suitable rooms were prepared and furnished at No. 5, Richmond-terrace, Domain, Sydney.

Review of the problem in New South Wales.

In New South Wales we lose 1,100 lives every year from this infectious disease, tuberculosis. We sustain greater loss from this disease than from the other epidemic, endemic and infectious diseases combined. Thus:

Causes of death.	1926.	Average 1925–1921.
Typhoid fever	80	102
Malaria	4	3
Measles	90	52
Scarlatina	53	13
Whooping cough	132	168
Diphtheria	143	200
Croup	4	7
Influenza (with pneumonia)	183	139 (4 years only)
Influenza (other)	134	145 (do)
Plague	0	2
Mumps	4	4 (do)
Cholera nostras	1	1
Dysentry	37	28
Leprosy	1	2
Erysipelas	35	31
Acute polyomyelitis	7	7 (4 years)
Infantile paralysis	14	9
Lethargic encephalitis	33	26
Epidemic cerebro-spinal meningitis	23	27 (4 years)
Other epidemic diseases	33	2
	1,011	968
Tuberculosis (pulmonary)	1,144	1,102
,, (other)	142	127
	1,286	1,229
Anthrax	0	2
Tetanus	26	31
Mycosis	1	2
Syphilis	62	46
Gonococcus infection	3	2
Purulent infection and septicaemia	42	49
Other infectious diseases	0	0
	134	132

The Method of Attack.

In what way can this national loss be eliminated, or at least minimised? A clue to the best means is afforded by a consideration of the success obtained against typhoid fever and by a consideration of the decline in tuberculosis itself.

In the case of typhoid fever success was primarily due to the recognition that it was an infectious disease, whose virus was carried per medium of fingers, food, filth and flies. Investigation of the sources of infection followed; the patient was isolated, the infectious discharges carefully destroyed. The increase of sanitary conveniences in the home and especially the water-borne disposal of sewage were most important factors in the control of typhoid fever. Then came the recognition of carriers as a factor in sporadic outbreaks, and, lastly, the method of prevention by immunisation. This general immunisation, though essential in war, is not necessary in civil life except for those who, like nurses, are in close attendance on typhoid patients. It is the more general hygienic means, used with special application to the particular problems which have been and still are the easiest and most effective methods of reducing the incidence of typhoid. It is evident nowadays that curative means alone would utterly fail in reducing the number of cases of typhoid and that the preventive method is the method of election. Preventive methods, however, do not exclude curative methods in any way, but include them in a larger whole.

The Decline of Tuberculosis. (See Graph.)

Though the results of treatment have not been brilliant when considered in the mass, yet there has been in the last forty years in New South Wales a decided decline in the death-rate from tuberculosis. Tabulated in five-year periods, we have the following figures:—

Death Rate per Million of Population.

	Tuberculosis of respiratory system.	Other tuberculous diseases.	Total.
1876–1880	1,013·6	379·4	1,393
1881–1885	1,140·4	338	1,478·4
1886–1890	992	412·2	1,404·2
1891–1895	867·2	304·2	1,171·4
1896–1900	796·2	238	1,034·2
1901–1905	825·8	168·8	994·6
1906–1910	663·4	148·2	811·6
1911–1915	633·2	104·6	737·8
1916–1920	571·4	84·8	656·2
1921–1925	503·4	58·4	561·8

This phenomenon of the falling death-rate from tuberculosis is not peculiar to New South Wales or Australia, but is found also in the Old World. The causes of the fall are, without doubt, very various. Some of these causes are the general improvement in the standard of living, improvement of general sanitary and hygienic conditions in home, factory, and workshop, the weeding-out of the unfit, the improvement in general education, the growth of sport, the better hospital facilities for all diseases which tends, on the one hand, to prevent the development of tuberculosis, and on the other hand, to segregate at lease temporarily large numbers of active tuberculous cases.

The analogy between the decline of tuberculosis and that of typhoid fever is fairly close, but while typhoid fever is becoming more and more negligible, tuberculosis is still a very real menace. Why has not the same success been obtained in both diseases ? Because, in the first place, typhoid fever is an acute disease with a short incubation period, while tuberculosis may remain quiescent for years. The causes of typhoid fever may be localised in space and in time very quickly in most cases, the causes of tuberculosis in individual cases are much more evasive. Again, the most important preventive measures against typhoid fever—purity of food and water supply and safe disposal of sewage—have been almost entirely removed from the control of the individual, but in the case of tuberculosis, much as public health measures have already effected and will continue to effect, a great field still remains where the co-operation of the individual is essential and must be actively sought. This co-operation must be founded on a knowledge of the principles involved if it is to be permanent. But it will not be always easy to obtain. Social or economic reasons may render co-operation difficult; in individual cases mental and moral poverty will render it impossible.

Preventive Measures.

1. The establishment of tuberculosis dispensaries; appointment of visiting nurses; classification of patients.
2. Compulsory notification of all forms of tuberculosis.
3. Care of the family of the consumptive.
4. After care of the patient.
5. Compulsory isolation of the criminally careless germ-spreading patient.
6. Constant supervision of milk and food supply.
7. Open-air schools, with adequate play-ground accommodation.
8. Prolongation of convalescence in lowered states of health.
9. Education in general hygiene, with special reference to tuberculosis.
10. Control of smoke and dust in factories, workshops, and outside work-places.
11. Better housing.
12. Control over boarding houses, hotels and week-end cottages, especially in places of popular resort.

All or most of the measures enumerated above are to some extent already in operation, but need emphasis, and a great deal of our success will depend on the relative emphasis placed on any particular phase of the problem.

(1) *Dispensaries.*

The relative success of the preventive measures hitherto adopted is indicated by the figures given above showing the striking decline in the death-rate from pulmonary and other tuberculosis.

But the failures are still far too numerous. By finding out these failures and by systematic investigation into their circumstances, home and work conditions, the reasons for lack of success will be discovered. The most important method of discovering these patients is at present and will continue to be the general medical practitioner. But there are numerous cases that he never sees, or sees only for a short time. The tuberculosis dispensary at the larger hospitals will be the chief means for detecting these cases and for examining contacts. Here is the ideal method for investigating these cases, with an adequate honorary staff and all the facilities of a modern hospital. The present anti-tuberculosis dispensaries in New South Wales are :—

(1) Royal Prince Alfred Hospital Dispensary.
(2) Royal North Shore Hospital Dispensary.
(3) National Association Dispensary.
(4) Newcastle Anti-tuberculosis Dispensary.

The dispensary exists mainly for diagnosis and the examination of patients, and also supervises patients who do not need institutional care or who have reported back on discharge from a sanatorium. In connection with special cases for diagnosis, observation or treatment a few hospital beds might be placed at the disposal of the honorary dispensary physicians. In cases of difficulty the private practitioner is able to refer patients to the dispensary for opinion and may decide either to continue treatment or to relinquish the case.

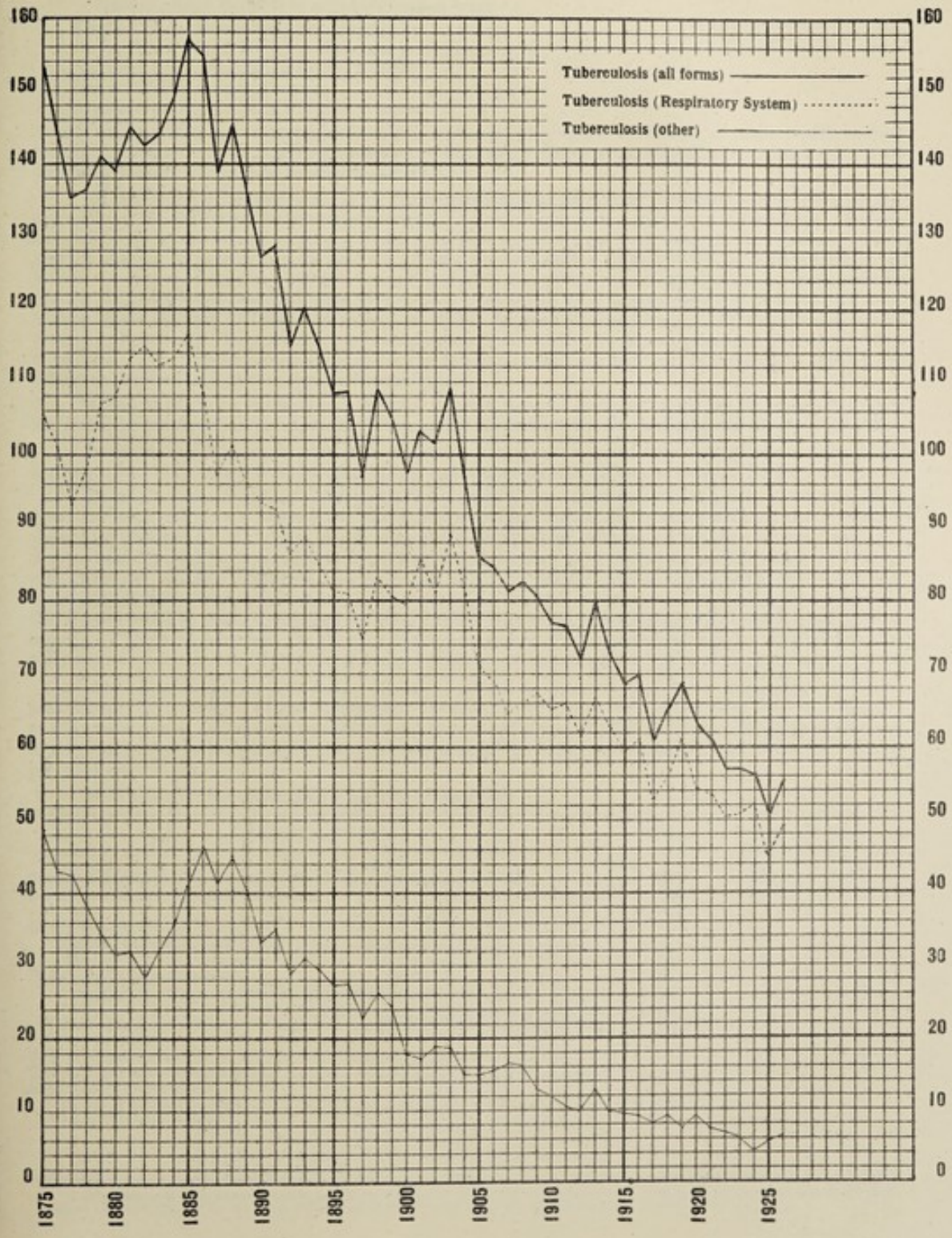
It is necessary to arrange for periodic reports from the dispensary to the Tuberculosis Division, giving names and addresses of all new patients in order to facilitate, on the one hand, the arrangements for visiting by nurses, and, on the other, for keeping the records up to date. The dispensary will also recommend to the Department patients needing either hospital or sanatorium treatment.

When beds are available at institutions arrangements will be made for the patient's admission. In other cases arrangements will be made for home supervision. In either case the dispensary will be notified of the action taken. The Tuberculosis Division will also notify the dispensary of the discharge of any ex-patient from hospital or sanatorium so that after-care may be continued. It will be observed that the General Hospital with its dispensary is regarded as an essential unit of any scheme dealing with tuberculosis It lends itself to easy extension and by its facilities for skilled examination of the patient in all directions, time can be saved, the advantages of team work obtained, and the confidence of the patient gained.

Visiting Nurses.—To enable a dispensary to do its work of prevention most effectively, the family of the patient must be examined and the conditions of his home life investigated. The four dispensaries mentioned above have each their visiting nurses.

TUBERCULOSIS.

ANNUAL DEATH RATE PER 100,000 OF POPULATION IN NEW SOUTH WALES, 1875-1926.



The duties of these nurses are to co-ordinate the work inside the dispensary with the work outside. They receive from the dispensary the names and addresses of patients, investigate and report on home conditions, teach the patient how to avoid infecting others, and induce contacts to present themselves at the dispensary for medical examination. They also distribute prophylactic supplies where necessary, and where a family is found to be in necessitous circumstances, they bring the case under the notice of the various charitable organisations with a view to having the matter suitably dealt with.

Two visiting nurses have been appointed to the Tuberculosis Division of the Department of Health, and more will be appointed as the need arises. One of these nurses visits cases not attached to a dispensary, the other is visiting the patients attached to the National Association Dispensary. In addition, they co-operate with the private practitioner who has reported a case and desires that such case be visited and supervised. No such visiting takes place unless by request of the physician in charge.

Hospitals having no tuberculosis dispensary report cases of tuberculosis from their in-door or out-door patients as usual, when the homes of such patients are visited by Health Department nurses, who endeavour to have the family contacts examined either at the general hospital or at a dispensary and who report directly to the Tuberculosis Division.

Visiting nurses engaged in anti-tuberculosis work :—

Royal Prince Alfred Hospital Dispensary, 2 nurses.
Royal North Shore Hospital Dispensary, 2 nurses.
National Association Dispensary, 1 nurse.
Newcastle Dispensary, 1 nurse.
Attached to Tuberculosis Division, 1 nurse.

The last three are departmental nurses, as out-door visiting is essentially a public health activity the Tuberculosis Division is willing to help any dispensary whose work is increasing to cope with it by providing visiting nurses paid by the Department.

In the course of routine work at the dispensaries and in the course of visiting, many cases are met especially in the children of tuberculous parentage, where the general condition is unsatisfactory. Perhaps the child is under the normal weight, pale, tired, listless, appetite capricious, doing badly at school. There may be nothing definite as regards positive tuberculosis, but such a child provides a likely patient in the future. A prolonged stay in a suitable home would save many from becoming tuberculous. It is probable that in the near future we shall have preventoria established, where, with plenty of open air and good feeding, these children will build up enough resistance to ward off the disease. The only preventoria at present in New South Wales are the two belonging to the Junior Red Cross and are reserved for the children of soldiers. The new preventoria will be for the children of civilians and will be increased in number and extent as required and as they justify themselves.

Allied to the preventoria in principle are summer camps. Summer camps are, however, of a much less specialised utility than preventoria. They are for the mal-nourished, the sickly, the weedy in general.

Incidental to their work, they will, without a doubt, catch many an incipient case of tuberculosis at the critical time, when a slight turn of the balance means the difference between health and disease.

There are 330,000 school children in New South Wales of which 150,000 are in the metropolitan area. In some districts 1 per cent. of the children are mal-nourished; in other districts the percentage rises to 10 per cent.* If summer camps were provided for these children during the summer vacation, a dose of health would be injected into them that would perhaps turn the whole current of their lives in a new direction. Schools empty in vacation times might be used for the accommodation of the children; in default of these, simple open-air shacks or tents might be used. The services of the Boy Scouts and the Girl Guides could be made use of, and voluntary adult help would be necessary and, I think, readily forthcoming. Those who have seen the effect on the mal-nourished of a short open-air holiday with good feeding will not underestimate the effect in all directions of such a procedure on the health of the coming generation.

Admission to Sanatorium Beds.—Where a patient is recommended by a dispensary or private practitioner, or otherwise, to the Tuberculous Division for admission to a sanatorium bed, he is referred to the examiners of the various institutions concerned and disposed of accordingly. If, after observation at any institution, it is considered that the patient would be better accommodated elsewhere, facilities are provided for transfer.

Beds available for consumptive patients are as follow :—

Sanatoria and Hospitals.	Males.	Females.	Total.
Waterfall Sanatorium (intermediate cases) under Government control	293	124	417
Randwick Auxiliary Hospital (late cases) " "	60	.....	60
Queen Victoria Homes (subsidised)—			
Thirlmere (females, early cases)	.....	54	54
Wentworth Falls (male, early cases)	54	.....	54
Red Cross Society (subsidised)—			
" Bodington " (male and female, early cases)	.....	.....	98
" Malahide " (male and female, late cases)	.....	.....	21
The above institutions work in full co-operation with the Tuberculous Division—			
R. T. Hall Sanatorium	8	8	16
Private Hospitals (approximately)	.....	.....	40
Repatriation Department—			
Prince of Wales Hospital	65	.....	65
Lady Davidson Home	77	.....	77
			902

* At a conservative estimate one might take 3 per cent. as the proportion of mal-nourished. This in the metropolitan area would give a grand total of 4,500, and for the whole State about 10,000. Surely this is a large and promising field set before us.

It is a well-recognised rule that there should be available at least one institutional bed for each death from tuberculosis per annum. The annual number of deaths from tuberculosis in New South Wales is about 1,100. It would thus appear that about 200 more beds are required for tuberculosis cases in this State. This lack of beds is felt more particularly as regards late cases, and especially as regards females.

Until recently, when sixty beds for late male cases were made available at Randwick Auxiliary Hospital, all male cases beyond the early stage were sent to Waterfall. This lack of classification affected unhappily the morale of the patients at Waterfall. The defect has, to a great extent, been now remedied.

The Randwick beds have the great advantage of easy access from Sydney, where relatives and friends can freely visit, so that the feeling of hopeless isolation is absent.

Unfortunately we have not, up to the present, a similar arrangement as regards female patients; All who are not early cases are still sent to Waterfall. The early cases are sent to Thirlmere and to Bodington. An urgent need exists for beds for female consumptives who are beyond sanatorium treatment. Like the beds at Randwick Hospital, these beds should be associated with a general hospital.

The Compulsory Notification of all Forms of Tuberculosis.

Compulsory notification that leads nowhere but to an accumulation of statistics is of little use. Now that we are to have a system of training and care for the patients concerned by means of visiting nurses, full and state-wide notification is necessary. The essential is the notification of pulmonary tuberculosis, but since the human factor of infection is obviously present in 50 per cent. of the cases of tuberculous meningitis investigated by this department, notification should include the various forms of tuberculosis A number of patients will be brought under observation by this means that otherwise would escape notice.

The Care of the Family of the Consumptive.

The adequate maintenance of a consumptive's family while the patient is in a sanitorium or hospital is most important. Probably nothing but a national insurance scheme against sickness and unemployment can cope properly with the question in all its phases.

This maintenance of the family is a very real difficulty to the working-man. At present he has not the time to be sick. Feeling out of sorts with the rather indefinite symptoms of early tuberculosis, hoping that the cough is of no account, he puts off seeking advice for fear that wife and children should starve if examination shows his lungs to be affected. Thus the most favourable time for cure slips by. We get very few really early cases of tuberculosis that come up voluntarily for examination. Not only does the most favourable time slip by, but in a large proportion of cases, when at last the patient presents himself for examination, he is in an advanced stage of the disease and the prognosis is unfavourable.

The evil does not end here, for the more favourable case, who soon begins to improve, is anxious to be away and at work again long before it is advisable for him to do so, and the less favourable case is hindered in his improvement by worry for his family. There is, in fact, a vicious circle which must be broken.

Another and more general aspect of the matter is that the patient is doing a service to public health by voluntarily segregating himself, and by learning lessons of prevention of infection of others; but his family, his most intimate contacts, and those most likely to be affected by the disease, know that under present circumstances, owing to the loss of his wages, they can look forward with certainty to straightened circumstances at a time when every help is needed to build up their resistance to the disease.

At present, in the case of a man, wife, and two children, all that the family can get if the husband has to go to a sanatorium is about 30s. per week.

This sum is made up thus :—

	£	s.	d.
10s. per week for each child under 14 from the Child Welfare Department	1	0	0
10s. per week but not constantly from the Chief Secretary's Department for the mother	0	10	0
	£1	10	0

In the case of a man already in receipt of the invalid pension for tuberculosis, the position is very anomalous.

If he enters Waterfall his pension of £1 per week is reduced to 4s. per week for the patient himself, the State is paid 10s. per week, and the Federal Authorities retain the remainder.

It is bad policy from the point of view of the prevention of tuberculosis to hinder in any way the voluntary segregation of an advanced case. Yet this reduction hurts his family who are his most immediate contacts and the most likely to develop tuberculosis, for they are to a certain extent deprived of what little resources they have. It is this consideration that often prevents the patient seeking institutional treatment at a stage when he is most infectious.

As a measure of prevention the full £1 a week should be paid to the family when the patient who goes to a sanatorium has children under 14 dependent on him, to effect this it would be necessary for the State and the Federal Authorities to forego their share of the pension.

After Care of the Patient.

The after care of the patient, in so far as preventive measures are concerned, resolves itself into seeing that he carries out properly the precautions he has learned against infecting others, that an adequate surveillance is exercised over his contacts, and that as far as possible the environment is altered to suit the patient's need and to minimise risk of infection to others.

Compulsory Segregation of the Careless Tuberculous Person.

Some patients are affected by such a degree of mental and moral poverty that they are unable to understand the danger of promiscuous spitting especially in the home. Others who have been taught the correct precautions are deliberately and criminally careless. It should be possible to compulsorily isolate such cases for a time, and then to release them on probation.

In actual practice the necessity would not often arise, the mere fact that such a power could be exercised would act as a very strong deterrent on recalcitrant patients. Such compulsion is at present exercised in England and America.

Constant Supervision of Milk and Food Supply.

Sporadic investigations on the presence of tubercle bacilli in milk have already been carried out by the Microbiological Branch of the Health Department. The results show an extraordinary purity in this respect. These investigations are now being made continuously.

An investigation into the incidence of bovine tuberculosis in children has been commenced by the Department of Health, but the material available is very scanty. This latter fact is no doubt co-related with the almost total absence of tubercle bacilli in the metropolitan milk supply.

Open Air Schools.

There are no open air schools in New South Wales. Fortunately the incidence of tuberculosis at school age is very slight, but considering the number of children of tuberculous parentage attending school it seems that a great opportunity of preventive teaching and training is being lost. One or two schools of easy access would be necessary, travelling facilities could be provided and constant medical supervision be assured. For other children whose circumstances seem to require it a boarding-school might be provided.

Such schools should not be for the frankly infectious child who should be excluded, but for those judged likely to acquire the infection.

Prolongation of Convalescence in lowered states of Health.

Convalescence after illness should be prolonged, more especially after such diseases as pneumonia, whooping cough and measles, where the respiratory system has been injured. The strain is such that a pre-existent tuberculosis is often wakened into activity, or lasting injury caused leading often to tuberculosis.

Education in General Hygiene with special reference to Tuberculosis.

Education in hygiene should be begun in the schools. A great deal of excellent work is already done by the school medical officers, work which must finally result in raising the average state of health. But most of it is work done for the individual where his personal wishes have little influence. Teaching should be as personal as possible, emphasising that the child himself by the acquisition of good habits must help in providing a basis for sound health.

The same lessons are much needed for adults. Concerning tuberculosis in particular, its causes and treatment and the means of its prevention could be expounded by means of lectures, pamphlets, cinema films and tuberculosis exhibits.

The Tuberculosis Division is at present preparing a film showing the facilities available for diagnosis and treatment at the various dispensaries and sanatoria.

A certain amount of broadcasting has been done also on the preventive aspect of the question.

Control of Smoke and Dust in Factories, Workshops, &c.

The employment of part-time or whole-time medical officers in large industries is a modern tendency which is sure to become more extensive on account of its obvious good economic effect. The bearing of the tendency on the hygiene of factories is obvious.

The smoke nuisance is not at present such an evil in our towns as in the large manufacturing towns of England. The main indication is to prevent it becoming so.

In conjunction with the Division of Industrial Hygiene, this division of the Department of Health has for some months been investigating the incidence of silicosis and tuberculosis in stonemasons, quarrymen, rock-choppers and sewer miners employed in the county of Cumberland under the Workmen's Compensation (Silicosis) Act. It is hoped that finally both diseases will be eliminated.

Better Housing.

The detached house in a residential district with adequate light, fresh air and ground space is another important means of prevention. The rows of gloomy terraces, the congeries of slums must give way to healthier dwellings.

Control over Boarding-houses, &c.

There should be more control over boarding-houses, hotels and week-end cottages, especially in places of popular resort. The measures should not be specifically against tuberculosis, as evasion would usually be very easy, but should be on more general lines, and the public would gain even as regards tuberculosis. This division is about to investigate under local conditions and circumstances as varied as possible the infectivity of dust in houses, &c., that are or have been occupied by tuberculous patients. On several occasions the dust from the wards of Waterfall Sanatorium gathered by vacuum sweeping has been emulsified and injected into guinea-pigs without infecting them with tuberculosis. How far this result is paralleled under circumstances less favourable than that of a well-conducted sanatorium will be investigated.

It will be seen that insistance is laid on prevention. All the means possible to build up personal resistance must be used, the environment must be modified in accordance with hygienic principles and the chance of massive infection reduced.

It must be inculcated that tuberculosis is an infectious disease, that it is quite easily passed on to close contacts if no care is taken; that the germ part of the problem is known, and if proper precautions are taken and the soil and environment rendered resistant the disease is robbed of most of its terrors. Propaganda will then be in a hopeful strain inviting co-operation by the healthy to remain fit and by the sick to come early for treatment.

By continuous education and by the large amount of segregation of tuberculous persons through sanatoria and hospitals a real control of the disease will be established.

It is not hoped to eliminate absolutely the possibility of infection, but to reduce that massive infection which overcomes the individual.

2. Summary of Activities of the Board of Control of the Campaign against Tuberculosis.

Examiners and referees for admissions of patients to the various sanatoria and homes. Allocation of work to referees and arrangement of roster for examiners.

Dispensaries.—Report of sub-committee on functions of and staff and equipment necessary for a fully constituted dispensary. (Appendix A., p. 71).

(*a*) Sydney Hospital and Newcastle Hospital authorities are being urged to provide a fully constituted dispensary at these hospitals.
(*b*) Action is being taken to co-ordinate dispensary literature, records, &c.
(*c*) The Federal Health authorities have been asked to ascertain what action is being taken to give effect to the recommendations of the Federal Health Council, second session, in regard to subsidising tuberculosis dispensaries. (See Appendix C., p. 72, par. 6.)

Sanatoria.—Report of sub-committee on purposes and equipment. (Appendix B., p. 71).

Preventoria and Summer Camps.—Appointment of sub-committee to inquire into the need for preventoria and summer camps. A recommendation has also been made to the Minister for a grant of £200 towards furnishing two preventoria each of fifteen beds, to be established by the Junior Red Cross, and for a subsidy of 12s. 6d. per week per bed for maintenance.

Bed Accommodation for Tuberculosis Cases.—A recommendation has been made to the Minister for provision of 200 additional beds to meet urgent requirements. At Sydney Hospital, Royal Prince Alfred Hospital, Royal North Shore Hospital, Coast Hospital, and Newcastle Hospitals 30 beds (15 male and 15 female) should be reserved for tuberculous cases; the Board of Control is urging the hospitals mentioned to make this provision as a matter of urgency.

On the recommendation of the Board of Control a subsidy of £100 per bed per annum is being paid to the Red Cross Society for maintenance of 50 beds (20 at Exeter, and 30 at " Bodington ").

Notification.—Recommendations have been made for issue of a proclamation making all forms of tuberculosis notifiable over the whole State. As this will entail an amendment to the Public Health Act there will be some delay in giving effect to the recommendation.

Power is also required to make regulations against promiscuous spitting; and for compulsory segregation of culpably tuberculous patients.

Maintenance of Dependents.—Approximately 1,200 replies have been received to a questionnaire issued by the Board of Control, and the information has been tabulated. A definite recommendation to the Government in reference to the maintenance of dependents of tuberculous patients is being prepared. In this connection attention is directed to the recommendation of the Federal Health Council, Second Session, March, 1928. (See Appendix C., p. 72.)

Sputum Disposal.—Inquiry is being made as to the efficiency or otherwise of the present methods of disposal of sputum at tuberculous homes and sanatoria.

Examination of Dust, Wall Scrapings, &c., for tubercle bacilli.—Arrangements have been made for bacteriological examination of material from walls and floors of dwellings, lodging houses, sanatoria, &c., with a view to determining the duration of infectivity of tubercle bacilli in such locations.

Work of Voluntary Associations.—A visit of inspection was made by the Board of Control to the settlement at Picton Lakes, where a number of chalets have been erected. It is hoped that these will shortly be occupied. To expedite this, the Board of Control has recommended to the Government that a sum of money not exceeding £1,500 be granted for the purpose of installing an electric light and water supply.

T.B. Sailors and Soldiers' Association.—Inquiry is being made concerning the rules, objects, and activities of this Association, and the persons to whom it extends aid.

Appointment to Board.—The Principal School Medical Officer (Dr. Harvey Sutton) has been appointed a member of the Board of Control.

Publicity.—A local film is in preparation depicting the activities of dispensaries and sanatoria controlled by the Board. Other publicity work undertaken comprised radio talks, lectures, and film displays; window exhibitions, distribution of literature, display of posters, &c.

3. APPENDIX A.

The Equipment and Functions of a Fully-constituted Dispensary.

Equipment.

Adequate waiting accommodation.

Adequate examining rooms.

Immediate and convenient access to services of pathological department, X-ray department, gynecological department, general surgical and medical department.

Sufficient male and female beds for diagnostic and therapeutic purposes up to the number of fifteen for each sex.

Nurse or nurses trained in anti-tuberculosis work whose salary should be adequate and increase progressively.

Resident officer in charge, whose duties are to organise and supervise work under honoraries, to keep notes and statistics up to date, to visit where necessary. Appointment should be for at least two years at adequate salary.

Honorary medical officers, who see new cases and decide diagnosis. Also see old cases at regular intervals and direct work of dispensary.

(Number of nurses and honoraries depends on size of dispensary.)

Adequate system of records.

Where artificial pneumothorax treatment is undertaken, a plant for screening in the department and a few cubicles for patients is a great help.

Functions.

1. To discover and deal with all cases of known or suspected tuberculosis in the district it serves.

All cases of definite or possible tuberculosis in the wards or out-patients' department of the hospital to which the dispensary is attached should be referred to it. (Much leakage occurs in hospitals.) Doctors in the district should be circularised regularly and supplied with handy forms to give to suspects. Contacts should be pursued and brought for examination at regular intervals.

2. To diagnose the disease.

Diagnosis should comprise in every case:—Physical examination, including regular temperature taking where necessary, examination of sputum, radiograms with (if possible) screening report, Von Pirquet and in some cases Koch's tuberculin test. These data should be available in every case, suspect or contact, as only in this way can early disease be detected. Ideally diagnosis should always be made before the lesion becomes open. Where doubt exists the services of the various special and general departments of a well-equipped and staffed hospital should be available.

3. To round up and examine contacts.

Rounding up contacts is the work of the nurse and resident medical officer. It is difficult, and requires patience and tact.

4. To deal with active cases.

Dealing with patients with active disease involves (1) sending to sanatoria; (2) sending to the country after careful instruction in mode of life necessary to cure and the protection of others; (3) caring for them in their homes, regulating their lives, treating at the dispensary with drugs, vaccines and artificial pneumothorax; (4) instruction in preventionary measures.

5. To visit homes, regulate life and surroundings of patient and contact.

Continual vigilance and perseverance are required to keep these people in the way of health.

6. To follow and supervise the life of arrested cases and those returning from sanatoria.

The periodic examination and regualtion of the activities of arrested cases is an essential part of the dispensary's work. All cases returning from sanatoria should be directed to the dispensary of their district. The notes of these cases should form a continuous record of the patient's life.

7. To educate the patient and public in the means of treatment and prevention of tuberculosis.

This involves the dissemination of suitable literature, as well as personal instruction.

8. To keep in close touch with the practitioners of the district served by the dispensary and to work with them.

The local practitioner should work hand in hand with the dispensary and be encouraged to send his cases for diagnosis. This involves considerable work of a clerical nature.

9. To conduct its work so as to help and not prejudice the means of living of the patient.

10. To test under scientific conditions new remedies.

11. To collect statistics.

12. To arrange for maintenance of patient and family through existing orgainisations.

APPENDIX B.

The Sanatorium.

Report of the sub-committee appointed to consider the question of the equipment of a sanatorium.

1. Sanatoria should be reserved for hopeful cases. All patients admitted should, prior to admission, have sputum examination and X-ray examination of lungs.

Surgical cases should be sent to a special sanatorium or to a special hospital. No urgent cases should be sent to sanatoria.

2. Conditions of admission of country cases, *i.e.*, outside metropolitan area. For the purpose of this clause metropolitan area includes the present sanatoria and the Picton Lakes Village Settlement.

Should (*a*) have sputum results;
(*b*) have X-ray result where possible;
(*c*) have a reasonable prospect of arrest of the disease;
(*d*) be a febrile for at least a fortnight prior to removal.
(*e*) not need to be provided with an escort except in the case of children.

3. Bodington and the Queen Victoria Homes to be for early cases, Waterfall for later sanatorium cases. Sanatoria are not for hopeless cases, which should be provided for elsewhere.

4. Examination for Bodington and the Queen Victoria Homes to be equivalent for the purpose of enabling the Director to equalise waiting lists.

5. Patients waiting longer than a month for admission to a sanatorium to be re-examined as to their suitability.

6. Cases found after admission to a sanatorium to have no active lesion and not to need sanatorium treatment not to be retained more than two months and, where warranted, not more than one month.

7. Cases found after admission to be unsuitable for the Queen Victoria Homes or Bodington should be discharged as soon as practicable.

8. The minimum duration of stay in a sanatorium should be at least six months, but no patients should stay longer than twelve months without special medical recommendation.

9. It is desirable that the complement fixation test for tuberculosis and syphilis should be done on each patient.

10. Sanatoria of less than 100 beds should, for economic reasons, be brought up to that number.

11. Sanatoria should have facilities for X-ray examination and sanatoria of 100 beds and over should have X-ray plant.

12. Sanatoria with X-ray plant should have facilities for doing artificial pneumothorax, or continuing such treatment.

13. There should be resident medical officers in definite proportion to number of patients. For the present, one to seventy is suggested.

14. Ordinary sanatorium treatment should include graduated exercise and occupational therapy.

15. An efficient dental service should be provided at each sanatorium and, where possible, each patient should be dentally fit before admission.

16. Laboratory facilities should be available at all sanatoria and all pathological work should be under the supervision of a competent medical officer.

17. The Government should bear the cost of transit of patients from one sanatorium to another or to a hospital when the transfer is approved by the Director, Tuberculosis Division.

18. The Government should bear the expense of the journey of patient to a sanatorium in necessitous cases approved by the Director, Tuberculosis Division.

19. Vocational training is not desirable in sanatoria.

APPENDIX C.

Resolutions of the Federal Health Council, Second Session, March 21-23, 1928.

4. *Tuberculosis.*—The council recommends to the favourable consideration of the Commonwealth Government that recommendation of the Royal Commission on Health, which proposes the amendment of the Invalid Pensions Act to allow of payment of adequate sustenance to the dependents of patients suffering from infective tuberculosis while they are undergoing treatment in sanatoria or hospitals.

The Council considers that Australia offers an exceptionally favourable opportunity for materially increasing the rate of decline in the incidence of, and the mortality from, tuberculosis and considers further that much more might be done than is now being done towards this end.

Special provision has already been made in every State for consultative clinics in connection with infant welfare work and venereal disease; similar special provision is now being made in each State for cancer; and this council commends to the attention of the Commonwealth and State Governments the urgent need for similar provision for tuberculosis.

The first step in an organised campaign against tuberculosis is the provision of such clinics, which have, in other countries, been designated "tuberculosis dispensaries." To these should be referred every case of tuberculosis, every member of the family concerned, and every child reserved by the school medical officers for further examination by reason of a suspicious degree of mal-nutrition. These clinics would serve also as co-ordination centres for all the social, economic, and sanitary activities associated with tuberculosis control.

The question of the necessity for further sanatorium accommodation requires more deliberate consideration, and is reserved.

For the above purposes, this Council urges the State Governments to establish a sufficient number of such clinics without delay, and urges the Commonwealth Government to extend the principle of subsidising State Governments to provide for the establishment and maintenance of such clinics.

SECTION I.—E.

Industrial Hygiene.

Medical Officer of Industrial Hygiene—CHARLES BADHAM, B.Sc., M.B., Ch.M., D.P.H.
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STUDIES IN INDUSTRIAL HYGIENE.

Studies in Industrial Hygiene, No. 12.

DUST SAMPLING IN SYDNEY SANDSTONE INDUSTRIES. By Charles Badham, Medical Officer of Industrial Hygiene, H. E. G. Rayner, Physicist Assistant, and H. D. Broose, Engineer Assistant, of the Division of Industrial Hygiene, New South Wales.

CONTENTS.

With 10 tables, 6 figures, 2 graphs, and 5 photographs.

Section I.—Introduction.

In the neighbourhood of Sydney a greater part of the excavations for foundations and most of the tunnelling and trenching for railways, water, sewerage and other purposes must take place in sandstone. In the past all the Government offices and most of the city buildings were the work of Sydney sandstone masons and this fine sandstone was exported to other Australian capitals and there was an Asiatic trade in millstones. A vast amount of tunnelling was done in this sandstone under grossly insanitary conditions, and these works remain in service to-day—unrecognised monuments to the men who gave their lives in the making of them.

Sydney is built upon a formation known as Wianamatta shale, and on the exposed portion of the sandstone deposit known as Hawkesbury sandstone. The shale extends from Sydney to the Blue Mountains, and the sandstone, a vast triassic fresh-water deposit which has an average thickness of about 500 feet, outcrops along the coast from the Shoalhaven River to Newcastle and extends westward to Lithgow.

The sandstone is exposed along the foreshores of Sydney and is covered by varying depths of Wianamatta shale at points further inland. The thickness of the sandstone strata of Sydney is about 1,000 feet.

The chemical analyses of samples of this sandstone vary from 86 to 95 per cent. of insoluble silica (quartz grains) and from 3 to 10 per cent. of oxides of iron and alumina.

During the past four years the frequent application to the Sydney sandstone underground workings of the dust standards as set down by this division has resulted in the education of the personnel of such works in certain aspects of the sandstone dust hazard.

We would stress the benefits towards those interested. Engineers have found that the ventilation required was well within their powers, and workers have appreciated conditions which left them free from nitrous fumes headaches and the resulting debility, so that they will not, we believe, be content again to labour in a dusty atmosphere.

Such criticism as has arisen appears to us of little moment. It has been said that our campaign has frightened the men with the fear of "dusting." But a phobia of sorts is a natural result of popular education in hygiene and cannot be avoided. We might cite the campaigns against venereal disease and tuberculosis which have given rise to many undesirable happenings, but who would wish this educational work undone? Our simple idea that the atmosphere underground could be "as clear as George-street" while greeted as an absurdity has been brought about by increased ventilation and regulation of firing.

On the economic side our activities are easily justified, for, with the dust kept below the level we ask, little or no silicosis will occur, and the cost to the State of the compensation of probably the most miserable of industrial diseases will be saved. With gross dust exposure any industrial tribunal when approached could not refuse to reduce the hours of work as some recompense for men placed in unhealthy conditions. This practice led equally to waste of lives and waste of time.

Mr. Justice Piddington, President of the Industrial Commission of New South Wales, has laid down the following principle, which has also guided Mr. Justice Street and Mr. Justice Cantor, and which will meet with the approval of all industrial hygienists :—

> "The principle to be followed in all cases by the Commission is not that unhealthy conditions be allowed to continue and a palliative sought in reduced hours, or a solatium in increased wages, but that the organised service of medical and engineering knowledge ought to be employed to abolish as far as possible the unhealthiness of the conditions."

Industrial tribunals, engineers, working men, and our division are at fault if men continue to work underground in a dusty atmosphere. The provisions of the Industrial Commission which apply to the City Railway and the Public Works Department tunnels should in our opinion apply to all underground sandstone workings.

We have in this publication dealt at length with our methods of dust sampling. These methods may be compared with those in use in South Africa for the past fifteen years, but we use apparatus introduced since the South African methods were standardised.

In counting particles we may say that the South Africans using the Kotzé Konimeter either did not catch or because they used low-power lenses, did not define smoke, tarry and small non-crystalline or opaque particles. Using the Owens' jet dust counter with oil immersion lenses we perceive all these, but count only selected particles. Very little practice is required to become expert in counting the Owens' record, and the personal equation is a small factor. The only advantage that the Kotzé Konimeter possesses is that with a low-power lens it may be more easily used underground, but the Owens' instrument could also be used with low-power objectives.

In this study we have given the results of a series of experiments in correlating the particulate count with gravimetric sampling.

We have made an investigation into the size-frequency of particles found in the air sampled.

We have given observations of the dust exposure of stonemasons and axial water feed drillmen, and have recorded the results of the routine dust sampling of the staff of the Railway Commission, and the Public Works Department.

In September, 1927, the belated Silicosis Scheme for the compensation of Sydney sandstone workers affected by silicosis began to function. It is the privilege of one of us to have drafted the medical sections of the scheme, a task of some difficulty owing to various factors, and to act as one of the medical practitioners constituting the medical authority of the scheme.

The liaison between our division and the compensation scheme will, we hope, aid in many ways our campaign for the betterment of the hygienic conditions of sandstone workers.

The prospects of markedly decreasing the incidence of silicosis in all classes of sandstone workers with the probable exception of the stonemasons are good. Underground workers can be guarded; newer methods of working will aid among the rock choppers and quarrymen. That this work of prevention may prosper is the first aim of our Division of Industrial Hygiene.

Our thanks are due to Dr. H. B. Taylor, of the Government Analyst Branch, for his aid in various matters which arise in our work; to Dr. J. J. C. Bradfield for photographs of the City Railway works, and to Mr. W. Farrow, Supervisor of Construction, and Mr. K. A. Frazer, Resident Engineer of the City Railway; Mr. Schey, Supervising Engineer of the N.S.O.O.S., for facilitating work and for various suggestions. To Mr. R. Grant, of the Microbiological Bureau, for photographs of the Stonemasons of Maroubra and our oculars, and to Mr. Roots, in charge of Maroubra Quarry, for his assistance in our work.

Section 2.—Description of Works and the Results of Dust Sampling in Sydney Sandstone Industries.

The works of the Public Works Department and the Metropolitan Water, Sewerage and Drainage Board consist chiefly of tunnels and trenches in the Metropolitan area. The works of the Railways are the tunnels and excavations chiefly for the City underground electric railway. The results obtained in the stone-dressing industry have been dealt with in Section 8.

The principal underground work of the Public Works Department during the past five years has been the construction of the Northern Suburbs Ocean Outfall Sewer. The submain consists of adits, shafts, and drives, the superficial area of these drives and adits being 30 square feet; these submains are from 10 to 12 feet above sea level. The shafts from which the drives are made vary in depth with the contour of the land, but none exceeds 300 feet. There is generally a distance of 1,000 feet between each shaft or adit opening. The drives from the shafts are worked by one or two sets of miners. As a general rule no adit or drive is worked for a greater length than 700 feet.

Another set of workings is the main sewer tunnel, which has an area of 98 square feet; the workings are about 10 feet above sea level. The shafts are about 1,000 feet apart, and no drive is worked for more than 700 feet.

An exhaust system of ventilation is used in shafts, drives and adits of these workings, and usually consists of two 7-inch diameter galvanised-iron exhaust pipes which are kept within 12 feet of the bottom of the shaft or face of the tunnel.

These pipes are rigged down the sides of the shaft and are carried along the walls of the tunnels on supporting spikes driven into the walls at suitable intervals. The exhaust is produced by fixing a centrally situated compressed air ejector in the centre of the pipe and near the outlet end, which is at the top of the shafts or the entrances to the adits.

Plate 1.

General view of the excavation and tunnels in the northern end of the Wynyard Square section of the City Underground Railway, showing the nature of the sandstone through which the tunnels are being driven.

Plate 2.

Showing the southern end of Wynyard Square section of the City Underground Railway, also the construction of the two level and the single and double track tunnels.

Plate 3.
Showing men at work in one of the City Underground Railway tunnels.

At the point where the length of such a pipe line from the ejector exceeds 500 feet another ejector is inserted, which assists the first. The controls for the ejectors are at the ejectors themselves.

The advantage of this system against one dependent upon an exhausting fan is that there is no necessity to instal a separate ventilating unit, as in the latter case, the compressed air from the main pipe line is being used for this purpose.

A serious disadvantage is the possibility of not having a sufficient reserve at the compressor station to cope with the ventilation of all workings on its line in addition to supplying sufficient air for the rock drills. On occasions a compressor unit has been temporarily off the line in order to effect a repair, thus reducing the capacity of the station and causing a temporary reduction of pressure throughout the section. This disadvantage has been shown by the fact that miners have at times shut off the ejectors in order to obtain sufficient air for drilling. If the compressor station is equipped to serve the purposes of ventilating the workings as well as working the rock drills and other duties this method of exhausting is quite satisfactory.

The capacity of this system varies with the amount of compressed air used and the efficiency of the ejectors. Generally only after firing is this system worked to its full capacity, which is from 400 to 500 cubic feet of air per minute.

In 1923, when our first attempts were made to reduce the dust hazard in Sydney sandstone workings, those of the Northern Suburbs Ocean Outfall Sewer were the first field of investigation, and have been dealt with by one of us in two publications.* From these accounts it can be seen that without any very elaborate methods the dust concentration could be reduced to a minimum.

In 1927 the Department of Public Works appointed an officer to inspect daily and report on the dust and general conditions of these tunnels, and the results since that period are summarised in Table I.

The sampling is done by the Owens' jet dust counting apparatus, by our method, and shows the average dust conditions over periods since that date. These samples were taken during all periods of work.

TABLE I.—Showing results of Dust Sampling by the Public Works Department at the Northern Suburbs Ocean Outfall Sewer from April, 1927, to August, 1928. Only particles up to 2 microns have been counted.

Period.	Number of Records taken whilst men were working.	Percentage of total number of Records above 200 particles per c.c.	Average number of particles per c.c. for the period.
April, 1927–September, 1927	122	0·8	47
October, 1927–February, 1928	349	6·9	57
March, 1928–August, 1928	283	5·4	66

The tunnels under the city of Sydney for the electric railway system are practically all in Hawkesbury sandstone. These tunnels have a cross-sectional area of approximately 225 square feet for single track tunnels. In various places there are double tunnels, also large excavations for the stations. Sites varying from about 500 to 1,000 feet apart throughout the city were selected on which shafts were sunk or open cut excavations made, and the tunnels driven from these. A pilot heading about 6 feet high and 5 feet wide is first driven at the top of tunnels, the length of the headings varying from 10 feet to 60 feet. Following upon the heading are one or two benches each with a height of about 6 feet. In a single track tunnel there are about twenty-eight men in a gang. (See plates I, II, and III.)

The method of ventilation of these workings varies with the conditions, but is usually by an exhaust system through the roof. Holes about 6 inches in diameter and spaced about every 16 feet 6 inches are bored from the surface in advance of the tunnel, and exhaust fans, belt-driven by an electric motor, are fitted to these holes. There are usually three fans to each tunnel, one in the heading and the other two over the benches, and the average capacity of each fan is about 2,000 cubic feet per minute. The fans and motors are housed in a shed on the surface. In places where exhaust fans, as described above, cannot be used an exhaust fan is fitted in a shaft and a suction line of pipes is run along the roof of the tunnel to within 40 feet of the face of the working. This suction line is usually rigged to the timbering of the tunnel. Where possible, however, tunnels are run under the streets to avoid the foundations of buildings, and the former system of ventilation is mostly used.

A blower is sometimes used when the exhaust is not through the roof but along the tunnel, and the pipe line of the blower is placed on the floor to within about 40 feet of the face. Its function is to aid the exhaust by keeping the dusty air at the face stirred up. The most efficient system for the removal of dust is by exhaust fans acting in roof holes, which are afterwards used as concrete chutes.

The ventilation of the city railway tunnels is under the supervision of this Division, and an officer of the Railway Commission samples the air and inspects these workings and reports to the Chief Engineer for Railways, our Division and the employees' union. The men work under an arbitration agreement " where the superficial area exceeds 60 square feet and where the atmosphere contains more than 200 particles

* Studies in Industrial Hygiene.
No. 2. Badham, C.—" An Investigation concerning Ventilation and the Sandstone Dust present in the air of certain Sewer Tunnels under construction at North Shore and in other Sandstone Workings."
No. 6. Badham, C. and Assheton, C. F.—" An Investigation of the Sandstone Dust Hazard among Miners, Quarrymen and Stonemasons in New South Wales."
Report of the Director-General of Public Health, New South Wales, 1924.

per cubic centimetre of sandstone dust, 40 hours per week shall be worked." A tunnel under these conditions is called a " B " class tunnel. Where the particles of sandstone dust do not exceed 200 particles per cubic centimetre the tunnel is in class " A," and the hours of work per week are 44. (See Appendix I.)

The routine sampling and inspection of these workings was first commenced in May, 1926, and a summary of the average results, in periods of six months, is shown in Table II.

The results given in this table were obtained by the Owens' jet dust counting apparatus, using our method. The chief sampling took place at periods of greatest dust concentration, *i.e.*, when the men return after blasting.

TABLE II.—Showing results of Dust Sampling by the Railway Commission during hours of work at the Underground City Railway from January, 1926, to August, 1928. Number of particles per cubic centimetre are for particles up to 2 microns in size.

Period.	Number of Records taken whilst men were working.	Percentage of total number of Records above 200 particles per c.c.	Average number of particles per c.c. for the period.
January, 1926–June, 1926	407	49·5	517
July, 1926–December, 1926	167	16·3	350
January, 1927–June, 1927	241	23·6	225
July, 1927–December, 1927	359	28·7	196
January, 1928–June, 1928	1,416	8·3	83
July, 1928–August, 1928	770	3·8	50

At present there are no large tunnels being made by the Metropolitan Water, Sewerage and Drainage Board; the largest within recent years was the pressure tunnel which has recently been completed. This tunnel, which is 11 miles long, was driven from Potts Hill Reservoir to Waterloo pumping station, and has been designed and laid out to supplement the Sydney Water Supply to the extent of one hundred million gallons per day. The tunnel was driven mainly through solid sandstone, with an average diameter of 12 feet, from seventeen shafts at an average depth of 300 feet. The finished size after concreting is 10 feet diameter.

Ventilation was effected by blower and exhaust. The exhaust was used after firing, until the men returned, when the system was reversed and air was blown in. The average time the exhaust was running was about one hour and this was usually during crib time.

The dust hazard and hygienic conditions of these workings have been investigated by the Board's medical officer. The records are not at present available.

SECTION 3.—THE OWENS' JET DUST COUNTING APPARATUS.

The Owens' dust counter, originally designed for the estimation of dust, fumes, and smoke pollution in the atmosphere, has been used by us extensively for the determination of the dust in the air of underground workings. The instrument is very suitable for this purpose, owing to its convenient size, lightness, and efficiency, and because a permanent record is made.

For a detailed description of the Owens' instrument readers are referred to the Journal of Industrial Hygiene, Vol. 5. In this section we have given a brief description of the instrument and detailed our method of using it, and the results which have been obtained by the practice of this particular method.

The air to be tested is drawn into an humidifying cylinder lined with damp blotting paper, a calibrated pump draws 50 c.c. of this air at a high velocity through a fine slit (about 0·2 mm.), 10 mms. long, impinging it against a cover glass placed 1 mm. from the slit. The adiabatic expansion thus produced results in a fall in temperature, and thus a condensation of moisture on the dust particles, and the moisture and dust are deposited on the cover glass. The jet of air after impinging on the cover glass immediately rises in temperature and the moisture evaporates, the dust is left firmly adhering to the cover glass. The dust appears on the cover glass as a fine ribbon, approximately the shape of the slit, through which it is drawn.

Before describing the methods used by us in taking the samples and mounting and counting the records, we would like to draw attention to the box used by us for carrying the glass cover slips.

In using the Owens' instrument in underground workings we have occasionally had the misfortune to lose a number of cover slips either through dropping the box or having the slips splashed with water from the drills when preparing to place a cover slip in the instrument. In order to minimise this risk we have made a special carrying box, which reduces any loss of cover slips to a minimum. We have found it more convenient to mount our cover slips in the laboratory rather than elsewhere, and this makes it imperative to have a box capable of keeping the cover slips in order and free from damage.

This box holds thirty-two cover slips, and is divided into eight compartments with four slips in each. The construction of it is clearly shown in fig. 4. The compartments are numbered 1 to 4, 5 to 8, ..., 29 to 32 on the lids of the compartments, and corresponding numbers are printed on the inside of tho box opposite the position of each cover slip. The depth of the box is just sufficient to give a clearance to the cover slips when in place. The box is filled with cleaned cover slips before leaving the laboratory. The advantages of this type of box are :—

(1) The cover slips are kept in the order that they are used.

(2) As only one compartment is open when changing a cover slip, a maximum of four records is lost if the box be dropped or splashed with dust or water.

In general we have used the standard method of taking a sample. We have, however, disconnected the humidifying cylinder when sampling in tunnels, as saturated conditions are met with in these workings. In using the humidifying cylinder it is necessary to make about six strokes with the pump at the place to be tested before inserting the cover slip, but when sampling without the cylinder the cover slip may be placed in position without making any preliminary strokes with the pump.

The number of cubic centimetres of air sampled will depend on the amount of dust in the air. We find that by taking 150 cubic centimetres (three strokes of the pump) at all times, approximate counts may be made at sight, by counting one slide and comparing the density of the other slide with this standard. The objection to this method of estimation is that the smoke content of the air varies, but if a number of slides are taken at the same place within a short period, the method is valuable for making quick and trustworthy estimations.

The cover slips are mounted in the laboratory. In the usual method of mounting circular metal (or cardboard) rings the size of the cover slips are pasted on cleaned microscope slides with a mixture of paraffin and resin and the cover slips stuck to these rings by the same adhesive. When a large number of cover slips have to be mounted this method is tedious, and the time spent in preparing the slides for mounting can be shortened by using a colourless varnish and a simple marker shown diagramatically in fig. 5. The marker is made of about eight thin wooden rods (about one-tenth of an inch in diameter) arranged circularly. A thin layer of varnish is poured into a petri dish, and the marker used to stamp a circle of dots of varnish on the slide. In an hour 200 slides can be prepared, and it is preferable to do this number each time, thus allowing the varnish to harden, otherwise it has a tendency to creep under the cover slip. Should it become too dry a slight heating will soften it. The slides can be readily cleaned after being marked if they become dusty.

When a right-angle stage is used on the microscope it is necessary to mount the ribbon of dust at right angles to the length of the slide.

The essence of our method of counting dust particles taken by the Owens' instrument is our endeavour to exclude organic matter such as smoke, and tarry condensations, and amorphous particles which cannot be sharply defined.

We define the term " crystalline " as clear or transparent.

The records taken in some atmospheres were contaminated by oil from pneumatic tools, mechanical buckets, grabs, and other sources, and the dust particles appeared blurred when counting. In these cases the cover slip was removed from the slide, placed on a clean slide, heated over an alcohol flame to vaporise the oil and remounted. Check counts before and after heating showed an increase in the number of smaller particles after heating. With clear slides no difference in the count before and after heating was noticed.

" By the simple trinity of full light, crystalline character, and sharp focussing " we consider, after considerable experience, that we can exclude from our count particles which are not inorganic. Where the dust sampled is not sandstone or quartz, gravimetric sampling and chemical analysis will determine the nature of the dust particles counted.

Konimeter workers in South Africa* have shown that many crystalline particles on the records are due to water soluble particles occurring in the mine air. These workers and Dr. Owens†, elsewhere, have demonstrated the presence of these soluble salts on " condensation spots." We are fortunate in having the air in our tunnels singularly free from water soluble particles, and we consider that we are justified in considering all crystalline (*i.e.*, clear) particles as quartz particles discounting the small amount of cementing substances in sandstone.

A number of fellow-workers in Sydney, following and experienced in our method, have approved of it, and the large number of records made by the staff of the Railway Commission and the Public Works Department show that the practical application of the method has been thoroughly tested.

To make it possible to calculate the number of particles per c.c. from an examination of the dust streak on the cover slip, the ocular of our microscope is fitted with a square-ruled micrometer, the size of the squares being equivalent to 8·75 microns when using the $\frac{1}{12}$-in. oil immersion objective. The calibration of the micrometer was carried out by a standard method.

To facilitate the determination of the size of the particles we have made a photographic scale consisting of 10 circles with diameters, when using the oil immersion objective, equivalent to 1, 2, 3, . . . 10 microns. The scale was photographed directly on to a lantern slide from a large diagram. The circles on the scale are black, and have very definite outlines. A disc was cut from the lantern slide around the scale, so that it fitted neatly into the ocular, and the film above the scale was cleaned off. The film side of the scale was placed in conjunction with the ruled side of the micrometer, or in other words the ruled micrometer and scale were placed in the focal plane of the eye piece. See fig. 6.

To determine the size of a particle we compare the area of the particle with the area of the circles. After a little practice we found that the sizes of the 1, 2 and 3 micron particles could be read off without reference to the scale.

This method for determining the sizes of the particles has an advantage over more elaborate methods, such as measurements with a filar micrometer, as it is specially adapted for making a large number of observations, and in view of the irregular shape of the dust particles the size determination is as accurate as the determinations by other methods.

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* Mavrogordato, A.—" The Value of the Konimeter.—Being an investigation into the methods and results of dust-sampling as at present practised in the mines of the Witwatersrand."—South African Institute for Medical Research, 1923. *No.* XVII.

† Owens, J. S.—"Suspended Impurities in the Air."—Proc. Rl. Soc., 1922.

For counting we used the $\frac{1}{12}$ in. oil immersion objective and in all cases natural light from a southern window for illumination. Our microscopes are fitted with Abbe illuminating apparatus which is always kept in its highest position, and the iris-diaphragm is always at full aperture. The magnification is 790 diameters and we are able to define clearly particles down to 0·5 microns in diameter.

The length of the dust streak on the cover slip is 10 mm.s. = 10,000 microns. In counting the particles from 0·5 to 2 microns we count 3 separate sections across the streak, each section being 2 micrometer squares or 17·5 microns wide. The total of these three counts gives the number of Class I particles (say x) in a length of 52·5 microns along the streak, and if 150 c.cs. of air have been sampled the number of particles per c.c. equals $\frac{10{,}000}{52{\cdot}5} \times \frac{x}{150}$. For the larger particles, that is, 2 microns to 10 microns (Class II) we count three sections 5 squares wide across the streak and compute the number per cubic centimetre in a similar manner.

In publishing the results of our counts the number of Class I particles and the number of Class II particles are shown separately.

In a special investigation we determined the size-frequency of the particles (that is the percentage of particles of each size) in certain atmospheres sampled. The general method of counting as described above was followed, and the size of each particle was accurately determined by reference to the magnitude scale. Particles between 0·5 and not greater than 1·5 microns we called 1 micron particles; particles greater than 1·5 and up to 2·5 we called 2 micron particles, and similarly for other sizes. The results of this investigation are given in Section 6.

In our work in the tunnels and elsewhere by taking parallel tests with two Owens' instruments we have found that the two instruments will give equal results. There is no wide variation in the counts made by different observers. In very dusty atmospheres the tendency is to under count with the Owens', owing to the difficulties in separating the particles on the dust slide when counting. In such atmospheres the impinger will give more accurate results than the Owens' instrument, but in well-ventilated workings where the number of dust particles is less than 200 per c.c. a gravimetric instrument must be kept running for many hours to collect sufficient dust for accurate weighing, and for sampling such atmospheres we consider that the Owens' sampler is superior to any gravimetric instrument.

The objection to the Owens' sampler is that it takes a grab sample. The same objection applies to other instruments of the Owens' type, but in selected conditions the Owens' instrument gives an accurate indication of the amount of dust present. In testing an atmosphere for a period of, say, half an hour, we have worked out a method by which we can take four records in five minutes, and by using this method the objections which have been made to grab sampling are discounted.*

The use of the Kotzé Konimeter and the Owens' Dust Sampler for routine dust sampling has not met with universal approval. Two objections levelled against the instruments are :—

1. Lack of uniformity of the dust deposit.
2. Variation between the weight (gravimetric returns) and the number of particles per c.c.

Workers in South Africa (Mavrogordato and the Miners' Phthisis Prevention Committee) have shown that these two objections are of little importance in practice, and that there is in general a correspondence between gravimetric and particulate returns, and that the Kotzé Konimeter indicates at least the relative, if not the absolute, dustiness of the air. The Miners' Phthisis Prevention Committee (1919) investigated the efficiency of the Kotzé Konimeter, and concluded that the efficiency was over 80 per cent. Other workers consider that the efficiency is much lower than this.

We have correlated the Owens' Jet Dust Sampler with the Greenburg-Smith Impinger, and have shown that there is a definite relation between the weight of dust and the number of particles between 0·5 and 10 microns and from theoretical calculation we conclude that the efficiency of the Owens' sampler is of the same order as the Impinger for these particles, and that the results obtained by the Owens' indicate, for all practical purposes, the dustiness of the air.

We wrote in 1925 : " Probably by such means we still only obtain a figure of merit and not an absolute measure of the quartz particles present, for while the enumeration of particles between half a micron and 2 microns by the method indicated appears to give a considerable measure of accuracy, still the use of the petrological microscope discloses that anisotropic particles that range in size below half a micron are likely to be confused with smoke particles. Probably, however, the enumeration of particles from half a micron upwards by the method which we have used and have described, will afford a useful index of the number of air-borne particles of sandstone dust. Following the reasoning of Mavrogordato (5 section 11 E.F.G.), there would appear to be little to be gained in endeavouring to enumerate particles which are below the fourth of a micron in size, and, given a standard method of counting such as he has so carefully worked out for the konimeter, we think that Owens' instrument is capable of a marked degree of accuracy in measuring sandstone dust." †

In our opinion the Owens' instrument is more likely to give uniform results than the Kotzé Konimeter when used by a number of observers. Mavrogordato has shown that four experienced observers (counting under light-ground illumination) returned counts varying by 300 per cent. To minimise the irregularities in the returns Mavrogordato has standardised a method, and uses dark-ground illumination for counting. By this method ultra-microscopic particles, which he states are relatively unimportant in regard to the production of silicosis, are counted. Another source of error has been demonstrated by an experiment

* Badham, C., and Assheton, C. F.—" An Investigation into the Sandstone Dust Hazard among Miners, Quarrymen, and Stonemasons in New South Wales."—Studies in Industrial Hygiene, No. 5, Report of the Director-General of Public Health, New South Wales, 1924.

† Mavrogordato, A., South African Inst. for Med. Research, 1923, No. 17.

FIG. I.

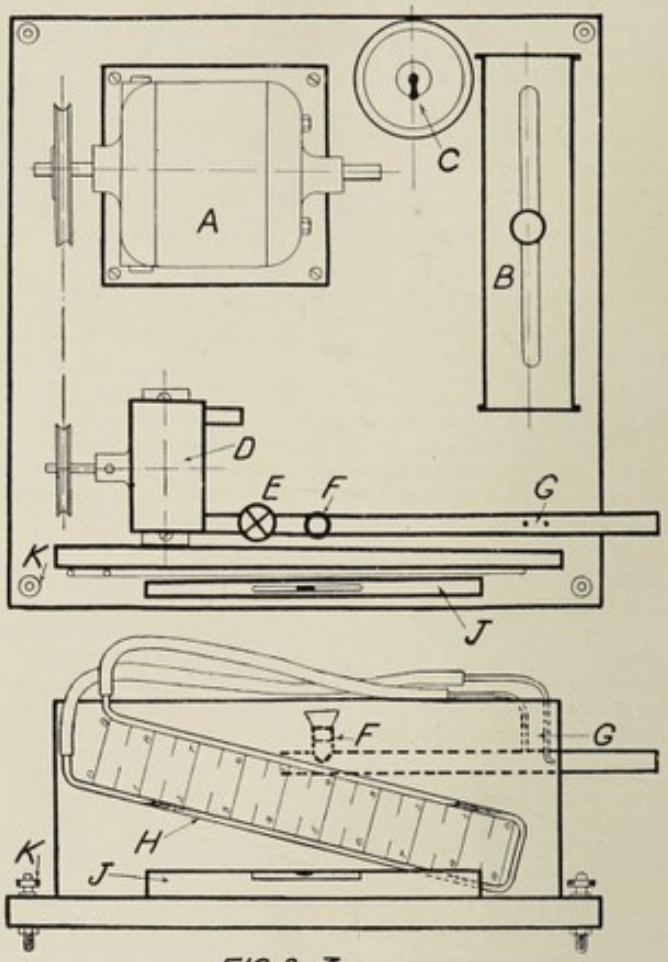


FIG. 2-3.

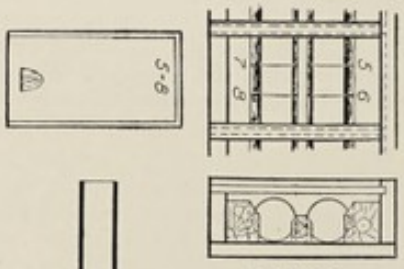


FIG. 4.

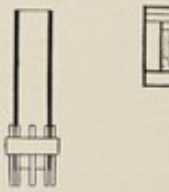


FIG. 5.

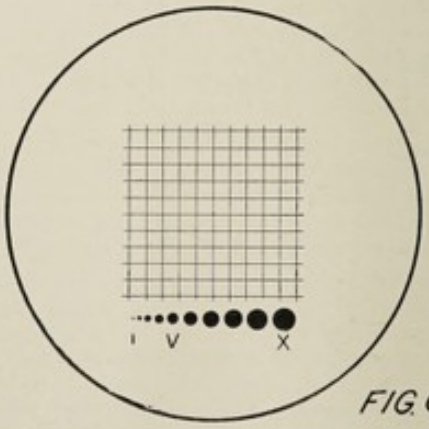


FIG. 6.

Apparatus for Gravimetric and Particulate Dust Sampling.

Fig. 1.—The Greenburg-Smith Impinger in the form as used by us.
Fig. 2, 3.—The lay-out of the pumping apparatus use l in conjunction with the Impinger.
A.—140 watt A. C. or D. C. 240 volts universal motor.
B.—Rheostat in series with motor for speed control of motor.
C.—Switch.
D.—Rotary pump.
E.—Stop cock at inlet to pump.
F.—Inlet to admit oil for pump lubrication.
G.—Pitôt tubes on suction line to pump.
H.—Manometer on Pitôt tube.
J.—Spirit level.
K.—Levelling screws.
Fig. 4.—Plan and end elevation of box for carrying round glass cover slips during field work with Owens' dust counter
Fig. 5.—Gadget for rapidly applying adhesive to glass slides for use in mounting Owens' records.
Fig. 6.—Eye piece used by us for measuring particles.

For full description and further details see text.

with finely divided vegetable carbon. which was suspended in distilled water and allowed to dry on a slide. By dark-ground illumination the carbon particles were indistinguishable from those of silica. They were easier to distinguish by light-ground illumination.

The use of a film of vaseline on the slides has two objections :—

1. Some of the particles are hidden.
2. The vaseline itself may contain dust.

The Owens' records are taken on a naked cover slip, and with light-ground illumination it is possible to exclude organic matter such as smoke, tarry condensations and amorphous particles which cannot be sharply defined and are not crystalline.

We have had an opportunity of comparing the counts by different observers, and have found little variation. The personal equation in counting the Kotzé Konimeter records is pronounced, but is not marked when counting the Owens' records.

Section 4.—The Greenburg-Smith Impinger.

For the gravimetric determination of dust in air the apparatus as devised by Greenburg and Smith* has been used by us. It consists of a half-inch diameter glass tube drawn to a nozzle having a bore of 2·3 mms. through which the air is forced and impinged against a bronze plate placed under water 5 mms. from the nozzle. It was selected by us because of its efficiency in both high and low dust concentrations, simplicity of construction, manipulation and portability. A disadvantage is the slow rate at which the air is aspirated, namely, 1 cubic foot per minute, so that with low concentration of dust, 1 to 2 mgms. per cubic metre, the length of time required to obtain a weighable quantity of dust (*i.e.*, about 10 mgms.) may be six hours. With a weight of 10 mgms. an accuracy of not more than 90 per cent. can be expected. This disadvantage can be overcome to a certain extent by running two (or perhaps more) impingers in parallel, this practice is limited by the aspirating power of the pump.

The impinger is based on the principles both of the earlier impinger konimeters and instruments used for collecting dust by bubbling air through water. The intake tube is drawn to a nozzle in a shape approximating the stream line flow of the water which is drawn along with the incoming air, and the air and water are impinged against the bronze plate. The dust is "wetted" and is then caught in the water.

Important points in the operation of this apparatus are the rate of air flow, which must approximate to 1 cubic foot per minute, and the distance of the bronze plate from the nozzle, the best result being obtained with a distance of 5 mms. Variations of these factors give a decrease in efficiency. At smaller distances there is a tendency for the dust to stick to the plate.

When the above conditions are adhered to efficiencies (checked against the Tyndall apparatus) of 94 to 97·5 per cent. are readily obtained.

The form of apparatus as used by us is shown in Fig. 1. We found that a longer bottle than that described was more convenient and a baffle over the outlet provided against loss of water (and hence dust) which might be carried away through the exhaust.

We have used the impinger for all gravimetric work in sandstone tunnels, quarries, stonemasons' sheds, and other work, also for lead containing dust in the air of battery works and other industries. In our hands this instrument appears trustworthy.

In gravimetric work with silica dust to separate the larger particles (*i.e.*, those above 10 microns) from the smaller particles we have used the following method. *The impinger tube and plate are removed and thoroughly washed with distilled water in a suitable container and the impinger water added. The liquid is made up to 10 c.ms. in height with distilled water. It is shaken thoroughly and allowed to settle for forty minutes. The supernatant liquid is then siphoned off through a tube reaching to within 1 c.m. of the bottom, the siphoning tube being drawn to a nozzle of 1 m.m. bore at outlet. The residual liquid is then made up to 5 c.ms. in height, shaken well and allowed to settle for ten minutes and the supernatant liquid is again siphoned to within 1 c.m. of the bottom and added to the first siphoned liquid.

To test the efficiency of this method of separation a portion of the residual liquid and a portion of the siphoned liquid were centrifuged for half an hour and slides were made of the deposits and examined microscopically. It was found that the residual portion of the liquid contained particles greater than 10 microns, the number of particles less than 10 microns being negligible and in the siphoned portion there were no particles of size greater than 10 microns. As this method was quite satisfactory it was adopted for our work, being simple and efficient.

The siphoned portion of the liquid was evaporated to dryness in a platinum dish ignited and weighed. The result was divided by the number of cubic metres of air aspirated and the inorganic dust per cubic metre obtained. Finally the residues were treated to estimate the amount of free silica present. The methods which can be used are by fusion with potassium pyrosulphate (using hydrofluoric acid on the silica residue) or by the ordinary alkali fusion method. The latter method was used by us. The residue was fused with sodium carbonate and the whole dissolved in hydrochloric acid and evaporated to dryness, again moistened with concentrated hydrochloric acid and evaporated to dryness, again taken up with water, filtered, and residue weighed and determined as silica.

The pumping apparatus used in conjunction with the impinger was similar to that originally used at Broken Hill.† The form as used by us is shown diagrammatically in Figs. 2 and 3. The motor (A) is a 1/6 h.p. 240 volt, Universal type, which will run on alternating or direct current. The efficiency is low, but the convenience in being able to use it with direct or alternating current renders it very suitable for our work. In series with the motor is a rheostat (B) which readily controls the speed of the motor. The pump (D) is of the rotary type, consisting of a rotating element eccentrically

* Public Health Bulletin No. 144 : "Comparative Tests of Instruments for Determining Atmospheric Dusts." Treasury Department, U.S.A.

† Warren, P. H., and Read, T. A. : "Methods and Apparatus for the Determination of Dust Suspended in Air." Pro. Aust. Inst. of Mining and Metallurgy, 1922.

located in the casing and provided with three packing pieces which are free to slide radially in the rotor. This form of pump gives a considerable amount of slip, but a uniform discharge and the capacity is limited due to slip and the effect of the speed on the reciprocating blades.

In the suction line of the pump is a gas stop-cock (E) for regulation of rate of flow of air, also a tee-piece fitted with a rubber stopper to admit oil to pump for lubrication.

The suction pipe is a three-eighths of an inch iron pipe to which is fitted Pitôt tubes (G), static and dynamic, which are connected with a sloping 4 to 1 U-tube alcohol manometer (H) giving readings showing the difference between static and dynamic pressures. The whole is set up on a board 15 in. x 15 in., which is fitted with levelling screws (K) and a spirit level (J). The Pitôt tubes were calibrated against a standard Thorpe's rotary gas meter. The manometer is graduated in inches and a graph showing rate of flow of air against manometer readings was plotted.

The apparatus as described above is capable of running two impingers in parallel with a rate of flow of air through each impinger of 1 cubic foot per minute. The suction pipe of the pump is connected by a 25 feet length of $\frac{1}{2}$-inch high pressure rubber tubing to the impinger, and the impinger can thus be readily placed in any desired position where the air sampling is to be done while the pumping apparatus can be placed at some distance if necessary.

To calculate the amount of air passed through the impingers, the manometer was kept at a level approximating the required rate and the reading noted every five minutes. The average of these readings was taken and the rate of flow from this value was determined. This procedure is open to objections as the Pitôt calibration graph is not a straight line, still the slight variation over a short part of the graph is negligible.

Section 5.—Correlation of Results obtained by Owens' Jet Dust Counting Apparatus and the Greenburg-Smith Impinger.

Investigations were made to find if there was a definite relation between the results obtained by the Owens' jet dust counting apparatus and the Greenburg-Smith impinger, the former being used in enumeration of the particles and the latter to obtain a gravimetric result. This was first attempted by running the impinger in the Railway tunnels for several hours and taking samples close to the inlet of the impingers with the Owens' instrument at periods of five minutes.

The results, however, were not consistent, the primary cause probably being that the dust concentration was not constant and that the average count obtained was not a true index of the average dust concentration. The average dust concentration found was not high enough for a complete correlation of the two instruments, the highest average for these preliminary tests being 181 particles of size 0—2 microns and 10 particles of size 2—10 microns.

The detailed results of these preliminary tests are given in Table IV in tests A and B and 1 to 5 inclusive.

As trustworthy results were not obtained from this work it was decided to make experiments in a room where the dust concentration could be controlled. The room was not hermetically sealed, but all openings were covered with cardboard or cotton wool. The size of the room was 12 ft. 4 in. x 11 ft. 6 in. x 7 ft. 8 in., the approximate net volume was 1,000 cubic feet. Finely ground quartz, 94 per cent. of which passed through a 140 mesh screen, and consisting of all sizes ranging down to less than one micron in diameter was used to put up the dust cloud. The duster used was similar to that described in U.S.A. Public Health Bulletin No. 144; dehydrated air was used. The cloud was made in front of a desk fan which dispersed the dust through the room.

To obtain the concentration desired samples were taken with the Owens' dust sampler and counts were quickly made and if the concentration was too high ventilation was provided and further counts were made until, by suitable manipulation of the duster and ventilation, the required conditions were obtained. When the desired conditions for the test were reached an observer remained in the room and read, at intervals, the wet and dry bulb temperatures and took samples every five minutes with the Owens' dust sampler. These slides were passed out of the room through a flap valve, immediately mounted, and counts were made.

Two impingers were run in parallel and the rate of flow was kept as near as practicable to 1 cubic foot per minute per impinger. The impingers were placed in the breeze generated by the fan so that there were no air or dust pockets within the vicinity of the place of sampling. To assist the saturation in the humidifying cylinder of the Owens' instrument, an electric kettle was kept boiling.

During the tests No. A, B, 1 to 3 the impinger used had a nozzle with a bore of 2 millimetres. In all other tests a bore nozzle of 2·3 millimetres was used.

The Owens' samples were taken at five minute intervals as close as possible to the inlet of the impingers. The results obtained from these samples when averaged, were considered to give a fair mean.

The gravimetric determination was made as described under Section 4.

These results have been plotted progressively (see Graph I). Before running a blank the room was closed for five days to allow the dust to settle out. Owens' slides taken after this period indicated two particles of silica per cubic centimetre and other particles which were not crystalline. The test was run for seven and a half hours, with no person present in the room and the fan not running. Several records taken during this test indicated silica in the air at an average concentration of less than five particles per cubic centimetre. The result of this test gave a blank of 0·34 milligram per cubic metre. In order to have a check on this result another blank was run on the roof of the building under similar conditions. Owens' samples taken during this test showed no crystalline and very little other dust. This test gave ·23 mgm. of inorganic dust per cubic metre.

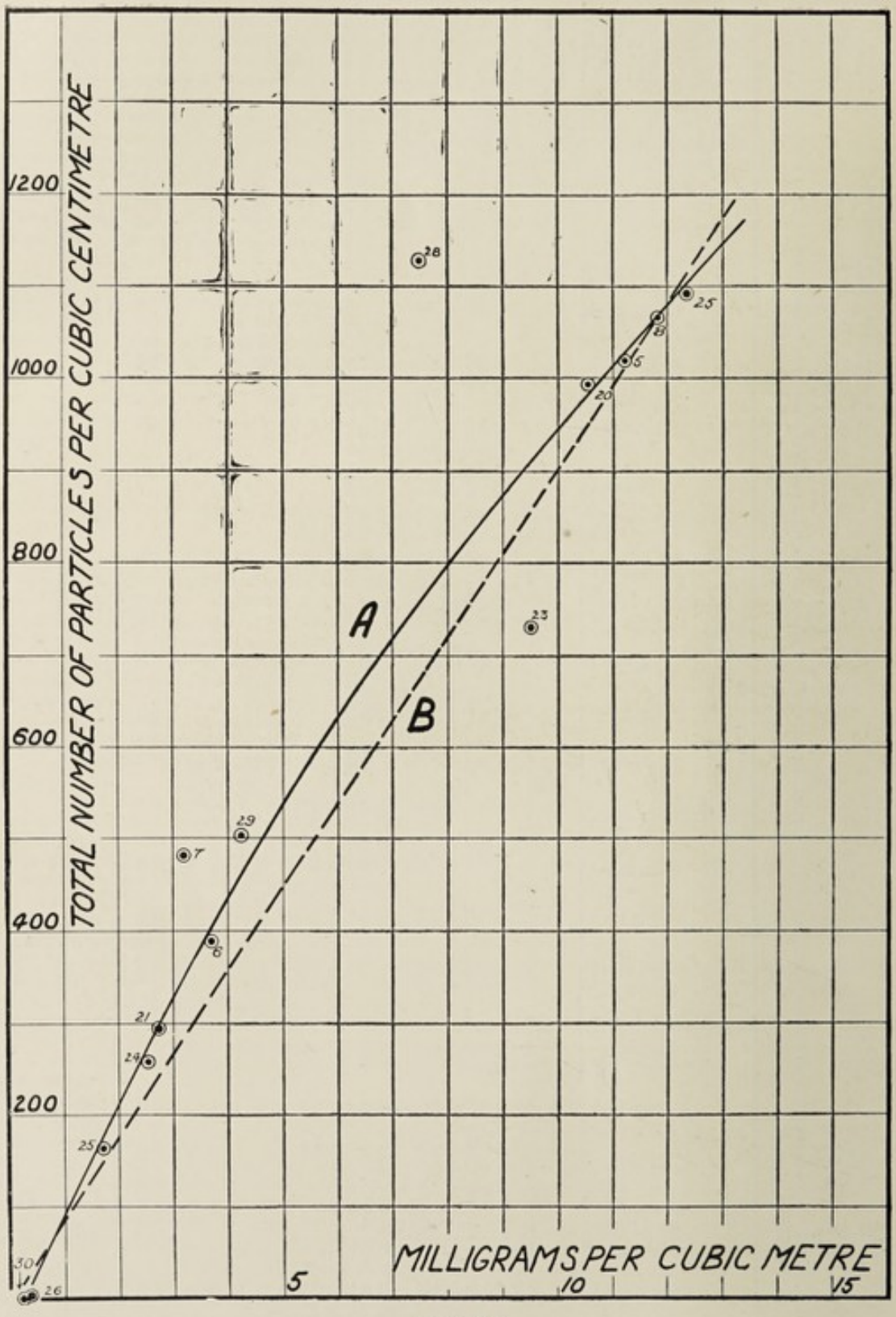
Another control test was made by evaporating to dryness a sample of the distilled water which was used in the test and igniting the residue. The result was equivalent to 0·5 mgm. in 300 c.cs. of water. The quantity of water used in each test was about 300 c.cs. so that the error from this source was negligible.

A summary of the whole of the results is given in Table IV and the details of one test (No. 6) are shown in Table V.

TABLE IV showing data obtained from experiments to correlate weights of dust (under ten microns) per cubic metre from samples obtained by the Greenburg-Smith Impinger—with the number of particles of dust (under ten microns) per cubic centimetre determined by the Owens' dust sampler.

Test No.	Date.	Place of Test.	Period of test, mins.	No. of Impingers.	Rate of flow through each Impinger, cub. ft. per min.	Total air passed, cubic metres.	Total inorganic dust, milligrams.	Dust per cubic metre, milligrams.	OWENS' RECORD COUNTS.														Remarks.
									No. of slides counted.	Particles per cubic centimetre.													
										0 to 10 Microns.	0 to 2 Microns.	2 to 10 Microns.	1 Micron.	2 Microns.	3 Microns.	4 Microns.	5 Microns.	6 Microns.	7 Microns.	8 Microns.	9 Microns.	10 Microns.	
A	24–4–28	Railway tunnels.	139	1	0·78	3·06	6·0	1·95	22	191·7	181	10·7	...	...	...	...	...	...	...	...	...	...	Tests A, B, 1 to 4 not plotted. Method of decanting was unsatisfactory. Gravimetric results too high. See Text. Tests No. A, B, 1 and 2 bore of impinger was 2·0 m.m. All other tests was 2·3 m.m.
B	2–5–28	,, ...	93	1	0·645	1·70	3·5	2·06	16	108·8	97·5	11·3	...	...	...	...	...	...	...	...	...	...	No. 2 Result not trustworthy portion of sample lost.
1	25–5–28	,, ...	170	1	0·940	4·52	6·0	1·325	33	91·8	80	11·8	52·7	25·6	7·21	2·5	0·97	0·58	0·06	0·18	0·12	0·18	
2	30–5–28	,, ...	155	1	0·902	3·96	5·0	1·25	31	183·7	174	9·7	145	29·2	5·5	2·37	0·66	0·18	0·06	0·03	0·06	0·06	
3	5–6–28	,, ...	135	2	0·650	4·98	7·5	1·50	24	36·7	31·1	5·6	24·1	7·05	3·16	1·45	0·5	0·25	0·04	0·04	0·04	0·04	
4	11–6–28	,, ...	180	2	0·840	8·57	10·5	1·225	35	40·1	36	4·1	30·2	5·8	2·4	0·88	0·4	0·17	0·09	0·03	0·03	0·0	
5	19–6–28	Laboratory	34	2	1·00	1·52	17·0	11·20	8	1018	926	91·5	730	196	66·4	17·6	3·4	1·6	1·4	0·6	0·0	0·0	
6	19–6–28	,, ...	60	2	1·00	3·40	12·5	3·68	13	390	342	47·5	271	71·2	32·2	7·6	4·9	1·54	0·31	0·31	0·31	0·0	Results 5–8 and 20–30 trustworthy. Used method of decanting as described in text.
7	19–6–28	,, ...	63	2	1·00	3·58	11·5	3·22	14	483	430	53·6	328	101·5	38·7	9·65	2·36	1·29	0·86	0·43	0·21	0·21	
8	19–6–28	,, ...	37	2	1·025	2·15	25·5	11·80	8	1066	897	169	592	304	110	38	13·0	3·0	4·0	0·0	1·4	0·0	
20	30–7–28	,, ...	30	2	0·95	1·62	17·0	10·50	7	992	904	88	...	...	...	...	...	...	...	...	...	...	
21	31–7–28	,, ...	55	2	1·00	3·12	8·5	2·72	13	293	268	25	...	...	...	...	...	...	...	...	...	...	
22	31–7–28	,, ...	30	2	1·00	1·70	21·0	12·35	7	1092	1037	55	...	...	...	...	...	...	...	...	...	...	
23	31–7–28	,, ...	35	2	1·025	2·03	19·5	9·50	8	730	672	58	...	...	...	...	...	...	...	...	...	...	
24	31–7–28 to 1–8–28	,, ...	115	2	1·01	6·66	16·5	2·48	23	256	220	36	...	...	...	...	...	...	...	...	...	...	
25	1–8–28	,, ...	90	2	1·025	5·22	9·0	1·73	19	164	147	17	...	...	...	...	...	...	...	...	...	...	
26	7–8–28 to 14–8–28	,, ...	448	2	1·00	25·4	9·0	0·35	Less than five particles per c.c. found.														Blank control test.
27	14–8–28	,, ...	15	2	1·00	0·85	16·5	19·50	6	1943	1836	107	...	...	...	...	...	...	...	...	...	...	No. 27 not plotted. Quantities too large for graph.
28	14–8–28	,, ...	20	2	1·00	1·13	8·5	7·50	5	1135	1073	62	...	...	...	...	...	...	...	...	...	...	
29	14–8–28	,, ...	40	2	1·00	2·26	9·5	4·20	10	504	452	52	...	...	...	...	...	...	...	...	...	...	
30	17–8–28 to 20–8–28	Open air on roof.	770	2	1·00	43·6	11·0	0·23	No crystalline particles detected.				...		...	...	...	...	...	...	...	...	Blank control test.

	Per cent of total particles.	
	0—2 Microns.	2—10 Microns.
24	86·0	14·0
25	89·7	10·3
26	...	...
27	94·5	5·5
28	94·5	5·5
29	89·7	10·3
30	...	...
Average ...	89·8	10·2



GRAPH I.

showing our correlation of particulate counts of silica dust by the Owens' jet dust counting apparatus, in particles per cubic centimetre and the corresponding weights in milligrams per cubic metre of air sampled as determined by the Greenburg-Smith Impinger, for particles 10 microns and less.

Graph A shows the result as determined experimentally. The numbers by the points refer to the experiment numbers (See Table IV).

Graph B shows the result as determined by calculation when the silica dust has a size-frequency ratio of three and the particles are considered as spheres.

TABLE V, showing example of detailed results taken in experiments for the correlation of results obtained by Owens' dust sampler and the Greenburg-Smith Impinger; also the size-frequency relation of dust particles.

TEST No. 6, 19TH AUGUST, 1928. LABORATORY.

Time.	Owens' Slide Number.	No. of c.ft. of Air Sampled.	Pitôt manometer Readings—Inches Alcohol.	Particulate Counts of Owens' Slides.											Remarks.
				Class I. 0-2 Microns.	Class II. 2-10 Microns.	1 Micron.	2 Microns.	3 Microns.	4 Microns.	5 Microns.	6 Microns.	7 Microns.	8 Microns.	9 Microns.	10 Microns.	
a.m.															
10 30	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Dust cloud put up.
10 45	10	100	...	(900)	...	...	...	...	...	...	...	...	...	...	...	.....
11 00	11	100	...	(900)	...	...	...	...	...	...	...	...	...	...	...	.....
11 05	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Door opened with fan on for one half-minute.
11 07	12	100	...	(700)	...	...	...	...	...	...	...	...	...	...	...	.....
11 18	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Impingers started.
11 20	13	100	5·5	480	29	400	80	23	...	6	...	...	...	...	...	.....
11 25	14	100	4·7	245	23	222	23	17	6	...	...	...	...	...	...	.....
11 30	15	150	5·1	285	50	247	38	34	8	4	4	...	...	...	...	.....
11 35	16	150	4·8	262	15	232	30	15	...	...	...	...	...	...	...	.....
11 40	17	150	5·4	183	11	175	8	7	4	...	...	...	...	...	...	.....
11 45	18	150	5·25	224	19	194	30	15	4	...	...	...	...	...	...	.....
11 46	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Impingers stopped and more dust put up.
11 51	19	150	...	(500)	...	...	...	...	...	...	...	...	...	...	...	.....
11 55	20	150	5·5	379	16	334	45	4	8	...	4	...	...	...	...	Impinger restarted.
12 00	21	150	5·0	580	35	530	50	19	8	8	...	...	...	...	...	.....
p.m.																
12 05	22	150	4·7	445	88	282	163	65	23	...	...	...	...	...	...	W.B. 65 D.B. 66 } R.H. 95 per cent.
12 10	23	150	5·65	338	84	220	118	72	...	8	4	...	...	...	...	.....
12 15	24	150	5·5	316	68	232	84	445	8	15	...	...	...	...	...	.....
12 20	25	150	5·45	358	103	210	148	61	30	8	...	...	...	4	...	.....
12 25	26	150	5·1	350	73	240	110	42	...	15	8	4	4	...	...	.....
12 27	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Impingers stopped.
Averages ...		...	5·2	342	47	271	71·2	32·2	7·6	4·9	1·5	·31	·31	·31	...	

Two Impingers run in parallel for 60 minutes. Average Pitôt Manometer reading 5·2 inches alcohol. Average rate of flow of air 2·0 cubic feet per minute. Total amount of air impinged = 3·4 cubic metres. Total weight of inorganic dust = 12·5 milligrams. Weight of dust per cubic metre = 3·68 milligrams.

The results of Tests 5 to 8 and 20 to 26 and 28 to 30 have been plotted on graph I and the mean line A drawn through these points. The line B on the same graph is the theoretical line calculated from the results obtained from the consideration of size-frequency of the dust particles.

It will be noticed that the experimental correlation graph is not a straight line which a general consideration might suggest. At first thought it may seem that at high concentrations of dust there is a larger proportion of large particles which would then give a larger weight for the number of particles, but the results given under Section 6 discount this. Among other possibilities the impinger may not be as efficient at low concentrations as it is at the higher concentrations and that the Owens' instrument may be more efficient at low concentrations than at higher concentrations.

Another factor is that at the higher concentrations there is a tendency to under-estimate the count, owing to the density of the dust streak.

In the two blank control tests made the average result was 0·29 milligrams per cubic metre. For absolute results it is necessary to move the experimental graph A to the left equivalent to this amount, and it will then pass through the zero-zero point.

The graph B is the theoretical graph deduced from the number of particles per cubic centimetre and the specific gravity of silica. The details of this calculation with other considerations are given in the latter portion of Section 6.

The values obtained, from the two methods, indicate the trustworthiness of the results themselves and the methods used.

From a broad point of view it may be taken that the result of the correlation shows that each 100 particles of silica dust per cubic centimetre in the air is equivalent to 1 milligram per cubic metre. This assumption is 10 per cent. in error for concentrations of about 1,000 particles per cubic centimetre, but in our work in the sandstone work of Sydney, where the dust concentration is now of the order of 200 particles per cubic centimetre the error is not appreciable.

This correlation is of considerable value in our work in Sydney, for it enables us to place either a particulate or gravimetric value on our readings and will greatly aid us in comparing our results with those of other workers in Australia and elsewhere. The results which we have obtained from sandstone masons may be turned into particulate values considered and compared with the dust exposure of workers whose conditions are sampled by the Owens' instrument.

SECTION 6.—SIZE-FREQUENCY OF DUST PARTICLES.

The investigation of the size-frequency of the dust in sandstone tunnels, in stonemasons' yards, and in quartz dust clouds put up in a laboratory, was undertaken as a necessary step in the correlation of results by the Owens' dust sampler with the weights determined by the Greenburg-Smith impinger. It also appeared necessary to ascertain if the size-frequency of the dust particles found in these workings approximated the facts determined by earlier investigators.

When the size-frequency of the dust was determined, it became possible to calculate the weight of the dust in the atmospheres sampled and to compare this calculation with the practical determination. Further, it became possible to deduce the relative danger of the different size particles in the production of silicosis.

This precise determination of the size-frequency may lead to a simpler method of particle enumeration for granted a definite ratio between larger and smaller particles it may result in the practice of counting a fewer larger particles and computing therefrom the greater number of smaller particles.

In our work in sandstone tunnels in Sydney over a period of five years, during which time many thousands of slides have been counted, we adopted the method of placing the particles up to 2 microns in Class I, and putting those between 2 and 10 microns in Class II. Particles larger than 10 microns, of which the number is always very small, were neglected.

With few exceptions the number of Class II particles has been about 10 per cent. of the total number of particles. In order to make a more intensive study of the problem we constructed a micrometer scale, which is described in Section 3.

The scale, which was placed in the same focal plane as the eyepiece grid, contained 10 circles with diameters equivalent to from 1 to 10 microns when using the oil immersion objective. We were thus able easily to compare the area of any particle with the area of the circles on the scale. Particles from 0·5 micron to 1·5 microns were classified as 1 micron; particles from 1·5 and up to 2·5 as 2 microns, and similarly for other sizes. This method, though not as accurate as methods of individual measurement, on regular particles, has advantages over those methods where a large number of observations has to be made on irregular particles.

In our work we measured some 16,000 particles as against a few hundred measurements by other observers in similar work. The method used by us is extensively used in the determination of star magnitudes, where a large number of observations is to be made.

The Owens' records used to determine the size-frequency were taken in connection with the work done in correlating the gravimetric determination with the particulate counts. In railway tunnel work and laboratory experiments a record was taken every 5 minutes while the impinger was running. In the stonemasons' investigation we considered that the impinger would give a more trustworthy index than the Owens' of the dust to which the workmen were exposed, and for this reason slides were not taken at regular intervals, but 28 slides taken under varying conditions were obtained and were used solely for a frequency count.

The counting was done by bright field illumination, using an oil immersion objective and 790 diameters magnification. We were able to define clearly particles down to 0·5 microns in diameter.

The summary of our results is shown in table (VI). The number of particles counted is not shown in the table but is about 16,000. The table shows the results of the work in the railway tunnels, the laboratory, and the stonemasons' shed separately. In the tunnels complete tests Nos. 1 to 4 were carried out on four days, during which 123 slides were taken and counted. The number of particles examined and classified according to their size and the total number of particles counted and classified are also shown.

TABLE VI.—Showing the size-frequency of particles.

SIZE-FREQUENCY OF DUST BY THE OWENS' JET DUST COUNTING APPARATUS.

1	2	3	4	5	6	7	8	9	10	11	12	13
Test No.	No. of Slides Counted.	Place of Sampling.	Number of Particles classified by Micron Sizes.									
			1	2	3	4	5	6	7	8	9	10
1	33	Railway Tunnels	1,734	845	238	83	31	19	3	6	4	6
2	31	,, ,, ...	4,500	905	170	77	20	6	2	1	2	2
3	24	,, ,, ...	577	169	76	35	12	6	1	1	1	1
4	35	,, ,, ...	1,060	203	84	31	14	6	3	1	1	...
		Totals	6,871	2,122	668	226	77	37	9	9	8	9
		Ratio		3·24	3·18	2·98	2·95	2·08	4·1	1·0	1·1	0·9
		Average Ratio ...				3·08						
5	8	Laboratory	5,840	1,568	531	141	27	13	11	5	...	...
6	13	,, ...	3,518	927	419	99	64	20	4	4	4	...
7	14	,, ...	4,598	1,419	543	135	33	18	12	6	3	3
8	8	,, ...	4,738	2,438	883	302	102	22	33	...	11	...
		Totals	18,694	6,352	2,376	677	226	73	60	15	18	3
		Ratio		2·94	2·68	3·53	3·0	3·09	1·2	4·0	·83	6·0
		Average Ratio ...				2·92						
9–19	26	Stonemasons' Yard	5,907	1,848	396	177	69	30	12	...	...	...
		Ratio		3·2	4·66	2·24	2·56	2·3	2·5			
		Average Ratio ...				2·9						

The first column gives the order in which the tests were taken, the second column gives the number of slides taken during the test, and the third column shows the atmosphere tested. Columns 4–13 show the total particles (classified according to their average diameters) counted in determining the dust concentration per c.c. The size classification was made by means of the special eye-piece shown diagramatically in Fig. 6. Particles classified as 1 micron include all particles from ½ micron to 1½ micron, 2 micron particles include particles greater than 1½ and less than 2½, and similarly for other sizes.

The ratios of the number of 1 micron particles to the number of 2 micron particles; the number of 2 micron particles to the number of 3 micron particles, . . . are shown at the bottom of each series of tests.

Thus there were 6,871 one-micron particles, 2,122, two-micron particles . . . and 9 ten-micron particles. The ratio between the number of particles in consecutive size is also shown in Table VI. Similar data for laboratory work, in which quartz dust clouds were used, and for work in a stonemasons' shed is shown in same table.

An analysis of the results reveals that the average ratio between the number of particles in consecutive sizes in the three series of tests is 2·96. Down to the 7-micron particles this ratio is almost constant, but we think that the small number of particles examined accounts for the want of uniformity in the ratio when dealing with the 8, 9 and 10-micron particles. The relative number of the larger particles is so small that the amount of work that would be entailed in correctly correlating these particles is not warranted. However, we believe that the same frequency ratio would exist between the number of particles in consecutive sizes up to and above 10 microns.

We have some evidence in support of this statement from the work done in the stonemasons' shed (tests 9–19). The residues (containing particles larger than 10 microns) left after siphoning-off the supernatant liquid were kept and compared nephelometrically. Without exception the opacity in these suspensions of residues was proportional to the weights of dust in the siphoned portions. This result indicates that there is probably a definite ratio between the sizes of and numbers of the larger particles.

The size-frequency of particles in air will necessarily depend upon the time of sampling the air after the generation of dust. The fundamental conception in this respect was put forward by the South African authorities* in their statement that—

"It takes 20 minutes for particles of 5 microns diameter to fall through a height of 6 feet, and 8 hours for particles of 1 micron in a quiet state of atmosphere."

These workers were the first to separate by processes of sedimentation the fine dust below 10 microns from particles of greater size.

Because it was extremely rare to find dust particles of larger size than 10 microns in the lungs, the view has prevailed that particles above 10 microns were not dangerous as they were extruded from the lungs by physiological processes. To our mind the reason for this absence of larger particles is partly because the numbers of particles between 10 and, say, 100 microns is, as compared with the lower sizes, comparatively small and, owing to gravity and the protective action of the mucuous surfaces of the upper respiratory tract, these particles do not find their way to the lower portion of the respiratory tract. It has been held that the failure to find particles larger than 10 microns in the lungs is due to the ability of the lung to extrude such particles and to the failure of the dust cells to ingest them.

While this is probably true, we think that there is reason to believe that such particles rarely reach the alveolar portion of the respiratory system.

The final South African Report† (p. 16) established the relation between the weight and number of dust particles taking the average diameter of particles, but gave no account of any definite size-frequency of particles in the air sampled.

Watkins-Pitchford and Moir‡ carefully estimated the size-frequency of quartz and other particles in sections of silicotic lungs, and Philip Drinker§ compared the size-frequency of these particles with the particles found in the sputum of men employed in ore mills and found a close correspondence. Both of these researches involved careful measurement of only a small number of particles. We have in our study counted and measured, but not within such fine limits, some 16,000 particles present in dust clouds of quartz and sandstone, both in working and experimental conditions, and we find that the size-frequency of particles in such dusty air corresponds closely with the size-frequency found in silicotic lungs by Watkins-Pitchford and in sputum by Philip Drinker, which are said to agree with those found in guinea pigs' lungs, the subject of experiment by Smyth and Iszard.‖

McCrae¶ states that 70 per cent. of the quartz particles in the ash of silicotic lungs were less than 1 micron in size. We find that about 67 per cent. of the particles in the dusty air sampled by us were below 1½ microns.

It would appear that below 10 microns there is no selective action by the dust cells of the lung and that the particles found in the lung have the same size-frequency as those in the air breathed, that is, as shown by curve (A) in graph 2.

The Broken Hill** authorities in a count of some 3,500 particles in lung sections state that for every particle of dust in lungs having a greater diameter than 7½ microns, at least 100,000 are present which have a smaller diameter. This, however, is a calculation which takes into account the thickness of the sections examined, and the figure so given does not agree with the figure obtained by McCrae and Watkins-Pitchford, also Iszard and Smyth.

We would expect to find in human lungs, exposed to dust in the industries which we have examined here, that one particle in 3,000 would be of size 8 to 10 microns or greater unless some physiological factor comes into play.

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* Final Report of the Miners' Phthisis Prevention Committee, 1919, South Africa. Page 18.

† Final Report of the Miners' Phthisis Prevention Committee, 1919.

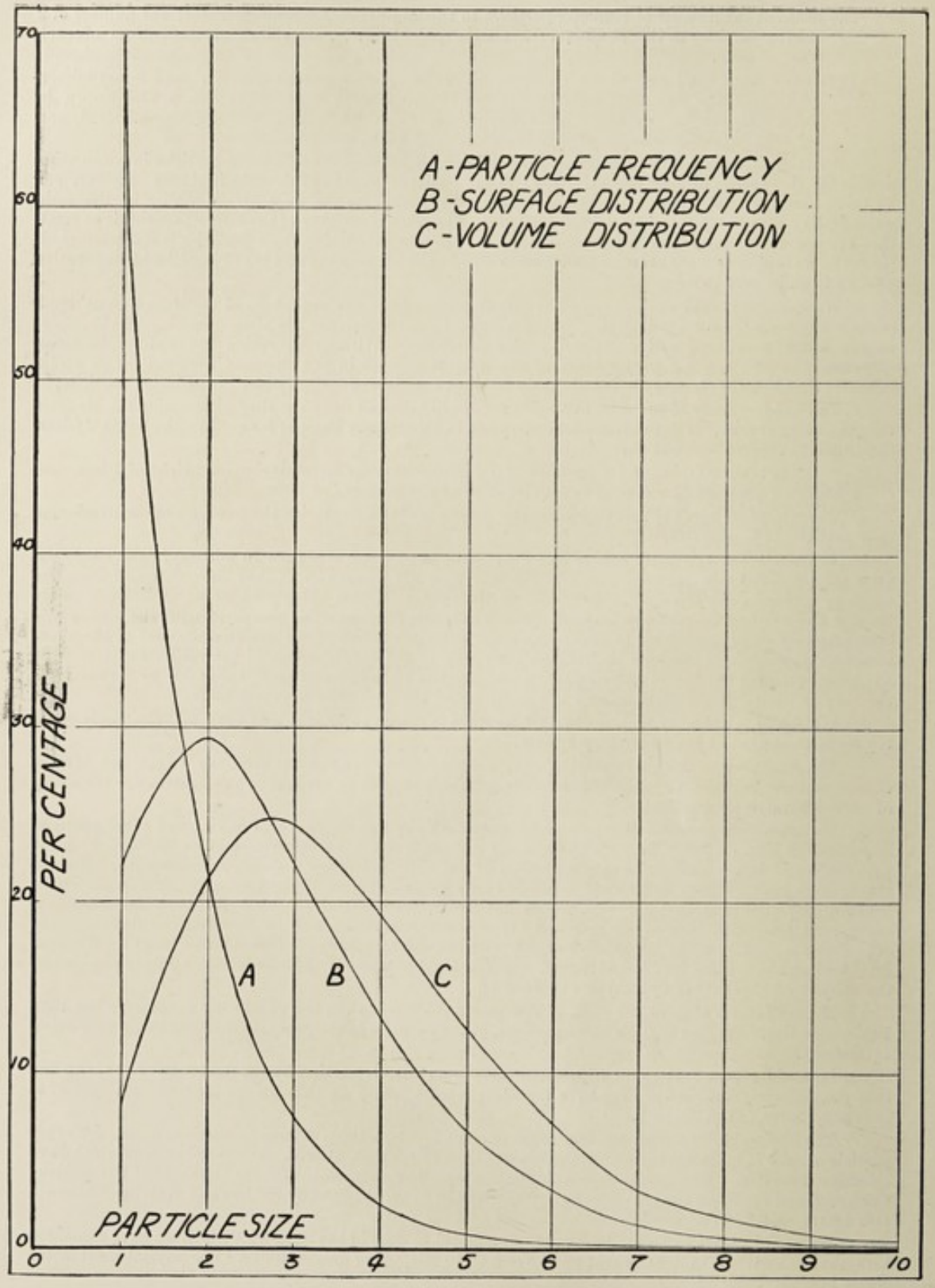
‡ Watkins-Pitchford, W. and Moir, J.: "On the nature of the Doubly-Refracting Particles seen in Microscopic sections of Silicotic Lungs and an improved method for disclosing siliceous particles in such sections." Memoirs of the South African Inst. for Med. Res., Vol. 7, 1916.

§ Drinker, P.: "The Size-Frequency and Identification of certain Phagocytosed Dusts." Journal of Ind. Hyg. 1925–6, Page 305.

‖ Smyth, H. F., and Iszard, M.: "The Practical Hygienic Efficiency of the Palmer Apparatus for Determining Dust in Air." Journal of Industrial Hygiene, Vol. 3, Sept., 1921.

¶ McCrae, J.: "The Ash of Silicotic Lungs." Memoirs of the South African Inst. for Med. Res., 1913.

** Technical Commission of Inquiry, Broken Hill, 1921, p. 75.



GRAPH II.

showing—

A. The percentage of the number of particles of any definite size of the total number of particles between 1 and 10 microns.

B. The percentage of surface exposed by each size expressed as a percentage of the whole.

C. The percentage of volume (or weight) of a given size expressed as a percentage of the total volume (or weight) of silica dust in air sampled. The graph is deduced from size-frequency ratio of three.

TABLE VII showing the data from which Graph 2 was plotted.

Line No. 1.	Size of Particles by micron sizes.	1	2	3	4	5	6	7	8	9	10
2	No. of particles.....	19,683	6,561	2,187	729	243	81	27	9	3	1
3	Per cent. of total particles.....	66·66	22·2	7·4	2·46	·82	·27	·091	·03	·01	·003
4	Surface of one particle proportional to.	1	4	9	16	25	36	49	64	81	100
5	Total surface of particles proportional to.	19,683	26,244	19,683	11,664	6,075	2,916	1,203	576	243	100
6	Per cent. of total surface	22·02	29·5	22·1	13·2	6·8	3·3	1·3	·65	·27	·11
7	Volume of particle proportional to...	1	8	27	64	125	216	343	512	729	1,000
8	Total volume of particles proportional to.	19,683	52,488	59,049	46,656	30,375	17,496	7,261	4,608	2,187	1,000
9	Per cent. of total volume	8·1	21·7	24·5	19·3	12·5	7·2	3·01	1·91	·907	·41

Line No. 1 shows the diameter of particles.

,, No. 2.—The number of particles in a dust having a constant frequency ratio of 3.

,, No. 3.—The precentage of each size of the total number of particles.

,, No. 4.—The proportional surface of each size of particle, *i.e.*, the square of line 1.

,, No. 5 is the proportional surface of each size particle in a dust, *i.e.*, line 2 multiplied by line 4.

,, No. 6 is the percentage of total surface of a dust for each particle size, *i.e.*, each item of line 5 expressed as a percentage of the total of line 5.

,, No. 7 is the proportional volume of each size particle, *i.e.*, the cube of each item of line 1.

,, No. 8 is the proportional volume of each size particle in a dust, *i.e.*, line 2 multiplied by line 7.

,, No. 9 is the percentage of total volume of a dust for particle size, *i.e.*, each item of line 8 expressed as a percentage of totals of line 8.

Thus in a dust having a size-frequency ratio of 3 there are 2·46 per cent. of the particles having an average diameter of 4 microns. The percentage of the surface exposed by the 4-micron particles of the total surface exposed by dust is 13·2, and similarly the percentage volume is 19·3 per cent.

Having accepted the existence of a size-frequency ratio of three in the atmospheric dust we have further developed our ideas in regard to the volume (or weight) and surface exposed by dust particles. The results of this work are illustrated in Graph 2. Curve A shows the percentage of the number of particles of any definite size of the total number of particles.

Curve B shows the percentage of surface exposed by each size expressed as a percentage of the total surface exposed. Curve C shows similarly the percentage of volume (or weight) of a given size expressed as a percentage of the total volume (or weight) of a dust. The method and details of this calculation are shown in Table VII. Thus, for example, in a dust having a size-frequency ratio of three with sizes ranging from 1 to 10 microns, there are 2·46 per cent. of the particles with an average diameter of 4 microns. These particles contribute 13·2 per cent. of the total surface exposed by a dust, and similarly for the volume (or weight) the percentage is 19·3 per cent.

From the graph it is readily observed that, although the 2-micron particles are not the largest in number, yet they contribute more surface than any other size particle. Similarly the particles of size 3 microns contribute more weight than any other size, and are but 7 per cent. of the total number.

It has been accepted that the particles of about 1 to 2 microns in size are the most harmful, the reason being that these particles are the greatest in number in the lungs which have been examined, and we may suggest :—

(*a*) If every individual particle is equally dangerous, that is, if each particle may initiate a fibrotic condition then the 1-micron particle is the most dangerous, because it is in the majority.

(*b*) If the condition of fibrosis is brought about by chemical reaction depending on the solubility of dust particles in the lungs (as is generally agreed), then the 2-micron particles are the most pernicious, this size exposing the greatest percentage of surface.

(*c*) If the quantity (*i.e.*, either volume or weight) of dust is the most important factor, then the size of 3 microns is the most pernicious, this size contributing the most weight.

If the number, surface and weight are each factors, then sizes 1–3 microns are the most dangerous.

A further check on the existence of a size-frequency ratio is shown when the weight of dust for a given number of particles having the size-frequency ratio of three and the specific gravity of 2·64 is taken. The method of calculation is as follows :—Consider a dust concentration of 100 particles per cubic centimetre of sizes ranging from 1 to 10 microns with a size-frequency ratio of three. The number of particles of each size is given in Table VII, line 3. By calculation the total volume of these particles is equivalent to the volume of 799 one-micron particles. For the purpose of this calculation the particles have been considered as spheres. That is, the volume of dust equivalent to 100 particles per cubic centimetre is 420×10^6 cubic microns per cubic metre. Taking the specific gravity of the dust as determined (that is 2·64) the total weight is 1·11 mgms. per cubic metre in a dust concentration of 100 particles per cubic centimetre.

One reason for considering the particles as spheres is that when classifying the particles according to size we compared each particle with a circle, that is the projection of a sphere on the focal plane. The South Africans* considered the particles as tetrahedrons to determine the average diameter of the particles, and in a later report† used this result to calculate the volume and the corresponding weight for a given number of particles.

The weight of a sphere is approximately four times that of a tetrahedron with sides equal to the diameter of the sphere.

By calculation 1 mg. of silica dust of the size-frequency as determined by us equals 400 particles if the particles are considered as tetrahedrons, or 90 particles if the particles are considered as spheres, or 50 particles if the particles are considered as cubes.

Drinker‡ states " to consider them as anything but spheres complicates the problem and introduces needless errors."

By comparing the straight line (B) on graph I, which is drawn from the result of this calculation, with the actual results as determined, it will be noticed that, considering the small quantities which are being dealt with the graphs are remarkably close. It is on these grounds that we consider that the results we have obtained in the correlation of the two instruments are trustworthy. For general work it is quite sufficient to consider that 100 particles (as enumerated by our methods) per cubic centimetre of sizes 1 to 10microns are equivalent to 1 mg. of quartz or sandstone dust per cubic metre.

Section 7.—The Dust Exposure of Men using Axial Water Feed Drills in Tunnels with varying Degrees of Ventilation.

The amount of dust which is produced by the use of a modern axial water-feed drill has received considerable attention in South Africa, and the authorities there have made investigations and have selected types of water-feed drills which have been found to produce the least dust.

The amount of dust produced in using such a drill is seldom sufficient to become visible to the naked eye, and for this reason engineers have queried its existence.

By our method of counting particles, in an atmosphere free of smoke, about 400 particles per c.c. of less than 10 microns are necessary before there is visible dust present in tunnels with electric lights, and it is only rarely that a water-feed drill will make this amount of dust. Dust is produced by water-feed drills because of the difficulty of wetting and settling particles of small size (that is, up to 10 microns) for the same reason water bubbling machines which have been extensively used for dust sampling are inefficient.

In earlier studies, this division has dealt with this problem and has recorded many results.

We recently investigated this problem at the request of the Industrial Commission.

A series of ten intensive tests on the dust conditions found in the headings of five different city railway tunnels were carried out.

These headings were extensions driven in advance of the main tunnel, and varied from 6 to 60 feet in length, the average length in which the tests were made being 24 feet. The approximate dimensions of the headings were 6 feet high and 5 feet wide.

The headings were selected for testing because the atmosphere was less likely to be contaminated by dust from processes other than drilling on the bench or floor of the tunnel. It has been our experience that the ventilation of the headings is generally below that of the rest of the workings.

We believe that the exposure to dust is greater in the headings than in other parts of the tunnel.

The system of ventilation in the railway tunnels in which these tests were made was by exhaust ventilation through the roof. Holes of about 6 inches diameter were bored from the surface, spaced 16 feet 6 inches along the tunnel, and an exhaust fan fitted to each. After the tunnel had passed the mining stage these holes were used for pouring the concrete from the surface to the tunnel.

The drilling machine used during this series of tests was with the exception of Test Number 9, an Ingersoll Rand Butterfly jackhammer drill of the axial water-feed pattern, with a hollow steel chisel bit. It is known as the " B.C.R.W.–430 Jackhammer." The machines were from 18 months to 2 years old. In test No. 9 the machine was of a similar character, the Hollman F.B. Pattern. This machine was new and was being used for the first time during test No. 9.

Owens' slides were taken approximately every minute for periods varying from thirty to forty-five minutes, holding the instrument as near as practicable to the mouth of the workman. When the gravimetric samples were being made, records were taken at five minute intervals. Slides were also taken about 6 feet away from the mouth of the drillmen.

Total number of dust records (slides)	265
Total number of slides counted	247
Records taken of air of headings showing more than 200 Class 1 particles	13
Records taken of air of headings showing less than 200 Class 2 particles	44
Records taken at mouth of driller showing more than 200 Class 1 particles	18
Records taken at mouth of driller showing less than 200 Class 1 particles	172

The results of one test (No. 2) are given in detail in Table IX, which serves as an example of the manner of taking the tests. It is clear that the results obtained in the headings are loaded to some extent by dust generated elsewhere, and that they represent something more than the dust made by the drills. They serve, however, as a record of actual working conditions.

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* Report of the Miners Phthisis Prevention Committee, 1916.

† Mavrogordato, A.: "The Value of the Konimeter—An investigation into the Methods and Results of Dust Sampling as at present practised in the Mines of the Witwatersrand," 1923.

‡ Drinker, P.: "The size-frequency and identification of certain phagocytosed dusts." J.I.H., Vol VII, No. 7, July, 1925.

Two gravimetric samples (the Greenburg-Smith Impinger) were taken, and the returns correspond to the Owens' counts (Section 5).

Particles.—Class I	139
Class II	11
Total	150

Inorganic dust per cubic metre, 2·0 milligrams.

TABLE VIII.—Summarising the results of ten tests carried out to determine the dust exposure of men using axial water-feed drills, showing the varying degrees of ventilation and the number of particles of dust per cubic centimetre in the air of heading and at the mouth of the drillman.

Test No.	Date.	Ventilation.			Particles of Air in Heading.		Particles at Mouth of Drillman.	
		No. of Fans in Tunnel.	Total amount Ventilation. Cubic feet per minute.	Distance of nearest Fan to Driller under test.	0-2 microns.	2-10 microns.	0-2 microns	2-10 microns.
				Feet.				
1	30-3-28	1	1,280	26	73	20	98	17
2	3-4-28	3	4,220	3	65	9	105	17
3	11-4-28	1	780	12	56	8	78	5
4	13-4-28	3	4,000	16	155	14	122	13
5	16-4-28	3	6,150	(Overhead)	67	8	60	4
6	19-4-28	3	6,150	(,,)	50	5	31	7
				Feet.				
7	24-4-28	3	5,300	30	181	11	...	...
8	27-4-28	3	5,300	15	302	23	326	22
9	1-5-28	2	3,700	8	47	10	43	10
10	2-5-28	2	3,700	15	...	...	97	11

Table IX, showing example of detailed results taken in experiments for the determination of the dust exposure of men using axial water feed drills. Test No. 2.

Slide No.	Time.	c.cs.	Remarks.	Class I.	Class II.
1	3·05	350	Floor—clear	70	10
2	3·08	250	Bench—clear	60	10
3	3·10	250	Heading—clear	66	11
4	3·32	100	Mouth of drillman collaring first hole—18-inch drill...	129	44
5	3·33	100	,, ,, ,, ,, ...	104	22
6	3·36	100	Mouth of drillman drilling first hole—24-inch drill	77	31
7	3·37	100	,, ,, ,, ,, ...	182	66
8	3·39	100	,, ,, ,, 3-foot drill	143	22
9	3·40	100	Mouth of drillman collaring second hole—18-inch drill	159	22
10	3·41	100	,, ,, (Second drillman on other side of ring began drilling)	135	18
11	3·42	100	,, ,, ...	132	12
12	3·44	100	Mouth of drillman—Second hole 2-foot drill	126	20
13	3·45	100	,, ,, ,, ,, 3 ,, ,, ...	99	10
14	3·46	100	,, ,, ,, ,, 4 ,, ,, ...	66	6
15	3·47	100	,, ,, ,, ,, 5 ,, ,, ...	71	9
16	3·49	100	,, ,, ,, ,, 6 ,, ,, ...	77	16
17	3·50	100	,, ,, ,, ,, 6 ,, ,, ...	27	4
18	3·51	100	In heading—no drills working	27	5
19	3·52	100	Mouth of drillman collaring third hole—18-inch drill	143	26
20	3·53	100	,, ,, ,, ,, ,, ...	99	20
21	3·56	100	Mouth of drillman—third hole 2-foot drill	159	19
22	3·57	100	,, ,, ,, 2 ,, ,, ...	102	12
23	3·59	100	,, ,, ,, 4 ,, ,, ...	55	2
24	4·00	100	,, ,, ,, 5 ,, ,, ...	176	11
25	4·01	100	,, ,, ,, 5 ,, ,, ...	75	2
26	4·05	100	Mouth of drillman collaring fourth hole—18-inch drill	99	18
27	4·06	100	,, ,, ,, ,, ...	70	7
28	4·07	100	,, ,, ,, ,, ...	75	3
29	4·08	100	Mouth of drillman—fourth hole 2-foot drill	...	...
30	4·09	100	6 feet from drillmen in heading	104	9
31	4·10	100	Mouth of drillman—fourth hole 4-foot drill	44	6
			Air in heading ... ... Average	65	9
			Mouth of drillman drilling ... ... ,, ...	105	17

Test carried out at mouth of heading tunnel No. 6, Town Hall on 3rd April, 1928, to determine the dust exposure of men using axial water-feed drills in tunnels with varying degrees of ventilation.

Stone being drilled was a " very hard sandstone " at ring of heading.

Details of machine under test :—Ingersoll Rand Butterfly Jackhammer. No. 273454—BCRW—430—about 18 months old.

Exhaust fans in roof,

No. 1. Cubic feet per minute=850, 8 feet from face.

No. 2. Cubic feet per minute=1,520, 24 feet from face.

No. 3. Cubic feet per minute=1,850, 41 feet from face.

Total exhaust in tunnel=4,220 cubic feet per minute.

Length of heading, 25 feet.

42 fuse shots fired at 2·40 p.m.

Men returned at 3·0 p.m.

First hole, shoulder high.

Second hole, waist high.

Third hole, knee high.

Fourth hole, on floor,

Section 8.—The Dust Exposure of Sydney Sandstone Masons.

The Sydney sandstone masons are a group of workers of particular interest to hygienists. They present a pure industrial history, the majority having spent their lives as sandstone masons and even when they have not commenced to work at their craft in Sydney generally it is found that their work elsewhere, usually in England or Scotland, has been confined to freestone. Masons who work in hardstone, *e.g.*, granite, basalt, appear in general to follow this class of work throughout their industrial lives. The change over from freestone to hardstone or from hardstone to freestone is not common.

We have then in Sydney a group of workers numbering some hundreds with a uniform exposure to the same hazard and in an industry where the working conditions have undergone little change, and an industry in which one may forecast that little improvement of dust exposure is likely. Periodical radiographic examination and removal of men showing dust changes of the lungs is the sanitary measure indicated, for even with work in the best conditions the exposure to dust will be sufficient to cause silicosis in susceptible individuals among them.

This group of Sydney sandstone masons deserves then special study, for it will serve for many years as a control group. Constant conditions have been the lot of these masons, variable and improving conditions the fortune of other sandstone workers.

To determine the dust exposure of the Sydney sandstone masons was an early desire of this division, but it presented a difficult problem owing to their work being in the open air or open sheds. To obtain trustworthy records of dust exposure one must endeavour to overcome variable conditions of ventilation and work by continuous sampling.

An earlier attempt was made by us to carry out this work by means of Owens' instrument and a relatively small number of readings was taken. These readings were recognised as insufficient and it was seen that many thousands of Owens' records would be required to give a trustworthy average.

When we had correlated the Owens' with the Greenburg-Smith impinger we decided to carry out this work by the gravimetric method.

In view of the open air conditions of masons, more objections can be taken to the use of the Owens' instrument than can be applied to such sampling in underground workings. On the surface the air change of any spot is great even in the absence of marked air movement. Underground, such rapidly changing conditions are not found. The objections to grab sampling apply then with greater force to open air conditions than they do to underground conditions.

We have made a series of tests with the Greenburg-Smith impinger. The results are shown in Tables X and XI. For these tests we selected the Government Stonemasons' shed at Maroubra, the dimensions of the shed being 300 feet long by 60 feet wide with a high ceiling. As the north, south, and west sides are open, and the shed in an isolated and elevated position, the natural ventilation is very good. Only Hawkesbury sandstone containing 90 per cent. of free silica is used, and the bulk of the work is "Blockwork" such as the preparation of dimensional blocks for building purposes. Before being handed over to a mason, the stones are cut to approximate size and roughly shaped by planing machines. As far as practicable, we commenced each test when a mason began to work a stone, and followed him through the work on that stone. The procedure for each test was as follows: The impinger bottle was fastened to the chest of the mason by a specially designed strap, the inlet tube being level with his mouth when working on a stone. The exhaust tubing passed over his shoulder and was tied in such a manner that it caused him little inconvenience when working. The motor, exhaust fan and manometer were placed about six feet from the stone. Plate IV shows the mason carrying the impinger bottle. Immediately the motor was started, the manometer reading (from which the rate of air flow was calculated) was noted, the air velocity observed with an Ower slow speed anemometer. The type of tool being used and the manometer reading were recorded throughout the test at five minute intervals, and at half-hourly intervals the air-velocity was observed over five minutes. From the observations the percentage of the work done with the punch, claw tool, chisel and bolster and the percentage of time required for marking out or carrying out other non-dust producing operations has been calculated, together with the average observed air-velocity. (See plates IV. and V.)

We considered that by working on the windward side of a stone a mason would reduce his exposure to dust, and an attempt was made to estimate the percentage of his time spent on the lee and windward sides of the stone, it was impossible to make any accurate estimation of the value of this factor.

Twenty-eight Owens' slides were taken for a determination of the size-frequency of the dust to which the stonemasons are exposed. The results obtained from these slides are given in Section 6.

Table XI gives the results of the eleven tests made. It shows the time the impinger was running, the average rate of flow of air through the impinger, the total volume of air sampled, the total weight of dust collected, the weight of dust per cubic metre of air, the average air-velocity during the test, the average dry and wet bulb temperatures, the time spent on each operation, and general remarks.

Table X summarises the results of table XI, and shows the weight of dust per cubic metre, and the chief factors on which the dust concentration depends, *i.e.*, the air-velocity and the work done. In this table the punch and claw tool (tools for heavy work) are grouped as one, and similarly, the chisel and bolster (tools for finer work) are grouped together. The table is arranged in descending order according to the percentage of work done with the punch and claw tool. In this order the value of the two main factors (air-velocity and tools used) in affecting the dust concentration can be more readily followed.

The average exposure of the stonemasons in this shed, under the conditions of the tests was 4·2 mgs. per cubic metre, corresponding to 420 particles per c.c.

The value of a high air-velocity is shown in test No. 14. Under average conditions approximately 4 mgs. of dust per cubic metre would be expected, but an air-velocity of 500 feet per minute has reduced this to 1·24 mgs. per cubic metre.

Plate 4.

Showing stonemason at work equipped with a Greenburg-Smith Impinger. The suction tube, motor, and pump are also shown.

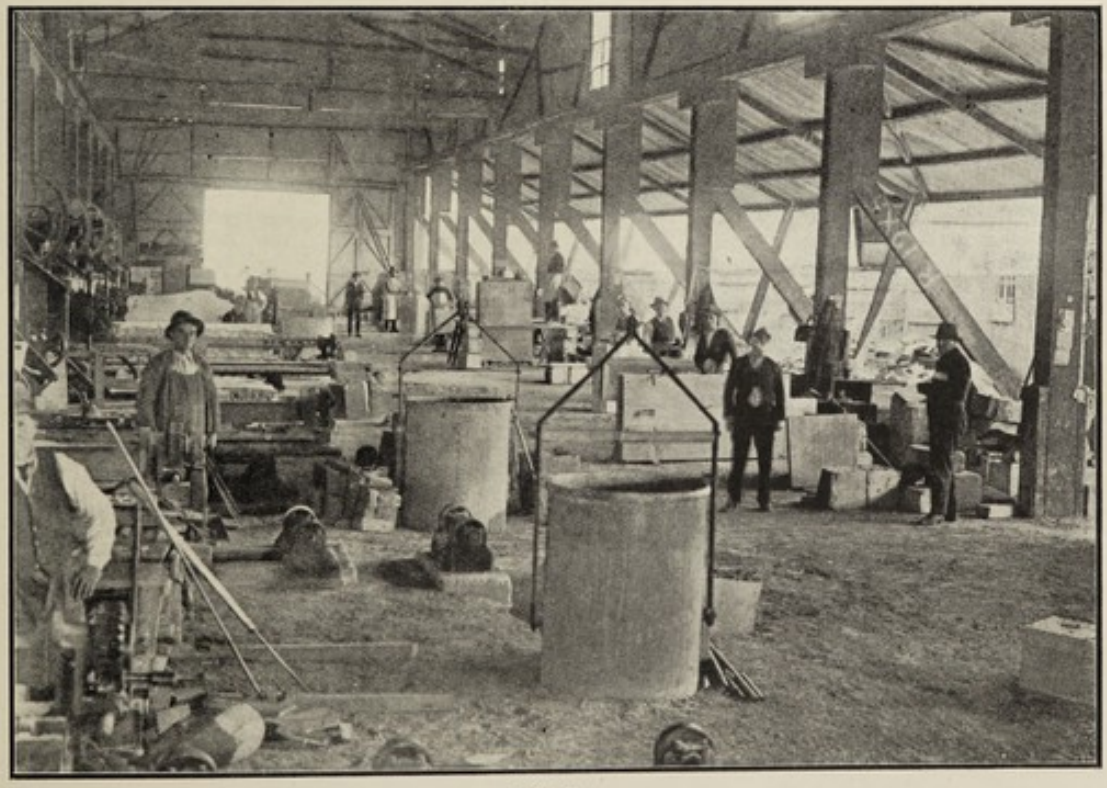

Plate 5.

Photograph showing the Government stonemasons' shed at Maroubra.

The highest dust concentration was recorded in test No. 19, the day on which the punch and claw tool were used for the greatest percentage of time.

The average obtained of about 420 particles was greater than we recorded in our work in 1924, but we recognise that this work was not carried far enough and that the conditions of work sampled were more favourable; the workers there doing little punch work and more fine dressing, and the work was chiefly done in the open.

TABLE X summarising the results of the eleven tests made to determine the exposure to sandstone dust of Sydney sandstone masons. The table shows the dust exposure under variable conditions of air-velocity and work performed, and is arranged in descending order according to the percentage of heavy work (using punch and claw tool). This order is convenient for studying the value of the varying factors (air-velocity and work performed) in affecting the dust and exposure.

Test Number.	Mgs. of Dust per cubic metre.	Air movement ft. per min.	Per cent.—Time on operations.		
			Punch and claw.	Chisel and bolster.	* Non dust producing operations.
19	7·10	50	85·0	.....	15·00
11	6·82	20	74·1	9·25	16·65
10	6·50	20	74·5	12·70	12·70
9	5·00	100	73·3	13·35	13·35
18	5·23	47	62·1	32·8	5·10
15	3·90	24	52·5	27·8	19·7
13	3·92	110	48·2	39·3	12·5
14	1·24	500	44·3	41·0	14·7
12	2·19	71	29·3	67·2	3·5
16	2·02	60	6·0	92·0	2·0
17	2·16	140	3·8	92·4	3·8
Average	4·2	100	50·	40·	10·

* These operations include—Marking out work; moving stone into new position; gads (wedges); pitching tool.

Maroubra State Quarry.

Table XI showing the data collected from Maroubra State Quarry and Stonemasons' Shed. The column referring to "marking out" includes all non-dust producing operations, *i.e.*, using gads or wedges, moving work, using pitching tool, &c.

Test No.	Total Time, Mins.	Average Rate of flow of air in Impinger, c. ft. p. min.	Total Air Impinged, c. metres.	Total Dust, mgs.	Dust per cubic metre, mgs.	Air movement feet per min., close to work.	D.B. °F.	W.B. °F.	R.H. %.	Per cent. of Time of Operations.					Weather Remarks.	Description of Work being done.
										Punch.	Claw.	Chisel.	Bolster.	Marking out, &c.		
9	154	1·02	4·42	22·0	5·0	100	52·5	51·0	90	50	23·3	13·35	...	13·35	Cold and raining all day, slight breeze	General dimensional work preparatory to carving. Size of stone, 7′ x 4′ x 3′.
10	265	1·06	7·95	51·5	6·5	20	61	55	73	61·8	12·7	12·7	...	12·7	Bright day after foggy morning, dull in late afternoon.	,, ,,
11	260	1·05	7·62	52·0	6·82	20	59	55	78	42·6	31·5	9·25	...	16·65	Fine day, periods of cloudiness, no breeze ...	,, ,,
12	285	1·05	8·47	18·5	2·19	71	58	56	91	6·9	22·4	67·2	...	3·5	Dull day, very slight breeze	Running and dressing of moulding on stone 7′ x 4′ x 3′.
13	270	1·00	7·65	30·0	3·92	110	60·5	56	81	23·2	25·0	12·5	26·8	12·5	Fine and sunny, no breeze in morning, slight breeze in afternoon.	Dressing and facing of two sides of cube 2′ side.
14	290	0·98	8·05	10·0	1·24	500	58	51	61	23·0	21·3	41·0	...	14·7	Strong westerly wind blowing, sunny and cold.	Dimensioning two ends of stone 8′ x 2′ x 18″, and running and dressing of moulding.
15	290	1·02	8·36	32·5	3·9	24	67	57½	56	24·6	27·9	24·6	3·2	19·7	Fine and sunny, slight warm breeze	,, Stone 8′ x 2′ x 18″.
16	235	1·03	6·66	13·5	2·02	60	67	57	53	...	6	77·5	14·5	2	Fine and sunny, no wind in morning, strong westerly wind in afternoon.	,, Stone 8′ x 2′ x 18″.
17	270	1·06	8·1	17·5	2·16	140	68·5	58	57	1·9	1·9	90·5	1·9	3·8	,, ,, ...	,, Stone 5′ x 2′ x 18″.
18	280	1·00	7·92	41·5	5·23	47	67	57	53	8·6	53·5	13·8	19·0	5·1	Dull and hazy in morning, sunny and light north-east breeze in afternoon.	Dressing of top of coping stone size 5′ x 2′ 6″ x 6″.
19	95	1·00	2·12	15·0	7·1	50	57	53	77	75	10	...	...	15	Dull cold morning with strong south-east breeze.	Punching and dimensional work on stone 3′ x 5′ x 18″.

Section 9.—Dust Standards.

For comparison with the standards which we have adopted for certain sandstone industries, we may consider the data available from South Africa. This has been well summarised by Mavrogordato in two publications.*‡

"*Section* 2.—Chart illustrating the History of Silicosis on the Witwatersrand by Periods, during which Great Variations in Dust Concentrations of the Mine Air Obtained.

"As a preliminary survey, an attempt is made to present the essential features in the history of silicosis on the Witwatersrand in the form of a chart based on the hypothetical 'critical levels' just suggested.

"Inspection of this chart shows three periods marked off by vertical lines :—

"*Period* 1.—From the commencement of the industry to the end of 1905. No precautions, or ineffective precautions, were taken.

"*Period* 2.—From 1906 to the end of 1911. The first effective precautions were initiated.

"*Period* 3.—1912 to date.

"On further reference to the chart, it will be seen that there are two curves running across it. The black line represents approximate dust concentrations at different periods. There are no continuous returns before 1913, so, until that year, the curve passes from one point to another at a considerable length of time apart. The green line represents approximate miners' phthisis prevalence from 1902 to 1916, and actual prevalence from 1916 to date.

"The 'critical levels' are taken as :—

"*Level A.*—20 mg. of dust per c.m. This is taken as the first level because this degree of dust concentration represents about the worst conditions possible for the production of miners' phthisis (concentrations of dust much greater than 20 mg. per c.m. have similar silicosis-producing results). There are, on record, returns for 1902 to 1904, averaging 150 mg. per c.m., and for 1911 averaging 20 mg. per c.m. The latter represent the dust returns for the three or four previous years. It is probable that the removal of air-borne phthisis-producing dust only begins at Level A. Conditions begin to improve efficiently below this level.

"*Level B.*—5 mg. of dust per c.m. A position attained in 1913. By the time this level is reached, visible dust has disappeared, and phthisis-producing dust is diminished appreciably. It is doubtful if dust alone at this concentration would disable a man within the ordinary working period. This represents the level of safety tentatively suggested by the Miners' Phthisis Prevention Committee (2, p. 22).

"*Level C.*—Somewhere below 1 mg. of dust per c.m. Below this imaginary level conditions cease to be dangerous. Our returns have been averaging about 2 mg. per c.m. for some years past, but we have no evidence that this degree of concentration is safe.

"Between Levels B and C there is a change in the type of disease produced, and a further fall in production. Conditions are still dangerous, however, because dust at a concentration that hardly disables *per se* can pave the way for a disabling infection."†

So much for the gravimetric standards which were taken by the sugar tube method, and are closely comparable with gravimetric results taken by Greenburg-Smith impinger.

The particulate standards offer greater difficulty for comparison, for the technique has varied. By a light ground method of counting particles by Kotzé's Konimeter 100 particles of size below 10 microns were equivalent to 1 mg.,‡ but there are many contradictory results.

By a method since standardised by Mavrogordato with dark ground illumination of a special type, much higher counts, running even to 300 or 400 particles per c.c., equivalent to 1 mg., may be expected.§

The South African authorities do not appear to have published a satisfactory account of the correlation of the particles counted by standard konimeter methods with the gravimetric estimation of dust by the sugar tube.

At Broken Hill, New South Wales, the Mining Inspectors use tentatively the following standards :—

1. 500 particles per c.c. of air as taken by the konimeter and counted at a magnification ratio of approximately 200.
2. Gravimetric.—5 mg. per cubic metre of air sampled.

For Sydney sandstone mining this division in 1924 advocated a standard of not more than 200 particles per c.c. of less than 10 microns as determined by the Owens' Jet Dust Sampler, and using our method of excluding non-crystalline particles. The experience of the last four years shows that this standard is bettered in all well-ventilated workings, and can reasonably be expected in all. The technique we use is described in Section 3.

This particulate standard has a marked advantage over gravimetric methods in the sandstone workings with which we are concerned.

There are no engineering difficulties to be overcome in ventilating such places. The chief hazard arises from frequent blasting and an early return to the face. By the particulate method of dust sampling the many working places can be frequently sampled during selected periods. Where it is desired to secure average exposures, gravimetric sampling extending over many hours is preferred. We have in this publication dealt exclusively with a quartz hazard, and our standards are for one particular field. We do not suggest that they apply generally for other kinds of dust.

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* Mavrogordato, A.: "Contributions to the Study of Miners' Phthisis." Johannesburg, South African Institute for Medical Research, 1926. No. XIX.

† *Ibid.* Page 47.

‡ Mavrogordato, A.: "The Value of the Konimeter: Being an Investigation into the Methods and Results of Dust Sampling as at Present Practised in the Mines of the Witwatersrand." Johannesburg, South African Institute for Medical Research, 1923. No. XVII. Page 19.

§ *Ibid.* Page 69.

Section 10.—Summary.

A review of the dust sampling work in the Sydney sandstone industries is given, and several investigations into special problems of dust sampling have been detailed.

Certain of the tunnelling operations carried out during the past five years are mentioned and the methods of ventilation described. The results of routine dust sampling are summarised, and show that the average dust exposure at the present time in these tunnels is approximately 50 particles of less than 10 microns per c.c., as determined by the Owens' jet dust counting apparatus, using our method of counting.

A brief description of the Owens' jet dust counting apparatus and a detailed account of our technique and method of counting the records is given. The Kotzé konimeter and the Owens' jet dust counting apparatus are discussed and compared.

The Greenburg-Smith impinger used in gravimetric sampling, and the method of sedimentation as used by us for separating the particles less than 10 microns from larger particles is described.

A correlation of the weight of dust per c. metre of air sampled by the Greenburg-Smith impinger with the number of particles per c.c determined by the Owens' jet dust counting apparatus has been made, and we have shown that one milligram of quartz or sandstone dust per c. metre is equivalent to 100 particles of less than 10 microns per c.c. This result has been shown to agree with that determined by calculation, if the particles are regarded as spheres.

The size-frequency of air-borne particles has been determined, and we have shown that there is a constant ratio of three between the number of particles in consecutive sizes.

The average dust exposure of men using axial water feed drills in tunnels with varying degrees of ventilation has been determined at 110 particles per c.c.

A special investigation of the dust exposure of Sydney sandstone masons was made with the Greenburg-Smith impinger, and we have shown that with good natural ventilation this group is exposed to an average dust concentration of 4·2 milligrams per c. metre equivalent to 420 particles per c.c.

The Dust Standards of South Africa and Broken Hill (N.S.W.) are mentioned and compared with the standard adopted by us for the Sydney sandstone industries, which requires not more than 200 particles of less than 10 microns per c.c. of sandstone dust as determined by the Owens' instrument and our method of counting. Our standards are for one particular field. We do not suggest that they apply generally for other kinds of dust.

It is considered that our work in correlating the particulate counting by the Owens' jet dust counting apparatus and the gravimetric results by the Greenburg-Smith impinger, and the study of the size-frequency of particles has made it possible to use and compare results of these two methods of dust sampling, which, in our opinion, for efficiency and ease of manipulation are unrivalled, and applicable to selected problems in dust sampling.

It is thought that the prospects of markedly decreasing the incidence of silicosis in all classes of sandstone workers with the probable exception of the stonemasons are good. Underground workers can be guarded; newer methods of working will aid among the rock choppers and quarrymen.

Appendix I.

The following are two judgments of the Industrial Commission of New South Wales, dealing with certain sandstone workers.

COMMISSIONER AND MEMBERS.

In re Government Railways and Tramways (Construction) Award. June 21, 1926.

Hours—Health of employees—Underground labourers—Application for reduction of ordinary working hours—Forty-four hours week—Principle on which Commission will act in dealing with unhealthiness of conditions.

The Commission reduced to 40 hours per week the working hours of underground labourers in tunnels where the ventilation equipment was such as to result in an atmosphere containing more than 200 particles of sandstone dust per cubic centimetre. In tunnels with ventilating equipment resulting in an atmosphere containing not more than 200 particles per cubic centimetre, the hours were fixed at 44 per week to be worked 8 hours per day, Monday to Friday, and four hours on Saturday.

Per Commissioner. The principle to be followed in all cases by the Commission is not that unhealthy conditions be allowed to continue and a palliative sought in reduced hours, or a solatium in increased wages, but that the organised service of medical and engineering knowledge ought to be employed to abolish, as far as possible, the unhealthiness of the conditions.

Application by Australian Workers' Union, Industrial Union of Employees, for variation of the Government Railways and Tramways (Construction) Award (XXIV I.G. 333) by reducing the working hours of underground labourers.

Mr. Henwood on behalf of the applicant.

Bretnall for Railway Commissioners for New South Wales.

With the Commissioner, Mr. W. Farrow, employer's representative, and Mr. G. C. Bodkin, employees' representative.

Commissioner: This is an application for a forty-hour week in lieu of a forty-four-hour week for all underground labourers in the employ of the Railway Commissioners, except Miner Class "A," and for consequential increases in the hourly rates of pay.

Under the Forty-four Hours Week Act a reduction below forty-four hours can only be awarded if "the health of the employees in an industry justifies a reduction." The industry dealt with in the present determination is that of underground labourers in sandstone only. The Commission has had the opportunity of frequent inspections of the tunnels on the City Railway and at North Sydney, and has been aided especially by the excellent research work done by Dr. Charles Badham, Medical Officer for Industrial Hygiene for the State. The conditions inimical to health in tunnelling work fall into two classes: First (and that the most important), the danger arising from dusty atmosphere and from atmosphere which, after shot-firing, has been vitiated both by sandstone dust and nitrous fumes. The second class is a miscellaneous one, and includes adverse results of any work underground, of wet conditions under foot, of wetting in the course of using the water-fed jack hammer, of wetting with sludge or slurry blown up out of the hole which is being drilled, and of strain upon the system when the air pick is used. Some other smaller matters may be left out of count, but as to this secondary class of general conditions affecting health, though there is no medical evidence before the Commission of any specific injury that results, it cannot be doubted that the work is extremely strenuous, that it goes on under unpleasant conditions, and that there is some visible risk of injury through working in clothes that at times are wet through, and that occasionally are dried while the work is going on, and again made wet at different times throughout the day.

The medically proved danger to health from the atmospheric conditions is the serious one of the risk of the disease known as silicosis arising from the presence in the atmosphere of silica particles in very minute subdivision. The ordinary dust that is seen flying when sandstone is picked or drilled without the use of water, or is broken up in scabbling, is not the dust that does the harm, it is silica in particles not exceeding ten microns (a micron being one thousandth part of a millimetre), which may not be visible unless present in dense clouds. Medical and engineering science between them have invented a mode of measuring the dust content of the atmosphere, and from that measurement establishing a standard of safety against the risk of silicosis, which may often be the first step towards tuberculosis.

Dr. Bradfield and Mr. Farrow are satisfied that the men engaged in the task are very good workmen, and the evidence given as to discomfort, loss of appetite, and often loss of weight, is not to be set aside as voicing the complaints of shirkers or malcontents.

The outstanding points in Dr. Badham's final report are as follows :—First, that the conditions as to dust have been greatly ameliorated in the workings of the city tunnels, that they had not been at the time of the last inspection so ameliorated in the North Shore tunnel (which is not under the control of the Railway Commissioners, and is not the subject of this application), and that they could be ameliorated in all sandstone tunnels by the adoption of suitable engineering equipment.

Having been asked to focus the result of his researches upon the question of the hours that it is safe to work in tunnels that are properly ventilated, Dr. Badham's conclusion is that in such tunnels the men ought not to work more than eight hours of actual work underground in any one day, and that in tunnels of this sort the risk of the onset of silicosis is not sensibly increased by working four hours on the sixth day. On the other hand, where the ventilation conditions do not reach the standard which Dr. Badham has suggested as the minimum of adequate ventilation, more particularly after shot-firing, he is of opinion that work on a sixth day after eight hours of actual work underground on five days would definitely add to the risk of injury.

The principle to be followed in all cases by the Commission is not that unhealthy conditions be allowed to continue and a palliative sought in reduced hours, or a solatium in increased wages, but that the organised service of medical and engineering knowledge ought to be employed to abolish, as far as possible, the unhealthiness of the conditions. So far as the Railway Commissioners' tunnels are concerned, Dr. Badham speaks highly of the spirit of co-operation in which Mr. Farrow, who is in charge of them, has received his suggestions to take from sandstone working underground its principal dangers, and Mr. Farrow, who is also the representative of the Commissioners, as my colleague, informs me that it will be the settled policy of the Railway Commissioners to achieve as good results in all future tunnelling as have been reached in the City Railway.

So far then as the question of hours is concerned, it is the simple duty of the Commission, in obedience to the statute's direction as to reducing hours where the health of employees justifies it, to apply the uncontradicted medical evidence to the case with which we are dealing. For this reason the hours at present worked, viz., 8 hours actual work, Monday to Friday, with 4 hours on Saturday morning and afternoon alternately, cannot be reduced for work done under conditions such as those that have been obtained in the city tunnels by suitable ventilating equipment.

There remains, however, another serious aspect of the health question, coupled as that is with the rights of employees under the Forty-four Hours Week Act. Since the Act was passed, an overpowering proportion of employees has shown preference for working 8¾ hours on five days in the week, so as to complete the 44-hour week and have an unbroken holiday on the Saturday. In this particular industry the employees cannot be allowed to exercise their choice in that direction because it would be in opposition to the medical evidence to permit of them working 8¾ hours during five days in the week,

That in itself would constitute some claim to consideration in regard to pay for the compulsory working of 4 hours out of the 44, on Saturday. The practice is to alternate a half-shift on Saturday morning with a half-shift on Saturday afternoon for the employees. Those who work the Saturday afternoon half-shift leave off at a time when, allowing for changing and returning home (both of them absolutely necessary in a dirty and wet occupation as this), they practically lose the Saturday holiday altogether. In the forenoon they are standing by for the shift to begin, and the afternoon is practically gone by the time they are ready to enjoy it. A fair and common enough recompense for enforced work on a holiday is double pay for the time worked, but instead of awarding double pay for the half-shift which is worked in the afternoon, and is, practically, holiday work (which double pay would be earned in alternate weeks by each shift of the employees), it is thought to be, from an administrative point of view, more desirable to have an additional half-pay for all the Saturday work, morning or afternoon.

The Award will, therefore, be varied to carry into effect these conclusions; the hours being left as they are, provided the standard of ventilation is satisfactory, and a compensating allowance of time and a half for Saturday work awarded in view of its enforced nature, arising as that does from medical necessity.

In order to ensure that the opinion expressed by Dr. Badham as to the danger to employees in tunnelling work where the ventilation does not secure the minimum standard of atmosphere in respect of dust, the Award will provide in such cases only for a 40-hour week without reduction of pay.

The terms of the Order when drawn will limit the application to the special case of sandstone tunnels, including in this term tunnels where the removal of sandstone is part of the work.

INDUSTRIAL COMMISSION.

In re Government Railways and Tramways (Construction) Award. March 16, 1928.

Piddington, J., President; Street and Cantor, JJ.

Hours—Underground miners—Unhealthiness of conditions—Air pick—Limitation of hours of work on—Government Railways—Appeal from Conciliation Committee.

Upon appeal from the Government Railways (Permanent Way) Conciliation Committee, the Commission refused to award a uniform 40-hours week for all underground miners, in the employ of the Railway Commissioners on railway construction, working in tunnels of sandstone or indurated shale, and declined also to prohibit the use of the air-pick above waist high. The Commission, however, amended the Government Railways and Tramways (Construction) Award by providing that the Railway Commissioners should have all tunnels and other workings in sandstone and indurated shale tested for atmospheric conditions continuously, and that an employee should not be required to use the pick machine more than two hours in any one week in hard sandstone, nor more than one hour per day in soft sandstone.

Principle laid down in *In re* Government Railways and Tramways (Construction) Award (1926 A.R. 92 at 94), as to the method to be adopted when dealing with unhealthiness of working conditions followed.

Appeal by the Australian Workers' Union, industrial union of employees, against the award of the Government Railways (Permanent Way) Conciliation Committee published 18th November, 1927 (XXXII, I.G. 1298) varying the Government Railways and Tramways (Construction) Award published 3rd December, 1926 (XXX I.G. 1690).

Mr. M. Henwood on behalf of the appellant.

Bretnall for the Railway Commissioners for New South Wales.

The President (Piddington, J.) read the Judgment of the Commission :—

The main object in this appeal was to obtain a uniform 40-hours week for all underground miners working in tunnels of sandstone or indurated shale. The ground upon which this was urged was the impossibility by any methods of ventilation of attaining the standard of safety in the atmosphere which has been laid down by Dr. Badham and is set out in 1926 Arbitration Reports at page 92 *et seqq.*

Another ground of appeal was that the use of the air-pick above waist high ought to be prohibited.

In support of the appeal, a large number of readings of the dust-content of the atmosphere in the various tunnels now under construction in connection with the City Railway were put in and have been subjected to close analysis by the advocates in the case. These readings disclose that the ventilating machinery and methods at present in use have failed upon occasion to keep the atmosphere at the necessary standard of freedom from silica particles. The question, however, is whether the number of these occasions and the mode of their occurrence compel us to the conclusion that there is no other way of providing against the risks to health involved in a dusty atmosphere than the reduction of hours. The Commission considers that such a conclusion is not warranted and, further, that even if a reduction of hours was decided upon, the appellants have not put forward any reason for thinking that such occasions as those to which allusion has been made would no longer arise.

The principle laid down by the Commission in the judgment already cited in 1926 Arbitration Reports, at page 94, is the principle to be followed, and Mr. Henwood insisted strongly that the union shares the view that reduction of hours, or increase of wages, leaving untoward conditions of health without remedy, is not the right policy. The objective of the union is to secure the health of the men, not to use the risks to health as a lever to effect reduction of hours, or increase wages, leaving the men still exposed to danger.

Following this principle, the Commission has come to these conclusions :—

(1) It is possible in all substantial respects to attain throughout the sandstone tunnels and other workings now being formed the standard described by Dr. Badham.

(2) That these tests disclose that the main occasion of failure in this repect has arisen when men returned to the tunnel after firing. In a large number of instances the count of dust particles has been in excess of the maximum just at this point of the operations, and has fallen to the desired standard in a very few minutes afterwards. It appears to the Commission that the representatives who hitherto have decided, and will continue to decide, when it is safe for the men to return to the work would be well advised to allow say, five or ten minutes grace after the atmosphere appears to the eye to be safe before the men return to work.

(3) The tests show that drillmen are more frequently exposed to an atmosphere below the standard than are other workers in the tunnel.

(4) The air-pick, though it is less injurious from the point of view of creating dust than the ordinary pick, produces an excessive content of dust particles in the atmosphere when used in hard sandstone.

In order to give effect to these conclusions the Commission has decided that the hours at present worked shall remain as under the existing award, but that the award appealed against shall be varied in the following respects :—

(1) The second paragraph of clause 26 of the variation made on the 7th day of June, 1927, and published in the *Industrial Gazette*, 15th June, 1927 (I.G. XXXI, page 1225), as also clause 28 of the variation made on the 14th November, 1927, published in the *Industrial Gazette* of the 18th November, 1927, and now to be found in XXXII *Industrial Gazette*, page 1298, are omitted with a view to substituting a new clause 28, in the following terms :—

28. Test of Workings.

The Railway Commissioners shall have all tunnels and other workings in sandstone and indurated shale tested for atmospheric conditions continuously. One copy of the tests taken shall be posted weekly in the shelter shed used by the men working in the particular section where the tests were taken.

A copy of all tests shall be forwarded to the applicant union and the State Medical Officer of Industrial Hygiene, and the tests shall be carried out under his direction and control.

Should any dispute arise on the readings of the tests as to the classification of any tunnel or other working, it shall be determined by the State Medical Officer of Industrial Hygiene.

(2) While not making it a part of the award, it is the desire of the Commission that, if necessary, special testing should take place and efforts be made to improve the atmospheric conditions in which drillmen work, and that a report of the tests be presented to the Commission by the State Medical Officer of Industrial Hygiene in two months' time, in order that the Commission may then consider whether there is occasion to review the hours and/or wages of drillmen.

(3) A new paragraph will be added to clause 30 in the following terms :—

An employee shall not be required to use the pick-machine more than two hours in any one week in hard sand-stone, nor more than one hour per day in soft sandstone.

The Railway Commissioners have in the past done everything that has been suggested to bring about the desired standard of atmosphere, with the result that a great improvement has already been effected. The Commission acknowledges with pleasure the cordial offer of the Commissioners to carry out whatever measures we think desirable in this regard and, in particular, the Commission is glad that the Commissioners have been able to see their way to set aside a full-time officer to act under the direction of the State Medical Officer of Industrial Hygiene in carrying out the provisions of clause 28 as now provided.

As the Commission is not satisfied to make a final order at this stage, the appeal will stand over generally, and both parties will have liberty to apply in the appeal.

Studies in Industrial Hygiene, No. 13.

Notes on a Fine Type of Fibrous Pneumonokoniosis produced by Silicates and other Minerals.

BY

By Charles Badham, B.Sc., M.B., D.P.H., Medical Officer of Industrial Hygiene, New South Wales.

"*Further pathological work, however, is required upon lungs exposed during life to other dusts, such as the dust of glass, emery, carborundum, corundum, cement, slate, clay, cotton, hemp and jute, to ascertain what changes dust other than silica originate.*" *Collis, Industrial Pneumonoconioses*, 1919.

"*It has become obvious that not only amorphous particles of quartz, but also particles of other moderately hard and insoluble minerals are likely to be carried into the lung tissue—whether they are equally deleterious is, however, one of the problems of the future.*" *Watkins-Pitchford and Moir*, 1916.

It is my intention in this paper to consider the ætiology of the fine fibrosis of the lungs which is not uncommonly found in the metalliferous and coal miners and some workers in other industrial activities in New South Wales.

This type of fibrosis is found only after exposure to certain mineral dusts and it can in most cases reasonably be assumed to be caused by various silicates. It is not found in workers who have only been engaged in activities where they are exposed to a high percentage of quartz (*i.e.*, 70–90 per cent.) such as workers in Sydney sandstone. I call this condition *silicatosis* to distinguish it from the well-known and sharply defined *silicosis*, which is a coarse nodular fibrosis. The terminology of dust diseases of the lungs used by various authors at the present time is as follows :—

Pneumonokoniosis : A general term covering all dust diseases of the lung, fibrous or not fibrous (from Greek *pneumon* lung, *konis* dust).

Silicosis : A fibrosis caused by free silica (or quartz). This is the best known scientifically of the dust diseases of the lungs. The fibrosis is of a coarse nodular character. The lungs may be black.

Anthracosis : A dust disease of the lungs found in coal miners which is ill defined and is presumed to depend on inorganic dust in coal. The lungs are black.

Siderosis : A term applied to a fibrosis of the lungs found in metal workers. The condition is ill defined. Lungs are yellow or red from metallic oxides, generally of iron.

Chalicosis : This term was originally used for silicosis or any stone-dust disease and still lingers in medical text books.

Asbestosis : A fibrosis of the lungs due to asbestos which is a silicate of magnesium. It is a fine fibrosis with characteristic miscroscopical stigmata. There is no comparative account of radiographic appearances.

These dust fibroses of the lungs are found either simple or complicated with tuberculosis or other infective processes which add a tuberculous or infective fibrosis to the already existing dust fibrosis. Only one of these fibroses silicosis has been placed on a sound radiological and pathological footing, and this is chiefly due to the South African workers, Watkins-Pitchford and his colleagues of the Miners' Phthisis Bureau and Mavrogordato, and by their work medical science has benefited greatly.

When the Technical Commission of Broken Hill, New South Wales, found a type of fibrosis which differed from the South African type, they applied the term *pneumoconiosis* to the condition found by them. There are objections to the use of the generic term for it includes non-fibrous as well as fibrous dust diseases of the lung.

I suggest that where it is possible to identify the dust responsible, a pneumonokoniosis should be styled "*silicosis*" only when due to free silica or quartz and presenting the characteristic radiographic appearance; or "*silicatosis*" when it presents the characteristic radiographic appearance and is the result of exposure to silicates. Where both types of fibrosis occur in the one lung the term "*siliconosis*" might be used or the disease called a fibrous pneumonokoniosis of a mixed type. At the present time there is seen a practice of grouping all fibroses of the lung together as silicosis; as typical examples of this one might cite a recent and excellent report on the the West Australian Miners by Dr. Nelson* and the recent work by Pancoast and Pendergrass. (†)

This view has been upheld by the work of early authorities on dust diseases of the lungs, for it was clearly seen that the free silica or quartz was the outstanding factor of industries with excessive mortality, and industries where there had been exposure only to silicates such as the felspars were not common.

In 1926 Mavrogordato‡ remarked, "The increasing use of the term silicosis implies the recognition that in industry this disease is particularly related to inhalation of dust of free silica (SiO_2), in fact it is doubtful if it occurs apart from free silica, or, anyhow, of the intractable silicates, *e.g.*, sericite."

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* Nelson, W. T., "Report on an Investigation of the Pulmonary Conditions of Mine Employees, Western Australia," during the years 1925–1926, Commonwealth of Australia, Div. of Ind. Hygiene.

† Pancoast, H. K., and Pendergrass, E. P., "Pneumonokoniosis [Silicosis]" Case, New York, 1926.

‡ Mavrogordato A., "Contributions to the Study of Miners' Phthisis," South African Inst. for Med. Research. 1926, No. xix.

Probably the radiological technique of earlier workers explains in part the wide acceptance of this view for radiographs taken at a short distance and with broad focus tubes did not stress the difference between the fine fibrosis of dusts other than silica, and the nodular fibrosis of quartz dust. Moreover, the coarse fibrosis of silica gave clear interspaces of normal lung while the fine fibrosis presented a uniform granular mottling leading to the conclusion which is probably erroneous that the actual development of fibrous tissue was greater in a nodular fibrosis as silicosis than in a generalised fine fibrosis caused by silicates. To me it appears that the mechanical damage to the lung is greater in a fine fibrosis than in a coarse fibrosis when both are well developed.

My attention was focussed on this subject by the early death of a man whom I had found affected by a fine fibrosis caused by an orthoclase basalt which contained no free silica. When this man was examined early in 1925 I discounted the gravity of the fine fibrosis present, guided by the South African opinion of a similar condition found in men exposed to norite, another felspar. The fibrosis was not of the silicotic type, and in the absence of the coarse nodules of the typical silicosis, I did not regard this man as having badly damaged lungs, but he died in less than two years from, I am of the opinion, this fine fibrosis. I will again refer to this case.

SOUTH AFRICAN WORK.

The South African workers, particularly Mavrogordato, recognise the type of fibrosis which I would call silicatosis, and Mavrogordato probably describes, under the heading of "More fibrosis than usual," the condition I write about :—

"*More Fibrosis than Usual.*" (*)

"One cause of fibrosis, then, in disease due to dust inhalation, is the excessive production of a cell which may become a white fibre, and *I would relate the type of fibrosis met with in the inhalation of the dust of hard stone other than free silica to this process* [the italics are mine.—C.B.]. Theresult is a condition of the lungs which the Miners' Phthisis Medical Bureau calls 'more fibrosis than usual'—an excessive amount of fibrous tissue in normal situations. Professor Collis has figured and described this condition in connection with quarrymen, and has insisted upon the distinction between it and true silicosis. In several publications Collis has put forward the hypothesis that there is no evidence that true miners' phthisis is caused by any dust other than that of free silica. It is not suggested that the whole excess of fibrous tissue is directly related to these new cells, probably the fibres in the ordinary connective-tissue scantling of the organ contribute by proliferating on their own account under the influence of the irritation provided by the newcomers. This condition of 'more fibrosis than usual' occurs with silica in common with other dusts, but is in no way peculiar to silica or even to dust."

Except for the last sentence my experience agrees with this, but I have not seen this fine fibrosis caused by silica nor the condition apart from exposure to dust.

It may be that the difference of opinion is one caused by different radiological technique.

Further work of the South Africans relates to quarrymen exposed to norite. They have stated§—

"An appreciable but not serious degree of pulmonary fibrosis may be produced by prolonged work at the Bon Accord quarry. No case of definite silicosis has been brought to light, although the dust conditions, especially at the crusher station, could not be worse. The rock dealt with is norite, a mixture of labradorite, pyroxene, and hypersthene, but without any free silica."

A. M. Mavrogordato‖ : *Further behaviour with dust of hard rock containing no free silica.*

"The changes in the lung which are consequent upon the inhaling of hard rock dust free from uncombined silica are illustrated in Figure 8. The section is of the lung of an animal eight weeks after exposure. It will be seen that most of the dust has remained within the cells, and these have not become aggregated but are scattered more or less uniformly throughout the tissues. The dust particles appear to have exerted some protective influence over the cells containing them, either preventing their death or preserving them from autolysis."

"The rock dust used for this experiment was derived from norite which was sent from the Bon Accord quarry, near Pretoria. In the combined reports of the Miners' Phthisis Medical Bureau and Department of Mines, upon certain mines and works of the Transvaal outside the Witwatersrand, date, January, 1920, Dr. James Moir writes of material from this quarry :—" This contained no free silica but the entire sample was composed of fine spicular hard minerals, estimated at 45 per cent. light felspar, 44 per cent. heavy felspar, and 11 per cent. of pyroxene and other dense minerals." Dr. Moir adds :—" This is a crucial test for the theory that free silica is the important element in producing pneumonokoniosis." Apropos of this latter remark, it is of interest to find that the Bureau has not detected any case of definite fibrosis of the silicotic type among the workers in this quarry, although the dust conditions, especially at the crusher station, could not be worse."

It will be noticed that there was no definite fibrosis of the silicotic type found, but the silicotic type of fibrosis could not be produced by a hard rock with no free silica. The type of fibrosis found was probably the fine type that I would call silicatosis.

Dr. Steuart writes† : "Miners' phthisis‡ is caused by the inhalation of fine particles of siliceous dust over a long period. It appears to be essential that the dust shall contain free silica ; silicates by themselves are relatively innocuous. Some of the dust is conveyed by wandering cells into the peri-bronchiolar

* Mavrogordato, A., "Studies in Experimental Silicosis and other Pneumonokoniosis." South African Institute for Medical Research, Johannesburg, 1922, No. XV., p. 16.

† Steuart W., "Radiography in its relation to Miners' Phthisis on the Witwatersrand." Archives of Radiology and Electrotherapy, February, 1923.

‡ The terms "Miners' Phthisis" and "Silicosis" are held by the law of South Africa to mean one and the same disease.

§ Report of the Miners' Phthisis Board, South Africa, 31st July, 1920, p. 49.

‖ Mavrogordato, loc. cit., p. 10.

tissues, in which position the lymphatic system speedily finds itself unable to cope with their removal. These cells now become transformed into fibroblasts, and thus a fibrosis is initiated which becomes more extensive as time goes on. The supervention of an infective process, especially tubercle, greatly accelerates the development of fibrosis, and eventually, owing to the obliteration of alveoli, bronchioles, and capillaries, the lungs become unable adequately to oxygenate the blood."

The extraordinary magnitude of the South African workers' experience in chest radiography causes me to wonder that they have made so little mention of the type of fibrosis such as that found in norite workers.

I assume that they have concerned themselves with the definite silicosis caused by the industry they supervise and have not written of other types of fibrosis such as we find in our metalliferous and coal miners.

PNEUMONOKONIOSIS AT BROKEN HILL.

It was found by the Broken Hill Commission that the fibrosis at Broken Hill was of a type which differs from silicosis produced by siliceous dusts. These authors state that " The condition of pneumoconiosis arising in Broken Hill. . . . differs from that of silicosis produced by the inhalation of siliceous dust—for example, at Bendigo, Cobar or Kalgoorlie—in that there is much less involvement of the portions of the lung directly concerned with the act of breathing.

" It has been found possible to distinguish by means of the X Ray photographs pneumoconiosis arising in Broken Hill from silicosis present in those who have worked in quartz mines as well as in Broken Hill."

" The dust breathed was not that which accumulates in the lungs of the Broken Hill miners."

" The composition of the material which accumulates in the lungs of the Broken Hill miners differs widely from the composition of the dust which must have been breathed. The material in the lungs consist mainly of silicates of an insoluble character. The amount of material which has accumulated in the lungs bears, however, no relationship to the period of time during which the miner had been employed at work underground."

The special character of the X-ray photograph of the Broken Hill pneumonokotic is due to the nature of the dust inhaled by the miners. This dust contains little quartz, probably it did not average 10 per cent. and much silicate. The silicate chiefly present was the mineral rhodonite, a silicate of iron and manganese. The disease at Broken Hill is a fibrous pneumonokoniosis of a mixed type. Radiographically it shows a fine and a coarse type of fibrosis the product of silica and of silicates. It is easy to distinguish the radiograph of a Broken Hill case from one of quartz only or of a silicate such as basalt.

FINE FIBROSIS RESULTING FROM EXPOSURE TO ORTHOCLASE BASALT.

Early in 1925 I examined a man aged 61 who had worked for 25 years in a crusher house and had only been exposed to the dust of orthoclase basalt which contains no free silica. He had worked at farming and then in a quarry attached to the crusher house. I reported this man (thanks to the aid of Dr. W. A. Edwards, Radiographer) as showing an *early stage of fibrosis of the pneumonokotic type.*

Owing to the fine character of the fibrosis we did not consider the stage present as an advanced one for we had not learned to attach as much importance to generalized fine fibrosis as we did to the discrete nodular fibrosis of quartz, until we saw other examples of this condition in men employed in metalliferous and coal mines. This orthoclase basalt worker was destined to die within two years. I failed to get further radiographs or a pathological examination.

Dr. Corner, who attended this man until his death, kindly wrote to me as follows :—

" Kiama, 14th January, 1927.

" I had been acquainted with the late A.B. for two years prior to his death. He had always been of small stature and lean, though he worked hard and seldom had any complaints as to ill-health. In April last or thereabouts he called me in and complained that he had a cold. O.E. I discovered he had a cough with thick viscid expectoration and numerous rhonchi in both lungs but detected nil abnormal. Medicine relieved his cough considerably, and after a week or two he appeared much better, but then returned again and said he had no appetite, and medicine again assisted him considerably for a short time. But the loss of appetite and cough gradually became established and he commenced to lose weight and strength. I kept him under observation for a few weeks. Sometimes the cough was troublesome and the sputum copious, while at other times both would be practically absent for days. However, his appetite remained very poor and by weekly weighings I found that he was slowly but surely losing weight. The rhonchi were always present, sometimes very numerous, sometimes not. I had mentioned the question of pneumonokoniosis to him previously, but as he gradually lost weight I thought possible he may have been tubercular or malignant. There were no sweats, but early in June he got a severe attack of pleurisy with a definite friction rub on right side but made a fairly good recovery, and by the end of June was up again and appeared a little better though still very weak. His sputum was negative for tubercle bacilli. At the end of June I went away on holidays for a few weeks and he was attended by Dr. Edwards. During my absence he had two recurrences of the pleurisy and his general condition became very much worse. Dr. Edwards considered that he was tubercular but sputum tests were again negative. Early in August he had the pleuritic pain and friction rub again for a few days. Shortly after this I received your report stating he had pneumonokoniosis and also your request to examine him again. By this time, however, his condition was so low that there was no prospect of his journeying anywhere. From this time onward. his appetite and weight continued to diminish and gradually the cough ceased to trouble him. There was no more pleurisy, no sweats and very little coughing with practically no expectoration. All sputum

tests had been negative for tubercle bacilli. Numerous rhonchi were always audible in both lungs, but I was able to detect nil else abnormal. Finally on 1st October, 1926 he died. For several months prior to his decease he had marked oedema of both ankles when the feet were dependent for any length of time, extreme dyspnœa on the slightest exertion, and a rapid irregular pulse. In conclusion then he had a pneumonokoniosis and several attacks of pleurisy and the terminal event was a cardiac syncope, but as to any other morbid condition underlying all this I am unable to certify."

His clinical history resembles that of Broken Hill miners who had died of pneumonokoniosis.

FIBROUS PNEUMONOKONIOSIS IN COAL-MINERS IN NEW SOUTH WALES.

The fibrous pneumokoniosis which is met with among coal miners in New South Wales and which probably occurs more often on the South than on the North Coast, is typically a fine type of fibrosis which, in my opinion, is evidence that it is caused by silicates. I have, however, seen radiographs of coal miners which showed a mixed type of fibrosis, and found that such men had a history of shaft sinking or driving in sandstone measures which are not uncommonly associated with our coal measures.

Analysis of a coal dust from the South Coast which may be regarded as typical of the majority of the coal dusts of that region, showed that there was present 13 per cent. of silicates and 1 per cent. of silica.

The association of tuberculosis with this condition of fine fibrosis in our coal miners does not occur as frequently as it does with a fibrosis resulting from sandstone dust. Judging by the number of cases which have been revealed during the past two years one may surmise that there is an appreciable incidence of such disease among our coal-miners. Of the pathology of this condition I have no knowledge—the opportunities for obtaining lungs for examination have yet to occur—but as this disease is compensable it should be possible in the future to study this condition post mortem. The radiographs suggest a dense, very evenly distributed fibrosis.

This year Collis and Gilchrist* have published an article of considerable interest dealing with the effects of dust upon coal trimmers. Writing about the radiographs of cases they say, "The impression gathered from examining these radiographs is similar to, if not identical with, that obtained from examining radiographs of men exposed to a recognised silica dust risk and belonging to an occupational group with an excessive mortality from phthisis.

"The condition is one of some interest; not only is it apparently not due to exposure to silica dust, but mortality records do not indicate the presence of any undue prevalence of phthisis among coal trimmers. Yet the lung shadows are not normal and would be quite compatible with exposure to silica dust risk; they are in accord with the undue tendency, disclosed by the death certificates, to succumb to pneumonia and bronchitis—diseases which are, indeed, always unduly fatal among those exposed to silica dust. The rarity of pulmonary tuberculosis among a group with lungs giving such radiographs is notable, and calls for care in interpreting radiographs.

Discussion.

"These cases are reported as examples in support of an opinion we have been slowly forming after examining radiographs of men occupied in a variety of dusty trades, only some of which present a silica dust risk.

"Just as a blue line on the gums is of the greatest help in detecting lead absorption when a worker is known to be exposed to a lead risk, so a "snow-storm" radiograph is of the greatest help in detecting silicotic fibrosis when a worker is known to be exposed to a silica dust risk. But a blue line on the gums may be caused by other things than lead, and so is not absolutely diagnostic of lead absorption, particularly not when knowledge is lacking of any exposure to a lead risk. Just so a "snowstorm" radiograph may be caused by inhaling other dusts than silica, and is not absolutely diagnostic of silicotic fibrosis, particularly not when knowledge is lacking of any exposure to a silica dust risk.

"When compensation for silicosis is under consideration, the foregoing conclusion is of some import."

They summarise their results, "Clinical observation by X-ray examination discloses that, after years of work, the lungs of coal trimmers are not normal, and exhibit signs similar to those widely regarded as characteristic of silicotic fibrosis."

FINE FIBROSIS OF THE LUNGS OF COBAR MINERS.

Among the radiographs of our sandstone miners we frequently find examples of a fine fibrosis of the lungs of men who worked for some years at the now defunct Great Cobar Mine.

I relate this fibrosis to exposure to the dust of the ore lode which was a cupriferous pyrrhotite. This mineral is a magnetic pyrites, containing 2·5 per cent. of copper.

FINE AND MIXED TYPES OF FIBROSIS AMONG WESTERN AUSTRALIAN AND TASMANIAN MINERS.

By the courtesy of Dr. Robertson, Director of the Commonwealth Division of Industrial Hygiene, I have seen radiographs of miners of Western Australia showing a fine and a mixed type of fibrosis. The fine type of fibrosis is probably related to sericite which is found in quantities greater than quartz in some Western Australian mines. Radiographs of miners of Western Tasmania from Dr. Robertson show a mixed type of fibrosis probably related to cupriferous ores.

* Collis, E. L., and Gilchrist, J. C.: "Effects of Dust upon Coal Trimmers," J.I.H., Vol. X, No. 4, April, 1928, p. 101.

FIBROSIS RESULTING FROM OXIDES OF IRON.

Goadby* has described the pathological appearances of the lungs of two cases of fibrosis of the lung in iron miners. He gives the following pathology of one case :—

"On section the right lung was firm and consolidated, the left lung was somewhat less firm and consolidated than the right, but was not normal. Numerous nodules of fibrotic nature were scattered about the lung and creaked under the knife. There were no tubercular nodules or minor cavities. There was no sign of active tuberculosis. Portions of the cut surface had irregular areas of a red-brown colour, from which, on scraping, a red-brown fluid exuded. This was most pronounced in the right lung. The remainder of the surface was greyish and mottled and very firm on pressure, without the usual spongy and elastic sensation common in a normal lung. The appearance and general physical condition was that of red and grey hepatization of broncho-pneumonia.

"The microscopical examination of a section of the lungs showed :—

"1. Generalised consolidation with round celled infiltration of the alveoli and exudation and occlusion of the bronchioles typical of pneumonia.

"2. Development of excess of fibrous tissues, especially in irregular areas, without the typical close texture and nodules seen in silicosis, which, however, it resembles in other ways.

"3. Excess of dust particles both in the peribronchial tissues and in consolidated areas surrounded and interwoven with fibrous tissue."

Cronin† has dealt with this subject. He considers that the dust inhaled by the iron miners of which he writes contained about 53 per cent. of iron and 13 per cent. of silica.

"The silica is probably present as such and not as a silicate, the iron is present as a sesquioxide.

"Of the hundred drillers examined clinically, 30 per cent. showed well-defined signs of pathological change."

He concludes :—

"1. The inhalation of hematite dust produces certain tissue changes in the lungs of iron ore drillers

"2. Such changes are not localised, but are generalised or diffused throughout both lungs, although the apices are perhaps more affected than the bases.

"3. These tissue changes do not give rise to the pulmonary diseases, *i.e.*, asthma, bronchitis pneumonia and phthisis, which commonly result from dust inhalation, but produce the independent and striking symptom complex which has already been described.

"These deductions are given additional weight by comparison with pathologic research. Clinically the results of hematite inhalation do not resemble those of silica inhalation, but present a unique picture, while the sections obtained by Sir Kenneth Goadby from the lungs of an ironstone miner clearly indicated not only the presence of a considerable amount of iron as shown by differential staining, but also a fibrosis which was essentially general throughout the lungs, finer and quite opposed to the nodular whorled masses of the silicotic lung."

ASBESTOSIS.

Two recently published accounts deal with the fibrous pneumonokoniosis caused by asbestos. There are several earlier accounts of this disease. Asbestos consists of various silicates—magnesium, alumina and iron, and there are many varieties. The trade Italian asbestos is a tremolite asbestos, a silicate of calcium and magnesium; the Canadian is a serpentine asbestos, a magnesium silicate. The South African asbestos has been referred to by Simson‡ in the following terms:—"In the Union of South Africa and Rhodesia there are many asbestos mines, from some of which chrysotile is obtained, but two other interesting varieties are found, namely, crocidolite and amosite. Amosite is a comparatively recent discovery, the chemistry of which has not been completely worked out, but it appears to be somewhat similar to crocidolite in composition. Both these compounds contain a large percentage of ferrous iron. Analysis of four samples of amosite showed between 32 and 44 per cent. of FeO, and eight samples of crocidolite between 16·5 and 40·5 per cent. Up to the present there has been no examination of post-mortem material from cases of death among those working in mills where these minerals are treated. No such material has been made available."

"Chrysotile or serpentine asbestos usually contains 2 to 3 per cent. of FeO isomorphously replacing magnesia. The analysis of Dr. Cooke's case showed 3 per cent. of FeO, and the Rhodesian mineral, according to Mr. A. L. Hall, 2·44 per cent. Dr. McCrae, of the Government Chemical Laboratory Johannesburg, analysed the FeO content of the asbestos used by Dr. Mavrogordato in his animal experiments, and found a much lower percentage—namely, 0·45. Apparently even with very small percentages of FeO the golden yellow bodies are formed in the lungs."

Cooke§ refers to previous cases and describes the case of a woman aged 33 who worked for many years in an asbestos factory. The pathological appearances of the lung are described—the fibrosis was not of the silicotic type. There were tubercular changes. Unusual foreign bodies considered to be asbestos fibres in process of alteration were present. "An X-ray plate showed extensive fibrosis more marked in the right lung."

Simson‡ describes four cases among natives working in an asbestos crushing mill. The fibrosis of one case was referred to. "There was no resemblance to the orderly whorled arrangement and sharp definition of the silicotic nodule."

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* Goadby, K. W.: "Fibrosis of the Lung in Iron Miners," Journal R. Micr. Soc., 1925, p. 432.

† Cronin, A. J.: "Dust Inhalation by Hematite Miners," Journal Indust. Hygiene, Vol. VIII, No. 7, 1926, p. 294.

‡ Simson, F. W., "Pulmonary Asbestosis in South Africa," B.M.J., vol. 1, 1928, p. 885.

§ Cooke, W. E., "Pulmonary Asbestosis," B.M.J., vol. 2, 1927, p. 886.

"The amount of fibrosis in two of the human cases (Cases I and II) was quite definite, and, if due to the presence of asbestos dust, the initial rate of production was rapid when compared with present-day non-infective silicosis on the Rand. It is difficult to state a definite time for the production of an appreciable degree of fibrosis in pure non-infective silicosis, but modern observation tends to show that it is in the neighbourhood of ten years. In Case I a moderately marked fibrosis had taken place after one year of work in the mill, but this was complicated by tuberculosis. It is known that the rate of fibrous tissue production is very much greater in dust diseases complicated by infections, but even allowing for this the connective tissue increase in Case I was rapid. In Case II there was a still more definite fibrosis after two years of work in the mill with no evidence of tuberculosis."

The curious bodies produced by fibres of asbestos undergoing changes are described. There appear to have been no radiographs of these workers.

FIBROSIS DUE TO CEMENT.

American workers* have reported the presence of pneumonokoniosis among workers in a Portland Cement Plant.

They say, "In the presentation of the history records and X-ray pictures of the cement workers we have purposely avoided any attempt at classification of pneumonoconiosis as to stages of development, such as are suggested by Pancoast and the South African workers, and any direct comparison of the pneumonoconiosis found in these workers with that of granite workers. From our observations so far we are not sure that it is possible to compare the X-ray findings in one dusty trade with those in another in which the offending dusts are of an almost entirely different chemical composition. Even when the X-ray pictures are quite similar in several instances, we can not be positive that they express the same character of fibrosis or the same degree of physical impairment of the individual."

In cement works the finished product contains 1 per cent. of free silica and various silicates.

I have seen one case of cement pneumonokoniosis in New South Wales, it was a fine type of fibrosis.

PATHOLOGY OF LUNGS AFFECTED BY SILICOSIS.

To Watkins-Pitchford and Mavrogordato we owe a debt of thanks for their lucid descriptions of the pathology of the silicotic lungs of South African miners. In particular the account of Watkins-Pitchford is very useful, and if one examines the lung of an individual dead of silicosis and tuberculosis and follows the naked eye appearances presented, with the text of Watkins-Pitchford the clarity of his description is manifest.

The stigmata of silicosis and silicosis with tuberculosis may be written of under the headings—

(1) The dust cell.
(2) The simply silicotic nodules.
(3) The sago grains of the pleura.
(4) The fibrotic figures.
(5) The fibrotic consolidation.

(1) *The Dust Cell.*—The dust which finds its way to the lung alveoli is of microbic size. The phagocytosis of inert bodies is the work of a cell—the macrophage or dust cell; its origin is still not agreed upon.

Many, including Mavrogordato, derive this cell from the endothelial tissues. Carleton†, who has recently investigated its origin considers that it is formed from a cubical epthelial cell of an alveolus. Full and interesting histological details are described by these two authorities.

While the origin and evolution of the dust cell is a matter of contention, the role it plays in dust disease of the lungs is agreed upon. As Carleton says, "It is a commonplace that of the finer dust particles inhaled a number fail to be arrested by the cilia and mucus of the air passages. Those which reach the pulmonary alveoli are rapidly engulfed by large and characteristic phagocytes—the dust cells.

The history of the dust cell with its phagocytosed particles has been investigated by Mavrogordato with reference to silica.

‡"Silica particles appear to possess the peculiar property of protecting the cells which have ingested them, both from autolysis and from digestion in the lymph. As a result of this peculiarity when the dust-laden cells have reached the lymphatics they accumulate there and block them. This does not occur with other dusts studied by me—the cells laden with them do not block lymphatics but are dissolved and the dust carried away.

"In the case of silica, but not with other dusts I have studied, the dust-laden cells flock together to form 'pseudo-tubercles' in and immediately beneath the visceral pleura.

§"The dust is taken up by the large mono-nuclear phagocytes, and these dust-laden phagocytes aggregate together forming 'pseudo-tubercles.' These 'pseudo-tubercles' are found on the walls of the alveoli, on the walls of the blood vessels, in and around the pleura and aggregates of dust-laden cells accumulate in the peri-bronchial and peri-vascular lymphatics."

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* Health of Workers in Dusty Trades.—I. Health of Workers in a Portland Cement Plant.—Public Health Bulletin, U.S. Public Health Service, 1928.

† Carleton, H. M., "The Origin of Dust Cells in the Lung," Journal Microscopical Science, vol. 71, 1927.

‡ "Studies in Experimental Silicosis and Pneumonokoniosis," South African Institute of Medical Research, vol. xv, 1922, p. 13.

§ "Contributions to the Study of Miners' Phthisis," South African Institute of Medical Research, vol. xix, 1926, p. 20.

(2) *Simply Silicotic Nodules.*—The dust cells containing silica particles aggregate in the lymphatic channels and connective tissue spaces of the lung to form the "pseudo-tubercles" of Mavrogordato. There follows then the formation of new fibrous tissue which, with the silica particles and adherent pigments give rise to the simply silicotic nodule. This fibrous tissue is the product of the "pseudo-tubercle," each dust cell develops into a fibro-blast. Small adjacent nodules may unite.

"In its final form each nodule is sharply defined from the surrounding tissues and possesses a spherical and full contour. It is usually from 3mm. to 4mm. in diameter and very rarely exceeds 6 mm. So completely do these simply silicotic nodules become encapsuled that the pathologist can often shell them out of the lung like grey or black pearls. After the lapse of many years and in the continued absence of tuberculous infection these nodules tend to disappear—the fibrous tissue becomes absorbed, while such of the minute silica particles as have escaped complete solution eventually find their exit from the body."

In its microscopical appearance the simply silicotic nodule of Watkins-Pitchford shows a sharp differentiation from the normal lung tissue—early it presents a collection of dust cells and various stages of fibrosis are seen until the fibres present a whorled appearance. Mavrogordato has shown how in the presence of an infective process—tuberculous or other—this nodule is not sharply separated from the normal lung tissue but is surrounded by a granulation tissue and that the pigment, which, in the simply silicotic nodule is found in the cells, or fibres, when an infective process occurs is found in unorganised debris or lies free. These simply silicotic nodules are uniformly distributed throughout the lungs and the criteria adopted by the South African Bureau for the diagnosis of silicosis are—

"(1) The lesions must be specifically those of silicosis and must be visible to the unaided eye and palpable to touch.

"(2) The lesions must be present in such numbers that on the average at least one will appear in each 5 cm. squared of the lung substance; provided that silicosis shall be deemed to be present when the visible and palpable lesions which have formed the point of a silico-tuberculosis are limited in number or even single."‡

(3) *The Sago Grains of the Pleura.*—Sago grains are the occurrence of simply silicotic nodules in the pleural lymphatics. These bodies are not usually pigmented.

(4) and (5). *The Fibrotic Figures and Fibrotic Consolidation.*—The stigmata of super-added tuberculosis infection in a lung affected by simple silicosis as evidenced by the presence of simply silicotic nodules, are the fibrotic figures and the fibrotic consolidation of Watkins-Pitchford. His words are precise. "It is, however, of some importance to note that in a man who is the subject either of latent silicosis or a well-developed simple silicosis a super-added tuberculous infection of the lungs does *not* give rise to the familiar lesions of ordinary tuberculosis, and particularly that the characteristic tubercles are conspicuously absent. The only exception to this general statement is that miliary tuberculosis in its familiar form, may very occasionally affect the simply silicotic lung. A tuberculous infection in a lung which is latently or simply silicotic usually produces changes which are distinctive, in fact, pathognomonic of the condition known as tuberculosis with silicosis."

The tissue which is formed as a result of tuberculous infection appears steel gray in colour and consists of common connective tissue chiefly composed of spindle-shaped cells which infiltrates lymph spaces and channels. "To the unaided eye this new tissue appears succulent and steel gray in colour and usually stands out in marked contrast with the pigmented and congested background of the cut surface of the lung. It presents itself in the form of small circles surrounding the divided vessels and as larger and more or less circular outlines or groups of outlines, including lobules or groups of lobules. The areas enclosed within these lobular outlines are more darkly pigmented and are irregularly divided by partitions of the gray tissue. To the patterns thus produced upon the cut surface of the lung affected with tuberculosis with silicosis one has applied the name 'fibrotic figures.'"

The fibrotic figures may be solitary or few in number. The nodules vary from 3 to 8mm. in diameter and when adjacent lobules are involved, masses are produced which Watkins-Pitchford has called "fibrotic consolidations." When the condition is of long standing the former subject of an area of fibrotic consolidation will appear as a dark gray or black, airless, tough, fibrous mass.

PATHOLOGY OF LUNGS AFFECTED BY FIBROUS PNEUMONOKONIOSIS OTHER THAN SILICOSIS.

Unfortunately my opportunities of studying these conditions have been limited. I could find few specimens of lungs in a recent visit to Broken Hill.

The descriptions of the Technical Commission of the pathology of the lungs they examined were made before the lucid accounts of the South African workers were available, and it appears that the lungs of men with a quartz mining history were not considered apart from the lungs of men with no such history.

RADIOLOGICAL TECHNIQUE.

I am indebted to Dr. W. A. Edwards for the following description of his radiological technique. He points out that the varying practices employed by radiologists may cause variation in appearance of radiographs of similar conditions, so that the character of the fibrosis revealed may differ in different hands to such a degree as to render a comparison difficult particularly in the early stages of pneumonokoniosis and tuberculosis.

The standard technique is as follows:—

1. The machine employed is of the interrupterless transformer type.

2. The plate holder is of the vertical type, so that the patent stands up during the exposure and a compression band is used to obviate movement.

‡ Watkins-Pitchford, W. "The Silicosis of the South African Gold Mines, and the changes produced in it by Legislative and Administrative Efforts," Journ. Indus. Hygiene, vol. ix, No. 4, April, 1927.

The vertical position has been found superior to the prone as the weight of the abdominal viscera drags on the thorax and widens the intercostal spaces, allowing a more extensive view of the lung structure to be obtained.

If the prone position is employed the ribs are crowded together and the intercostal spaces are consequently narrowed.

3. The tube employed is of the fine focus type capable of carrying 100 milliamperes. The hot kathode tubes are preferred as they are far more easily controlled than the gas tube.

4. The films are duplitised and are held in cassettes with double intensifying screens. The size of the films employed as a routine are 17 x 14 inches which are more expensive than the smaller, sizes, often used for chest skiagrams, but as they cover the whole thorax showing the apices and bases we think that their use is advisable.

5. The milli-amperage employed is 100 and the time varies from 1/10th to 4/10ths second according to the thickness of the subject. A stabiliser is used to control the current and an electrical timer is employed.

6. The distance of the tube from the plate is 6 feet. At this distance the rays are more parallel and more truly portray the actual changes in the lung fields. Greater distances have been used, but for general purposes we find that a distance of 6 feet gives the most satisfactory results.

7. The position of the patient is the dorso-ventral that is the anterior chest wall is to the plate and the back to the tube. The exposure is made with the breath held in full inspiration.

8. Centering of the tube is an important factor, as a low position of the tube gives a poor view of the apices owing to the ribs and clavicles being crowded together, and in skiagrams taken with a low centred tube many early tuberculous lesions at the apex are not visible.

The tube is centered at the level of the spine of the scapula as we find that this gives a good illumination of the apex above the clavicle.

COMPENSATION LAWS CONCERNING FIBROUS PNEUMONOKONIOSIS IN NEW SOUTH WALES.

The compensation laws of New South Wales have made the subject of which I am writing one of medico-legal importance. It appears to me to be opportune to note the reasons for the opinions I have expressed to the Minister for Health, the Industrial Commission and the Workers Compensation Commission for New South Wales and various interested parties.

For I think it is clear that some felspars, silicates, and other ores (besides silica) readily produce fibrosis of the lungs and that the practice of the Broken Hill Compensation Scheme, which compensates a fibrous disease of the lungs as a pneumonokoniosis not as a silicosis, should extend to all cases of disease except those caused by minerals containing a high percentage of quartz.

Three Acts of Parliament deal with the compensation of fibrous pneumonokoniosis in New South Wales. They are :—

(1) *The Workers Compensation (Broken Hill) Act*, 1920-1927.

This is an Act to provide for a scheme to compensate workmen suffering from pneumonokoniosis or tuberculosis and prevented from resuming employment in the metalliferous mines at Broken Hill.

This scheme applies only to the workmen of the Broken Hill silver-lead mines. The compensation paid to workmen approximates that paid to workmen under the Workmen's Compensation Act, 1926, and is on a higher level than the compensation for workmen who come under the Silicosis Act, 1920, and the scheme of this Act, 1927. The Broken Hill Act followed on the work of the Technical Commission of Inquiry of 1920. The authorities of this inquiry, Drs. Smith, Chapman, Edwards and Wardlaw, called the dust disease found there a pneumonokoniosis because they found that—

> "The condition of pneumonokoniosis arising in Broken Hill . . . differs from that of silicosis produced by the inhalation of siliceous dust, for example, at Bendigo, Cobar, or Kalgoorlie, in that there is a much less involvement of the portions of the lung directly concerned with the act of breathing. It has been found possible to distinguish by means of the X-ray photograph pneumoconiosis arising in Broken Hill from silicosis present in those who have worked in quartz mines as well as in Broken Hill."

They found that, "The material in the lungs consists mainly of silicates of an insoluble character."

(2) *The Workmen's Compensation Act*, 1926.

This Act, which is the general Act for New South Wales, is probably the most liberal in the British Empire. Compensation is provided for any industrial disease (diseases are not scheduled) and all injuries arising in employment or in journeying to and from work. The weekly payments are on a high scale. This Act excludes from its ambit diseases provided for by the Workmen's Compensation (Broken Hill) Act; and diseases which are caused by silica dust. Diseases caused by silica dust were provided for by—

(3) *The Workmen's Compensation (Silicosis) Act*, 1920, which gave authority for a scheme to be put in force to compensate diseases of the respiratory organs caused by silica dust. After a gestatory period of seven years a scheme to cover sandstone workers in the vicinity of Sydney was brought forth and came into force in September, 1927; a further scheme which I devised to apply to workers in the rest of the State (too distant for medical supervision) was not proceeded with.

It will be seen that there are in New South Wales no less than three different Acts (and two schemes depending on two of these Acts) for compensation of fibrous pneumonokoniosis.

(1) *The Broken Hill Act and scheme* dealing with a mixed type of fibrous pneumonokoniosis produced by the mines in a small area.

(2) *The Sydney Sandstone Workers' Scheme* was devised to deal with all the sandstone workers about Sydney, but many sandstone workers have not been placed within its scope. In a sandstone tunnel, for instance, only men working with jack hammers have been brought under the scheme. Boodlers and powder monkeys have been excluded, but both these groups have been grossly exposed to maximal dust conditions in past years and cases of silicosis and tuberculosis are found among them.

3. *The Workmen's Compensation Act*, 1926.—Under this Act, which is State-wide, fibrous pneumonokoniosis (not caused by the Broken Hill mines or by silica dust) is compensable, and the compensation is on a more liberal scale than that provided by the Silicosis Act and scheme. *I have put forward my opinion that all fibrous pneumonokoniosis not due to dust containing over 70 per cent. of quartz should come under this Act.* At the present time coal miners with fibrous pneumonokoniosis have been held by the Workmen's Compensation Commission to benefit by this Act. Despite our three Acts and two schemes which deals with fibrous pneumonokoniosis this industrial disease is by no means always compensable.

The difficulty of drafting equitable compensation schemes for fibrous pneumonokoniosis lies in the fact that this disease is one of gradual onset and may become established three or more years after the causal employment has been abandoned and the employer no longer liable or the industrial activity (*e.g.*, a mine) has petered out. It should be possible to draft a single scheme for the State supported by special rates of insurance for all workers in dusty occupations, provided one insurance office, such as the State Insurance Office, dealt with all such risks. In Queensland certain of the profits of the State Insurance Office are used for subsidising such a scheme.

The present three Acts and schemes under them which differ in the stage of disease compensable and in the rates of compensation, and leave unprotected many workmen, deal with the problem piecemeal, and in an anomalous fashion and could be replaced by a uniform scheme for the State. In these trades or activities where the incidence of the disease is most marked periodical radiographic examinations should be made.

SUMMARY.

The aetiology is discussed of the fine fibrosis of the lungs which is not uncommonly found in metalliferous and coal miners and some workers in other industrial activities in New South Wales.

It is considered that this fine type of fibrosis can in most cases reasonably be assumed to be caused by various silicates.

The term "Silicatosis" is suggested for the fine fibrosis caused by silicates and the term "Siliconosis" for a fibrous pneumonokoniosis of a mixed type.

The type of fibrosis is considered in workers exposed to orthoclase basalt, coalminers, copper miners, and miners in Broken Hill, Western Australia and Tasmania; iron miners, asbestos and cement workers.

The compensation laws of New South Wales relating to pneumonokoniosis are summarised and it is concluded that all fibrous pneumonokoniosis not due to dust containing over 70 per cent. of quartz should come under the Workers' Compensation Act, 1926, and the Workers' Compensation (Silicosis) Act, 1920, which provides compensation for diseases caused by silica dust, should apply only to workers who are exposed to dust containing over 70 per cent. of quartz.

Sydney, September, 1928.

Studies in Industrial Hygiene, No. 14.

Notes on the the Ventilation of Cinema Theatres,

BY

CHARLES BADHAM, Medical Officer of Industrial Hygiene; H. E. G. RAYNER, Physicist Assistant; and H. D. BROOSE, Engineer Assistant, of the Division of Industrial Hygiene, New South Wales.

At the request of the Director-General of Public Health, we have made a survey of the fourteen continuous cinema theatres in Sydney.

During the year, two new continuous theatres were opened, and at the request of the Chief Secretary's Department we investigated the efficiency of the ventilation systems of these theatres.

In this report we have given the data obtained, and the recommendations made by us from the inspection of the sixteen continuous cinema halls.

We have plotted the observations on our comfort curves (see Study in Industrial Hygiene No. 10)* and the results show the practical value of these curves for determining the air movement required to produce comfort at known temperatures and humidities.

In Table I we have given details of the present state of the ventilating machinery in the sixteen continuous cinema theatres. The table shows seating capacity, volume of the theatre, volume per person, situation and aspect, available natural ventilation, plenum ventilation and the calculated number of air changes per hour that it will give, exhaust ventilation, and the calculated number of air changes per hour, plant for the production of local air movement, such as wall or ceiling fans, and remarks mainly with regard to the present state of the plant.

Observations taken at these theatres are shown in Table II. The table shows outdoor and indoor observations of wet and dry bulb temperatures, wet and dry Kata thermometer cooling powers and the air movements computed from the dry Kata readings. The air movements required by our formulæ* to produce comfort are shown in the column next to the computed air movements in the theatre. In addition, the rise in temperature in the theatre above the outside temperatures, the carbon dioxide concentrations in parts per 10,000, and the computed air change from the carbon dioxide readings and from the fan readings is shown. Comfort votes recorded with each set of indoor readings are also shown. The technique detailed in our previous publication (Study in Industrial Hygiene No. 10)* was followed.

The present regulations require eight changes of air per hour, irrespective of the number of cubic feet per person, and we have necessarily framed our reports on this regulation.

1. Only four of the continuous cinema theatres meet the requirements of the present regulations, and the ventilation of the other twelve is below the required standard.

2. The ventilation of the two new theatres, investigated at the request of the Chief Secretary's Department, complies with the present regulations. In one, the instalment and adjustment of the machinery had not been completed, and an accurate estimation of the efficiency of the ventilating plant could not be made until the adjustments are completed. In the other, there are well defined "pockets" in the stalls, in which the air movement was noticeably low and where owing to lack of air movement the rise in temperature is higher than in other parts of the theatre. There are good reasons to believe that during the summer months these parts of the stalls will be uncomfortable.

3. We recommend that the regulations governing the ventilation of cinema theatres should be amended, and that new regulations should be framed based on our work in the theatres* to provide for—

(*a*) an air movement depending on the dry bulb temperature and absolute humidity. (These air movements may be read off from curves plotted by us in our previous report).

(*b*) an air supply depending on the outdoor temperature.

The comfort curves plotted by us in our previous investigation are reproduced in Graph 1 of this report. The graph is divided into five sections, the first section showing the comfort curve for 4 grains absolute humidity, and the following sections showing the comfort curves for 5, 6, 7 and 8 grains absolute humidity. The curves show the air movement required to produce comfort at the stated absolute humidities, for dry bulb temperatures between 60 degrees and 80 degrees F.

We have plotted the observations shown in Table II on this graph. Readings taken when the absolute humidity was between 3·5 and 4·5 grains are plotted on the 4 grain curve; readings taken when the absolute humidity was between 4·5 and 5·5 grains are plotted on the 5 grain curve; and similarly for other humidities. We have used the voting scale described in our Study in Industrial Hygiene No. 10*, so that a comfort vote of 3 is just comfortable and votes less than 3 uncomfortable; votes greater than 3 and less than 4 represent comfortable conditions that should be asked for in all theatres. The votes are the average of votes made by two independent observers, and are printed on the curves alongside the points to which they refer. The points shown ● indicate that the vote was not less than 3 and not greater than 4, our comfort zone. Points shown ○ refer to votes less than 3, and represent uncomfortable conditions.

An inspection of these points reveals—

1. That all points shown ○ are above the curves.
2. That in general the 3·5 votes follow the curve, that the 3 votes are slightly above the curve, and the 4 votes below the curve.

This result is a further indication of the practical value of these curves for determining the air movement required to produce comfort, with known temperatures and humidities.

*Badham, C., Ashelon, C. F., Rayner, H. E. "On the Index of Comfort in the Ventilation of Theatres in Sydney, New South Wales." Studies in Industrial Hygiene No. 10, Report of Director-General of Public Health, 1926.

TABLE I.—Showing, for the sixteen continuous cinema theatres, details of the seating capacity of the theatre, the total volume, volume per person, the situation and aspect, the provisions for ventilation by natural, plenum and exhaust machinery with a special note as to the condition of the machinery at the time of the inspection.

Theatre.	Seating Capacity.			Total Volume-Cubic Feet.	Vol. per Person, Cub. Feet.	Situation and Aspect.	Natural Ventilation.		Plenum Ventilation.			Exhaust Ventilation.			Plant for Local Air Movement.	General Remarks.
	Total.	Section.	No.				Provision.	Remarks.	Plant.	Cubic ft. per Min. per Person.	No. of Air Changes per Hour.	Plant.	Cubic ft. per Min. per Person.	No. of Air Changes per Hour.		
Hoyts' de Luxe.	1,225	Stalls Circle	902 323	189,000	151	Lane on southern wall; westerly aspect.	Two sliding roofs (one over front stalls, one over back stalls).	Cannot be opened in day time or wet weather.	Centrifugal fan in basement; registers on walls in stalls and circle (with humidifier).	10.2	4·15	Plant in basement; registers under seats in stalls and grids over and around circle.	...	...	.....	Exhaust plant out of order for about two years.
Lyric	1,483	Stalls Circle Upper Circle.	786 450 247	289,000	195	Lane on one side; easterly aspect.	Four large shutters on northern wall; two large shutters on eastern wall above circle; five large shutters on eastern wall above upper circle. Cannot be opened in wet weather.	Cannot be used in wet weather or in day time.	Two centrifugal fans (with humidifiers) on roof. Inlets to theatre on roof.	24.0	7.4	.....	...	...	.....	One fan out of order at time of inspection (both fans estimated at approximately the same capacity).
Empress ...	946	Stalls Circle	607 339	141,000	149	Lane on southern wall; easterly aspect.	Two sliding roofs—one over front stalls, one over circle.	Cannot be opened in day time or wet weather.	.....	...	...	.....	...	...	Four ceiling fans over circle; two ceiling fans in stalls under circle; about twenty vent bricks on southern wall.	
Haymarket	1,885	Stalls Circle	1,122 763	269,000	140	Street at back; easterly aspect.	Two large cowl vents in roof.	.....	Centrifugal fan in basement; and registers on walls in stalls and circle.	15·4	6.5	Centrifugal fan in basement with registers under seats in stalls.	15.4	6.5	Two ceiling fans in stalls under circle; three ceiling fans in circle.	Unable to measure capacity of exhaust plant, estimated at same capacity as the plenum plant.
Crystal Palace.	1,000	Stalls Circle	703 197	214,000	214	Lane on one side; westerly aspect.	Movable dome roof over front stalls.	Cannot be used in day time.	Centrifugal fan in basement with registers on walls and floor in stalls and circle.	17.4	4.9	.....	...	...	.....	.....
Lyceum ...	1,634	Stalls Circle	998 636	215,000	162	Buildings on three sides; westerly aspect.	Sliding roof in dome; louvres on top of walls on two sides.	Cannot be used in day time and movable roof not in wet weather; louvres cannot be used in wet weather.	.....	...	...	Exhaust fan in basement (centrifugal); registers under seats in stalls and circle.	19.0	7.0	Ten wall fans in stalls, five ceiling fans and nine wall fans in circle.	.....
Strand	978	Stalls Circle	644 334	129,000	131	Lane on one side; westerly aspect.	Eleven shutters near roof on side, near lane one ventilator in roof.	Cannot be used in day time.	Centrifugal fan in basement (with humidifier), registers on walls in stalls and circle.	20.4	6·5	Centrifugal fan in basement; registers under seats in stalls and circle.	20.4	6.5	Two ceiling fans in circle.	Unable to measure capacity of exhaust fan but was estimated the same capacity as the plenum fan.

TABLE I.—Showing for the sixteen continuous cinema theatres, details of the seating capacity, &c.—*continued.*

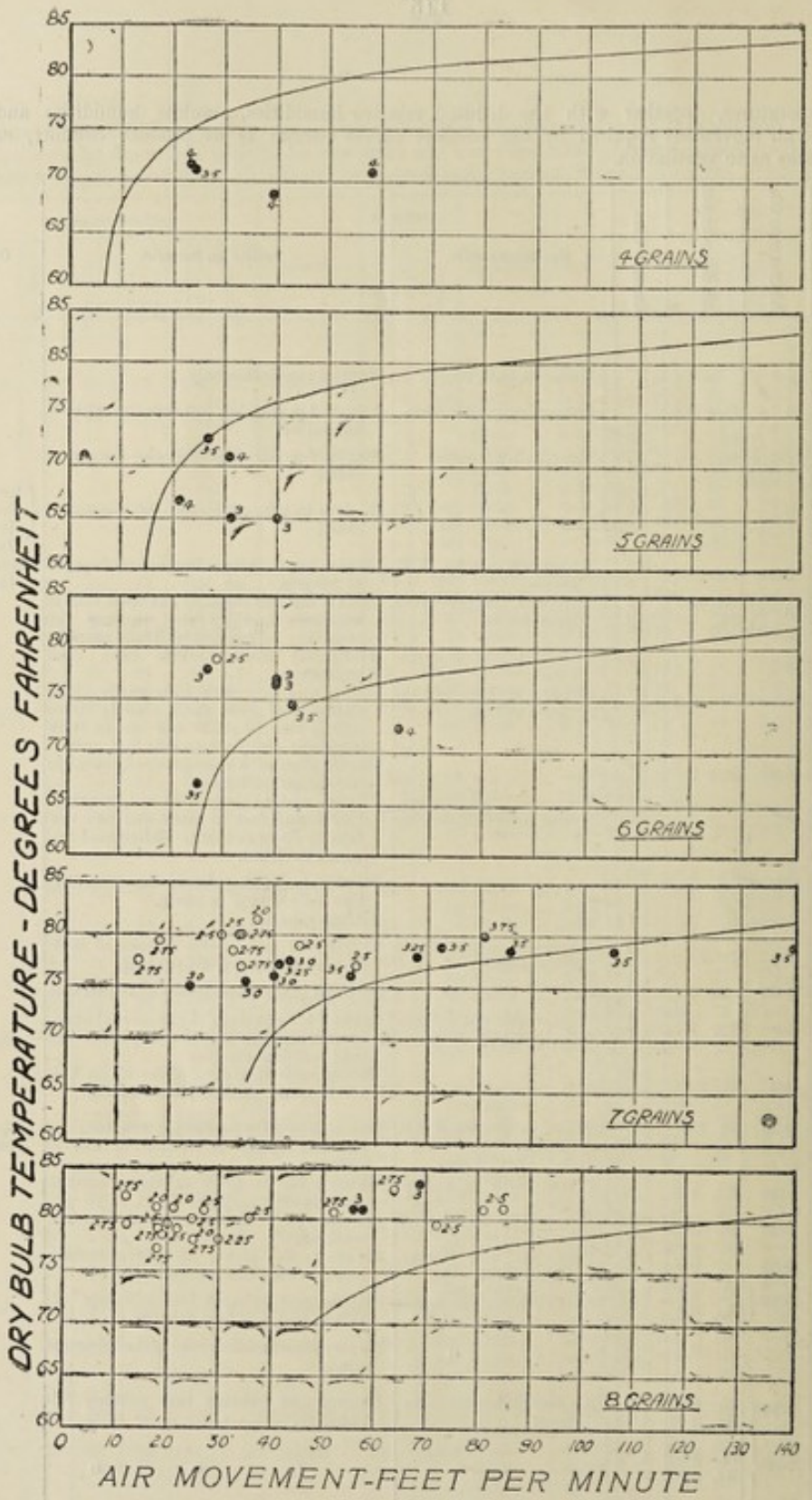
Theatre.	Seating Capacity.			Total Volume-Cubic Feet.	Vol. per Person, Cub. Feet.	Situation and Aspect.	Natural Ventilation.		Plenum Ventilation.			Exhaust Ventilation.			Plant for Local Air Movement.	General Remarks.
	Total	Section.	No.				Provision.	Remarks.	Plant.	Cubic ft. per Min. per Person.	No. of Air Changes per Hour.	Plant.	Cubic ft. per Min. per Person.	No. of Air Changes per Hour.		
Blaille ...	807	Stalls Circle	534 353	111,000	125	Westerly aspect.	Four sliding roofs over circle; cowl vents in roof over stalls.	Cannot be used in day time or wet weather.	Centrifugal fan in basement with humidifier, registers on wall in stalls and circle.	5.0	2.4	Fan in basement with registers on floor under seats and in walls near floor in stalls.	...	...	.....	Exhaust plant has not been working for some months.
Piccadilly ...	605	Stalls Circle	386 220	85,500	141	High buildings on three sides; westerly aspect.	Thirty-two large grids in ceiling under roof.	Always open to atmosphere.	Centrifugal fan in basement with registers on walls in stalls and circle.	23.8	10.1	Centrifugal fan in basement with registers under seats; two propeller fans in roof over circle.	17.7	7.6	Two wall fans in front of circle; one large ceiling fan in stalls under circle.	.....
New York ...	625	Stalls Circle	356 239	68,000	98	Buildings on three sides; easterly aspect.	Two sliding roofs, one over front stalls, one over circle; two windows at back.	Cannot be used in day time or wet weather.	Two propeller fans in roof over screen (with humidifier).	...	4.0	Two propeller fans at back of theatre.	...	...	Two ceiling fans in stalls under circle; two wall fans in circle.	Unable to measure the plenum fans. Exhaust fans out of order. Results estimated.
Arcadia ...	705	Stalls Circle	407 357	106,500	139	do.	One cowl vent in roof.	.....	.....	...	...	Two propeller fans at back of theatre.	...	...	.....	Exhaust fans have never been in operation since this theatre has been reconstructed (i.e., about 12 months).
The Kings ...	884	Stalls Circle	600 284	87,000	99	Buildings on three sides back to street. Entrance to east through long corridor.	Two large louvred vents in roof; two windows at back of circle.	Open at all times; windows cannot be opened in day time.	.....	...	...	One 9 in. sirocco fan exhausting with one register over circle.	...	2.0	No ceiling or wall fans; four large Punka fans over circle.	Unable to measure capacity of exhaust fan (estimated not more than 2 changes per hour).
Majestic ...	1,197	Stalls Circle	697 400	200,700	184	Lane on eastern wall and at back; northerly aspect.	Eight shutters on eastern wall to lane on southern wall.	Cannot be used in day time or wet weather.	Centrifugal fan at back with register on walls in stalls and circle.	17.0	5.6	Exhaust fans with registers under seats.	17.	5.6	.....	Unable to measure exhaust fan but estimated at the same capacity as plenum fan.
Australian ...	1,000	Stalls Circle	774 226	157,000	157	Street on eastern wall; northerly aspect.	One sliding roof; four shutters on southern wall to street.	do.	Have a duct system fitted but fan and motor have been removed; registers on walls in stalls and circle.	...	...	Have a duct system fitted with registers under seats, but fan and motor have been removed.	...	...	One ceiling fan over circle.	Exhaust and plenum fan have not been in use for two years.
Regent ...	2,228	Stalls Circle	... ...	550,000	240	Lane on side; easterly aspect.	.....	.....	One centrifugal fan on roof. Inlets through ceiling.	31.4	8.0	Centrifugal fan under circle registers under seats in stalls and circle.	12.7	3.24	.....	Exhaust fan not in proper working order. One inlet to fan blocked off owing to motor overheating.
Capitol ...	3,500	Stalls Circle	... ...	770,000	256	Streets on three sides; northerly aspect.	.....	.....	Two centrifugal fans on roof. Inlets through ceiling.	34.4	8.85	Centrifugal fan in basement; registers under seats in stalls.	18.2	4.67	.....	.....

TABLE II.—Showing for the sixteen continuous cinema theatres all observations made of outdoor and indoor dry-bulb
The table also includes for indoor conditions, dry kata and wet kata cooling powers, and calculated air movements,
determinations in parts per 10,000, air change computed from carbon dioxide and fan readings, comfort votes

Test No.	Date.	Outdoor Readings.						Theatre.	Attendance.		Position in Theatre.	Time.	Indoor Readings.							
			Dry Bulb, °F.	Wet Bulb, °F.	Relative Humidity, per cent.	Absolute humidity, grs. per cub. ft.	Dew Point, °F.		Percentage House.	No. of Persons.			Dry Bulb, °F.	Wet Bulb, °F.	Relative Humidity, per cent.	Absolute Humidity, grs. per cub. ft.	Dew Point, °F.	Kata. Wet.	Kata. Dry.	Kata. Air movement, ft. per min.
												p.m.								
1	12-1-28	Day	78·0	69·5	65	6·6	65	Empress ...	25	50	Gallery ..	3·20	79	68	57	6·0	62	6·8	3·4	29
2										200	Stalls ...	3·55	78	68	60	6·2	63	8·0	3·5	27
3	13-1-28	,,	77	70	71	7·1	67	Hoyt's ...	33	...	Gallery ..	3·26	78	70·5	69	7·1	67	8·8	4·5	68
4											Stalls ...	2·54	79	71	68	7·2	67	8·8	4·3	73
5	17-1-28	,,	80	72	68	7·4	68	Haymarket	50	566	Circle ...	1·45	80	70	61	6·7	65	10·0	4·2	81
6										40	Stalls ...	2·20	80	72	68	7·4	68	7·4	3·3	34
7											Circle ...	2·25	80	70	61	6·7	65	...	6·9	280
8	17-1-28	,,	80	72	68	7·4	68	Lyric	35·2	400	Stalls ...	3·10	78·5	70·5	67	7·0	66·5	7·4	3·6	32
9										65	Circle ...	3·45	80	72	68	7·4	68	7·0	3·2	30
10										60	Upper Circle.	4·15	81	73	68	7·7	70	7·1	2·8	21
11	18-1-28	,,	78	69	63	6·4	64	Crystal Palace.	70	600	Stalls ...	2·20	79	71	68	7·2	67	12·6	5·4	143
12										100	Circle ...	3·15	80	72	68	7·4	68	8·0	3·3	34
13	19-1-28	,,	76	68·5	68	6·8	65	Piccadilly	50	230	Stalls ...	4·03	78·3	69	62	6·6	65	8·0	5·0	106
14			75·5	68	68	6·6	64·5			70	Circle ...	3·20	78·5	70	66	6·8	65·5	8·8	4·7	86
15	23-1-28	,,	77	70	71	7·1	67	Lyceum ...	100	1,000	Stalls ...	3·30	79·5	71	66	7·1	67	...	2·9	18
16			76	68·5	68	6·6	65			600	Circle ...	2·45	81·5	72	63	7·2	68	...	3·1	37
17	27-1-28	Night	74·5	70·5	82	7·5	68·5	Empress ...	51·5	425	Stalls ...	8·40	79	74·5	81	8·6	73	5·4	3·1	22
18										60	Circle ...	8·05	77	71	74	7·4	68	6·0	4·4	56
19	27-1-28	,,	74·5	70·5	82	7·5	68·5	Hoyt's.....	70·5	770	Stalls ...	9·50	80	75	79	8·6	73	...	3·3	36
20										96	Circle ...	9·25	78	...	...	...	...	5·4	3·4	25
21	2-2-28	Day	78	73	79	8·1	71	New York	11·5	65	Stalls ...	2·55	78·5	72	73	7·8	69·5	6·3	3·14	19
22										15	Circle ...	3·45	81	73·5	70	8·1	70·5	11·1	3·59	56
23	3-2-28	,,	78·5	73	77	8·1	70·5	Strand ...	44	386	Stalls ...	2·30	80	73	72	7·9	70	5·5	3·06	25
24										45	Circle ...	3·00	81	74	72	8·2	71	7·1	3·58	58
25	3-2-28	,,	78·5	73	77	8·1	70·5	Piccadilly	34	...	Stalls ...	3·05	83	74	65·5	8·0	70	...	3·2	64
26	6-2-28	,,	79·5	71	66	7·2	67	Rialto	6·8	50	Stalls ...	2·05	77·5	71	73	7·5	68	6·8	4·05	43
27										10	Circle ...	2·02	77·5	71	73	7·5	68	6·6	3·27	14
28	6-2-28	,,	79·5	71	66	7·2	67	Arcadia ...	5·2	40	Stalls ...	3·02	79	71	68	7·2	67	6·3	3·92	45
29										10	Circle ...	3·45	78	71·5	73	7·7	69	6·6	3·6	30
30	6-2-28	Night	75	70·5	80	7·5	68	Lyceum ...	69	880	Stalls ...	9·15	79·5	73	73·5	8·1	70·5	7·0	4·05	72
31										250	Circle ...	9·45	81	74	72	8·3	71	7·2	3·94	81
32	6-2-28	,,	75	70·5	80	7·5	68	Rialto	6·8	50	Stalls ...	8·03	77	71	74	7·4	68	6·6	3·91	34
33										10	Circle ...	9·0	77	71·5	77	7·8	69	5·35	3·39	18
34	7-2-28	Day	71	71	71	7·5	68	Lyric	30	354	Stalls ...	4·0	80·5	73·5	72	8·1	70·5	6·77	3·02	27
35										50	Circle ...	2·30	79·5	73	73·5	8·1	70·5	6·77	3·08	20
36										40	Upper Circle.	4·30	82	73	65	7·7	69	5·4	2·75	12
37	8-2-28	,,	72·5	79	71	7·5	68	Kings	20·4	150	Stalls ...	2·30	79·5	73·5	75	8·3	71	5·3	2·85	12
38										30	Circle ...	3·30	83·5	74·5	66	8·1	70·5	7·4	3·12	69
39	9-2-28	,,	79	73	75	8·0	70	Majestic ...	14·6	150	Stalls ...	2·45	80·5	74	74	8·4	71·5	6·3	3·64	52
40										10	Circle ...	3·45	81·25	73·75	75·5	8·0	70	6·13	3·98	85
41	10-2-28	,,	82	74·5	70·5	8·4	71·5	Australian	17	150	Stalls ...	2·10	79	74	75	8·0	70	5·34	3·0	18
42										20	Circle ...	2·40	81	75·5	75·5	9·0	73·5	4·6	2·66	18
43	10-2-28	Night	76	67	62	6·1	62	Haymarket	66	1,010	Stalls ...	8·20	77	70·0	71	7·2	67	6·32	4·1	41
44										230	Circle ...	8·40	75	69·5	76	7·2	67	6·32	4·0	24
45	10-2-28	,,	76	67	62	6·1	62	Lyric	60	890	Stalls ...	9·15	76	69	70	7·0	66	7·03	4·3	40
46										125	Circle ...	9·45	75·5	68·5	70	7·1	66·5	...	4·35	35
47										100	Upper Circle.	10·15	76	69	70	7·0	66	...	4·65	54
48	4-5-28	,,	65	60	75	4·9	...	Capitol ...	90	2,700	Stalls ...	8 35	72·5	64	63	5·5	...	15·4	4·6	27
49											Circle ...	9·12	71	62	60	4·9	...	15·4	5·1	31
50	9-5-28	,,	68	63	76	5·7	...	Capitol ...	100+	3,100	Stalls ...	8·10	76·5	68·5	67	6·5	...	9·3	4·2	40
51											Circle ...	8·30	72·5	65·5	69	5·9	...	14·2	5·8	64
52											Stalls ...	9·0	77	67·5	61	6·1	...	8·5	4·1	40
53											Circle ...	9·55	74·5	66	64	5·9	...	10·3	4·7	43
54	27-4-28	,,	66·5	54·5	44·5	3·1	...	Regent ...	100	2,278	Stalls ...	8·20	71·5	59	46·5	3·8	...	15·4	4·6	23
55											Circle ...	8·45	71	58	45·0	3·7	...	13·6	5·9	58
56											Stalls ...	9·05	71	58	45·0	3·7	...	12·6	4·8	24
57											Circle ...	9·50	69	57·5	49·0	3·7	...	18·1	5·7	39
58	1-5-28	,,	60	55	73	4·2	...	Regent ...	60	1,360	Stalls ...	8·15	65	59	70	4·7	...	22	6·3	31
59											Circle ...	8·35	66·5	60	68	4·9	...	20·4	5·6	21
60											Stalls ...	8·50	65	60	75	5·1	...	23·7	6·7	40
61											Circle ...	9·20	67	63	80	5·8	...	18·1	5·7	25

and wet-bulb temperatures, together with the deduced relative humidities, absolute humidities and dew points, the attendance, the air movement required by our comfort curves (Graph I) to produce comfort, carbon dioxide recorded, and remarks as to ventilation.

Air Movement Required, ft. per min.	Rise in Temp. over outside Temp., °F.	CO_2 parts per 10,000 Average for Theatre.	Air Change by CO_2.	Air change by Fan.	Comfort Vote.	Weather Remarks.	Ventilation Remarks.	General Remarks.
87	+1	5	5·3	0	2·5	Moderate N.E. breeze ...	Natural ventilation only.	
75	0				3			
85	+1	6·2	4	Pl. 4·15	3·25	Strong southerly breeze	Plenum fan working full capacity without humidifier.	
100	+2				3·5			
113	0	4·85	7·4	Ex. 0	3·75	Light E.N.E. breeze ...	Plenum fan working—Exhaust fan out of order.	
120	0			Pl. 6·5	2·75			
113	0				5·0			
91	−1·5	7·5	2·4	0	2·75	,, ,,	No fans in operation—One blower out of order.	Reading No. 7 taken 3 from No. 5, immediately under ceiling fan.
120	0				2·5			
135	+1				2·0			
100	+2	6	6·5	Pl. 4·9	3·5	Moderately strong N.E. breeze.	Plenum fan working—Dome in roof opened at 3·0 p.m.	Average comfort vote in stalls 3.
120	+2				2·5			
86	+2·5	5	14	Ex. 10·1	3·5	Dull and muggy—very light breeze.	Plenum fan full capacity; exhaust fans in basement and on roof running full capacity; ceiling and wall fans running.	
88	+2·5			Pl. 7·6	3·5			
110	+3	11·1	4·5	0	2·25	No perceptible air movement.	Mechanical plant broken down (belt broken).	
150	+5				2			
120	+4·5	5·12	10	0	2	cloudy; muggy, and inclined to rain.	Sliding roof over circle only partly open; sliding roof over stalls closed; three ceiling fans in circle and one in stalls working; exit door on side lane open.	
75	+2·5				2·5			
135	+5·5	5·87	9·5	Pl. 4·15	2·5	,, ,,	Plenum plant with humidifier full capacity; sliding roof not open.	
100	+3·5				2·75			
95	0	4·9	3·7	0	2·75	Very hot and muggy, with light N.E. breeze.	Plenum and exhaust fans not working; two ceiling fans in stalls and two wall fans in circle running; sliding roof and windows closed.	
140	+2·5				3·0			
125	+1·5	4·5	13·3	Pl. 6·5	2·5	,, ,,	Plenum fan and exhaust fans running; two ceiling fans in circle.	
140	+2·5			Ex. 6·5	3			
140	+4·5	...	...	Ex. 10·1 Pl. 7·6	2·75	,, ,,	All fans running.	
88	+2	4·12	2·9	Pl. 2·4	3·0	Warm and sultry; strong S.E. breeze.	Sliding roof and louvres at back of circle closed; plenum plant running.	
88	+2				2·75			
101	+ ·5	5·7	1·05	0	2·5	,, ,,	No plant running; no means of ventilation.	
90	+1·5				3·25			
121	+4·5	8·2	4·9	Ex. 7	2·5	Warm, but not oppressive; light N.E. breeze	Exhaust fan running; dome on roof open; shutters on top of roof open; all ceiling and wall fans running.	
140	+6				2·5			
87	+2	4·81	1·8	Pl. 2·4	2·75	,, ,,	Sliding roofs closed; louvres at back of circle open; plenum plant running.	
90	+2				2·75			
140	+2·5				2·5			
122	+1·5	5·66	3·46	Pl. 7·4	2·5	Warm, with strong S.E. breeze.	One blower with humidifier running; no shutters open; other blower out of order.	CO_2 readings taken only in stalls.
140	+4				2·25			
126	+·5	5·5	·49	Ex. 2	2·75	Warm, with light N.E. breeze.	Exhaust fan in circle running; punkah fans running in circle.	
140	+4·5				3			
140	+1·5	5·12	2·24	Pl. 5·6	2·75	Hot, muggy, strong N.E. breeze.	Plenum fan working; exhaust fans not working.	
140	+2·25				2·5			
110	−3	4·5	4·33	0	2·5	Very hot and muggy, slight breeze.	No mechanical plant; no natural ventilation; ceiling fan not running.	
140	−1				2·0			
75	+1	6·2	8·65	Pl. 6·5	3·25	Mild—strong S.E. breeze	Plenum and exhaust fans running; all ceiling and wall fans running.	
59	−1			Ex. 6·5	3·0			
64	0				3·0			
61	− ·5	6·07	6	0	3·0	,, ,,	No mechanical plant running; all shutters open.	
63	0				3·5			
30	7·0	6·5	7·74	Pl. 8·85	3·5	No perceptible air movement.	Plenum and exhaust fans running full capacity.	
22	6·0			Ex. 4·67	4			
70	8·5				3			
38	4·5	7·3	7·05	Pl. 8·85	4	,, ,,	,, ,, ,,	
62	9·0			Ex. 4·67	3			
46	6·5				3·5			
12	5				4			
11	4·5	6·25	9·1	Pl. 8	4	Light westerly breeze ...	,, ,, ,,	
11	4·5			Ex. 3·24	3·5			
9	2·5				4			
14	5				3			
17	6·5	5·5	7·45	Ex. 3·24	4	Moderate westerly wind	,, ,, ,,	
17	5·0			Pl. 8	3			
25	7·0				3·5			



GRAPH I.—Comfort curves showing air movements required to produce comfort at absolute humidities of 4 to 8 grains per cubic foot for dry bulb temperatures between 60 degrees and 80 degrees F. The plotting of these curves is described in detail in our Studies in Industrial Hygiene No. 10.

We have plotted the observations taken at the sixteen cinema theatres (Table II of this report) on the comfort curves. Conditions judged by us as comfortable (votes 3 or greater) are shown thus ● ; conditions judged by us as uncomfortable (votes less than 3), thus ○

The uncomfortable conditions are all above the curves, indicating inadequate air movement, and the conditions judged by us as comfortable lie close to the curve, the votes of comfort (3) mainly above the curves and the votes of comfort (4) all below the curves.

The results emphasise the practical value of these curves for determining the air movement required to produce comfort with known temperatures and humidities.

SECTION II.

1927.

1.—Metropolitan Combined Sanitary Districts of Sydney.

Report of the Medical Officer of Health for the Year 1927.

J. S. Purdy, D.S.O., M.D., C.M.(Aberd.), D.P.H.(Camb.), F.R.S.(Edin.), F.R.San.I.

To the Director-General of Public Health.

Sir,

I have the honor to report on the health conditions of the Combined Sanitary Districts of the Metropolitan Area of Sydney for the year 1927. Both the death-rate and the infantile mortality rate were lower than those of the previous year.

On the 31st December, 1927, the population of the Metropolitan Combined Sanitary Districts was 1,258,720, an increase during the year of 37,390 equivalent to 3·00 per cent; the death rate was 9·93 per thousand of the population; and the infantile mortality was 55·8 per 1,000 births.

Summary of Vital Statistics for 1927.

Metropolitan Combined Area, 442,981 acres (692½ square miles).
Population (estimated to the middle of the year) 1,239,070.
Births, 24,015 (birth rate, 19·38).
Deaths, 12,304 (death rate, 9·93).
Death of infants under 1 year of age, 1,341 (infantile mortality rate 55·8 per 1,000 births).

Staff.

Office of the Metropolitan Medical Officer of Health.—Dr. J. S. Purdy, Metropolitan Medical Officer of Health. *Clerk*, Henry F. Reeve. *Inspector*, Hugh W. Wormal, R.S.I. *Nurse Inspector*, M. Fletcher, R.S.I. *Messenger*, L. Peterson.

City of Sydney.

Clerical Staff.—Chief Clerk, E. W. Adams, R.S.I. *Senior Clerk*, G. D. Maitland. *Clerks*, H. E. Carthew, W. H. Wallace, G. Grayson, W. F. Clarke. *Typistes*, Miss A. Crichton, Miss E. Ohlsson. *Messengers*, J. Thompson and J. Mealing. *Warrant Officer*, D. A. McLachlan.

Inspectorial Staff.—Chief Inspector, W. O. Vogwell, F.I.S.E., M.R.S.I. *Health Inspectors*, W. D. McNeill, R.S.I., A. B. Cook, R.S.I., A. Webb, R.S.I., D. Thompson, R.S.I., E. H. Dowling, R.S.I., C. A. Calf, R.S.I., H. R. Byrne, R.S.I., J. E. Edwards, M.R.S.I., J. C. Crichton, R. S.I., E. S. Furniss, R.S.I., J. H. Martin, R.S.I., F. N. Kite, R.S.I., N. J. Courtney, R.S.I. *Meat and Pure Food Inspectors*, J. Kaine, R.S.I., J. P. Collier, R.S.I., H. Warner, R.S.I. *Lady Inspector*, Miss I. Bloomfield, A.T.N.A., A.R.S.I. *By-laws Inspectors*, J. Dickson, S. L. Black, H. Horton, M. Keane, M. O'Reilly, R. McGarrigle.

Disinfectors.—J. Maroc, J. Whelan.

Ratcatching Staff.—J. Hayes (Leading hand), J. Gibson, J. Benson, J. McGinn, J. C. Walker, W. Drury, C. N. Abrahams.

Suburban Inspectors.

Suburban Municipalities.	Health Inspector.
Alexandria	A. Freestone, A.R.S.I.
Annandale	A. S. Campbell, S.E.
Ashfield	T. E. Anderson, R.S.I.
Balmain	A. Sinfield, R.S.I. A. V. Lloyd, R.S.I.
Bexley	A. G. Baker, R.S.I.
Botany	G. Holloway, R.S.I.
Burwood	J. Ferguson.
Canterbury	H. J. Ferrett, R.S.I. S. P. Meale, R.S.I.
Concord	C. Massey, R.S.I.
Darlington	J. Griffiths, R.S.I.
Drummoyne	H. H. Stewart, R.S.I.
Eastwood	E. W. Fawcett.
Enfield	F. E. Moore, R.S.I.
Erskineville	R. Bell, R.S.I.
Glebe	W. P. Young, R.S.I.
Homebush	G. Bressington.
Hunter's Hill	C. Holdsworth.
Hurstville	H. S. Doig, R.S.I.
Kogarah	C. W. Bardsley, R.S.I.
Lane Cove	F. T. Limbert.
Leichhardt	A. Pritchard, R.S.I.
Manly	H. S. Scot Young, A.R.S.I.
Marrickville	E. Brownell, R.S.I. R. E. Hughes.

SUBURBAN INSPECTORS—*continued.*

Suburban Municipalities.	Health Inspector.
Mascot	H. J. Robinson.
Mosman	R. C. Nankervis.
Newtown	J. Kirkpatrick, R.S.I. T. W. Chambers, R.S.I.
North Sydney	C. T. Trickett, R.S.I. P. St.J. Neville, R.S.I. A. Tedder. R. Baird.
Paddington	M. F. Gallagher, R.S.I. J. Prendergast, R.S.I.
Petersham	J. Doswell, R.S.I. B. R. Packer, R.S.I.
Randwick	J. A. Wauchope, R.S.I. P. J. Mackie, R.S.I. A. J. Roper, R.S.I. W. H. Woods, R.S.I.
Redfern	J. Forgie, R.S.I. H. Bathis, R.S.I.
Rockdale	J. V. Tyrell, R.S.I. W. A. Jackson, R.S.I.
Ryde	J. Ainsworth.
St. Peters	F. Fitzpatrick, R.S.I.
Strathfield	H. F. Stewart, R.S.I.
Vaucluse	M. B. Kirwin.
Waterloo	W. J. Colhoun, R.S.I.
Waverley	J. Fitzpatrick, R.S.I. J. V. Smith. L. Minkie, R.S.I.
Willoughby	E. Corrigan, R.S.I. A. S. Norris, R.S.I.
Woollahra	L. E. Howlett, R.S.I.
Ku-ring-gai Shire	S. Luckett, R.S.I.
Auburn	W. Copeland, A.R.S.I.
Bankstown	G. Thompson, certificate.
Cabramatta and Canley Vale	E. H. Mortimer.
Dundas	G. Winter, R.S.I.
Ermington and Rydalmere	E. Gillies.
Hornsby Shire	A. D. Griffiths, T.C.C.
Lidcombe	J. Bell, R.S.I.
Liverpool	T. Laing.
Parramatta	C. Membry, R.S.I.
Holroyd	T. Haigh, R.S.I.
Fairfield	E. H. Way.
Warringah Shire	E. T. Starr, T.C.C.

POPULATION.

Population.—The Metropolitan Combined Sanitary Districts for purposes of health administration consist of the Metropolis and Extra-Metropolitan District.

The Metropolis proper or "Sydney and Suburbs" includes the City of Sydney, forty municipalities and Ku-ring-gai Shire.

The Extra Metropolitan District is separately dealt with statistically and includes twelve municipalities and two shires.

The population of the Metropolitan Combined Sanitary Districts at the end of 1927 was 1,258,720, the increase during the year being 37,390, equivalent to 3·00 per cent. The mean population was 1,239,070. The estimated population for 1950 at an annual rate of increase equivalent to that of last year would be 2,118,690. By calculation on the last decennial increase of population it would be 3,293,720, calculated (with logarithms) by geometrical progression on the known population for 1917 and 1927.

Metropolis Proper (Sydney and Suburbs).—The population was estimated by the Government Statistician to be 1,101,190 on 31st December, 1927, of which the City of Sydney contained 109,640, an increase of 1,760, and the Suburbs 991,550, and increase of 28,920 for the year. The annual rates of increase between the last four Census was 2·33 per cent. from 1891 to 1901, 2·69 per cent from 1901—1911, and 3·60 from 1911 to 1921. The annual rate of increase for twenty years up to 1921 was 3·15 per cent.

The mean population of the metropolis for 1927 was 1,085,080. The instances in which population figures as estimated by the Government Statistician have been altered in this report are in the case of the municipalities of Lidcombe, Hunter's Hill and Leichhardt, in the first of which there is a large Government Institution for the aged and infirm, and in the two latter of which there are large mental hospitals—Gladesville, 1,189 average daily number; Callan Park, 1,174. As in previous reports, deaths among the inmates of these hospitals have been distributed to the districts in which they have previously resided. Consequently, whilst including the inmates in the total population for the Metropolis, it was necessary to exclude the inmates of these hospitals from the estimate of the population of the municipalities in which they are situated.

Extra Metropolitan District.—The estimated population was 157,530 on the 31st December, 1927, an increase of 6,710. Mean population exclusive of benevolent homes and mental hospitals, 146,430.

Births.

Metropolis.—The Government Statistician's report shows that the number of births registered in the metropolis proper during the year 1927 was 20,588, equivalent to a birth rate of 18·97 per 1,000 of population. Of the total 10,576 were males and 10,012 females, the proportion being 105 males to 100 females. The number of births was 899 below that of the previous year. The birth rate for 1927 was the lowest recorded for the Metropolis. As a general rule, the birth rate declines as the standard of comfort, convenience and earning power of the community increases.

The number of ex-nuptial children born during the year was 1,194 or 5·80 per cent. of the total births, equivalent to 1·10 per 1,000 of the population which rate is 10·7 per cent. below the average of the previous five years. Of these children 78 per cent. were born in public institutions.

Extra Metropolitan District.—Three thousand four hundred and twenty three births were registered during the year, equivalent to 23·38 per 1,000 of the population. Included in the total were 160 ex-nuptial births, or 4·7 per cent of the total, equivalent to ·09 per 1,000 of the population.

Table I.

Showing Population, Density of Population, and certain Death-rates in the Municipalities of the Metropolitan Combined Sanitary Districts for 1927, including deaths which have occurred in General Hospitals, Special Hospitals for Consumption, and Hospitals for the Insane. Deaths occurring in Hospitals in the Metropolis have been distributed to their proper districts before calculating these rates.

Municipality.	Estimated Mean Population, 1927	Mean Density of Population to the acre.	Death Rate per 1,000 of Population.				
			All Causes.	Diarrhœal Diseases, including Enteritis.	Epidemic Diseases.	Tuberculosis of Respiratory System.	All Tubercular Diseases.
City of Sydney	108,720	33·5	12·68	·20	·25	·75	·87
Alexandria	10,180	9·7	10·41	·39	·39	·68	·68
Annandale	12,940	37·4	12·44	·23	·77	·61	·61
Ashfield	38,420	18·8	11·11	·85	·62	·39	·44
Balmain	32,760	33·5	10·74	·24	·27	·51	·51
Bexley	18,380	9·6	6·63	·27	·16	·32	·38
Botany	7,030	3·3	8·53	·84	·14	·42	·42
Burwood	18,470	16·7	10·44	·43	·59	·54	·70
Canterbury	62,540	7·6	8·33	·33	·27	·62	·67
Concord	19,620	7·2	6·16	·10	·20	·40	·40
Darlington	3,660	67·8	9·28	·27	·27	·00	·00
Drummoyne	26,190	13·4	8·74	·30	·50	·34	·38
Elstwood	2,690	·9	10·74	·00	·74	1·48	1·48
Enfield	12,780	7·6	8·99	·46	·46	·39	·54
Erskineville	7,580	40·8	9·23	·52	·39	·26	·26
Glebe	23,020	44·4	10·42	·21	·65	·43	·60
Homebush	2,890	4·9	15·22	·69	·69	1·38	1·38
Hunter's Hill	9,180	6·5	10·45	·21	·43	·54	·65
Hurstville	18,820	3·1	10·36	·37	·42	·63	·63
Kogarah	25,480	5·4	8·24	·23	·31	·43	·43
Lane Cove	13,570	5·3	5·74	·00	·14	·29	·36
Leichhardt	30,850	26·7	10·46	·38	·38	·42	·51
Manly	24,680	8·8	8·30	·16	·36	·16	·20
Marrickville	45,440	24·1	9·26	·02	·02	·41	·45
Mascot	12,550	5·6	8·84	·47	·63	·47	·71
Mosman	23,810	11·1	7·42	·04	·32	·24	·24
Newtown	28,440	59·3	11·81	·14	·45	·49	·59
North Sydney	53,480	21·2	8·64	·21	·27	·64	·70
Paddington	26,820	63·7	11·58	·07	·17	·66	·70
Petersham	27,520	32·4	9·86	·25	·25	·54	·61
Randwick	68,210	8·0	8·35	·16	·43	·30	·39
Redfern	24,100	59·7	11·64	·45	·53	·53	·57
Rockdale	33,420	6·6	7·13	·14	·26	·20	·23
Ryde	22,180	3·2	7·42	·18	·63	·22	·31
St. Peters	13,530	15·0	8·79	·43	·65	·43	·43
Strathfield	11,240	6·3	7·48	·00	·26	·17	·17
Vaucluse	6,470	8·1	12·14	·00	·00	·46	·46
Waterloo	11,880	14·4	9·96	·58	·49	·79	·79
Waverley	48,920	22·4	9·36	·18	·55	·36	·42
Willoughby	39,590	7·2	8·07	·25	·43	·40	·42
Woollahra	32,200	17·1	6·77	·12	·34	·43	·49
Ku-ring-gai Shire	24,830	1·2	8·40	·04	·20	·48	·56
Total Metropolis	1,085,080	.....	9·50	·26	·35	·47	·53
Extra Metropolitan Municipalities.							
Auburn	18,100	(On account of the population being confined to small areas with large unpopulated spaces surrounding.)	7·70	·38	·21	·38	·38
Bankstown	18,020		8·42	·21	·44	·82	·88
Cabramatta and Canley Vale	4,250		10·10	·00	·94	·47	·47
Dundas	4,990		6·21	·60	·40	·40	·40
Ermington and Rydalmere	2,030		46·74	5·41	·49	3·14	3·41
Fairfield	7,090		11·28	·56	1·12	·28	·28
Granville	17,140		10·90	·75	·46	·40	·63
Holroyd	12,670		8·19	·23	·78	·46	·54
Ingleburn	1,510		4·63	·00	·00	·00	·00
Lidcombe	18,900		29·36	·71	·49	2·27	2·47
Liverpool	5,940		14·11	·00	·67	·00	·00
Parramatta	16,570		15·13	·24	·48	·60	·84
Hornsby Shire	19,040		9·62	·46	·31	1·14	1·20
Warringah Shire	14,290		7·00	·21	·14	·42	·42
Total	155,590	.....	12·12	·41	·46	·73	·84
Total combined Metropolitan Sanitary Districts	1,240,580	.....	9·99	·28	·33	·51	·57

* The Government Statistician's return (1,279,070) does not include Ingleburn.

DEATHS.

The recorded deaths in the metropolis for 1927, after correction and including those for institutions totalled 10,418, equivalent to a rate of 9·60 per 1,000 of the population. The number of children under one year of age who died was 1,161 or 56·4 per 1,000 births.

In the year 1922, the general death-rate of 8·16 per 1,000 and the infantile mortality rate of 56 per 1,000 births was not only the lowest ever recorded in the metropolis, but gave to Sydney the proud distinction of having the lowest death, and one of the lowest infantile mortality rates of any city in the world with a population of over 500,000. In 1923 the death rate was 9·6, and the infantile mortality 63·9. In 1924 the rates were 9·28 and 57·2 respectively. In 1925 the rates were 9·03 and 57. In 1926 the rates were 9·3 and 61·2.

The number of persons aged 65 and over who died in 1927 was 3,839 or 36·8 per cent. of the total deaths. Of these 100 were aged 90–94, nine were 95, five 96, three 97, one 100, one 101, and one 102.

Diseases of the Heart.—An analysis of the chief causes of death in the metropolis shows that the group diseases of the heart, again occupies the premier position, accounting for 1,778, or a rate of 161 per 100,000.

In 1913, with a mean metropolitan population of 710,100, there were 653 deaths ascribed to diseases of the heart, giving a rate of 92 per 100,000. In 1914 the rate was 98; in 1915, 122; in 1916, 122; 1917, 116; 1918, 119; 1919, 122; 1920, 119; 1921, 117; 1922, 115; 1923, 133; 1924, 132; 1925, 143, and in 1926, 146. From the above figures it will be seen that there has been a progressive increase in the death rate from diseases of the heart.

In Sydney in 1903 heart diseases formed 8 per cent.; in 1913 nearly 9 per cent.; in 1923 and in 1926 15 per cent.; and in 1927 as much as 17 per cent. of the total deaths.

As pointed out in a previous report in comparing the death rates in Sydney with those from Glasgow, the apparent increase of diseases of the heart might be ascribed to what Dr. Chalmers called the result of denudation, a process akin to what the geologist means by that term. Some diseases, without being necessarily more prevalent, have become more prominent among the prevailing causes of death owing to differences in the rate of movement.

As to sex, there were 872 deaths from heart disease among females to 906 among males.

With regard to the rheumatic affections, the great congener of heart disease, the group of diseases including chronic rheumatism, chronic arthritis, rheumatoid and osteo-arthritis, and gout with rheumatic fever, only accounted for 40 deaths or 3·6 per 100,000. Of these deaths 26 were due to acute rheumatic fever, 17 of which, 9 males and 8 females, occurred between 5 and 19 years of age. There were two deaths from rheumatic fever between 30 and 40 years of age.

Under 25 years of age there were 37 males and 36 females died from heart disease. From 25 to 40 years there were 29 males to 38 females died therefrom. From 40 to 75 years there were 496 deaths of males to 372 deaths of females from diseases of the heart. Occupation is the main factor in the difference in the rates in men and women.

There is a wide field for propaganda to make the public realise that heart disease, degenerative changes in the arteries and the (of recent years) frequent diagnosis of high blood pressure, are to some extent preventable by a campaign against syphilis and alcohol, the elimination of lead poisoning and the prevention of over-fatigue both in work and play of men over fifty.

Those attaining 40 years of age should submit to medical examination, and if thereafter they do not make it a birthday event should at least have an overhaul on the completion of each decennial period of life. Insurance companies find that it is of benefit to both their funds and their clients to encourage medical examination with a view to warning people and keeping them fit.

Cancer.—Perhaps the disease most dreaded, with a toll of 1,120 deaths in the metropolis, and 177 in the extra metropolitan area, comes next on the list of killing diseases; 521 males and 372 females died from cancer in the metropolis in 1927; 60 to 70 years of age was the most fatal period in both sexes.

As to the site of the disease and the association therewith of chronic irritation as a determining factor, it is noted that only 3 females died from cancer of the buccal cavity (mouth) in contrast to 59 males so affected. This strongly suggests smoking as a possible source of irritation, and a warning to men to immediately seek advice with regard to any sore on the lip or tongue. Cancer of the female genital organs and of the breast caused 240 deaths of women over 30 years of age.

Pneumonia, as in previous years, follows as the third most important cause of death with a total of 914. From broncho-pneumonia the deaths of males were 140 to 138 females. After 30 years of age there were 303 males to 171 females died from pneumonia (other). Inhalation of dust in certain occupations and indulgence in alcohol rather than exposure in a climate such as ours are suggested as the main factors causing the difference in sex incidence in the second half of life.

Bright's Disease (acute and chronic) claimed 588 victims. Acute nephritis (including eight unspecified under 10 years) only accounted for 15 males and 14 females; chronic nephritis accounted for the deaths of 312 males and 247 females. Between 45 and 70 years there were 171 deaths in males from nephritis to 123 females. The excess of deaths in males may be ascribed to occupation and to over-eating, especially of meat.

Cerebral Hæmorrhage accounted for the deaths of 264 males to 302 females, the total of 566 being an increase of 46 on that of the previous years.

Pulmonary Tuberculosis.—In 1927, according to the Government Statistician, there were, in the metropolis, 519 deaths from tuberculosis of the respiratory system. In previous years in compiling this annual report it has been necessary to correct the figures for the metropolis by adding the deaths in institutions outside the metropolis, including Waterfall Sanatorium, of those who previously resided in the metropolis.

From the beginning of 1927 the Government Statistician has allocated deaths to the locality in which the diseased permanently resided. In 1926, corrected for deaths in Waterfall Sanatorium and other institutions outside the metropolis, there were 575 deaths from pulmonary tuberculosis. The reduction of the mortality from pulmonary tuberculosis during the past thirty years may be credited to some extent to the intensive propaganda on the prevention of tuberculosis, instructions given in Sanatoria, better

housing, increased wages, shorter hours of labour, better feeding, and more appreciation of living and sleeping in the open air. Long before the end of the present century if the present rate of decrease is maintained, tuberculosis should be as rare as typhus fever is to-day.

Epidemic Diseases.

Measles.—There was a marked decrease in the number of deaths from measles, which only accounted for two deaths in 1927 in contrast to 45 in 1926, an average of 23 for the five years preceding that year. Both the deaths were of female infants, one a month and the other a year old.

Scarlet Fever.—There were 73 deaths from scarlet fever in 1927. This was an increase of 31 on the number for the previous year, which was six times the average for the preceding five years. To get similar numbers of deaths from Scarlet fever in the metropolis we had to go back to 1915, 1916, and 1902, 1903. On the estimated mean population of 1,085,080, the death rate per thousand works out at ·006 or 6 per 100,000 of population in contrast to 20 per 100,000 in England where the death rate for scarlet fever has fallen from 1·2 in the sixties of last century to ·02 per 1,000 in 1924.

Diphtheria.—There were 67 deaths from diphtheria in 1927, 10 more than in 1926, and two above the average for the previous five years.

Whooping Cough accounted for the deaths of 52 males and 57 females (109) in 1927, 73 in 1926 and 124 in 1925, when there was a distinct increase of 48 per cent. on the average of 84 for the previous five years. Under 1 year of age in 1927 there were 39 males to 31 females died from whooping cough; under 5 years of age the deaths were equal to 54 for each sex. One woman died of whooping cough at the age of 74 years. Were there more co-operation between the baby health centres, the hospitals and the district nurses in these days of treatment with special vaccine, one should not have so many deaths from this desease. This is one reason why the co-ordination of the work of district nurses, school nurses, and nurses at baby welfare centres should be co-ordinated into community health centres, one feature of which would be intensive propaganda for the protection of the pre-school child, who as far as organised care by institutions is concerned is nobody's bairn. Now that we have pre-natal clinics, maternal clinics, post natal supervision and baby clinics, we ought to bridge the gap between the baby clinic and the school clinic. Health centres similar to those established by Dr. Heiser, at Manila, in the Philippines, which I have twice had the privilege of visiting, seem to me to meet all requirements by co-ordinating the various units and securing unity of command.

Influenza in 1927 with 71 deaths to its credit, showed a decrease of 70 on the record for the previous year, which was 36 above the average of 105 for the previous five years.

Infantile Paralysis caused 1 death in contrast to 6 for the previous year.

Epidemic Cerebro-Spinal Meningitis—8 deaths, the average being 9 for the previous five years.

Lethargic Encephalitis accounted for 15 deaths in contrast to 25 deaths in 1926, and an average of 16 for the previous five years.

Typhoid Fever, with 19 deaths in 1927, showed a decrease of 4 on the toll for the previous year when the decrease was 41 per cent. on the average of 39 for the previous five years.

The infectious diseases to show decreases were measles, influenza, tuberculosis, typhoid, infantile paralysis, epidemic cerebro-spinal meningitis and encephalitis lethargica. Scarlet fever, diphtheria, and whooping cough showed increases.

Diabetes accounted for 160 deaths, an increase of 26 on the number for 1926 and an increase of 14 on the average of the five years previous thereto. As noted in previous years the majority of the deaths occurred in the sixth decade of life, later on the average than in England and the United States. Previously I have emphasised the sex incidence of this disease in so far as it has been a more frequent cause of death among women than men in Sydney. The usual incidence in England and the United States was in the ratio of 3 men to 2 women, but in Sydney the reverse obtains. In 1927 the deaths were from diabetes, 113 females, 47 males. In 1924, 99 females to 70 males; 1925, 80 females to 53 males; 1926, 87 females to 53 males. As a predisposing cause of diabetes is said to be nervous strain and worry, and the disease is more common in those not engaged in manual labour, I suggested that possibly the absence of domestic help was a factor in the relatively unusual high incidence among elderly women in Sydney

Diarrhœa and Enteritis accounted for 208 deaths of children under 2 years, a decrease of 136 on the record of the previous year, which also showed a decrease of 13 per cent. on the average of 395 for the previous five years. As noted last year, this is the most gratifying feature one has to record, especially in view of the fact that the 78 deaths from diarrhœa and enteritis over 2 years of age did not show any marked decrease from the average of 84 for the five years previous to 1926. The work of Baby Clinics undoubtedly is a feature in reducing gastro-enteritis in children under 2 years.

Maternal Mortality.—One regrets to record an unfortunate return to the fatal 41 figure for the preventible disease, puerperal septicæmia, whereas for the previous four years one was pleased to record a reduction. There were 30 deaths in childbirth from puerperal septicæmia in the metropolis in 1926, of which 16 were in mothers under 30 years of age. The reduction was 27 per cent. below the average of 41 for the previous five years. Of the 41 deaths from puerperal septicæmia in 1927, six were in cases following abortion and miscarriage. Thus there were strictly speaking only 35 actual deaths in childbirth from puerperal septicæmia. In 1927 there were 121 deaths from other puerperal diseases, an increase of 11 on the number for 1926. There were 31 deaths from puerperal albuminuria and convulsions, in contrast to 26 therefrom the previous year and 34 in 1925. Puerperal hæmorrhage caused 13 deaths, 2 less than in the previous year and 5 less than in 1925. " Other accidents of labour " were credited with 11 deaths, 4 more than in the previous year, when the number was actually half that of 1925; 101 deaths of women in the metropolis either in or actually after childbirth, gives a death rate in childbirth, or immediately associated therewith, of 4·9 per 1,000 births, slightly above that of last year, 4·6, the lowest yet recorded; 10 deaths from ectopic gestation, 8 from accidents of pregnancy, and 33 from illegal operations, are not included in the above figures. It is interesting to note the maternal mortality rate in the metropolis, as pointed out in my paper in the *Medical Journal of Australia* in 1923, contrary to the experience in most countries, remains higher than in the country centres. The more intensive training of the future practitioners, increased provision of lying-in facilities, and, above all, increased prematernity supervision, are the factors by which one expects to secure a reduction in the future.

Infantile Mortality.—The deaths of infants under one year of age in the metropolis, as recorded by the Government Statistician during 1927 numbered 1,161, whilst the births numbered 20,588, giving an infantile mortality rate of 56·4 per 1,000 births. Whereas in 1926 one recorded with regret that the rate was 2·3 per cent. above the average of 59·8 of the previous five years, it is with pleasure one records that for 1927 there was a decrease of 2·2 per cent. on the average of 58·6 of the previous five years. The decrease was actually 4·8 per 1,000 below the 61·2 of the previous year. The actual average infantile mortality for the last five years—including 1927, was 59·06, the average infantile mortality for the previous five-yearly period 1918–1922 was 67·0. The years 1919 and 1920 were years of high infantile mortality, being 79·4 and 74·2 per 1,000 births. From 1904, synchronising with the attention directed to a reduction of infant mortality and the visitation of mothers by nurse inspectors of the City Council, and later of the Public Health Department, there was a progressive decline in infant mortality from 98 to 62 per 1,000 births in 1918. It is interesting to note that in my first annual report as District Health Officer of Auckland, New Zealand, I had to record an infantile mortality of 97·2 per 1,000 births for Auckland City and Suburban Boroughs in 1907. As a matter of actual fact, Dr. J. M. Mason, the Chief Health Officer for New Zealand, sent Dr. Agnes Bennett to Sydney to study the means by which my predecessor as Metropolitan and City Health Officer, Dr. Armstrong, had succeeded in reducing the infantile mortality rate. In 1927, Auckland had an infantile mortality rate of 40, and the whole of New Zealand 38. When I made my first annual report on the health of the Metropolis of Sydney for 1913, the infantile mortality rate was 78·3 per 1,000. By 1918 the rate was down to 62·7 per 1,000 and had actually been 59·8 in 1917. During the years previous to 1914 an investigation of all fatal cases showed that the incidence of gastro-enteritis was highest in artificially-fed infants. The proportion of entirely breast-fed children found on first visits in 1904 was 72·2 of all those visited; in 1911 it had risen to 82·5 per cent.; in 1913 to 90·4 per cent.; and in 1914 to 93·2 per cent. The increased percentage in the year 1913–1914 was ascribed to the fact that the children were seen on an average at an age of a fortnight younger than in the previous years, as a result of the introduction of the £5 baby bonus.

Artificial feeding increased in proportion to the age of the child. Every effort should be made to co-operate with the Director of Maternal and Infant Welfare to extend the work of the Baby Health Centres, to teach girls in school, and to institute further compulsory courses of training for a few hours at least each month after leaving school. In this regard I recommend, as the corollary to compulsory cadet training, compulsory service for girls. In New Zealand in 1909 when compulsory service for boys was introduced, I also put forward a scheme for compulsory service for girls. In the Tasmanian Health Amendment Act, 1911, I managed to get the following clauses (which one can commend to this State) inserted :—

1. The Governor may from time to time make regulations *inter alia* :—
   (1) Providing for, prescribing and regulating courses of instructions for females—
      (*a*) In hygiene generally;
      (*b*) In subjects concerning the health and welfare of women and children, and in particular the nurture, care and feeding of infants,
      and for examinations to be held, and for the granting and issuing of certificates of knowledge or merit and of medals to candidates passing such examinations.
2. The Minister may from time to time:—
   (1) Appoint instructors, lecturers and examiners for the purpose of this section.
   (2) Decide upon the places where, and the times when, any examination shall be held.

During the winter of 1911 a class for women and girls over 16 years of age was held at the Technical School, Hobart, and a course of twelve lectures was given by myself.

In New Zealand, following the recommendation of the Commission in 1910, scientific exercises and physical drill were introduced into the schools, and in some cases special instructors were recommended to work in co-operation with medical inspectors. The drills, with graduated exercises, were compulsory during short periods each day.

The Committee advised that before every lesson three to five minutes should be devoted to breathing exercises and other simple physical exercises, and not less than three of these short lessons should be taken every day in the open air.

The drill was recommended so as to prevent monotony, that it be varied with organised games such as basket ball, with lessons in First Aid, Life Saving, and Swimming.

The idea was to encourage character formation, including discipline, self-restraint, a sense of duty to others and to the State.

For the encouragement of the idea that physical development in boys and girls is largely a matter of individual responsibility, it was suggested that badges be awarded to prefects and class monitors for combination of moral character, efficiency in physical exercises, and good influence exercised in various parts of the school life.

The same drill was to be prescribed for both boys and girls under 12 years of age, but those of that age and upwards were to receive different training.

After 12 years of age girls should receive once a week special exercises, including abdominal exercises, balance movements, and breathing exercise in the supine position. Instruction is recommended in elementary physiology, within the range indicated by the preliminary note on physiology in the English Board of Education Syllabus, and in personal hygiene.

Special attention to care of the teeth and the mouth, cleanliness, importance of good habits in eating and drinking, and the value of fresh air and cleanliness in the home, a modified first-aid and home nursing course, with special attention to the latter subject, is recommended. The principles of plain cooking should be taught practically, with special regard to the price of goods used, to the utilising of cold meat and vegetables, and means of avoiding waste. Where possible, housewifery should be taught in a hostel or flat set apart for the purpose.

In all matters the director and the inspector will act in conjunction on the one hand with the officers of the Education Board, and on the other hand with the medical inspectors of schools.

Of the deaths in 1927 associated with infant mortality the most marked decrease was from diarrhœa and enteritis, from which there were 163 deaths, 112 less than in 1926. Of the total of 1,161 deaths in the

first year of life, no less than 459 occurred in the first week, and a total of 613, or more than half, in the first month. In countries where there has been a general reduction in infantile mortality, there has been little change in the death rate in the first month of life. Holland, with its system of state and municipal midwives, is said to be an exception in this regard. Even in New Zealand there has been little reduction in the first month, although there has recently been a decrease. Of deaths from prematurity, congenital debility, injury at birth, and other diseases peculiar to early infancy, 373 out of 496 dies during the first week.

TABLE 2.—(*a*) Showing Deaths of Children under 1 year per 1,000 births from 1880 to 1927, and (*b*) Deaths of Infants in the Metropolis from various causes 1917–1927.

(*a*)—Infantile Mortality per 1,000 Births, 1880–1927.

Year.	Deaths of Children under 1 year per 1,000 births.	Year.	Deaths of Children under 1 year per 1,000 births.	Year.	Deaths of Children under 1 year per 1,000 births.	Year.	Deaths of Children under 1 year per 1,000 births.
1880	192	1892	130	1904	98	1916	68
1881	162	1893	147	1905	89	1917	59
1882	183	1894	134	1906	84	1918	62
1883	163	1895	131	1907	96	1919	79
1884	172	1896	139	1908	82	1920	74
1885	187	1897	129	1909	81	1921	63
1886	173	1898	153	1910	82	1922	58
1887	141	1899	120	1911	71	1923	64
1888	152	1900	109	1912	76	1924	57
1889	172	1901	120	1913	78	1925	57
1890	135	1902	112	1914	69	1926	61
1891	148	1903	116	1915	72	1927	56

(*b*)—Showing Deaths of Infants under 1 year of age in the Metropolis from various causes, 1917–27.

Cause of Death.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	1927.
Measles	3	8	1	20	3	1	6	2	1	8	1
Whooping-cough	19	26	17	121	27	24	24	16	68	37	70
Diphtheria	14	14	6	11	1	10	12	5	10	10	8
Influenza	2	3	42	6	7	1	9	4	6	3	5
Cerebro-spinal meningitis	6	5	3	2	1	3	2	6	2	5	3
Tuberculous meningitis	5	8	4	1	9	8	2	3	1	4	4
Other tuberculous diseases	...	4	1	3	5	2	2	1	2	3	2
Meningitis	6	12	8	7	14	10	19	19	12	15	17
Convulsions	27	20	22	22	18	15	11	13	12	25	19
Other nervous diseases	4	1	6	8	4	1	2	3	1	8	4
Bronchitis	22	21	18	26	20	21	29	17	18	10	13
Pneumonia	95	102	124	126	101	132	129	138	132	97	146
Other respiratory diseases	6	...	8	12	6	2	2	4	3	1	5
Diseases of the stomach	11	12	8	11	12	6	6	5	5	6	8
Diarrhœa and enteritis	279	222	411	443	385	257	407	224	191	248	163
Intestinal obstruction and hernia	11	10	19	10	17	7	8	9	9	15	5
Bright's disease	2	3	3	...	2	2	...	5	...	1	1
Prematurity	307	351	409	440	379	362	379	382	354	386	313
Other developmental diseases	333	337	307	319	332	351	299	237	282	287	285
Accident	10	11	10	12	9	7	10	13	11	7	13
All other causes	50	55	56	58	52	57	47	156	66	67	76
Total	1,212	1,225	1,483	1,658	1,414	1,279	1,405	1,262	1,186	1,243	1,161

An analysis of the mortality shows that 71 infants died of gastro-enteritis between the ages of 6 and 12 months, half the number for 1926; 63 died in the third, fourth and fifth months, 24 in the second month, and 5 in the first month.

The deaths of infants from gastro-enteritis, as a rule, are related to the mean monthly temperature, the maximum temperature, and the rainfall. In 1927 the monthly incidence was:—January, 29; February, 11; March, 11; April, 7; May, 9; June, 4; July, 1; August, 4; September, 9; October, 2; November, 14; December, 27. Only in January, February, March, and December was the mean monthly temperature over 68 deg.

The highest rainfall was in April and the lowest in November. There is not much to be inferred from this except that nearly a third of the deaths occurred in the summer months, from the beginning of November to the end of March. The increase of flies in these months, when the temperature and humidity are such as to encourage their multiplication, probably accounts for more enteritis at this season, or, at least, is a contributing factor.

TABLE 3.—Table showing for the Metropolis the population, number of deaths, and the death-rate per 1,000, together with deaths of children under 1 year and the infantile death-rate per 1,000 births during the last twenty years:—

Year.	Number of Deaths.	Ratio per 1,000 Living.	Deaths of Children under 1 year.		Year.	Number of Deaths.	Ratio per 1,000 Living.	Deaths of Children under 1 year.	
			Total.	per 1,000 Births.				Total.	per 1,000 Births.
1908	6,036	10·32	1,220	82·7	1918	7,862	10·02	1,225	62·7
1909	6,149	10·27	1,261	81·6	1919	11,907	14·69	1,483	79·4
1910	6,365	10·36	1,329	82·0	1920	11,449	12·21	1,852	73·9
1911	6,973	10·90	1,238	71·1	1921	8,276	9·07	1,414	63·0
1912	7,681	11·37	1,530	76·0	1922	8,043	8·16	1,239	56·0
1913	7,938	11·18	1,608	78·3	1923	9,351	9·65	1,405	63·9
1914	7,603	10·26	1,452	69·7	1924	9,185	9·29	1,418	56·8
1915	8,189	10·81	1,516	72·6	1925	9,377	9·15	1,255	57·0
1916	8,156	10·68	1,428	68·5	1926	10,220	9·70	1,315	61·2
1917	7,518	9·75	1,212	59·8	1927	10,407	9·59	1,161	56·4

Deaths from Accidents.—There has been a still further unfortunate increase in the number of fatal accidents.

In 1927 there were 620 fatalities in the metropolis, an increase of 128 on the 492 which occurred the previous year, which showed an increase of 25 per cent. on the average number of fatal accidental deaths of the previous five years. In 1927 there were 39 deaths from burns, 25 males and 14 females; deaths from drowning, 77 males, 22 females. The large increase over the 25 deaths of the previous year was due to the catastrophe of the sinking of the Sydney ferry "Greycliffe" in Sydney Harbour. The deaths of 52 males from accidents on railways and tramways; 208 from vehicles and horses (an increase of 67 on the number in 1926) may, as to the latter, be due to the serious and ever-increasing congestion in the main arteries of traffic.

Sydney may justly be proud of the life-saving organisations on her beaches, which keep down the number of drowning fatalities. The St. John Ambulance Association and the St. John Ambulance Brigade and the Ambulance Transport Board also do excellent work.

It is estimated that 65 per cent. of accidents are due to negligence, lack of thought, and, above all lack of appreciation of danger.

The training in first-aid of the Boy Scouts, the Girl Guides, the Junior Red Cross, and, above all, the work of the St. John Ambulance Association, and the inculcation of the ideas of safety-first by the campaigns of the Railway Commissioners and our excellent police force should be encouraged.

Meteorology.

The following table compiled from information supplied by the Commonwealth Weather Bureau, Sydney, shows that the mean tempertaure of the air in Sydney during 1927 was 62·6 deg. F., which is 0·5 lower than the mean of sixty-nine years' observation.

An examination of the monthly means shows that the mean temperature was above the average during only the months of July, August, and October. In the previous year the monthly means were above the average from January to July, and in September, as well as in August and October. In 1927 the monthly means were below the average in January, February, April, May, June, September, November and December.

January and February were the warmest months of the year, June was the coldest.

The rainfall for the year was 1·1 inch above the average of sixty-nine years.

The heaviest monthly rainfall was during April, 18·58 inches; the lowest in December, 0·52 inches.

In view of Sir Leonard Rogers' recent observations on "Climate and the forecasting of epidemics," as illustrated by the incidence of small-pox in India, when the incidence was high in certain States, such as the Punjab and the United Provinces, but very low in Bengal, where he showed that it varied directly with the absolute humidity and not with the temperature, it would be interesting to study the incidence of influenza outbreaks, measles, scarlet fever and other diseases in Australia in relation to the humidity.

Even in England where, owing to lack of vaccination, smallpox has increased sixtyfold in the last six years, the lowest absolute humidity (which was in December) was followed by an increase in the number of cases in January. The reverse was also true, and the lowest number of cases was in the month following the lowest absolute humidity. Relative humidity and absolute humidity were almost equal.

With regard to plague epidemics, these depended on the saturation deficiency computed from the absolute humidity and the temperature; when this was low, plague was low in the following year. When the absolute humidity was low cholera died out in the cold weather.

In Sydney in previous reports I showed the relationship of the incidence of gastro-enteritis to temperature and rainfall.

Research into the relationship of climate to the incidence of epidemics such as plague and influenza in Sydney would probably show some definite relationship to humidity.

Table 4.—Temperature and Rainfall, 1927.

	Temperature in Shade.			Departure of Mean Monthly Temperature from Average of 69 Years. (+ or —)	Rainfall.		
	Max. Extreme.	Min. Extreme.	Mean for Month.		Number of Rainy Days.	Amount, Inches.	Departure of Amount from Average of 69 Years. (+ or —) In Inches.
January	89·8	55·9	70·7	— 0·9	14	4·11	+ 0·44
February	97·5	56·5	70·5	— 0·8	9	0·82	— 3·43
March	100·5	54·5	69·3	0·0	17	3·69	— 1·30
April	84·0	47·2	63·5	— 1·2	18	18·58	+ 13·25
May	78·2	42·2	58·7	— 0·1	8	1·63	— 3·60
June	70·3	39·5	53·2	— 1·5	15	4·18	— 0·57
July	72·8	39·6	54·0	+ 1·3	4	0·30	— 4·56
August	77·8	38·9	55·5	+ 0·4	5	0·30	— 2·71
September	80·9	42·0	57·0	— 2·2	11	3·06	+ 0·21
October	98·2	42·2	63·9	+ 0·4	17	3·48	+ 0·64
November	82·7	52·8	65·9	— 1·1	11	6·06	+ 3·25
December	91·8	56·2	68·9	— 1·2	9	2·35	— 0·52
Means and totals for the year 1927	.....	.....	62·6	— 0·5	138	48·56	+ 1·10

Infectious Diseases.

Table 5.—Showing cases of Scarlet Fever, Diphtheria and Typhoid Fever notified in the metropolis and extra metropolitan districts, together with attack rates per 1,000 of the estimated mean population, year 1927.

Municipality.	Scarlet Fever.				Diphtheria.			Typhoid Fever.		
	Estimated Mean Population.	Cases Notified.	Attack Rate per 1,000 Living.	Death Rate per 1,000 Living.	Cases Notified.	Attack Rate per 1,000 Living.	Death Rate per 1,000 Living.	Cases Notified.	Attack Rate per 1,000 Living.	Death Rate per 1,000 Living
Metropolis.										
City of Sydney	108,720	279	2·56	·06	209	1·92	·02	10	·09	·01
Alexandria	10,180	37	3·63	·29	15	1·46	·00	2	·19	·00
Annandale	12,940	78	6·02	·00	34	2·62	·31	...	·00	·00
Ashfield	38,420	206	5·36	·13	83	2·16	·02	5	·13	·02
Balmain	32,760	140	4·27	·06	35	1·06	·06	2	·06	·00
Bexley	18,380	106	5·76	·00	41	2·23	·00	...	·00	·00
Botany	7,030	29	4·12	·14	9	1·28	·00	1	·14	·00
Burwood	18,470	92	4·98	·05	36	1·95	·11	2	·11	·00
Canterbury	62,540	556	8·89	·07	104	1·66	·04	13	·28	·00
Concord	19,620	78	3·97	·00	28	1·42	·00	2	·10	·00
Darlington	3,660	10	2·73	·00	10	2·73	·27	1	·27	·00
Drummoyne	26,190	135	5·15	·07	44	1·67	·10	1	·03	·00
Eastwood	2,690	19	7·06	·33	7	2·36	·00	...	·00	·00
Enfield	12,780	72	5·63	·00	39	3·05	·00	3	·23	·00
Erskineville	7,580	29	3·82	·13	7	·92	·13	1	·13	·00
Glebe	23,020	79	3·43	·21	44	1·91	·08	6	·24	·00
Homebush	2,890	28	9·69	·00	7	2·42	·00	1	·35	·00
Hunter's Hill	9,180	27	2·94	·00	6	·65	·00	6	·65	·22
Hurstville	18,820	123	6·53	·10	39	2·06	·10	2	·10	·05
Kogarah	25,480	179	7·04	·11	64	2·51	·04	3	·11	·00
Lane Cove	13,570	76	5·60	·07	16	1·18	·00	2	·15	·00
Leichhardt	30,850	140	4·53	·03	43	1·39	·06	3	·09	·03
Manly	24,680	220	8·91	·00	75	3·03	·00	3	·12	·08
Marrickville	45,440	48	1·05	·00	23	·50	·04	4	·08	·02
Mascot	12,550	67	5·38	·15	24	1·91	·07	2	·15	·00
Mosman	23,810	70	2·94	·04	18	·75	·04	...	·00	·04
Newtown	28,440	107	3·76	·17	75	2·63	·06	...	·00	·00
North Sydney	53,480	199	3·72	·05	79	1·46	·05	5	·09	·03
Paddington	26,820	82	3·05	·00	35	1·30	·03	4	·14	·00
Petersham	27,520	113	4·10	·07	38	1·33	·10	3	·10	·03
Randwick	68,210	162	2·36	·05	54	·78	·02	10	·14	·01
Redfern	24,100	89	3·69	·04	32	1·32	·08	3	·12	·00
Rockdale	33,420	168	5·02	·05	69	2·16	·17	3	·08	·00
Ryde	22,180	129	5·81	·09	52	2·34	·27	8	·36	·00
St. Peters	13,520	43	3·17	·14	27	1·99	·00	2	·14	·07
Strathfield	11,240	57	5·06	·08	20	1·77	·00	...	·00	·00
Vaucluse	6,470	29	4·48	·00	5	·44	·00	...	·00	·00
Waterloo	11,880	58	4·77	·08	20	1·74	·00	3	·24	·00
Waverley	48,920	190	3·87	·08	60	1·22	·10	9	·18	·04
Willoughby	39,590	162	4·08	·05	51	1·28	·10	4	·10	·02
Woollahra	32,200	99	3·06	·00	44	1·36	·03	2	·06	·03
Kuring-gai Shire	24,830	122	4·90	·04	27	1·08	·04	2	·08	·00
Total, Metropolis	1,085,080	4,732	4·36	·07	1,748	1·61	·06	133	·12	·01
Extra-Metropolitan Districts.										
Auburn	18,100	153	8·44	·05	27	1·49	·05	4	·22	·00
Bankstown	18,020	95	5·27	·11	56	3·10	·05	...	·00	·00
Cabramatta and Canley Vale	4,250	19	4·47	·00	6	1·41	·23	...	·00	·00
Dundas	4,990	43	8·61	·20	20	4·00	·20	...	·00	·00
Ermington and Rydalmere	2,030	10	4·92	·00	...	·00	·00	...	·00	·00
Fairfield	7,090	67	9·44	·00	12	1·69	·28	7	·98	·00
Granville	17,140	183	10·66	·34	25	1·45	·00	5	·29	·00
Ingleburn	1,510	5	3·31	·00	4	2·64	·00	...	·00	·00
Holroyd	12,670	88	6·94	·07	43	3·39	·23	3	·23	·15
Lidcombe	13,900	122	8·77	·07	37	2·66	·14	4	·28	·00
Liverpool	5,940	28	4·71	·16	21	3·53	·00	13	2·17	·00
Parramatta	16,570	105	6·33	·06	15	·90	·00	3	·18	·06
Hornsby Shire	19,040	122	6·40	·05	45	2·36	·10	1	·05	·00
Warringah Shire	14,250	21	1·47	·00	20	1·40	·14	2	·14	·00
Harbour of Sydney	.....	...	...	...	...	...	...	4	...	...
Extra Metropolitan Municipalities and Shires	155,500	1,061	6·79	·09	331	2·11	·09	46	·30	·01
Combined Totals	1,240,580	5,793	4·66	·07	2,079	1·67	·06	179	·14	·01

* The Government Statistician's return does not include Ingleburn.

DIAGRAM SHOWING THE ANNUAL DEATH RATES PER 1,000 LIVING FROM TYPHOID FEVER, DIPHTHERIA, AND SCARLET FEVER FOR YEARS 1900-1927, INCLUSIVE.

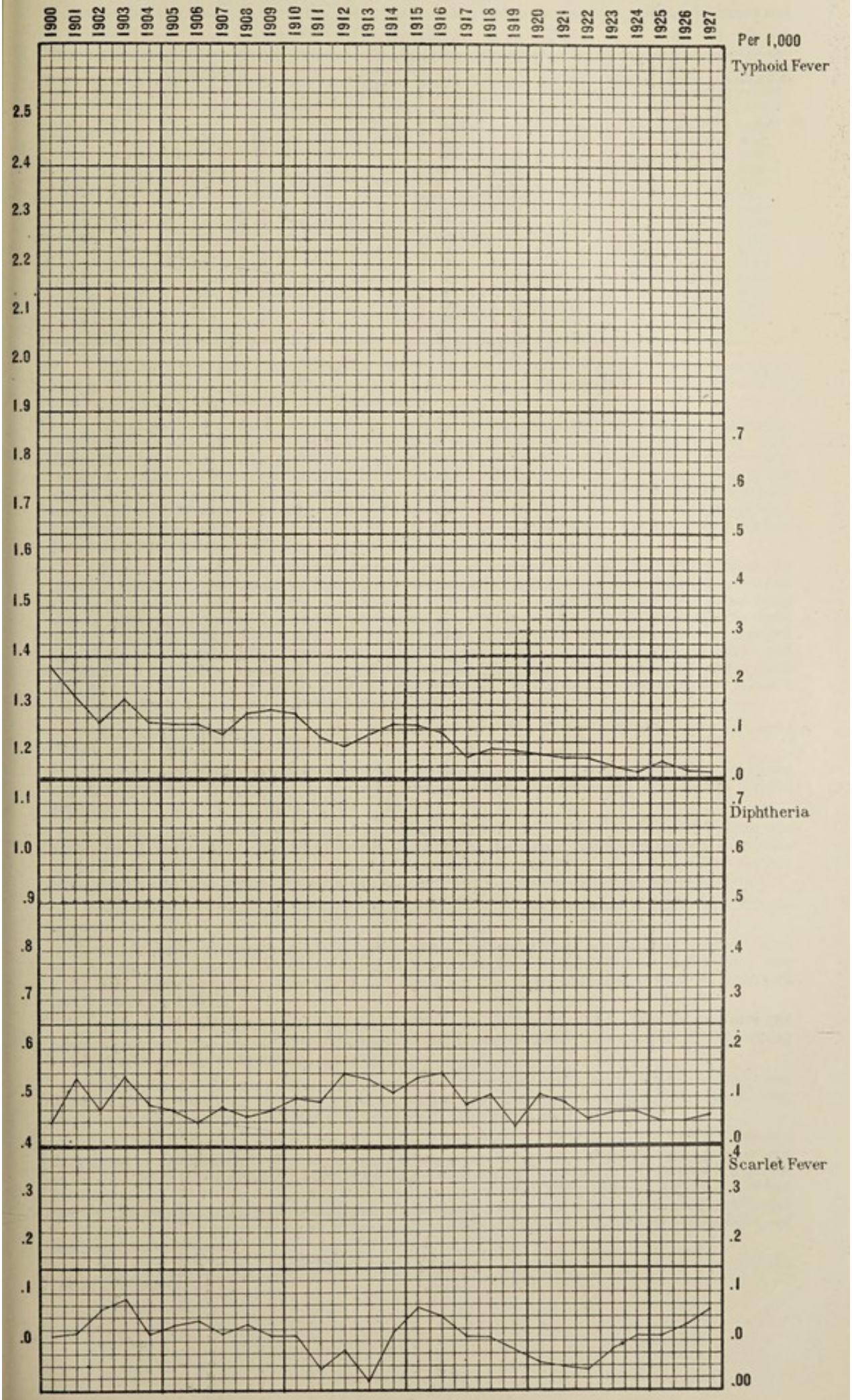


TABLE 6.—Notified Scarlet Fever in the Metropolis since notification became legal, showing Incidence and Mortality.

Year.	Cases.	Attack-rate per 1,000 of Population.	Deaths.	Case-fatality per cent.	Death-rate per 1,000 of Population.	Year.	Cases.	Attack-rate per 1,000 of Population.	Deaths.	Case-fatality per cent.	Death-rate per 1,000 of Population.
1898	2,425	5·37	25	1·03	0·07	1913	555	0·79	12	2·16	0·002
1899	556	1·20	10	1·80	0·02	1914	1,717	2·32	16	0·9	0·02
1900	464	·098	5	1·07	0·01	1915	4,190	5·53	48	1·14	0·07
1901	884	1·82	13	1·41	0·02	1916	2,468	3·24	38	1·53	0·05
1902	1,253	2·54	38	3·03	0·07	1917	1,110	1·44	9	0·8	0·01
1903	2,910	5·77	48	1·65	0·09	1918	637	0·81	11	1·7	0·01
1904	1,361	2·40	14	1·03	0·02	1919	376	0·46	7	1·86	0·008
1905	1,136	2·15	16	1·41	0·03	1920	346	0·41	5	1·44	0·006
1906	1,869	3·44	22	1·17	0·04	1921	407	0·44	5	1·22	0·005
1907	976	1·72	11	1·12	0·02	1922	554	0·58	4	0·74	0·004
1908	1,153	2·00	20	1·73	0·03	1923	1,369	1·41	8	0·58	0·008
1909	836	1·41	8	0·9	0·01	1924	1,921	1·92	12	0·62	0·001
1910	394	0·65	9	2·28	0·01	1925	1,705	1·66	13	0·76	0·001
1911	369	0·57	3	0·81	0·004	1926	2,783	2·67	38	1·36	0·03
1912	304	0·45	6	1·9	0·008	1927	4,732	4·36	73	1·54	0·07

The above table shows that during the past five years the incidence of scarlet fever has been higher than in the previous five years. With this disease there are periods of comparative quiescence followed by a series of years, as at present, of increased incidence.

A review of the incidence of scarlet fever in Sydney since the introduction of compulsory notification in 1898 shows that in addition to five yearly periods of quiescence, such as the quinquennia 1918—1922, 1909—1913 followed by similar period of average treble and quadruple incidence, there is a twelve yearly period of maximum incidence as in 1903, 1915, and 1927. There is generally explained as due to the appearance of children who have not acquired immunity by a previous attack, sometimes so mild as to have escaped notice, or by some increased virulence of the causative organism. Possibly it is due to as yet some unrecognised cause, which may be climatic, such as an alteration in humidity, or some condition which makes the organisms more prolific.

The occurence of scarlet fever in Australia was first recorded in 1850. The type of disease in Australia and New Zealand has never been so severe as it was in England about the middle of last century. In reports on outbreaks in Auckland, New Zealand, in Tasmania and in Sydney during the past twenty years, I have emphasized the less virulence of the type of scarlet fever with what one was familiar in Great Britain, even at the end of last century. As a matter of fact in the British Isles, scarlet fever was regarded as a highly infectious, dangerous disease. Still infectious, although not to the same degree as measles and diphtheria, it is no longer considered the severe dangerous disease it was. Thus even in England the death rate has fallen from 1·2 in the sixties of last century to ·02 per 1,000 in 1924. The case fatality is now 1 per cent. in England compared to 12·6 per cent in 1977—1881.

In the metropolis of Sydney for 1927, the death rate was only ·07 per 1,000, that is there were seven deaths in each 100,000 of population.

A remarkable feature of scarlet fever is that the sickness rate in England and Wales had not shown any marked decline, except during the war, when, strange to relate, the machinery for its control was disorganised.

In 1911 the rate per 1,000 of population was 2·9; in 1925 it was 2·35. Dr. Allen C. Parsons who made a special report for the Ministry of Health, England, says the figures "show no substantial submission of the disease to the highly organised measures of control used against it . . . . . They compare unfavourably with those of some countries, where the measures of control are seemingly less comprehensive."

A remarkable feature in Australia is that there has been increased incidence of scarlet fever without increased mortality of late years.

In 1927 in the metropolitan area of Sydney with an estimated mean population of 1,240,580, there were notified 5,793 cases of scarlet fever, giving an attack rate of 4·6 per 1,000 living. In 1926 there were 3,262 cases notified giving an attack rate of 2·07, a rate in excess of any year since 1916, when the attack rate was 3·24 per 1,000.

Although the case fatality 1·54 per cent. in 1927 was higher than that of the previous year with 1·36 per cent., this was probably due to less thorough notification of the disease owing to difficulty of securing isolation accomodation in hospitals.

It is believed that three-quarters of all people who come in contact with scarlet fever, escape infection. Fifty per cent. of cases occur between two and ten years of age. From one to six years of age susceptibility increases rapidly, after which it steadily declines, adults being rarely attacked.

Although it is recognised that the patient himself is the main source of infection and that "bedside" disinfection or the destruction of germs in the discharges from the mouth and nose of the patient as well as the thorough washing in boiling water of bedding, bedclothes and food utentsils, is all that is required, routine terminal disinfection by spraying with formalin or thymoline is still practised. As a matter of fact probably the only advantage of terminal disinfection is that such a mess is made that the people are forced to throughly clean the room, or at least to get rid of the smell and flood it with fresh air and sunlight, our best natural disinfectants.

It is generally held that notification, isolation in hospital and disinfection have failed to prevent the spread of scarlet fever.

In Great Britain during the war no harm apparently accrued from milder cases having been treated in their own homes.

It is not essential, therefore, to provide hospital accomodation for all cases of scarlet fever. However, where members of the family are employed in dairying or milk distribution, or in supplying other food or in clothes making, or where a family is condemned to live in one room as unfortunately so many are in the more congested suburbs contiguous to the city proper of Sydney, isolation in hospital should be secured.

The future points to immunisation of the susceptible population as the most scientific method of combating this and other communicable diseases. It is possible now to separate the immune from the non-immune.

In 1924, Drs. G. F. and Gladys H. Dick of Chicago published a simple test to indicate susceptibility to scarlet fever similar to the Schick test for diphtheria.

After a skin injection of a minute quantity of scarlatinal toxin prepared from culture of the organism causing scarlet fever, a so-called hemolytic streptococcus, in susceptible individuals a local redness develops usually within six hours at the site of the superficial injection. Any reaction which has completely disappeared in twenty-four hours is said to be negative and to indicate probable immunity.

The susceptibility of scarlet fever from one to two years of age was 70 per cent. At 5—10 years of age 35 per cent. of those tested.

The Dick test is also used to gauge the effectiveness of toxin immunisation.

Susceptible persons receive three injections at weekly intervals and remain immune for at least twelve to eighteen months.

The Drs. Dick report that none of 205 immunised nurses in charge of scarlet fever cases contracted the disease.

The prevention of the spread of scarlet fever depends apart from any attempt at immunisation on early recognition and isolation.

The patient becomes infectious at the onset of the sore throat and remains so sometimes for weeks after recovery when there are discharges from ears or abscesses. Hence there are always a number of so-called "return cases" due to the infection of others in the family on the return of convalescents. Of 3,000 cases all of whom had been kept 50 days 1·5 per cent. caused further cases.

Scarlet fever carriers, persons who harbour the germs in their throat without any obvious symptoms, are said to be not uncommon, although some authorities deny the existence of any healthy carriers. There are occasionally mild unrecognised cases. Transmission by milk often has been noted.

Two years ago I found a small outbreak in a Sydney suburb directly due to a boy delivering milk who was recovering from an unrecognised attack.

With regard to schools, experience has shown that closure is not only useless in checking an outbreak as the harm has been done when the case is discovered, and carriers are already at large, but is actually harmful as it prevents supervision. The correct procedure is the exclusion of cases with the natural corollary seclusion. It is however, extremely difficult to keep children indoors with a complaint like scarlet fever, which when mild may not inconvenience them much. It is these mild and unrecognised cases which make the spread of the disease so difficult to combat. There is hardly a month passes without some cases actually occuring in hospitals owing to children contracting the disease due to an unsuspected case or cross infection. Daily inspection for sore throat by a competent nurse would in times of undue prevalence probably be helpful.

In combating an epidemic in a boarding school it may be necessary to make cultures from the throats of contacts and associates of actual cases and insist on isolation and daily observation of those who are positives, as demonstrated by the actual presence of the organisms. Where susceptibility is determined by the skin action in the Dick test, active immunisation may be undertaken.

TABLE 7.—Notified cases of Diphtheria in the Metropolis since notification became legal, showing Incidence and Mortality in each year.

Year.	Cases.	Attack-rate per 1,000 of Population.	Deaths.	Case-fatality per cent.	Death-rate per 1,000 of Population.	Year.	Cases.	Attack-rate per 1,000 of Population.	Deaths.	Case-fatality per cent.	Death-rate per 1,000 of Population.
1898	613	1·43	75	12·23	·16	1913	2,841	2·89	96	4·70	·13
1899	285	·66	14	4·91	·03	1914	2,011	2·67	95	4·72	·11
1900	278	·63	21	7·55	·05	1915	2,295	3·03	95	4·13	·14
1901	439	·95	65	14·82	·13	1916	2,585	3·39	111	4·20	·15
1902	393	·79	37	9·41	·07	1917	2,261	2·94	72	3·18	·09
1903	690	1·37	73	10·60	·14	1918	2,085	2·65	87	4·17	·11
1904	738	1·40	45	6·10	·08	1919	859	1·059	37	4·30	·04
1905	695	1·19	42	6·60	·07	1920	1,618	1·92	90	5·46	·106
1906	659	1·21	32	4·85	·05	1921	2,475	2 709	90	3·63	·098
1907	659	1·16	46	6·98	·08	1922	1,513	1·607	62	4·09	·066
1908	880	1·53	38	4·20	·06	1923	1,485	1·53	77	5·18	·079
1909	1,144	1·93	42	3·70	·07	1924	1,847	1·85	75	4·06	·075
1910	2,109	3·47	61	2·89	·10	1925	1,428	1·39	55	3·85	·053
1911	1,834	2·86	58	3·16	·09	1926	1,628	1·54	57	3·50	·054
1912	2,632	3·92	105	3·9	·15	1927	1,748	1·61	67	3·83	·06

The incidence of diphtheria in the metropolis in 1927 showed an increase of 120 cases on that of the previous year and an increase of 168 on the average for the previous five years.

The death rate of ·06 per 1,000 was slightly higher than that of the previous year, which, with the exception of that for 1919, was the lowest yet recorded.

The highest attack rates were in the municipalities of Enfield, 3·05 per 1,000, represented by 72 cases in a population of 12,780, and Manly, 3·03 per 1,000, 220 cases in a population of 24,680. Enfield in 1926 had the second highest attack rate, 2·67 per 1,000; Strathfield with an attack rate of ·44 had the best record.

Diphtheria is transmitted directly or indirectly by droplets of infected mucus and saliva. Loeffler found the bacilli alive after fourteen weeks in partially dried pieces of diphtheritic membrane. Zinsser easily explains the indirect method of transmission by the transfer of saliva to fingers, pencils and other objects.

In examination of carriers I showed some years ago how cases were missed, as in an outbreak in Tasmania, by failure to take a nasal as well as a throat swab. Convalescents usually get rid of the bacilli within three weeks. The measures to check diphtheria are the teaching of cleanliness as to secretions of the mouth, nose and throat, early diagnosis by bacteriological examination followed by seclusion of actual cases and carriers.

Schick tests can be carried out to determine whether an individual is susceptible to the disease, and immunisation may be secured by over-neutralized toxin antitoxin.

There is no evidence to support the belief still held by the laity that diphtheria is associate with defective drains. Dampness is, however, undoubtedly a predisposing cause in that it produces an unhealthy condition of the mucus membranes of the throat and nose, thus favouring the propagation of the bacillus. It is a matter of observation that relaxed throat and unhealthy tonsils predispose to attacks of diphtheria. Injection of antitoxin, although acting so magically in relieving symptoms by removing the effects of the toxin does not remove the bacilli from the throat and nose. Whilst the treatment of diphtheria by antitoxin was a revelation, protection by immunisation is claimed to be a revolution.

It is possible to control the occurrence of diphtheria, especially in young children from 1 to 7 years, as has been done in New York, Boston, Chicago, Edinburgh and Aberdeen, where immunisation has been carried out as a routine procedure of the medical inspection of schools and at pre-school clinics.

Typhoid Fever.

Table 8.—Notified cases of Typhoid Fever in the Metropolis since notification became legal, showing incidence and mortality in each year.

Year.	Cases.	Attack-rate per 1,000 of Population.	Deaths.	Case-fatality per cent.	Death-rate per 1,000 of Population.	Year.	Cases.	Attack-rate per 1,000 of Population.	Deaths.	Case-fatality per cent.	Death-rate per 1,000 of Population.
1898	824	1·93	73	8·86	·17	1913	566	·81	59	10·42	·09
1899	786	1·81	87	11·08	·20	1914	616	·81	82	13·31	·11
1900	983	2·25	103	10·47	·23	1915	746	·98	74	9·91	·11
1901	829	1·71	81	9·77	·17	1916	613	·80	65	10·06	·09
1902	610	1·23	59	9·70	·12	1917	371	·48	27	7·27	·04
1903	833	1·66	81	9·72	·16	1918	297	·37	51	17·1	·06
1904	665	1·29	64	9·62	·12	1919	300	·37	53	17·6	·06
1905	561	1·06	58	10·34	·11	1920	322	·38	45	13·97	·05
1906	485	·89	60	12·37	·11	1921	311	·34	44	14·14	·04
1907	505	·89	51	10·09	·09	1922	221	·29	41	18·5	·04
1908	678	1·17	75	11·06	·13	1923	217	·22	27	12·4	·028
1909	700	1·18	81	11·50	·14	1924	184	·18	18	9·80	·01
1910	812	1·33	84	10·34	·13	1925	187	·18	30	16·05	·029
1911	488	·76	50	10·24	·08	1926	232	·22	22	9·48	·020
1912	535	·80	53	9·9	·07	1927	133	·12	19	14·28	·01

Typhoid Fever Incidence.—With 133 cases notified in the metropolis in 1927, there was a decrease of 99 cases on the number for the previous year. The attack rate of ·12 per 1,000 is the lowest yet recorded in the metropolis. No cases were reported from Alexandria, Bexley, Eastwood, Mascot, Newtown, Strathfield or Vaucluse. Botany, Darlington, Drummoyne, Erskineville and Homebush each had a single case. Hunter's Hill, with 6 cases in a population of 9,180, had an attack rate of ·65 per 1,000, as in the previous year had the worst record. Hunter's Hill in 1926 had no less than 26 cases in December, practically all traceable to infection associated with the milk supply from a dairy in a neighbouring municipality.

Mortality.—There were 19 deaths, actually three less than in the previous year, whilst the case fatality was 14·28 per cent. As pointed out in previous reports, the marked reduction of the morbidity and mortality from typhoid fever in the metropolis of Sydney is an index of the progress of communal sanitation. The death rate from typhoid fever is now a 48th of what obtained in the metropolis forty years ago.

Thus, giving a death rate per 100,000, the typhoid rate in Sydney had fallen from 51·3 for the years 1888–1890, to 21·6 for 1891–1900, to 13·2 for 1901–1910, to 11·8 for 1910–1915, 6 for 1916–1920, and 2·9 for 1921–1925. In 1926 the death rate from typhoid fever was 2·8 per 100,000. In 1927 it was 1 per 100,000

In the exta metropolitan districts in 1927 there were 46 cases of typhoid fever, nine more than in the previous year. There were 13 cases in Liverpool and 7 in Fairfield, in contrast to 1 and 3 during the previous year. No cases were reported from Bankstown, Cabramatta and Canley Vale, Dundas, Ermington and Rydalmere, and Ingleburn. Most of the extra metropolitan districts and, unfortunately, still large portions of the metropolis, are unsewered, the extension of the sewerage not having kept pace with the marked increase of population. Hence there are all the conditions associated with a dry conservancy system which encourage the spread of typhoid, and no credit can be given to the authorities concerned for the fact that there has been no serious epidemic of typhoid during the year. Prompt measures are taken by local inspectors to investigate the circumstances of each notified case of typhoid, and as far as possible cases are removed to hospital and every effort made to check the spread of the disease.

Separate emergency pans have been provided for cases in unsewered areas, stools have to be disinfected, and if possible incinerated. A careful watch is kept on the milk supply so that on the least suspicion an investigation is carried out with a view to detecting a possible carrier or other source of contamination.

Year by year as the outlying suburbs become more closely built over the problem of the disposal of night soil becomes more difficult.

A judgment of the Supreme Court in 1926 prohibiting a local authority taking the nightsoil to an area outside its boundaries and utilising a depot in another municipality, as was the case of Kogarah, which has a depot in Rockdale, and Hunter's Hill which had a depot in Ryde, has made this problem practically impossible of a satisfactory solution even where there is direct access to a sewer, as in the case of Kogarah where such access is within 100 feet of residences. If any example were needed of the lack of foresight of a local authority in securing a sanitary depot, surely it is the position of Kogarah, the local authority of which absolutely refused to allow the sanitary depot to be established in its area at a time when such could have been done under reasonable conditions, and has ultimately been forced to tip into the sewer at the nearest available point.

Attention has been drawn repeatedly to the difficulty in unsewered areas of the disposal of household wastes. Technically under the Local Government Ordinance each householder is responsible for the disposal of all waste waters within his own grounds. Instances are common of houses built on land with a slope to the front street, where it is practically impossible to satisfactorily dispose of the sullage waters.

To show the condition into which the metropolitan area has been allowed to drift owing to the extension of the sewerage system not keeping pace with the increase of population, one need only instance the case of Canterbury, where there are large open drains, natural stormwater channels or creeks to which drainage naturally gravitates.

The Metropolitan Water, Sewerage and Drainage Board has so far confined its operations for the concreting of such open channels to those which are on the boundaries of two local authorities. It appears to be nobody's business to rectify the present condition of affairs, as obviously the local authorities concerned either are not financially able to undertake the task, or are unwilling to incur the necessary expenditure.

Although no actual case of typhoid in 1927 was traced to the eating of oysters, this risk, especially from the picking of oysters from polluted portions of the harbour foreshores is always present, and although the sale thereof may be prevented, it is impossible to stop persons casually partaking thereof in spite of repeated warnings.

Tuberculosis.—The number of deaths from all forms of tuberculosis in the metropolis proper during 1927 was, according to the Government Statistician, 587, of which 519 were due to tuberculosis of the lungs, 31 to tubercular meningitis, and 37 to other tubercular diseases. These figures include deaths of former metropolitan residents which occurred at Waterfall Sanatorium and other institutions.

The appended table represents, as accurately as possible, the true number of deaths from phthisis which might be debited to the metropolis proper for each of the past twenty-three years :—

1905... ... 495	1911... ... 541	1917... ... 482	1923... ... 539
1906... ... 498	1912... ... 494	1918... ... 507	1924... ... 584
1907... ... 512	1913... ... 521	1919... ... 654	1925... ... 482
1908... ... 504	1914... ... 601	1920... ... 536	1926... ... 575
1909... ... 458	1915... ... 658	1921... ... 532	1927... ... 519
1910... ... 495	1916... ... 623	1922... ... 494	

For the Metropolitan Combined Sanitary Districts 988 cases of pulmonary tuberculosis were notified during 1927, a decrease of 109 on the number for the previous year. Of those notified, 604 were males and 384 females; 115 cases were notified from the city proper.

From the Blue Mountain area there were 112 notifications (66 males and 46 females).

AGE GROUPS.

Table A.

City and Metropolitan Combined Sanitary Districts.

Under 1 year	—	35–44 years	228
1–4 years	2	45–54 „	144
5–14 „	12	55–64 „	84
15–24 „	170	65 and over	41
25–34 „	253	Ages not stated	54
			988

Table B.

Blue Mountain Shire and Katoomba and Blackheath Municipalities.

Under 1 year	—	35–44 years	25
1–4 years	—	45–54 „	7
5–14 „	2	55–64 „	11
15–24 „	24	65 and over	2
25–34 „	35	Ages not stated	6
			112

The home visiting of notified tubercular patients has been carried out by Nurse Inspector Fletcher, R.S.I. (Metropolitan Health Officers' Staff), and Nurse Inspector Blomfield, R.S.I. (Sydney Municipal Council), visiting nurses attached to the anti-tuberculosis clinics of the Royal Alfred and Royal North Shore Hospital, and anti-tuberculosis dispensary, and the Red Cross organisation.

Care has been taken to avoid overlapping in home visiting. During the year 327 disinfections were carried out by local authorities after removal or death of notified cases of pulmonary tuberculosis. There were 205 second notifications. Notices with regard to damp and insanitary dwellings occupied by tubercular patients were served through the local authorities.

Infantile Paralysis.—There were 10 cases recorded in the metropolis and 3 in the extra metropolitan district during the year 1927. Of the 13 cases notified for the whole of the metropolitan combined sanitary district only one proved fatal, that being at Waterloo. Burwood 1, Hurstville 1, Lane Cove 1, Marrickville 1, Mascot 1, Petersham 2, St. Peters 1, Strathfield 1, and in the extra metropolitan districts one case each at Auburn, Holroyd and Ingleburn. Monthly incidence for the metropolis: January 2, February 1, March 1, April 1, May 2, July 1, September 1, December 1; extra metropolitan districts, February 1, May 1, and November 1.

The following is a record of the disease in the metropolis since it was declared notifiable in 1912:—

1912	28 cases notified.	1920	37 cases notified.
1913	32 „	1921	19 „
1914	63 „	1922	12 „
1915	48 „	1923	62 „
1916	186 „	1924	42 „
1917	6 „	1925	38 „
1918	11 „	1926	45 „
1919	8 „	1927	10 „

In my annual report for 1925 I dealt at considerable length with the subject of infantile paralysis and reviewed my experiences of the special epidemic in New Zealand during the latter part of November, 1924, to the end of February, 1925.

As the result of my visit to New Zealand I was convinced that even during a serious outbreak of this disease, it is not advisable to close all schools, but to keep the children under observation, relying on exclusion and seclusion of cases. Although nothing is evidently to be gained by household disinfection I am of opinion that full advantage should always be taken to get a good general clean up, when the public is not only willing but anxious to co-operate with the authorities.

Epidemic Cerebro-Spinal Fever.—In the metropolis there were 11 cases and 8 deaths. The case were distributed as follow:—City of Sydney 1, Ashfield 2, Drummoyne 1, Hurstville 1, Marrickville 1, North Sydney 2, Randwick 2, Redfern 1. In the extra metropolitan districts there was only one case at Liverpool.

The following is the mortality record in the metropolis:—

1915	43 deaths.	1922	7 deaths.
1916	62 „	1923	8 „
1917	33 „	1924	15 „
1918	25 „	1925	8 „
1919	14 „	1926	9 „
1920	12 „	1927	8 „
1921	12 „		

Encephalitis Lethargica.—Two cases were reported, 1 from Sydney and 1 from Willoughby.

The Statistician shows 15 deaths for the metropolis and 5 in the extra metropolitan area.

The distribution of the deaths was:—City of Sydney 1, Ashfield 1, Glebe 1, Lane Cove 1, Leichhardt 2, Marrickville 1, Mascot 1, North Sydney 2, Randwick 1, Willoughby 2, Woollahra 1, Ku-ring-gai Shire 1, Fairfield 1, Lidcombe 1, Parramatta 3.

The reason for non-notification of these cases was that until 1st April, 1926, the disease was not notifiable and no special announcement had been made that the disease was included in the notifiable diseases.

From the 12th August, 1927, yellow fever, typhus fever and cholera were made notifiable to bring the notification of these diseases into line with notification in the other States. No cases have been recorded of yellow fever or cholera in New South Wales. Typhus fever may have existed in the early days of settlement but no authentic case has been noted in recent time.

Housing and Overcrowding.

Measures however extensive for the improvement of the public health avail little unless better homes are provided for that portion (the most prolific) of the population at present crowded into congested areas or housed under conditions not conducive to the maintenance of health and the rearing of a healthy race.

The overcrowding of persons into houses and the congestion of houses on an area have a deleterious effect on the health of the people.

Apart from vitiation of the atmosphere of a room by exhalations from the bodies of occupants, there is an added risk of the spread of communicable or infectious diseases by spray infection from the nose and throat. This is well illustrated by the evidence of consumption being heavier in the more congested parts of cities than in the less closely built suburbs.

A spot map of the city of Sydney shows this both with regard to infectious diseases generally, and with regard to mortality from phthisis in particular.

Of course the concomitant factor of poverty is associated with unhygienic dwellings.

In none of the six Australian capital cities is there any high density of population to the acre comparable to conditions in the older cities in Great Britain, Europe, or the United States. Thus the city of Sydney proper only has a density of 31·9 to the acre, and the most closely built suburb, Darlington, 87, in contrast to 300 to 400 in parts of Glasgow. Thus we do not get the differences of death rates in different portions of our cities so marked as in the older cities of the Old World.

Especially during the pandemic of influenza in 1919, it was found, however, that the incidence and mortality were highest in the more congested districts, as was to be expected from the manner in which the disease is propagated from individual to individual by droplet infection. Whilst the remarkably low average death rate over a period of five years of 9·3 per 1,000 for the metropolitan area of Sydney with a population of over 1,250,000 indicates that the general health of the people is satisfactory (in all probability due to the wonderful equable climate encouraging an outdoor life all the year round), there is undoubtedly a house famine as shown by the practice of two or more families living in one house and the sub-letting of rooms in houses.

At the census in 1921, there were 179 families consisting of 2 or more persons living in single-room dwellings other than tenements and flats in the metropolis of Sydney. In addition there were 514 families of 2 to 10 persons, each family living in one-room tenements and flats. In the whole metropolitan area there were 6,270 persons living alone, 868 actually existing in one room. There were in all 1,461 one-room dwellings inhabited by 2,464 persons. This is not a state of affairs one should expect in the largest city of Australia, not much over a hundred years old, as apart from overcrowding there must be domestic discomfort and insanitary conditions which make for inevitable disease and degeneration of the race.

As a matter of fact in the city proper, that is the area controlled by the city council, with a population of 109,000 there were only five one-room dwellings and 629 two-room dwellings.

The main notorious so-called slum areas of last century, such as "The Rocks," and "Wexford-street," have been wiped out by resumptions, undertaken by the Government, the Harbour Trust and the City Council.

In 1918, with the co-operation of the City Surveyor and City Building Surveyor and myself as City Health Officer, a map was plotted out showing the more congested-areas in the city, with the idea of urging their gradual resumption, demolition and replanning.

In reporting generally on congested areas regard was given to the narrowness, closeness, bad arrangement, condition of the streets or groups of houses within the various areas, on the score of lack of light, air, ventilation, and other sanitary defects, in addition to the actual condition of the houses as to structural defects and lack of repair.

Following a report on 17/3/1919, the area bounded by Commonwealth, Goulburn, Riley and Campbell streets, Surry Hills, was marked down for resumption. Portion of this area known as Brisbane-street Resumption No. 1 bounded by Commonwealth, Upton, East and Hunt streets, was resumed and ultimately demolished in 1922. Brisbane-street Resumption Area No. 2 was resumed by the City Council on 2/7/1923. A number of houses in this area have already been demolished and the whole area is being replanned. The narrowest street in this area is Milk-street, 30 feet wide. Some of the yards at the rear of the houses are as small as 18 ft. x 12 ft. Robin Hood lane was resumed on 2/7/23; Burton-street, on 2/7/26; portion of Charles lane, Woolloomooloo, 8/5/25; Garratt lane, 6/11/25. The Council also resumed portion of Dowling-street, Ways terrace, Pyrmont, and an area opposite the Royal Alexandra Hospital for Children, Camperdown, where workmen's dwellings have been erected. In addition the Council resumed and built upon the area occupied by the Strickland Flats, Chippendale.

It is, however, in the industrial suburbs contiguous to the city proper that the more congested areas still obtain, more especially in Redfern, Waterloo, Alexandria, Newtown, Darlington and the Glebe.

Possibly the worst examples are as follow :—

Redfern.—Hugo, Lewis, Alderson, Kettle streets, the two latter are for the most part occupied by Syrians.

Paddington.—Gibbs, Elfred and Comber streets.

Alexandria.—Garden, Wyndham, and adjoining streets, also Henderson-road, and area in which the Town Hall is situated.

Waterloo.—Pitt, Wellington streets, Botany-road, McEvoy-street, and back to Pitt-street.

Glebe.—Christie-street, Nos. 2 to 28, Cowper, Wentworth and Mitchell streets. The Church Trustees have renovated 46, and demolished 41 buildings on their area.

Darlington.—Shepherd, Vine and Rose streets.

Overcrowding is probably as rife in Redfern as in any portion of the metropolitan area. There are dwellings in which different people occupy, each family, a separate room in the house, in some cases having the use of the common kitchen. There are cases where an individual rents two or three houses and makes a living by sub-letting rooms.

With regard to the congested areas, the majority of dwellings therein are squatty in design, poor in construction, and "jerry" built. The yards are small in area, whilst the houses abut on narrow streets and lanes. There is no provision for playgrounds for the children, and unless there is a vacant allotment in the neighbourhood, the children's playground is a narrow street or lane.

Professor Irvine in his Report on Housing in 1913 states :—"In Redfern there are whole blocks in which small yards abut on other yards, each surrounded by a dilapidated high paling fence, and presenting the appearance of a boarded well." An objectionable feature of many of these houses is the use of a middle room between the kitchen and the front room as a bedroom without direct light and air, a defect which has to be remedied by the provision of sky-lights in some cases.

How can we expect children to develop into healthy manhood and modest womanhood when they are compelled to live in jerry built terraces with the yard area as small as 8 feet by 12 feet abutting on a lane 10 feet to 14 feet wide.

No really satisfactory solution of the housing problem is possible in the metropolis of Sydney until existing means of transport are greatly improved. It is recognised that the ideal arrangement is for the population to be spread over a comparatively large area in the outskirts and suburbs instead of being overcrowded in the congested central districts. This is the principle aimed at by town planning enthusiasts. Without cheap and quick means of transport, however work-people cannot afford to live in the outskirts. In this regard profit on public transport should be subordinate to public benefit, and the fares for the outer zones should be as cheap almost as for the near zone. This ideal is of course only possible where the authority controlling the whole area also controls the means of transport, and by purchasing land on the periphery and providing playing areas suitable, in advance, is able rationally to deal with the problem and prevent the suburbs from falling into the condition of the older portions.

Experience as District Health Officer, Auckland, New Zealand, and later as Chief Health Officer, Tasmania, demonstrated to me that any movement to deal with planning for the future on a comprehensive scale, such as the provision of the rehousing of those displaced by the condemnation of property beneath a habitable standard, was handicapped by the inability of the main central municipal authority to deal with the problem.

It has been demonstrated, as for instance, in Glasgow, that a broad, bold, and enlightened policy as regards all things pertaining to the health, comfort, and advancement of the masses, is compatible with sound economy and perfect solvency. The immediate and pressing needs of the future in the metropolis of Sydney urgently call for the increase of better housing accommodation if the standard of health is to be maintained or improved.

The more consideration one gives to the problem of housing in view of the present conditions as far as the metropolitan area is concerned, the more convinced one is that the only practicable solution is the creation of a Greater Sydney and improvement of the existing means of transit by the completion of the city railway and the harbour bridge.

Of late years the increase in houses has been most marked in residential suburbs. The industrial suburbs have not shown any marked increase. This indicates that private enterprise in the building trade has not catered for that considerable section of the community which struggles along on a weekly rent. There is a large field for national or community building to cater for the satisfactory housing of the people. As a means of protecting the health of the people and safeguarding the future generation it must be recognised that the labourer is worthy of his home as well as of his hire.

To rear children in houses such as exist in some of the Sydney industrial suburbs is to increase the need for hospitals and other institutions, to treat the after effects which arise from overcrowding and defective housing. The sight afforded by conditions where one family lives in one room, which children must perforce share with their parents, is not one which should be permitted to continue in a comparatively new country.

Any attempt to deal on a comprehensive scale with the resumption of congested areas, the condemnation of property beneath a reasonable standard of habitation, and the rehousing of those displaced as far as the city proper is concerned, is handicapped by inability to control the extension on round lines of the development of the adjoining areas.

Flats and Tenement Houses.

A feature of all large cities is that the well-to-do leave the houses towards the centre of the city and occupy more recently built houses with gardens in the suburbs. The houses vacated become residentials, or are divided, and again sub-divided into tenements or flats accommodating two or more families. In houses reconstructed into flats it is common to find conditions decidedly cramped. There is insufficient air and yard space, whilst the absence of playgrounds make them unsuitable for rearing children as they are deprived of nature's gifts, fresh air, sunlight, breathing room and playing area.

A common subterfuge has been to screen a verandah to make an extra room, thus limiting the light to the inner room. In some cases one has found, as recently in North Sydney, in a flat occupied by a Doctor, that the W.C. ventilated into the enclosed verandah which was used as a kitchen.

Land, however, is so valuable towards the centres of cities, and a section of the people elect to live there near their work or for other reasons, that the practice of building tenements or flats is one which evidently has come to stay.

As a matter of fact, ideal as is the separate single detached house with a garden, the extra expense of extended frontage, upkeep of roads, provision of water, gas, and sewerage, makes the cost prohibitive in the central area.

Where there are large open spaces in cities like Adelaide, Melbourne and Sydney, huge blocks of flats, overlooking the parks or water frontage are, when suitably designed so as to secure direct light and air to every room, one solution of the housing problem.

The flat mode of living complies with the altered condition of society. The difficulty is to secure wholesome conditions where there are enclosed areas or courtyards from which the inner rooms derive all light and air. The air of these courtyards and shafts is sometimes sunless and stagnant. In the better class flats these inner rooms are sometimes used as servants' bedrooms. The unhealthy conditions of these inner rooms are mitigated by the fact that the windows are commonly kept open. Some of the flats of to-day, however, in all probability, will be the slums of to-morrow.

Town Planning.

The tendency of the times in all countries is towards the segregation of the masses of the people in cities. There is not wanting evidence such as the percentage of city dwellers found unfit for active service in the last war, that the overcrowding of people in cities, with the industrialism of the last half of the last century, was not conducive to the physical improvement of the people as a whole. There is no reason, however, why life in a modern city with a plentiful supply of water, modern sewerage, good scavenging, incineration of garbage, properly constructed houses, with at least a tenth of the area secured for parks and recreation, with a well organised health and medical service, reasonable hours of work, abundance of fresh air, sunshine and fresh food, should not be as healthy as residence in the country. There is one essential, however, to the good government of a city and that is unity of control. Second only to London, and first among her peers overseas, Sydney, a city which, not only in name embraces socially and commercially one community, with one water supply, with one system of drainage, with streets continuous or contiguous at present controlled by a multiplicity of authorities, calls for one responsible authority in order to do justice to its unique natural endowments, its present prosperity and its commanding position as a centre of commerce in the Southern Pacific.

In my official capacity as Metropolitan Medical Officer of Health of Sydney, and City Health Officer for the past fifteen years, actually synchronising with the existence of the Town Planning Association, I have been in charge not only of the department of health and sanitation of the City of Sydney, but have acted as Health Officer for the fifty-five other local authorities with a population ten times that of the city proper.

It is my firm conviction that there is a prime necessity for a central body with functions common to the metropolitan area as a whole, even if there also must be other local authorities with functions restricted to their localities.

To paraphrase the report of the 1894 Royal Commission, appointed to recommend a scheme for the complete municipal unity of the metropolis through the amalgamation of the Old City and County of London:—"Whether we undertake the organisation of the government of the greater area, or of the smaller areas comprised within it, we are in all cases dealing with areas which possess the characteristics of town life, and the organisation of their joint and several governments should be settled accordingly."

Sydney, like London, is one large town which, for convenience of administration as well as from local diversities, confines within itself several smaller towns; and the application of the principles and still more of the machinery of municipal government to these several areas must be limited by conditions arising from this fact.

Parts of each arbitrary division are for some purposes known by the name of the adjoining area of which they are in reality an extension. As a matter of actual fact it has not been unknown for one authority unwittingly to refer to another the upkeep of a road in their own district, and the disposal of stormwaters or nightsoil from one district to another is a continual source of annoyance and discussion.

Large numbers of children living in one district go to school in another.

An examination of municipal problems shows that whilst the people have one community of interest, there is such a lack of the viewpoint of the community as a whole as to local government, that there does not exist the organisation and machinery to secure positive action on progressive lines.

There are splendid exceptions. For instance, Woollahra has carried out the widening of the great South Head Road and the resumption of the Chinese gardens at Rose Bay with the reclamation of the foreshore and the making of the Marine-parade.

Can anyone seriously suggest that unless there is some material change in social conditions and a reversal of the tendency to urban segregation, this great Sydney centre of population in which we live will not be greater and that our preparations at present, through lack of provision, are not such as will be satisfactory for a population of two or more millions within the same area?

Take the problem of open spaces, recreation grounds, and parks alone. It is obvious to the average schoolboy, forced sometimes to play cricket on the roadway, that we are not making adequate provision in the suburbs for the increasing population. Surely, although the cost may be considerable to-day, it is a mere bagatelle to what it will be two or more decades hence.

The late Hon. J. D. Fitzgerald, in his work on "Greater Sydney," says: "It is worth while contrasting the conditions of Sydney in regard to public utilities with those of such cities as Glasgow, Liverpool, Birmingham and Dublin, which have concentrated the ownership and control of all the public utilities in the hands of their municipal representatives. The British municipality owns waterworks, street cars, electric light, gas, public baths, laundries, markets, harbour and river ferries, docks, farms, and water and sewerage works. It demolishes slums and rebuilds whole areas; it rehouses the slum dwellers in municipally-owned houses; it supplies sterilised milk in poor districts; it supplies bands of music, gives municipal lectures, and has abattoirs, saleyards and markets under the control of its inspectors. It owns art galleries, libraries, concert rooms, and in some places golf links, cricket and football pitches, and tennis courts. These utilities are held and managed for the citizen by the municipal councils. The reason of this concentration of management and control and of ownership was given by Mr. Joseph Chamberlain in words which are constantly quoted by municipal reformers:—

> The City Council (Birmingham) are the directors of a great co-operative undertaking in which every citizen is a shareholder, and the dividends are payable in better health, in the increased comfort, in the recreation, and in the happiness of the people.

"Now let us take Sydney: A suburban resident leaves his home on the North Shore, takes a government tram or train, managed by statutory commissioners, to the shores of Sydney Harbour. There he leaves the government utility and transfers himself to a private ferry company. Arrived at Circular Quay he passes under the yoke (the silken yoke it may be) of the Sydney Harbour Trust Commissioners. After being obstructed on his way to business by sundry excavations in the streets, which might have been caused by any one of the following authorities:—the City Council, the Public Works Department, the Gaslight Company, the Hydraulic Company, the Water, Sewerage and Drainage Board, the Federal Postal Department, or the Railway Commissioners—he at length arrives at his office. Here on dark days he carries on his business by the aid of light supplied by the City Council. In plague time he may find his premises quarantined by the orders of the Public Health Board, a Government institution. On all occasions he uses a telephone owned by the Federal Government, with headquarters in Melbourne. If he go through the city in a vehicle, he is "regulated" by a policeman belonging to the Government Traffic Board. On the zone of the streets generally he has to obey by-laws formulated by forty-one municipal councils and enforced by a Government policeman. If he drink whisky, he has it in a house licensed by the Central Government, and if he puts water in it, that water is supplied by a conglomerate Board, nominated by city and suburban councils and by the Government. If he has to move about much on business in the course of the day, he may travel by a Government tram on the metropolitan area through forty-one separate and distinct municipalities, where he may see the various services conducted by forty-one odd mayors and 500 aldermen, and may observe the efforts made to keep their roads in order, and diminish or swell their forty-one odd bank overdrafts. If he seek recreation he has the parks, some owned and

managed by the State Authorities, others by various municipalities. Then, perhaps, he may have leisure to visit the Art Gallery or the Public Library, managed by other Boards. His cattle and sheep are sold in a stockyard, killed in a Government institution, and inspected by an Inspector who is sometimes a Government, sometimes a municipal officer, sometimes both.

"On the beautiful Sydney Harbour he finds one lovely island given over to the Imperial Authorities, who have wire-fenced one side of it, and have erected a most picturesque shear-legs on the other. Another island and a beautiful headland are quarantine stations for cattle and dogs, under the Stock Department of the State (which is, singularly, a branch of the Mines Department). A third island is under the control of the Harbour Trust Commissioners. Only one island is used for public recreation, and that is controlled by the Lands Department."

The many beautiful ocean beaches which make Sydney stand supreme among the cities of the world for eligible open-air recreation sports are under the dual control of the Lands Department and the local councils.

From the point of view of the town planner, Sydney, with its narrow streets, is sometimes compared with Melbourne, with its wide thoroughfares. Personally I think that the fact that Sydney has grown without any definite plan, although it means that it is costly to replan on modern lines to meet the phenomenal increase in population, has added to the charm of Sydney. Much as may be said for the planning of cities on geometrical patterns, I do not think that it gives them a distinctive character, such as one finds in cities that have just grown haphazard.

In 1875, in introducing the English Public Health Act, Disraeli said that in comparison with the preservation of the public health, all other matters were of comparative unimportance. The care of the public health was, he also said, the first duty of a statesman.

Let those in authority realise that by replanning our cities and satisfactorily housing the people, they will ultimately, with the prevention of the multiplication of the unfit, get a healthy, sturdy people.

What a golden opportunity as far as Sydney is concerned, to have the whole problem dealt with in a comprehensive way by the recognition of the need for unity of control with intelligent concentration of forces.

Everyone agrees that regional planning is essential. A general survey of local conditions must precede replanning.

Sydney, to be worthy of her beautiful setting, obviously must be rebuilt to a definite regional plan.

There should be an abundant water supply, a complete sewerage system, good dustless roads, underground railways, with buses in the more congested streets in place of trams, horses replaced by motors, adequately garaged and parked. The main narrow streets either widened or arcaded, or better still, additional main arteries of traffic, such as those suggested by Dr. J. J. C. Bradfield and the City Engineer; a civic centre, the harbour and rivers bridged to facilitate traffic, beautiful marine drives as from the Gap to Ben Buckler, and Manly to the North Head, more playing-grounds, our foreshores and beaches, with their natural beauty as far as now practicable preserved, Martin-place extended ultimately before the end of the century from the Domain to Darling Harbour, the hospitals distributed and organised on definite lines, schools with adequate playgrounds, a stadium for Olympic games, hangars and aeroplane landing stages, local government offices collected in one area with branch libraries and rest rooms, an Anzac Arch and Memorial House, cafés, with music, refreshment and dancing in the open air; meat, milk and other produce distributed on the most hygienic lines; adequate provision made in the Hawkesbury District, Burragorang, or other suitable area by irrigation for the supply of vegetables.

Beautifully endowed by nature, it only remains to create a worthy civic spirit in the rising generation by inculcating through the schools the ideal of the city's great destiny, and so ultimately get a generation worthy of its heritage.

Death is, unfortunately, our greatest reformer. It is, however, comforting to feel that as the present generation passes, one more enlightened and less trammelled by tradition and the dead hand of the past, will wonder why we allowed opportunity to pass.

As the present generation passes, a more enlightened and bolder generation, chastened and stimulated by the epoch-making war, is replacing it.

A little leaven such as that supplied by town planning authorities may ultimately leaven the mass.

There can be no absolute satisfactory administration without unity of command and control. Anything short of the amalgamation of the fifty-six local authorities in the metropolitan area, or in other words a "Greater Sydney" taking over also the functions of the Metropolitan Water, Sewerage and Drainage Board, the Harbour Trust, the Fire Brigades Board, the control of hospitals, theatres, abattoirs, gas, traffic, the provision of model lodging houses, the removal of congested areas and rehousing of the people, the provision of adequate playing areas and parks, the securing of landing places for aeroplanes, and all those municipal concerns which are the functions of the great municipalities, such as Glasgow, Manchester, Leeds, &c., will fail to meet the situation.

To create such a Greater Sydney, however, is a task which in the first place will require much propaganda, and a change of the whole outlook of the people with regard to local government; hitherto the people having been content to go, cap in hand, to the central government for any suggested general improvement.

North Sydney.—As an immediate step one commends the creation of a North Sydney, to embrace the seven municipalities and shires on the North Shore—North Sydney, Mosman, Willoughby, Lane Cove, Manly, Ku-ring-gai Shire and Warringah Shire.

East Sydney.—To embrace Vaucluse, Waverley and Woollahra.

The City Proper.—To be extended to embrace the following municipalities—Redfern, Darlington, Waterloo, Alexandria, Botany, Randwick, Mascot, Paddington, Newtown, Erskineville, St. Peters, Balmain, Leichhardt, Annandale, and the Glebe.

Western Sydney.—Ashfield, Burwood, Enfield, Concord, Strathfield, Homebush, Drummoyne, Marrickville and Petersham.

Southern Sydney.—To embrace Canterbury, Hurstville, Bexley, Kogarah, and Rockdale.

At present by utilising the Local Government Act, 1919, it would be possible to group most of the local authorities into county councils, and this might be a preliminary step to the ultimate creation of a "Greater Sydney."

A bill on town planning is urgent specifying the need and the machinery for carrying it out not only in the metropolitan area but throughout New South Wales.

To obtain an immediate objective, a regional plan for the county of Cumberland, a solution would be the creation by the Local Government Department of a special board with an engineer, architect, and surveyor whose duties would be to supervise town planning as it affects the whole of the metropolitan area, on much the same lines as the metropolitan medical officer of health supervises the control of the health of the city and the fifty-five adjoining municipalities.

To this board, of which the metropolitan medical officer of health should be a member, there might be co-opted a large advisory honorary body representative of various organisations and departments. Such a board would act merely in an advisory capacity and it would be necessary to have a paid staff.

Parks, Open Spaces, and Playgrounds.

It is gratifying to note that since 1919, when in this report, attention was directed to the importance of parks and open spaces not only as breathing areas in cities but as fields for recreation for improving the health of the people, attention has similarly been directed thereto in other parts of the English-speaking world.

In 1919, in consultation with Sir John Sulman, President of the Town Planning Association, one-tenth of the total area was laid down as the ideal to be attained, or not less than 1 acre to every 200 of the population in the suburbs, exclusive of national and state parks.

Parks should be within 1 mile of every portion of a residential area and accessible with ease to all. Parks would thus be 2 miles apart on the average, and their size should be proportionate to the density of the resident population.

An exception in size and also in distance was made with regard to the central park of the city, which caters not only for the residents but for the large daily visiting population.

It was laid down that provision should be made for great gatherings of the people at public functions, such as reviews of troops, festivals, processions. In this last respect Sydney is indeed fortunate in its Domain and Centennial Park.

The public is now so alive to the importance of breathing spaces for the people that one need never fear their curtailment.

In suggesting one-tenth of the total area, the prospective increase of population was considered, as once the whole area is built over it is expensive to clear and reconvert it into open land.

A glance at the accompanying Table (9) compared with that published in 1919 shows increases in Annandale, Ashfield, Balmain, Bexley, Botany, Burwood, Canterbury, Concord, Drummoyne, Eastwood, Homebush, Hunter's Hill, Kogarah, Lane Cove, Leichhardt, Manly, Marrickville, Mascot, North Sydney, Paddington, Randwick, Redfern, Rockdale, Ryde, St. Peters, Strathfield, Waverley, Willoughby, Woollahra.

In the extra metropolitan municipalities, Auburn, Bankstown, Cabramatta, Dundas, Fairfield, Granville, Holroyd, Ingleburn, Lidcombe, and Liverpool, Hornsby, Ku-ring-gai and Warringah Shires. The total increase during the previous nine years has been 1,109 acres.

A stroll along Riley, Bourke and Palmer streets in the city on any summer evening shows women on door steps, watching their children dodging the traffic as they endeavour to fulfil their natural instincts of play whilst the elder boys and girls drift into side lanes.

Contrast this condition with the Field House in Chicago. Here the people of an industrial city are said to be working out their own salvation. Whilst the elderly people sit in the shade of trees, the young people, both men and women, are engaged in playing baseball, tennis and other games. For children between the ages of 10 and 12, there are playgrounds equipped with every kind of apparatus. For younger children there is a third playground containing swings, see-saws, a wading pool, and a sand heap shaded by trees. In the Field House itself there are books, dancing classes and debating clubs. After dark the grounds are brilliantly lighted, whilst the Field House is crowded, all activities being in full swing until 11 o'clock.

Each of the Field Houses in the playgrounds under the five separate boards of park commissioners in Chicago has a social meeting place containing an indoor gymnasium, dancing hall, auditorium, a library room for the use of clubs, playrooms, reading rooms and baths.

The Sydney City Council has established playgrounds, but so far the community does not seem to have been sufficiently interested therein to secure adequate protection thereof.

There is urgent need in Sydney for recreation grounds for young women. In this regard a suggestion has been made that either the land at the rear of the Royal Alexandra Hospital for Children should be resumed and filled with spoil from the city railway, or portion of Camperdown Cemetery should have the gravestones removed and this area be given to the girls.

In my opinion there is no provision which the government or municipality can make which gives a better return as far as improvement in the general health is concerned, than the provision of playing areas, as by encouraging healthy play we are getting citizens imbued with high ideals of playing the game.

TABLE 9.—PARKS AND RESERVES.

Metropolis.

Local Authority.	Park Area.	Area of Municipality.	Percentage of Area.	Local Authority.	Park Area.	Area of Municipality.	Percentage of Area
	a. r. p.	acres.			a. r. p.	acres.	
Sydney	647 0 34	3,244	19·6	Ryde	215 0 0	6,968	3·0
Alexandria	22 0 32	1,051	2·02	St. Peters	46 0 10	902	5·1
Annandale	9 0 5	346	2·6	Strathfield	65 0 0	1,790	3·6
Ashfield	45 0 0	2,042	1·6	Vaucluse	122 1 14	796	15·3
Balmain	41 1 28	977	4·2	Waterloo	13 3 14	827	1·6
Bexley	31 1 0	1,910	1·6	Waverley	182 2 33	2,185	8·3
Botany	80 0 0	2,163	3·7	Willoughby	226 0 30	5,470	4·1
Burwood	20 2 0	1,107	1·8	Woollahra	315 0 0	1,885	16·7
Canterbury	174 3 29	8,256	2·1				
Concord	235 2 7	2,716	8·6				
Darlington	Nil.	54	Nil.	*Extra Metropolitan Municipalities.*			
Drummoyne	55 3 0	1,956	2·7				
Eastwood	114 0 31	2,953	3·8	Auburn	20 0 0	2,590	0·7
Enfield	18 0 0	1,678	1·0	Bankstown	116 0 0	19,205	0·6
Erskineville	22 3 8	186	12·2	Cabramatta and Canley Vale.	69 2 38	7,830	0·9
Glebe	50 0 0	518	9·6	Dundas	18 0 0	2,722	0·6
Homebush	24 0 0	595	4·03	Ermington and Rydalmere.	11 0 0	2,039	0·5
Hunter's Hill	94 0 0	1,415	6·3	Fairfield	45 2 20	15,976	0·2
Hurstville	146 2 8	6,165	2·3	Granville	65 1 0	4,038	1·6
Kogarah	94 1 29	4,762	1·9	Holroyd	65 0 8	9,621	0·6
Lane Cove	63 3 19	2,567	2·6	Ingleburn	189 0 0	8,592	2·2
Leichhardt	39 0 23	1,155	3·3	Lidcombe	86 2 8	5,274	1·6
Marrickville	108 0 0	1,889	5·7	Liverpool	76 1 16	26,195	0·2
Manly	193 1 2	3,520	5·4	Parramatta	263 3 12	2,230	11·8
Mosman	232 3 21	2,139	10·8				
Mascot	30 0 0	2,228	1·3				
Newtown	1 1 0	480	0·2				
North Sydney	161 2 11	2,528	6·2	*Shires.*			
Paddington	20 0 0	421	4·7				
Petersham	19 3 0	850	2·3			Sq. miles.	
Randwick	1,183 0 0	8,528	13·8	Hornsby Shire	11,725 0 0	198	
Redfern	10 0 0	404	2·4	Ku-ring-gai Shire	10,010 0 0	33	
Rockdale	320 0 0	5,102	6·2	Warringah Shire	17,091 0 0	103	

MOSQUITO EXTERMINATION.

Three of our most capable and earnest experts, Dr. Eustace William Ferguson, Surgeon-Lieut.-Commander Paradyce, and Inspector Bertram, of Lane Cove, all of whom did excellent work in the campaign to get rid of mosquitoes, have died within a year.

Those left on the original committee appointed at the conference of local authorities on the 12th August, 1926, Alderman Davey, Alderman Rothwell, of Strathfield and Concord, Councillor Dr. W. H. Read, of Ku-ring-gai Shire, and Messrs. Brownell and Nankervis, have co-opted Dr. E. S. Stokes, Medical Officer of the Metropolitan Water, Sewerage and Drainage Board, and Dr. I. M. Mackerras, of the Microbiological Laboratory of the Health Department.

A considerable amount of work was carried out with much success by the late Inspector Bertram in Lane Cove.

Inspector R. Stewart at Strathfield, Inspector Corrigan in Willoughby, and Inspector Massey in Concord, also carried out special measures for the prevention of breeding of mosquitoes.

In the absence of any actual disease spread by mosquitoes and the lack of one executive authority controlling the whole area with power to strike a special rate so as to employ a specially trained staff to make a survey of the whole area, carry out drainage, reclamation, oiling and other measures, it has not been practicable to do more than keep the public interested by propaganda.

Prosecutions have, however, been taken and convictions recorded for nuisances due to mosquito infested pools of stagnant or contaminated water.

Circulars were forwarded to all local authorities, especially directing attention to the prevention of the breeding of the special house mosquito (*Culex fatigans*) in water receptacles, such as flower vases, water jugs, and flower pots inside houses, and in any collection of polluted water in the vicinity of the house.

Some local authorities have had regular clean-up weeks, thus getting rid of old tins bottles, crockery, and other receptacles containing water.

Reclamation of mangrove swamps and mud flats on the Parramatta River.

For the past eight years I have, in season and out of season, advocated the reclamation of the swamps and mud flats on the Parramatta River. All concerned agree that such reclamation would be one of the best works for the improvement generally of the health of the community. The conversion of these swamps into recreation and playing areas, as well as sites for industries, is a matter of concern not only to the whole of the western suburbs, which are at present insufficiently supplied with playing areas, but to the whole future expansion of the industries of Sydney.

As in the case of the much-needed improvement of Cook's River, Powell's Creek, Haslam's Creek, and Cox's Creek, there has been constant wrangling between the local authorities, the Metropolitan Water, Sewerage and Drainage Board, and the Harbour Trust, as to whose responsibility it was to carry out much-needed improvement.

It is hoped that at last power is to be given to the Harbour Trust to carry out the reclamation of the swamps on the Parramatta River, the Public Works Department to deal with Cook's River, and the Metropolitan Water, Sewerage and Drainage Board to deal with the foul-smelling creeks.

TABLE 11.—Principal Causes of Death i

Year 1927. Causes of Death.	Age Groups: Under 1 year.	1—4 years.	5—14 years.	15—24 years.	25—34 years.	35—44 years.	45—54 years.	55—64 years.	65 and Over.	Age not stated.	Total.	Municipalit: City of Sydney.	Alexandria.	Annandale.	Ashfield.	Balmain.	Bexley.	Botany.	Burwood.	Canterbury.	Concord.	Darlington.	Drummoyne.	Eastwood.	Enfield.	Erskineville.	Glebe.	Homebush.	Hunter's Hill.	Hurstville.	Kogarah.	Lane Cove.	Leichhardt.
Typhoid Fever	...	...	...	2	3	7	6	1	...	...	19	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	...	1
Measles	1	1	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
Scarlet Fever	5	29	21	9	6	3	1	...	...	...	73	7	3	...	5	2	...	1	1	5	...	...	2	1	...	1	5	...	...	2	3	1	1
Whooping Cough	70	34	4	...	...	...	...	...	1	...	109	13	...	5	5	2	2	...	4	4	3	...	5	1	4	1	7	1	1	...	2	...	4
Diphtheria	8	47	9	1	1	...	...	1	...	...	67	3	...	4	1	2	...	...	2	3	...	1	3	...	...	1	2	...	...	2	1	...	2
Influenza with Pulmonary Complications specified.	1	...	...	1	4	4	8	7	14	...	39	2	...	1	2	2	1	...	2	1	1	...	1	...	...	...	...	...	...	...	...	...	1
Influenza—other	4	...	2	...	1	4	3	1	17	...	32	2	...	...	4	...	...	...	...	1	...	...	1	...	...	...	...	1	1	1	2	...	1
Erysipelas	10	2	...	...	...	...	...	3	6	...	21	2	1	...	3	1	...	...	1	1	...	...	1	...	...	...	...	...	...	2	...	...	...
Infantile Paralysis	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lethargic Encephalitis	...	...	2	3	...	3	3	3	1	...	15	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	1	2
Epidemic Cerebro-Spinal Meningitis.	3	3	1	...	...	1	...	...	...	...	8	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Epidemic Diseases	1	...	2	2	1	3	2	1	6	...	18	2	...	...	2	...	...	...	1	...	...	...	1	...	1	...	...	...	...	...	...	...	...
Tuberculosis of Respiratory System.	1	...	4	70	117	142	89	57	39	...	519	82	7	8	15	17	6	3	10	19	8	...	9	4	5	2	10	4	5	12	11	4	13
Tuberculosis—Meninges, &c.	4	14	6	1	2	2	2	...	...	...	31	6	...	...	1	...	1	...	1	3	...	...	1	...	1	...	1	...	1	...	...	...	3
Other Tuberculosis Diseases	2	6	4	5	6	5	2	3	2	...	35	7	...	...	1	...	...	...	2	...	...	...	...	...	1	...	3	...	...	...	...	1	...
Cancer	1	3	3	5	16	98	172	329	493	...	1,120	148	6	11	46	30	17	5	20	49	9	5	23	9	13	5	30	4	8	15	24	13	29
Diabetes	...	...	3	8	5	7	14	48	75	...	160	14	2	1	4	5	1	...	7	5	1	...	2	...	2	2	5	1	2	4	2	...	4
Other General Diseases	32	8	21	19	24	22	51	68	55	...	312	40	5	6	22	7	2	4	3	21	4	...	6	1	3	3	3	2	5	5	6	3	6
Meningitis	17	19	12	9	9	6	...	4	2	...	78	7	1	2	1	2	...	...	2	5	1	3	...	...	...	1	...	...	1	3	2	...	1
Cerebral Hæmorrhage	...	...	...	1	3	25	59	146	232	...	466	73	5	5	22	16	4	4	7	22	6	2	7	4	8	4	10	...	7	6	12	4	15
Convulsions of Infants	19	1	...	...	...	...	...	...	...	...	20	2	...	1	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	1	...	2
Other Diseases of Nervous System.	4	6	11	17	22	49	51	62	151	...	373	42	3	3	14	12	3	1	9	20	4	1	6	4	1	3	7	2	7	8	8	1	17
Diseases of the Heart	3	5	16	38	45	107	186	366	1,010	...	1,776	246	12	27	66	56	23	4	35	88	21	9	36	6	23	12	36	10	18	46	33	8	67
Other Diseases of the Circulatory System.	1	...	...	...	8	16	24	53	138	...	240	33	3	3	9	10	7	5	6	6	3	2	5	...	2	2	6	...	1	4	4	1	11
Bronchitis	11	7	1	...	3	3	8	[illegible]	158	...	219	23	4	6	11	6	4	1	5	8	3	...	10	...	2	3	4	1	...	2	5	2	11
Pneumonia	146	88	22	36	37	95	91	113	284	...	912	136	12	13	41	41	10	9	11	53	13	2	20	5	9	4	24	4	9	15	17	11	35
Other Diseases of Respiratory System.	5	4	2	1	4	9	20	17	57	...	119	17	1	3	3	4	1	2	5	5	2	...	3	2	...	1	6	...	1	1	4	...	3
Diseases of the Stomach	8	1	...	...	4	15	22	11	17	...	78	10	1	2	4	2	...	1	...	...	2	...	2	1	...	2	3	2	...	...	...	...	2
Diarrhœa and Enteritis	163	62	6	1	...	6	6	6	36	...	286	28	4	3	33	8	5	6	8	21	2	1	8	...	6	4	5	2	2	7	6	...	12
Appendicitis	1	2	12	15	12	8	17	9	12	...	88	5	...	3	1	3	...	...	2	6	...	...	4	1	1	...	...	...	...	2	6	...	2
Hernia-Intestinal Obstruction	5	...	2	4	7	7	10	18	36	...	89	4	...	1	3	6	...	...	2	5	1	...	1	...	1	...	3	...	...	1	1	2	1
Cirrhosis of Liver	...	...	...	1	3	9	17	14	20	...	64	17	...	...	4	2	...	...	1	3	1	...	2	1	2	...	1	1	...	...	...	...	...
Peritonitis	1	3	5	1	3	3	4	2	5	...	27	6	...	...	...	...	2	...	...	3	1	...	1	...	...	...	...	...	1	1	...	...	1
Other Diseases of Digestive System.	4	2	5	7	18	18	30	31	30	...	145	15	1	4	5	7	...	...	[illegible]	[illegible]	1	...	1	1	2	1	[illegible]	...	2	5	2	1	3
Bright's Disease, Acute and Chronic.	1	4	11	17	27	62	83	118	264	...	587	62	5	10	29	27	12	1	10	21	3	...	18	2	5	5	17	2	3	11	20	4	16
Other Genito-Urinary Diseases	4	3	...	6	12	20	23	23	86	...	177	20	1	3	11	5	3	1	3	10	2	1	3	...	2	2	3	1	...	1	4	1	5
Puerperal Septicæmia	...	...	...	16	17	7	1	...	...	...	41	1	2	1	5	2	...	...	1	2	...	...	1	...	2	...	1	...	...	...	...	...	...
Other Puerperal Diseases	...	...	...	27	60	33	1	...	...	...	121	17	2	...	4	6	2	1	2	12	1	3	2	...	...	1	5	1	...	2	3	2	3
Prematurity	313	...	...	...	...	...	...	...	...	...	313	39	4	5	6	9	3	3	2	18	6	1	8	2	5	3	6	...	1	10	5	8	12
Other Developmental Diseases of Infants.	285	9	4	...	...	...	...	...	...	...	298	19	5	15	9	18	3	2	4	20	7	...	11	...	5	1	2	1	3	7	7	1	10
Senility	...	...	...	...	...	...	...	6	347	...	353	57	2	7	6	8	2	1	11	15	3	1	8	...	1	1	12	1	4	2	8	1	8
Suicide	...	...	...	17	21	33	23	19	14	...	127	30	1	...	4	6	1	1	2	5	...	...	4	1	...	...	6	1	...	...	4	1	3
Accident	13	37	86	67	75	84	71	81	103	...	617	120	11	8	26	24	6	3	6	22	10	2	9	1	7	5	10	2	11	14	6	7	11
All other Causes	12	6	5	13	12	14	12	12	26	...	112	18	2	...	8	4	1	1	...	7	2	...	3	...	...	...	3	...	...	1	1	...	5
Totals	1,161	406	284	420	588	910	1,112	1,659	3,837	...	10,467	1,379	166	161	438	352	122	60	193	521	121	34	229	47	115	70	240	44	96	193	210	78	32
Deaths under 1 year	1,161	...	...	...	...	...	...	...	...	...	1,161	118	19	23	64	40	14	11	17	74	19	1	39	4	18	11	20	4	7	29	24	11	52

ach Municipality and in Age Groups, year 1927

Manly.	Marrickville.	Mascot.	Mosman.	Newtown.	North Sydney.	Paddington.	Petersham.	Randwick.	Redfern.	Rockdale.	Ryde.	St. Peters.	Strathfield.	Vaucluse.	Waterloo.	Waverley.	Willoughby.	Woollahra.	Kuring-gai Shire.	Auburn.	Bankstown.	Cabramatta and Canley Vale.	Dundas.	Ermington and Rydalmere.	Fairfield.	Granville.	Holroyd.	Lidcombe.	Liverpool.	Parramatta.	Hornsby Shire.	Warringah Shire.	Total Extra Metropolitan.	Causes of Death:
...	1	...	1	...	...	...	1	1	...	...	...	1	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	1	...	...	3	Typhoid Fever.
...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	2	Measles.
...	...	2	1	5	3	...	2	4	1	2	...	...	1	...	1	4	2	...	1	1	1	...	1	...	...	6	1	1	1	1	1	...	15	Scarlet Fever.
2	3	2	...	4	1	2	1	6	4	...	3	5	...	...	4	3	4	3	1	1	1	1	...	1	...	1	1	2	...	1	1	...	14	Whooping Cough.
...	2	1	1	2	3	1	3	2	2	6	6	...	...	...	...	5	4	1	1	1	1	1	1	...	2	...	3	2	...	...	2	2	15	Diphtheria.
2	...	1	1	1	2	...	...	5	3	...	1	1	1	...	...	6	...	1	...	...	...	2	...	...	5	...	2	1	1	1	1	...	13	Influenza with Pulmonary Complications specified.
1	2	...	...	1	1	1	...	3	1	...	...	...	1	...	...	...	3	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...		Influenza—other.
2	1	...	...	...	...	...	...	2	...	1	1	...	...	...	...	...	1	...	1	1	...	...	...	...	...	1	...	...	...	1	1	...	4	Erysipelas.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Infantile Paralysis.
...	1	1	...	...	2	...	...	1	...	...	...	...	...	...	...	...	2	1	1	...	...	...	...	...	1	...	...	1	...	3	...	...	5	Lethargic Encephalitis.
...	...	...	1	...	1	...	...	2	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Epidemic Cerebro-Spinal Meningitis.
...	...	1	3	...	...	1	...	2	1	...	...	...	...	...	...	2	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	Other Epidemic Diseases.
4	19	6	6	14	36	18	15	22	13	7	5	6	2	3	9	18	16	14	12	7	15	2	2	2	2	7	6	32	...	11	22	6	119	Tuberculosis of Respiratory System.
1	...	...	...	1	2	...	1	3	1	1	1	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	Tuberculosis—Meninges, &c.
...	2	3	...	2	1	1	1	3	...	...	1	...	...	...	...	3	1	1	1	...	1	...	...	...	...	4	1	2	...	3	1	...	12	Other Tuberculosis Diseases.
30	41	14	30	34	42	40	38	72	21	27	16	8	11	8	13	63	34	33	26	14	15	3	2	4	6	17	10	45	6	22	25	8	177	Cancer.
6	4	2	4	9	7	10	7	9	3	9	2	1	1	1	1	4	4	5	7	2	2	...	1	...	...	4	2	3	2	4	1	1	22	Diabetes.
4	15	1	8	11	17	9	8	14	7	6	10	5	...	...	4	9	6	15	6	5	9	...	1	...	7	6	4	8	4	5	7	3	59	Other General Diseases.
1	1	1	1	6	2	...	2	6	4	1	3	2	...	1	1	5	3	1	3	1	1	1	1	...	1	2	...	2	...	...	2	...	11	Meningitis.
17	19	5	7	12	31	16	24	41	14	17	9	9	5	2	7	29	29	19	11	11	4	...	1	5	2	6	7	11	6	17	11	6	87	Cerebral Hæmorrhage.
...	1	...	...	1	2	1	...	...	...	...	1	...	...	...	1	...	1	...	4	...	...	...	1	...	...	...	1	...	...	...	...	...	2	Convulsions of Infants.
8	10	3	9	12	22	14	12	21	5	12	7	4	5	4	4	18	13	8	6	6	1	1	...	13	2	8	5	20	4	17	5	2	84	Other Diseases of Nervous System.
32	91	17	37	43	76	50	40	91	42	45	37	20	27	8	15	69	67	49	38	24	24	4	5	27	14	41	21	104	12	44	33	26	379	Diseases of the Heart.
4	10	6	6	4	6	8	5	14	5	9	6	4	1	2	2	9	4	7	2	1	2	...	...	6	1	3	1	5	2	11	2	4	42	Other Diseases of Circulatory System.
1	13	...	1	12	10	12	5	11	4	8	1	2	3	1	2	8	5	5	5	8	4	1	1	...	2	2	4	10	2	5	3	1	43	Bronchitis.
14	52	7	9	16	39	27	16	49	36	22	12	9	3	4	7	35	27	18	15	15	13	7	2	6	14	11	10	17	5	26	10	8	144	Pneumonia.
2	4	...	2	6	5	1	5	5	1	2	1	3	...	1	1	7	6	1	2	3	1	...	...	1	3	1	...	4	2	3	4	1	25	Other Diseases of Respiratory System.
1	4	1	3	5	5	2	2	5	2	4	1	1	...	1	...	2	1	3	1	...	1	...	...	...	...	2	...	2	...	2	...	1	8	Diseases of the Stomach.
4	10	6	1	4	12	2	7	12	11	5	4	6	...	...	7	9	10	4	1	7	4	...	3	11	4	13	3	10	...	4	9	3	71	Diarrhœa and Enteritis.
3	1	2	1	1	3	4	2	6	3	3	2	...	5	...	1	7	2	2	2	2	2	1	...	...	...	3	...	...	...	1	...	1	10	Appendicitis.
2	7	3	1	1	5	3	2	6	1	1	2	...	...	...	1	4	4	3	3	...	...	1	...	...	...	1	...	3	1	3	1	2	14	Hernia-Intestinal Obstructions
3	...	1	...	...	5	3	2	6	3	1	1	...	...	...	...	3	...	1	...	...	...	...	...	...	...	...	...	4	...	1	...	...	5	Cirrhosis of Liver.
...	1	1	...	1	1	1	...	1	1	...	1	...	...	...	1	2	...	...	...	1	1	...	...	...	...	...	1	3	...	...	1	...	7	Peritonitis.
2	5	2	5	8	4	2	5	18	3	1	...	2	...	1	2	5	3	6	3	...	1	2	1	1	1	...	1	4	...	3	4	...	18	Other Diseases of Digestive System.
21	28	1	11	18	35	18	15	31	17	12	5	7	4	2	10	26	12	20	11	1	4	3	1	4	3	3	4	8	1	9	2	10	53	Bright's Disease, Acute and Chronic.
5	10	3	3	8	11	7	7	9	4	3	2	1	...	4	2	4	2	6	4	...	...	1	...	...	...	5	1	1	...	3	1	...	20	Other Genito-Urinary Diseases.
...	...	...	...	4	5	1	1	4	...	1	3	...	1	...	...	...	1	1	1	...	1	...	3	...	...	1	1	...	...	1	...	1	8	Puerperal Septicæmia.
1	4	2	3	3	8	1	1	8	3	...	1	2	...	...	...	6	4	4	1	2	1	...	...	...	2	2	...	...	1	3	1	1	13	Other Puerperal Diseases.
5	8	3	3	18	10	13	6	19	14	6	4	5	3	4	5	10	8	7	6	6	7	...	...	...	1	9	2	2	4	6	7	3	47	Prematurity.
7	12	1	3	10	12	11	9	20	9	7	5	4	1	...	5	11	9	6	6	2	3	4	2	1	...	7	2	5	4	3	6	3	47	Other Developmental Diseases of Infants.
6	11	2	6	13	17	12	5	16	16	8	4	4	6	2	4	25	13	11	13	4	6	5	...	8	2	4	3	7	13	22	3	3	152	Senility.
1	3	2	3	2	5	5	1	6	5	...	...	...	1	...	2	8	5	2	6	1	1	...	...	...	...	2	1	2	3	2	2	3	17	Suicide.
8	16	8	9	15	23	16	18	31	19	15	4	9	3	3	3	28	12	11	12	10	16	1	3	...	5	15	3	7	7	10	11	7	95	Accident.
3	5	1	1	2	3	...	5	6	4	3	1	...	...	...	5	8	4	4	1	3	...	1	...	...	...	1	1	10	1	2	2	1	22	All other Causes.
205	421	112	181	309	480	313	274	597	284	246	165	123	85	86	120	459	323	283	210	140	155	43	31	95	80	183	105	422	84	251	185	107	1,836	Totals.
14	40	11	9	45	35	33	28	55	47	31	22	22	6	6	19	40	27	29	18	23	29	6	4	1	9	29	11	14	8	18	19	10	181	Deaths under 1 year.

All deaths have been corrected to the usual place of permanent residence of diseased, where known.

Inspection of Restaurants, Tearooms, Butchers' Shops, Milk Vendors, Common Lodging-houses; Barbers' Shops, &c., in the City.

In connection with the general administration of the City Health Officer's Department, it may be stated that there are 20,108 premises, 247 restaurants, 194 tearooms, 50 grill-rooms, 185 fruit shops, 58 fish shops, 89 butchers' shops, 405 barbers' shops, and 950 milk vendors in the city.

The following is a summary of the routine work during the year :—

1. Number of complaints received and dealt with	20
2. House-to-house inspection work, re-inspections, inspections re restaurants, garbage receptacles, streets, lanes, &c.	42,348
3. Inspections of butcheries, meat depots, poulterers, &c.	6,624
4. Inspections made under Pure Food Act Regulations	11,950
5. Inspections of common lodging-houses	52
6. Inspections under Dairies Supervision Act	3,131
7. Investigations of smoke nuisance	41
8. Inspections made by lady inspector	1,265
9. Investigations of infectious diseases	297
10. Notices served	4,598
11. Number of premises referred to the City Building Surveyor	604
12. Plans reported on	922
13. Number of premises visited by rat-catching staff	14,520
14. Number of complaints investigated by rat-catchers	417
15. Number of traps set and poison baits laid	59,005
16. Number of rats caught	3,217
17. Number of milk vendors registered	1,127
18. Number of milk samples taken for analyses	1,020
19. Disinfection of premises	392
20. Prosecutions against offenders	670
21. Total amount of fines inflicted	£1,261 4s. 0d.

Legal Proceedings, Sydney Municipal Council.

The following is a record for the year 1927, with regard to legal proceedings undertaken by the Sydney Municipal Council :—

Sydney Corporation Act and By-laws	505
Public Health Act	17
Pure Food Act	115
Police Offences Act	21
Electric Lighting Act	11
Vagrancy Act	1

Four hundred and eighty-one (481) notices were served in the city proper under the Pure Food Act; 922 plans were inspected and reports made thereon by the City Health Officer's staff.

In all there were 4,598 notices served in the city under the Public Health Act, the Sydney Corporation Act, the Pure Food Act, the Dairies Supervision Act, and the Noxious Trades Act.

Of the 1,020 samples of milk taken in the city, 16 were found not in conformity with the standard. There were 9 convictions for selling milk deficient in milk fat.

Septic Tanks.

During the year 1927, 171 septic tanks were submitted to the Board of Health for consideration, of this number 164 were granted approval for construction, the remainder (7) being refused.

2.—Hunter River Combined Sanitary District.

Staff.

H. G. Wallace, M.B., B.S., D.P.H. (Melb.), Medical Officer of Health.
George H. Godfrey, Assoc. Roy. San. Inst. (Lond.), Senior Sanitary Inspector.
Nancy B. McKay, Cert. Roy. San. Inst. (Lond.), Nurse Inspector.
Beatrice M. Durie, Clerk.

REPORT OF THE MEDICAL OFFICER OF HEALTH FOR YEAR 1927.

I have the honor to submit the following report of the Public Health work done in this district during the year 1927.

Description.—The Hunter River Combined Sanitary District consists of eighteen municipalities and five shires, together with the harbour of Port Hunter. The total area of the district, exclusive of Port Hunter, is 1,768 square miles, the district extending in outlying portions up to 70 miles from headquarters at Newcastle. From time to time, on instructions from Head Office, Sydney, the staff is required to carry out duties in areas beyond the boundaries of the district.

Population.—The estimated mean population of the district in 1927 was 197,340, an increase of 5,560 compared with the population in 1926. The inhabitants are chiefly engaged in industrial, coal-mining, and pastoral occupations.

Administration.—The staff of the District Headquarters at Newcastle consists of one Medical Officer of Health, one Senior Sanitary Inspector, one Nurse Inspector, and one clerk. Each municipal and shire council in the district is a local health authority charged with the administration of the "Public Health Acts," and each employs one or more health inspectors. Of the twenty-three local government areas included in the district, ten (10) employ health inspectors holding the health inspector's certificate of the Royal Sanitary Institute, or the Sydney Technical College. The rest are without this qualification. In numerous cases, in addition to their duties as health inspectors, the inspectors carry out the duties of one or more other positions, such as town clerk, engineer, working foreman, &c. In consequence, some health activities, especially housing inspections and inspections under the Pure Food Act, are liable to be overshadowed by other duties, and part of this work is carried out by officers of the Department of Public Health. For example, only five councils took samples of milk or other food or drugs for analysis during the year, and only five undertook prosecutions under the Public Health Acts or allied acts.

Vital Statistics.—Figures showing the population of each municipality and shire, together with the chief causes of death at all ages, and of infants under one year of age, are set out in tables appended to this report. It is to be noted that, for the first time, all births have been allotted to the municipalities or shires where the mother resided, and all deaths to the usual place of residence of deceased, so that comparisons with figures for previous years are not quite correct.

The total births in the district numbered 4,929, giving a crude birthrate of 24·9.

The deaths from all causes numbered 1,894, giving a death-rate of 9·59.

Diseases of the heart were again the commonest cause of death, 324 deaths being attributed to this cause. The next most common cause was cancer, accounting for 152 deaths, followed by pneumonia with 151, and accident 130. Diarrhœa and enteritis came eighth with 81 deaths, of which 61 were at ages of under 5 years.

Cancer as a cause of death has gradually climbed from sixth place twenty years ago to second place in each of the past five years.

Infectious Diseases.—The following tables show the distribution of notifiable infectious diseases in the district during 1927.

Typhoid Fever, 1927.

Table I.—Showing distribution of cases of Typhoid Fever in the Hunter River Combined Sanitary District, the number treated in hospital, and the attack and death rates per thousand of the population during the year 1927—47 cases, ; 6 deaths.

District.	Estimated Population.	Cases notified.	Removed to Hospital.	Attack-rate per 1,000.	Death-rate per 1,000.
Municipalities—					
Adamstown	4,620	.....	.....	.....	.....
Carrington	3,090	1	1	·35	·35
Cessnock	14,080	5	5	·31	·07
Greta	1,580	.....	.....	.....	.....
Hamilton	18,520	2	2	·10	.....
Lambton	4,250	.....	.....	.....	.....
Maitland East	3,980	1	1	·25	.....
Maitland West	9,030	5	5	·55	·11
Merewether	7,870	2	1	·25	.....
Morpeth	1,070	.....	.....	.....	.....
Newcastle	15,070	4	4	·26	.....
New Lambton	5,460	.....	.....	.....	.....
Raymond Terrace	820	.....	.....	.....	.....
Singleton	3,300	.....	.....	.....	.....
Stockton	5,440	5	4	·91	.....
Wallsend	7,200	1	1	·13	.....
Waratah	16,940	.....	.....	.....	.....
Wickham	12,660	1	1	·08	.....
Shires—					
Bolwarra	3,320	3	3	·90	.....
Kearsley	24,680	10	10	·40	·04
Lake Macquarie	24,080	5	4	·27	·04
Port Stephens	3,870	.....	.....	.....	.....
Tarro	6,410	2	2	·31	.....
Total	197,340	47	44	·02	·03

The number of cases of typhoid fever notified is the lowest ever recorded for this district. Of the 47 cases notified, 44 (or 93 per cent.) were treated in hospital. The incidence rate per thousand of population was 0·23. The average number of notifications per year during the previous five years was 80.

It is very regrettable that there are still some medical practitioners in the district who do not insist on the testing of all cases for the "carrier" state before ceasing attendance on the case. This appears to be a matter requiring further legislation. The provision of better laboratory facilities in the district would, no doubt, cause this routine testing to be more closely adhered to.

The cases, grouped according to age incidence, are shown in the following table :—

Typhoid Fever, 1927.

Ages.	Male.	Female.	Total.
All ages	33	14	47
Under 1 year	...	...	...
1- 4 years	2	1	3
5-14 ,,	9	2	11
15-24 ,,	11	7	18
25-34 ,,	1	1	2
35-44 ,,	7	...	7
45-54 ,,	1	3	4
55-64 ,,	...	...	...
65 and over	...	...	...
Age not stated	2	...	2
Total	33	14	47

Deaths from Typhoid Fever.—There were six deaths from typhoid fever during 1927, giving a death-rate of 0 03 per 1,000. compared with 0,028 for whole State. The fatality rate was 12·7 per cent.

DIPHTHERIA, 1927.

TABLE 2.—Showing distribution of cases of Diphtheria in the Hunter River Combined Sanitary District, the number treated in hospital, and the attack and death rates per 1,000 of the population during the year 1927—546 cases, 16 deaths :—

District.	Estimated Population.	Cases notified.	Removed to Hospital.	Attack-rate per 1,000.	Death-rate per 1,000.
Municipalities—					
Adamstown	4,620	16	12	·24	.....
Carrington	3,090	4	4	1·28	.....
Cessnock	14,080	73	69	5.19	.....
Greta	1,580	3	3	1 89	·63
Hamilton	18,520	28	27	1 51	·10
Lambton	4,250	6	6	1·41	.....
Maitland East	3,980	16	16	4 20	.....
Maitland West	9,030	22	21	2·43	·11
Merewether	7,870	21	21	2·67	·25
Morpeth	1,070	5	3	4·66	.....
Newcastle	15,070	23	19	1·52	.....
New Lambton	5,460	13	8	2·38	.....
Raymond Terrace	820	.....	.....	.....	.....
Singleton	3,300	17	10	5·15	.....
Stockton	5,440	15	7	2·75	·18
Wallsend	7,200	18	16	2·5	.. ...
Waratah	16,940	44	43	2·59	·24
Wickham	12,660	25	21	1·97	.....
Shires—					
Bolwarra	3,320	7	6	2·10	.....
Kearsley	24,680	86	82	3·44	·12
Lake Macquarie	24,080	68	62	2·82	·04
Port Stephens	3,870	12	10	3·10	·26
Tarro	6,410	24	14	3·74	.....
Total	197,340	546	480	2·76	·08

Diphtheria.—Five hundred and forty-six cases of diphtheria, with 16 deaths, were notified during the year. The average number of cases notified per year during the previous five years was 340;

The disease unusually prevalent was widespread, only the smallest municipality, Raymond Terrace; remaining free.

The incidence according to age and sex is shown from the following table :—

Ages.	Male.	Female.	Total.
All ages	261	285	546
Under 1 year	8	9	17
1– 4 years	116	128	244
5–14 ,,	102	104	206
15–24 ,,	15	15	30
25–34 ,,	12	15	27
35–44 ,,	2	5	7
45–54 ,,	1	2	3
55–64 ,,	...	2	2
65 and over	...	1	1
Age not stated	5	4	9
Total	261	285	546

The incidence rate per 1,000 of population was 2·76. The death-rate was 0·08 compared with 0·07 for the whole State.

Schick Test.—During the year the Schick Test was applied to 967 children at two schools in Cessnock and five at Singleton, and one each at Martin's Creek, Tea Gardens and Nelson's Bay. Publicity was given to the method of testing by public lectures and newspaper articles, and the response of parents was encouraging, though there is room for a great deal of improvement in this respect. A special effort of publicity work is required for this test, as testing and subsequent immunization appears at present to be the chief method of combating the spread of the disease.

Scarlet Fever, 1927.

Table 3.—Showing distribution of cases of Scarlet Fever in the Hunter River Combined Sanitary District, the number treated in hospital, and the attack and death rates per 1,000 of the population, during the year 1927 : 305 cases, 2 deaths.

District.	Estimated Population.	Cases notified.	Removed to Hospital.	Attack-rate per 1,000.	Death-rate per 1,000.
Municipalities—					
Adamstown	4,620	1	.....	·21	.....
Carrington	3,090	7	4	2·26	.....
Cessnock	14,080	36	5	2·55	·08
Greta	1,580	4	1	2·53	.....
Hamilton	18,520	31	5	1·67	.....
Lambton	4,250	6	.....	1·41	.....
Maitland East	3,980	8	3	2·03	.....
Maitland West	9,030	7	3	·77	.....
Merewether	7,870	10	2	1·27	.....
Morpeth	1,070	.....	.....	.....	.....
Newcastle	15,070	18	7	1·19	.....
New Lambton	5,460	9	1	1·64	.....
Raymond Terrace	820	1	.....	1·21	.....
Singleton	3,300	12	1	3·63	.....
Stockton	5,440	5	.....	·91	.....
Wallsend	7,200	13	4	·18	.....
Waratah	16,940	29	8	1·71	.....
Wickham	12,660	12	.....	·94	.....
Shires—					
Bolwarra	3,320	6	1	1·81	.....
Kearsley	24,680	51	22	2·06	.....
Lake Macquarie	24,089	21	2	·87	.....
Port Stephens	3,870	2	.....	·51	·26
Tarro	6,410	16	6	2·49	... ...
Total	197,340	305	75	1·54	·01

Scarlet Fever.—Three hundred and five cases of scarlet fever were notified, compared with an average of 264 per annum during the previous five years. The incidence rate per 1,000 of population was 1·54. The type of the disease was generally mild, though there were 2 deaths, giving a death-rate of 0·01 compared with 0·05 for the whole State. There were no localised epidemics, and there were no reasons to suspect the milk supply in any case.

The following table shows the age and sex incidence of the cases notified.

Ages.	Male.	Female.	Total.
All ages	89	216	305
Under 1 year	1	1	2
1– 4 years	31	52	83
5–14 ,,	38	109	147
15–24 ,,	10	28	38
25–34 ,,	8	20	28
35–44 ,,	1	2	3
45–54 ,,	...	1	1
55–64 ,,	...	...	...
65 and over	...	...	...
Age not stated	...	3	3
Total	89	216	305

Cerebro-Spinal Meningitis.

Eight cases were notified, distributed as follows: Adamstown, 1 case; West Maitland, 2 cases; Newcastle, 1 case; New Lambton, 1 case; Kearsley Shire, 2 cases; Lake Macquarie, 1 case.

One death was reported from Newcastle. All the cases were from young persons, as shown in following table :—

Ages.	Male.	Female.	Total.
All ages	4	4	8
Under 1 year	1	2	3
1– 4 years	1	1	2
5–14 ,,	1	1	2
15–24 ,,	1	...	1
25–34 ,,	...	...	...
35–44 ,,	...	...	...
45–54 ,,	...	...	...
55–64 ,,	...	...	...
65 and over	...	...	...
Total	4	4	8

Infantile Paralysis, 1927.

Two cases were reported, neither having fatal termination. The incidence per 1,000 of population was 0.01.

Pulmonary Tuberculosis, 1927.

Fifty-eight cases of pulmonary tuberculosis were notified, compared with 63, the average number notified annually during the previous five years. There were 66 deaths from the disease. The following table shows the age and sex incidence of reported cases :—

Ages.	Male.	Female.	Total.
All ages	30	28	58
Under 1 year	...	...	...
1– 4 years	...	...	...
5–14 years	1	...	1
15–24 years	2	5	7
25–34 ,,	4	16	20
35–44 years	9	4	13
45–54 ,,	6	...	6
55–64 years	2	1	3
65 and over	3	2	5
Age not stated	3	...	3
Total	30	28	58

The Throat and Chest Dispensary continued under the direction of Dr. Ethel Byrne during the year, Nurse Inspector McKay attending at each session. This clinic appears to be badly located, and has not met with the support that might have been expected from medical men in the district. Now that the work of the Tuberculosis dispensaries is to be co-ordinated by the Director of the Tuberculosis Division, it would appear desirable to remove the clinic to the Newcastle Hospital as soon as accommodation can be made available there.

Dengue Fever.

With the exception of a few cases in Newcastle and suburbs, probably imported infections, there was only one outbreak of dengue fever in the district—at West Maitland during March.

It is estimated that over 90 per cent. of the population became affected. The local Chamber of Commerce called a public meeting to discuss the methods of prevention and several addresses were given. However, the Council subsequently declined to have the ordinance dealing with mosquito prevention made applicable.

It is gratifying to note that this ordinance has now been adopted by every Council in Newcastle and suburbs, and much valuable work has been done in mosquito eradication.

Plague.

One temporary rat-catcher was employed by the Department at Newcastle during the year, who accounted for 1,852 rats trapped on the wharves and in the stores along the water front. In addition, the Newcastle Council continued to pay a bonus of 6d. per head for all rats brought to the Council's depot at Cook's Hill, 528 rats being paid for.

The Navigation Department continued to lay poison baits along the water front, 4,060 being laid during the year, of which 1,767 were taken, presumably by rats.

As far as possible rats were examined daily at the Newcastle Councils' depot, but no signs of plague infection were found in any rat examined. The new wharves at Lee Wharf are being constructed so as to minimise rat harbourage, but there are miles of wharves in the harbour which require improvement in this respect.

Housing.

During the year there were 2,196 new dwelling houses erected in the district. In addition, numbers of large houses were converted into flats. The coal fields still continue to provide some of the worst examples of bad housing, especially near Catherine Hill Bay. An attempt was made to have an area of land here resumed by the Government for subdivision, but circumstances prevented it being carried out.

The housing shortage in Newcastle and suburbs appeared to be less acute than during the previous two or three years, though the population is increasing fairly rapidly. Possibly the proposed increase of Federal and State aid to intending home-builders will meet the case, though an increase in the cost of construction appears inevitable.

As in previous years, a number of inspections of dwellings were carried out for councils whose health inspectors were not qualified to undertake this work. Wherever possible repairs were effected to render houses habitable, though in one or two cases it was found necessary to have the buildings condemned as unfit for habitation.

Infantile Mortality.

Births in the district during 1927 numbered 4,929, and deaths of infants under one year of age numbered 310, giving an infantile mortality of rate 62·9, compared with an average of 64 for the previous five years.

Deaths from diarrhœa and enteritis totalled 48.

Maternal Mortality.

The number of deaths from causes connected with childbirth in 1927 was 30, showing a death rate in child-birth of 6·1 per thousand births, compared with 4·6 in 1926. Twenty of these, or 66·6 per cent. occurred in private hospitals or similar institutions. There is great need for publicity regarding the necessity for pre-natal examinations, and clinics it is suggested should be established at every public hospital, and also in connection with each baby clinic for which an honorary medical officer is appointed.

Private Hospitals.

Inspections of the 54 registered private hospitals in the district were made at intervals during the year. Of these, 45 were for lying-in cases only. The total number of beds available in private hospitals in the district was 334. The inspections showed that these hospitals were being satisfactorily conducted and registers were much better kept than in previous years.

Pure Food Act.

During the year an inspector from Head Office staff visited the district at intervals. A report of his work is not included here. Owing to the lack of interest in this work by local Councils it would appear advisable that a whole-time pure food inspector should be stationed permanently in this district.

Noxious Trades Act.

Inspections of all premises were made prior to licensing and also at irregular intervals during the year. Premises were on the whole found to be kept in a satisfactory condition.

Hospital Accommodation.

Convalescent Hospital, New Lambton.—This activity of the Newcastle Hospital is meeting a long-felt need in connection with the institution, and has served to relieve the congestion in the main wards. The convalescent home now has a capacity of 40 beds. A large area was added to the grounds during the year and will enable further extensions to be undertaken in future years.

Infectious Diseases Hospital.

A commencement has not yet been made in connection with the erection of this very much needed institution. Several times during the year the whole of the available isolation accommodation at district hospitals was occupied. Fortunately expedients were devised to cope with the threatened overcrowding of existing wards at the district hospitals, but any extensive epidemic could not adequately be dealt with here. It is hoped that finances will permit of this urgently necessary work being commenced during the coming year.

Venereal Diseases Clinic.

The facilities for treating venereal diseases at Newcastle are still extremely inadequate, and although the plans and estimates for the proposed new out-patient building at the Newcastle Hospital, in which the venereal diseases clinic will be incorporated, have been revised and completed during the year, the building has not yet been commenced.

Miscellaneous Services.

During the year approximately 200 medical examinations were made, comprising—

(*a*) All first-class pilots stationed at Newcastle.
(*b*) Candidates for employment in the public service, or public servants requiring medical examination on account of sickness or invalidity.
(*c*) Young persons without means seeking employment in factories for the first time.
(*d*) Applicants for admissions to hospitals or asylums.
(*e*) Casual and permanent employees of the Hunter District Water Supply and Sewerage Board.
(*f*) Claimants for compensation under the Workers Compensation Act, 1926.

Under instructions from Head Office, visits were made outside the districts to Tamworth, Mummulgum and Grafton *re* leprosy cases; to Ballina and Kyogle *re* public hospitals; to Runnymede *re* tuberculosis amongst aboriginals; to Martin's Creek and Tea Gardens *re* Schick testing, and to Stroud and Dungog *re* sanitary matters, &c.

Bacteriological Laboratory.

Examination of a limited number of specimens from medical practitioners in the district were made, but owing to the limited time available for this work the total number of specimens examined was small.

Vital statistics tables are appended.

H. G. WALLACE,
Medical Officer of Health.

*70407—M

TABLE 4.—Births and Deaths—Each Municipality—City of Newcastle and adjacent Suburbs—1927.

Municipality.	Estimated Mean Population, 1927.	Births.						Deaths.					Number who died in Public Institutions (included in foregoing).
		Total Births.			Ex-nuptial (included in foregoing).			M.	F.	Total.	Deaths under 1 year.		
		M.	F.	Total.	M.	F.	Total.				M.	F.	
Newcastle City	15,070	141	111	252	14	15	29	135	75	210	7	7	124
Adamstown	4,620	55	57	112	1	4	5	21	21	42	...	5	17
Carrington	3,090	46	37	83	3	3	6	21	12	33	6	1	17
Hamilton	18,520	216	177	393	8	8	16	84	78	162	11	11	44
Lambton	4,250	63	64	127	2	...	2	14	18	32	2	6	8
Lambton, New	5,460	77	69	146	1	3	4	22	16	38	7	6	11
Merewether	7,870	91	83	174	2	5	7	34	27	61	11	9	35
Stockton	5,440	68	63	131	5	3	8	33	48	81	7	2	49
Wallsend	7,200	68	65	133	5	3	8	48	34	82	12	4	27
Waratah	16,940	313	301	614	9	13	22	73	16	139	13	12	61
Wickham	12,660	152	150	302	14	9	23	70	53	123	18	8	53
Total	101,120	1,290	1,777	2,467	64	66	130	555	448	1,003	94	71	446

HUNTER RIVER COMBINED SANITARY DISTRICT.

TABLE 5.—Districts comprised in Newcastle and Suburbs, together with seven outside Municipalities, Cessnock, Greta, East and West Maitland, Morpeth, Raymond Terrace, Singleton; and five Shires, Bolwarra, Kearsley, Lake Macquarie, Port Stephens, and Tarro, enumerated below.

Births and Deaths, each Local Area—Hunter River Combined Districts, 1927.

Municipality or Shire.	Estimated Mean Population, 1927.	Births.						Deaths.			Deaths under 1 year.		Number who died in Public Institutions (included in foregoing).
		Total Births.			Ex-nuptial. (included in foregoing).								
		M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	
Newcastle and Suburbs	101,120	1,290	1,777	2,467	64	66	130	555	448	1,003	94	71	446
Cessnock	14,080	239	197	436	9	6	15	71	40	111	15	12	54
Greta	1,580	21	20	41	...	...	...	3	5	8	...	...	3
Maitland, East	3,980	43	54	97	2	1	3	26	15	41	1	...	16
,, West	9,030	110	90	200	8	7	15	65	53	118	9	7	69
Morpeth	1,070	12	13	25	...	...	...	6	8	14	...	...	7
Raymond Terrace	820	9	9	18	...	...	...	11	7	18	2	...	2
Singleton	3,300	42	50	92	4	3	7	12	16	28	3	4	13
Bolwarra Shire	3,320	36	38	74	1	...	1	16	15	31	...	2	10
Kearsley	24,680	319	307	626	4	12	16	127	95	222	22	17	92
Lake Macquarie Shire	24,080	282	297	579	8	11	19	132	74	206	18	15	70
Port Stephens Shire	3,870	35	51	86	...	...	...	9	11	20	1	1	10
Tarro Shire	6,410	89	99	188	2	5	7	40	34	74	7	9	20
Total	197,340	2,527	2,402	4,929	102	111	213	1,073	821	1,894	172	138	812

Table 6.—Causes of Death of Children under 1 year—Hunter River Combined Sanitary District—1927.

Causes of Death.	NEWCASTLE AND SUBURBS.											REMAINDER OF COMBINED DISTRICT.											TOTAL DEATHS.
	Newcastle.	Adamstown.	Carrington.	Hamilton.	Lambton.	New Lambton.	Merewether.	Stockton.	Wallsend.	Waratah.	Wickham.	Total.	Cessnock Shire.	Greta.	Maitland, East.	Maitland, West.	Morpeth.	Raymond Terrace.	Singleton.	Bolwarra Shire.	Kearsley Shire.	Lake Macquarie Shire.	Port Stephens Shire.	Tarro Shire.	
Scarlet fever	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1
Whooping cough	2	...	...	3	...	...	...	...	1	1	...	7	3	...	...	...	...	...	...	...	1	3	...	...	14
Diphtheria	...	...	...	...	...	...	1	...	...	1	...	2	...	...	...	...	...	...	...	...	...	...	...	...	2
Influenza	...	...	...	...	1	1	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	2
Dysentery	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cerebro-spinal meningitis	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tuberculosis—intestines, peritoneum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other General Diseases	...	...	...	...	...	...	1	...	...	2	...	3	...	...	...	1	...	...	...	...	1	...	...	...	5
Meningitis	...	...	...	...	...	...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	1	3
Convulsions	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1
Bronchitis	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	...	1	...	...	1	1	...	1	5
Pneumonia	2	2	...	3	4	2	2	2	2	3	7	29	2	...	...	1	...	...	1	1	3	4	1	...	42
Diarrhœa and enteritis	4	...	2	5	1	1	2	...	2	2	7	26	3	...	...	5	...	...	1	...	3	4	...	6	48
Intestinal obstruction	...	1	...	...	...	...	1	...	...	...	1	3	...	...	...	...	...	...	...	...	...	...	...	...	3
Diseases of the Skin	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	1	...	...	...	...	...	...	...	...	2
Congenital malformations	1	...	...	2	...	1	3	2	5	3	...	17	...	...	...	2	...	...	3	...	4	2	...	1	29
Congenital debility	1	...	...	1	...	...	4	...	2	2	4	14	3	...	1	1	...	...	1	...	1	2	...	...	23
Premature birth	4	1	4	6	1	5	3	3	2	6	4	39	8	...	...	3	...	1	1	...	13	14	1	4	84
Injury at birth	...	...	...	1	...	1	1	1	1	1	1	7	5	...	...	...	...	...	...	1	3	1	...	1	18
Other diseases peculiar to early infancy	...	1	...	...	1	1	...	1	...	1	2	7	2	...	...	1	...	...	...	...	6	1	...	1	18
Accident	...	...	...	...	...	...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	2
All other causes	...	...	1	1	...	1	...	...	...	1	...	4	...	...	...	1	...	...	...	...	1	1	...	1	8
Total	14	5	7	22	8	13	20	9	16	25	26	165	27	...	1	16	...	2	7	2	39	33	2	16	310

No. 7.—Causes of Death—Hunter River Combined Districts—1927.

Causes of Death.	NEWCASTLE AND SUBURBS.												REMAINDER OF COMBINED DISTRICTS.											Deaths in Institutions (included in foregoing).	AGES.									Total Deaths.
	Newcastle.	Adamstown.	Carrington.	Hamilton.	Lambton.	Lambton, New.	Merewether.	Stockton.	Wallsend.	Waratah.	Wickham.	Total.	Cessnock.	Greta.	Maitland, East.	Maitland, West.	Morpeth.	Raymond Terrace.	Singleton.	Dolwarra Shire.	Kearsley Shire.	Lake Macquarie Shire.	Port Stephens Shire.	Tarro Shire.		Under 1	1 - 4	5 - 13	14 - 19	20 - 29	30 - 39	40 - 49	50 - 64	65 and over.	
Typhoid Fever	...	...	1	...	...	...	...	...	...	...	...	1	1	...	...	1	1	...	...	...	1	1	...	...	6	...	...	...	...	1	3	1	1	...	6
Measles	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	1	1	...	1	...	...	...	...	...	...	2
Scarlet Fever	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	1	...	1	...	...	...	...	...	...	2
Whooping-cough	2	...	...	4	...	...	...	...	1	3	1	11	3	...	...	...	...	...	...	...	1	6	...	...	6	14	6	...	...	...	1	...	...	...	21
Diphtheria	...	...	...	2	...	...	2	1	...	4	...	9	...	1	...	1	...	...	...	...	3	1	1	...	16	2	11	3	...	...	...	...	...	...	16
Influenza (with Pulmonary Complications Specified)	2	...	...	...	1	...	...	...	3	...	...	6	...	...	...	1	...	...	...	...	...	2	1	...	6	...	1	...	1	1	1	1	4	1	10
Influenza (Other)	...	...	...	...	1	1	...	...	...	...	...	2	...	...	1	...	...	...	...	...	1	...	1	...	1	2	1	...	...	...	...	...	2	2	5
Erysipelas	1	...	...	...	...	...	1	...	1	1	...	4	...	...	...	...	...	...	...	...	...	...	...	...	3	1	...	...	...	...	...	2	1	4
Infantile Paralysis	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lethargic Encephalitis	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Epidemic Cerebro-spinal Meningitis	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1
Other Epidemic Diseases	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	2	2
Tuberculosis of Respiratory System	9	1	1	3	3	4	2	3	2	4	6	38	6	...	1	2	...	...	1	...	12	3	...	3	30	...	...	...	3	13	19	15	14	2	66
Tuberculosis-Meninges, and Nervous System	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	1	...	...	2	...	...	...	...	...	...	2
Other Tuberculous Diseases	...	...	...	...	...	...	1	...	...	1	...	2	1	...	...	...	...	...	...	...	1	1	...	...	4	...	2	...	1	...	2	...	1	...	5
Cancer	13	4	6	14	1	3	3	9	7	12	8	80	12	1	3	11	2	1	1	4	14	16	1	6	53	...	2	...	1	1	5	20	50	73	152
Diabetes	...	1	...	2	...	...	3	...	1	...	...	7	...	...	5	...	2	2	...	...	...	6	...	...	10	...	...	1	...	1	3	1	7	9	22
Other General Diseases	7	2	1	6	...	2	1	1	3	8	7	38	5	...	1	9	1	...	2	1	10	4	1	3	44	4	3	9	4	5	8	10	20	12	75
Meningitis	...	...	...	...	...	...	1	...	...	2	...	3	1	...	...	...	1	...	...	...	3	2	...	1	8	3	1	3	...	...	2	...	2	...	11
Cerebral Hæmorrhage	17	1	1	12	1	1	2	5	6	11	6	63	5	...	3	8	1	...	2	4	8	10	1	1	34	...	...	...	...	...	6	8	27	65	106
Convulsions of Infants	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1
Other Diseases of the Nervous System	12	...	...	5	1	1	1	6	2	7	2	37	4	...	...	1	2	2	1	1	10	7	3	2	38	1	5	4	1	4	5	14	10	27	71
Diseases of the Heart	39	9	2	35	11	8	11	18	13	8	17	171	14	3	5	21	1	3	7	6	29	42	2	20	90	...	...	6	2	8	11	25	81	191	324
Other Diseases of the Circulatory System	7	...	1	4	...	...	...	4	1	2	1	20	3	...	2	3	...	...	1	1	5	3	...	2	12	...	...	...	...	...	1	2	10	27	40
Bronchitis	2	...	...	4	...	...	2	4	3	2	3	20	...	...	...	1	...	2	...	...	6	4	...	1	8	5	2	1	...	...	...	2	3	21	34
Pneumonia	18	6	2	10	6	3	3	7	8	9	16	88	8	1	2	11	...	...	2	4	16	15	1	3	87	42	27	6	2	7	8	11	17	31	151
Other Disease of the Respiratory System	1	...	...	6	...	...	...	2	...	5	1	15	1	...	...	1	...	...	...	2	5	6	...	...	9	...	...	1	...	2	1	4	6	16	30
Diseases of the Stomach	3	...	1	1	...	...	...	...	...	4	1	10	3	...	...	2	...	...	...	...	1	2	...	1	10	5	1	2	...	...	2	2	4	3	19
Diarrhœa and Enteritis	13	2	2	9	1	1	3	...	2	5	10	48	4	...	2	6	...	...	1	2	5	6	1	6	46	48	20	4	...	1	1	2	5	...	81
Appendicitis	2	...	1	...	1	...	...	...	...	...	1	5	...	...	1	2	...	...	...	...	...	1	...	1	9	...	...	...	1	3	1	1	1	3	10
Hernia, Intestinal Obstruction	...	1	...	1	1	...	1	...	1	...	5	10	...	...	...	...	...	...	...	1	1	...	...	...	10	3	...	...	...	...	2	1	3	3	12
Cirrhosis of the Liver	2	...	...	2	...	...	1	...	...	1	...	6	...	...	...	...	...	...	1	...	...	1	...	...	5	...	...	...	...	...	1	2	5	...	8
Peritonitis	...	...	...	...	...	...	...	1	...	1	1	3	...	...	...	...	...	...	...	...	...	...	...	1	4	...	...	1	...	...	2	...	...	1	4
Other Diseases of the Digestive System	2	...	1	3	1	1	...	1	1	4	1	15	...	1	...	...	1	...	1	1	4	1	...	...	16	1	2	1	1	...	6	1	6	6	24
Bright's Disease (Acute and Chronic)	12	...	1	8	1	...	2	5	7	4	2	42	4	...	2	6	...	1	1	3	14	10	...	3	37	...	...	...	...	...	5	12	28	41	86
Other Genito-Urinary Diseases	4	1	...	2	...	3	...	1	3	3	3	20	3	...	2	7	...	...	...	...	1	7	...	...	32	...	...	...	...	2	7	1	7	23	40
Puerperal Septicæmia	1	...	1	1	...	...	...	...	...	2	1	6	...	...	...	...	...	...	...	...	2	2	...	...	6	...	...	...	...	5	5	...	...	...	10
Other Puerperal Diseases	1	...	1	1	...	1	1	...	...	1	2	8	3	...	...	...	1	...	...	...	7	1	...	...	14	...	...	...	2	5	9	4	...	...	20
Prematurity	4	1	4	6	1	5	3	3	2	6	4	39	8	...	...	3	...	1	1	...	13	14	1	4	31	84	...	...	...	...	...	...	...	...	84
Other Developmental Diseases of Infants	8	1	...	5	1	3	8	4	8	7	8	53	10	...	1	4	...	...	4	1	15	6	...	3	32	88	5	3	1	...	...	...	...	...	97
Senility	8	3	...	5	...	...	3	...	2	4	5	30	2	...	3	4	...	2	...	...	8	7	1	5	11	...	...	...	...	...	...	...	1	61	62
Suicide	3	1	...	...	...	...	...	...	...	3	2	9	...	...	...	1	1	1	...	...	3	3	...	...	3	...	...	...	...	5	...	2	7	4	18
Accident	12	7	6	10	...	...	6	5	4	9	6	65	9	1	3	8	...	2	1	...	21	12	3	5	67	2	9	23	10	20	16	22	15	13	130
All Other Causes	3	1	...	1	...	1	...	1	1	5	3	16	...	...	3	3	...	1	...	...	1	4	1	2	12	2	2	1	...	1	1	2	6	16	31
Total	210	42	33	162	32	38	61	81	82	139	123	1003	111	8	41	118	14	18	28	31	222	206	20	74	812	309	100	72	30	87	132	167	343	654	1,894

3.—Broken Hill, 1927.

The position of Medical Officer of Health at Broken Hill has been vacant since 31st December, 1925, but an appointment is now being made.

An investigational visit in connection with the general sanitation of the municipality was made by an officer of this department during the year.

Description of the District.

Broken Hill's latitude is 31 degrees 58 minutes South and its longitude 141 degrees 29 minutes East. Elevation, approximately 1,000 feet. Mean annual rainfall over a period of 39 years since the first complete yearly record was kept, 9¼ inches; rainfall for 1927, 383 points only. Area within municipal limits, 27 square miles. Population, 27,506. Density of population, 1018·74 persons per square mile. Occupied dwellings, 6,344. Average number of persons per dwelling, 4·33.

Vital Statistics.

The Broken Hill Council has supplied the following figures for 1927.:—

The death rate, birth rate and infantile mortality rate are given below for 1926 and 1927 :—

	1926.	1927.		1926.	1927.
Deaths, males ...	193	178	Death rate per 1,000 of population ...	10·8	10·42
,, females ...	111	109			
Total ...	304	287			
Births, boys ...	377	427	Birth rate per 1,000 of population ...	26·5	29·41
,, girls ...	367	382			
Total ...	744	809			

Infantile Mortality Rate.—Deaths of infants under 1 year per 1,000 registered births :—

1926.	1927.		1926.	1927.
55	50	giving a rate of	73	61·80

The 50 deaths (under 1 year) in 1927 were classified as prematurity and other developmental causes, 23; intestinal diseases, 9; broncho-pneumonia, 7; asthenia, 3; all other causes, 8.

Twenty-two deaths occurred under 1 week; 6, one week and under one month; 2, 1–2 months; 10, 3–5 months; 10, 6–11 months.

The death rates and infantile mortality rates for the years 1920 to 1927 are given below :—

	1920.	1921.	1922.	1923.	1924.	1925.	1926.	1927.
Death rate	13·69	13·46	14·70	11·26	17·69	10·0	10·8	10·42
Infantile mortality rate	111·79	122·85	97·00	91·68	146·00	69·76	73·00	61·80

Notifiable Infectious Diseases.—The following notifications were received from Broken Hill during 1926 and 1927 :—

Typhoid Fever.				Scarlet Fever.				Diphtheria.				Cerebro-Spinal Fever.				Infantile Paralysis.				Tuberculosis.	
1926.		1927.		1926.		1927.		1926.		1927.		1926.		1927.		1926.		1927.		1926.	1927.
C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	D.	D.
95	5	62	5	82	1	14	...	60	1	8	...	3	...	1	...	...	...	1	...	27	25

1927.

SECTION III.

Report upon the State Hospitals and Asylums under the Control of the Director-General of Public Health.

SECTION III.

REPORT upon the State Hospitals under the Control of the Director-General of Public Health.

1.—THE COAST HOSPITAL, SYDNEY: REPORT FOR THE YEAR 1927.

The Medical Superintendent to The Director-General of Public Health.

Sir,

I have the honor to submit the following Report on the working of the Coast Hospital during the year 1927.

The Staff during the year has been as follows:—

Honorary Medical Staff.

Honorary Physicians.—Alfred Walter Campbell, M.B., M.S. (Edin.), M.D.; James McDonald Gill, M.D. (Lond.), L.R.C.P. (Lond.), M.R.C.S. (Eng.); Hazlett Hamilton Marshall, L.R.C.P.S. (Edin.), L.F.P.S. (Glas.), M.B., M.S. (Edin.); Alan Worsley Holmes àCourt, M.D. (Syd.), M.R.C.P. (Lond.), Medaille d'Epidemics.

Honorary Surgeons—Sir Charles Clubbe, L.R.C.P. (Lond.), M.R.C.S. (Eng.); George Henry Abbott, M.B., Ch.M. (Syd.); Sir Alexander MacCormick, M.B., M.S., M.D. (Edin.), M.H.F.R.C.S. (Eng.), H.F.R.C.S. (Edin); John Colvin Storey, M.B., Ch.M. (Syd.), F.R.C.S. (Eng.); Edward Thomas Thring, F.R.C.S. (Eng.), L.R.C.P. (Lond.); Harry Cecil Rutherford Darling, M.D. (Lond.), F.R.C.S. (Eng.); Earle Christian Grafton Page, M.B. (Syd.); Thomas Maynard Furber, M.B. (Syd.); James Harold Willmott Leadley, M.B., M.S. (Syd.),

Honorary Gynæcologists.—Joseph Foreman, L.S.A. (Lond.), L.M.R.C.P. (Edin.), M.R.C.S. (Eng.); Ralph Worrall, M.D., M.S. (Ire.).

Honorary Ophthalmic Surgeons.—Charles Gordon McLeod, M.B., M.S. (Edin.); Albert Tange Dunlop, M.B., M.S. (Syd.).

Honorary Ear, Nose, and Throat.—Herbert Huff Johnston, M.B. (Syd.).

Honorary Dermatologist.—Wahab McMurray , M.D., M.S. (Ire.).

Honorary Urogolist.—Robert Joseph Silverton, M.B., M.S. (Syd.).

Honorary Radiographer.—Malcolm Frizell, M.B. (Syd.).

Honorary Orthopædic Surgeon.—Edmund Bruce Mortimer Vance, M.B., M.S.

Resident Medical Staff.

Medical Superintendent.—Reginald Jeffery Millard, M.B., Ch.M. (Syd.), D.P.H. (Camb.), C.M.G., C.B.E.

Senior Assistant Medical Officers.—Robert Maxwell McMaster, M.B., M.S. (Syd.), D.S.O.; Cecil Julian Manning Walters, M.B., Ch.M. (Syd.); Robert James Wherry Malcolm, M.B., M.S. (Syd.).

Junior Medical Officers.—8.

Manager.—Mr. R. Goldrick.

Matron.—Miss C. M. Burne.

Sub-Matron—Miss C. M. Dickson, R.R.C.

Dispenser—Miss E M. Kirton.

Clerk and Storekeeper.—Mr. W. Dwyer.

Sisters—15.

Nurses—195.

Other Female Staff—60.

Attendants (Ward)—17.

Other Male Staff—53.

STATISTICS.

Detailed tables of statistics will be found in the Appendix, but I may summarise here the more important of these.

I.—The following table is a comparative general statement for 1927 and the previous year :—

	1926.	1927.
Remaining in Hospital on 31st December	657	647
Admitted during the year	10,175	10,163
Total cases under treatment during the year	10,754	10,820
Discharges, including deaths	10,097	10,173
Deaths	601	574
Death-rate per cent. of total discharges	5·9	5·6
Average daily number of occupied beds	668·09	709·96
Average stay of patients (in days)	23·74	27·8

For the year the number of admissions was 12 less than in 1926, and the average daily number of occupied beds was 709·96 as against 668·9 in 1926. The average stay of patients was 27·8 days.

II. *Infectious Diseases.*—The following table summarises the work of the year in regard to these, and affords a comparison with 1926. In this table the "cases" are cases treated until discharge or death, and the fatality is reckoned on the total cases treated. Cases remaining in hospital on 31st December, 1927, are not included in these figures for the year :—

	1926.			1927.		
	Cases.	Deaths.	Fatality.	Cases.	Deaths.	Fatality.
Typhoid Fever	34	4	11·7	59	4	6·8
Measles	705	35	4·9	91	1	1·1
Scarlet Fever	1,557	38	2·4	2,403	53	2·2
Whooping-cough	39	5	12·8	43	5	11·6
Diphtheria	994	13	1·3	1,062	15	1·4
Influenza	254	5	1·9	145	1	0·69
Erysipelas	75	5	6·6	119	10	8·4
Other Epidemic Diseases	65	...	...	62	2	3·2

Typhoid Fever.—The number of cases under treatment was more than in 1926; the fatality was lower.

Scarlet Fever.—Was more prevalent than in 1926—8,243 cases being notified in the whole metropolitan area during 1927 as against 3,424 during 1926, and the cases treated at the Coast Hospital showed a corresponding increase. There were 53 deaths.

Diphtheria.—In the Metropolis the cases notified amounted to 2,112 in 1927 as against 2,048 in 1926; and the cases treated at the Coast Hospital were 1,062 as against 994 in 1926. The percentage of notified cases which came to this hospital for treatment was—in 1926, 49·2 per cent.; and in 1927, 50·3 per cent. Of the 15 fatal cases, 6 died within seven days of admission. Intubation was performed on 31 patients and tracheotomy on 11.

Antitoxin was administered in the hospital to 1,269 cases in the doses shown in the following table :—

Antitoxin.	Cases.	Percentage of Total Cases.	Antitoxin.	Cases.	Percentage of Total Cases.
2,000 units	21	1·65	36,000 units	...	...
4,000 „	90	7·09	38,000 „	...	...
6,000 „	246	19·38	40,000 „	1	0·08
8,000 „	360	28·40	42,000 „	...	...
10,000 „	377	29·70	44,000 „	...	...
12,000 „	35	2·76	46,000 „	...	...
14,000 „	14	1·10	48,000 „	...	...
16,000 „	39	3·08	50,000 „	...	...
18,000 „	5	0·30	52,000 „	...	...
20,000 „	76	5·90	60,000 „	...	...
22,000 „	...	...	70,000 „	...	...
24,000 „	...	...	74,000 „	...	...
26,000 „	...	...	80,000 „	...	...
28,000 „	...	...	90,000 „	...	...
30,000 „	5	0·30	100,000 „	...	...
32,000 „	...	...	120,000 „	...	...
34,000 „	...	...			

Altogether 3,808 cases of typhoid fever, measles, scarlet fever, diphtheria, influenza, meningitis, and whooping cough were treated. In the Appendix will be found some further details of these cases, viz. :—

Table III.—Age and sex distribution of cases discharged or died during the year.

Table IV.—Number of cases of diphtheria, scarlet fever, and typhoid notified within the Metropolis, and the percentage of these cases treated at the Coast Hospital in each of the years 1902–1927, inclusive.

Table V.—Duration of stay in hospital of cases of typhoid fever, measles, scarlet fever, whooping cough, and diphtheria.

Table VI.—Fortnightly admissions of all patients during 1927.

Table VII.—Classification of diseases treated during 1927.

Table VIII.—Operations performed during 1927.

Table XI.—Summary table showing the work of the Coast Hospital and its cost each year from 1884 to 1927.

Abortion.—During the year 581 patients were treated for abortion. The admissions for this condition have increased of late years at a startling rate, as indicated by the following figures, which show the ratio of abortion cases to all cases treated in successive years 1919–1927 inclusive :—

Year.	Total patients treated.	Abortions.	Percentage.	Year.	Total patients treated.	Abortions.	Percentage.
1919	5,941	54	0·91	1924	8,667	436	5·03
1920	6,313	193	3·06	1925	8,935	497	5·56
1921	6,952	237	3·41	1926	10,754	620	5·76
1922	7,339	354	4·82	1927	10,820	581	5·3
1923	8,769	381	4.34				

3. *Expenditure.*—Table IX gives a detailed statement of the working expenses for 1926 and 1927, from which it will be seen that the total expenditure increased from £94,153 9s. 9d. to £107,564 18s. 11d. in 1927, and the average cost per occupied bed increased from £140 18s. 7d. to £151 10s. 1d.

Instruction by lectures and demonstrations was, as usual, given to the Nurses by the Medical Staff and Matron; and in invalid cookery by a specially engaged teacher (Miss Shepherd), as in former years. Examinations were held in accordance with regulations, and nurses passed as follows :—

First-year examination	...	53
Second-year	,, ...	44
Third-year	,, ...	34
Fourth-year	,, ...	40

During the year 27 certificated nurses left the hospital to take up private nursing, and to take positions in other hospitals. In addition to these, 7 Coast Hospital nurses passed the A.T.N.A. Obstetric Examination, after having the necessary training at Montrose Hospital, whilst 39 nurses passed the Nurses Registration Board Examination.

Sick leave was granted to 145 nurses, amounting in the aggregate to 3,316 days. Of these nurses, some were ill on more than one occasion, there being 247 cases of illness altogether. Of the sick nurses 3 had diphtheria, 135 days; 16 had scarlet fever, 680 days. All the nurses recovered satisfactorily.

5. *Laboratory.*—The following Table summarises the work done in the hospital laboratory month by month. In all, 15,024 cultures were examined for diphtheria. The practice was continued of accepting no diphtheria culture as negative unless found so after forty-eight hours' incubation.

1927.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Cultures examined for diphtheria—													
1. After 12–24 hours' incubation	1,167	1,211	1,838	1,474	1,636	1,387	1,685	1,092	995	909	955	675	15,024
2. Negative after 12–24 hours' incubation, and re-examined after 48 hours	981	938	1,379	1,068	1,276	1,141	1,414	961	910	739	783	506	12,096
3. Positive for diphtheria at second examination	38	71	122	80	67	47	54	23	12	7	16	16	553
4. Percentage of positives in second examination	3·9	7·6	8·8	7·5	5·3	4·1	3·8	2·4	1 3	0·9	2·0	3·2	4·6
Blood—Full counts	16	14	27	16	20	36	24	26	26	25	29	16	275
Leucocyte counts	46	36	33	18	36	42	24	38	57	31	31	27	419
Parasites, &c.	2	3	3	1	...	1	1	2	...	2	4	6	25
Cultures	4	2	3	...	7	7	5	11	8	4	2	4	57
Widals	39	15	17	12	19	19	10	15	14	8	14	15	197
Fluids—Cerebro-spinal	4	1	6	6	1	10	6	10	20	5	17	5	91
Body fluids	1	4	9	3	4	5	9	12	7	14	13	10	91
Fæces	22	6	15	9	5	3	10	3	1	4	2	6	86
Pus—For organisms, &c.	8	11	10	6	6	15	11	17	11	85	26	14	220
Smears—Gonococci	59	53	57	53	67	66	90	52	42	56	62	62	719
Leprosy	1	...	...	...	1	...	4	...	2	1	...	...	9
Diphtheria and Vincent's Angina	7	5	3	4	...	4	1	2	3	3	4	1	37
Sp. pallidum	7	8	4	5	4	5	2	2	1	5	4	4	51
Hairs and Scales for fungi	3	3	...	1	...	...	...	2	...	1	...	2	12
Sputum for T.B.	79	91	58	58	98	125	132	132	128	65	106	101	1,173
Urines—Bacteriological	27	6	10	6	4	1	7	4	1	6	1	5	78
Bacteriological and pus, &c.	53	37	44	56	65	43	84	56	30	44	38	41	591
Deposits only	7	7	7	5	11	20	8	11	18	11	11	6	122
Chemical	10	5	12	19	15	13	13	7	9	10	11	17	141
Vaccines prepared	4	6	6	9	6	7	4	7	5	15	12	6	87
Blood—Sugar	25	16	12	32	11	7	40	74	65	88	101	78	549
Typing for transfusion	9	...	2	2	5	7	28	10	7	8	16	...	94
Totals	2,581	2,478	3,585	2,863	3,297	2,964	3,612	2,546	2,360	2,139	2,242	1,607	32,244

Auxiliary Branch at Prince of Wales Hospital, Randwick.—An important development was the opening in April, of two wards, each of thirty beds, at the Prince of Wales Hospital, Randwick. These wards had been built and used for Military patients, but had been empty for some years. An agreement was arranged with the Repatriation Department, whereby that Department undertook the feeding of patients and staff on a per capita basis. The wards have been kept fully occupied by transfer of convalescent and chronic male patients from the Coast Hospital. Staffing and administration is controlled from the Coast Hospital and a Medical Officer visits the wards every morning as a routine, and oftener if required.

The principal works carried out during 1927 by the Hospital Staff were the following :—

(1) Improvements, &c. :—Nurses' Dining Hall—Re-arrangement of kitchen and sub-matron's office, enclosing verandah and enclosing and asphalting yard. Infectious division kitchen—Erecting coal bunker and fence. Operating theatre—Making wheel tables and cupboard. Laundry—Shelving for sorting room, enclosing back verandah with sliding sashes, installing wash-hand basins, constructing concrete settling tank at dam, installing new cold water service throughout, oil tank on roof, and storage for bulk oil supplies. Weigh-bridge—Erecting concrete retaining wall, regrading road and ramping approaches. Ward XVI—Alterations sister's office. New Units—Overhauling and repairing fittings throughout, new steam service, Ward XX, installing new sterilizers, Wards XVIII, XIX, XX, XXIII, installing street lights, Wards XVIII, XIX, XX, XXI. Ward XIII—New hot water service. Military nurses quarters and La Perouse nurses quarters—Installing new boilers. Street light service—Renewing mains. Randwick Auxiliary Wards—General repairs, &c., installing meters and power points.

(2) Renovation—Painting annexes, &c., Wards I, V, VII, VIII, IX, X, XII, XIV, XVI, XVII, XXI, and at medical superintendent's quarters, matron's quarters and sub-matron's office; painting interior of operating theatre; painting interior No. 6 cottage, male staff quarters dining room, laboratory exterior, working patients dormitories Nos. 1 and 2; painting exterior and roof.

(3) General improvements of flower gardens, lawns and vegetable gardens.

I have, &c.,

R. J. MILLARD,

Medical Superintendent.

R. GOLDRICK, Manager.

TABLE I.—General Statement of the working of the Hospital from 1st January to 31st December, 1927.

	Males.	Females.	Total.
Number of beds available in the General Division on 31st December, 1927	202	200	402
" " Infectious Division	.....	.....	311
" " Nurses' Sick Room	.....	4	4
Coast Hospital Auxiliary, Randwick	60	.....	60
Total accommodation	.....	.....	777
Number of inmates remaining in hospital on 31st December, 1926	293	364	657
" admitted during the year 1927	4,404	5,759	10,163
Total treated	4,697	6,123	10,820
Discharged—Cured	2,769	4,587	7,356
" Relieved	1,156	775	1,931
" Unrelieved	117	85	202
" No Disease	60	50	110
Died	301	273	574
Total number discharged, or who died	4,403	5,770	10,173
Remaining in hospital on 31st December, 1927	294	353	647

Average daily number resident	709·96
Average residence of discharged patients in days	27·8
Rate of mortality on total number who were discharged or who died	5·6
Total cost of maintenance and treatment of indoor patients	£107,564 18s. 11d.
Average cost of patients per annum	£151 10s. 1d.

	Males.	Females.	Total.	Total Visits.
Out-patients—				
Total number of individuals who received treatment	1,575	1,987	3,562	9,656
Total cost of Out-patient treatment	.....	.....	£1,109	.....

Hospital Staff on 31st December, 1927.

Medical and Administrative.	Number.	Nursing.	Number.	General.	Number.
Medical Superintendent	1	Sub-Matron	1	Foreman	1
Deputy Medical Superintendent	1	Asst.Sub-Matron	1	Artisans	11
Assistant Medical Officers	11	Sisters—		Attendants, Outdoor	9
Manager	1	Senior	9	,,	15
Matron	1	Junior	6	Telephone Attendants	4
Dispensers	3	Nurses—		Male Cooks	4
Clerks	8	Staff	19	Female Cooks	7
Laboratory Assistants	2	Pupil	176	,, Servants	34
X-Ray Assistant	1	Ward Attendants	17	Laundresses	11
		Housekeeper	1	Needlewomen	3
Total	29		230		99
				Total Staff	358

TABLE II.—Return showing the number of Wards, together with the cubic space and number of beds in each Ward, in the General and Infectious Divisions of the Coast Hospital for the year 1927.

Ward.	Cubic Space.	No. of Beds.	Cubic space per Bed in Ward.	Ward.	Cubic Space.	No. of Beds.	Cubic Space per Bed in Ward.
1	32,100	48	668	16	11,520	13	886
3	12,000	10	1,200	17	16,915	30	564
4	12,900	11	1,173	18 and verandah	53,062	50	1,263
5 and gallery	31,368	25	1,254	19 and verandah	53,062	50	1,263
6	10,800	8	1,350	20 and verandah	53,062	50	1,263
7	10,800	8	1,350	21 and verandah	53,062	50	1,263
8 and gallery	32,268	24	1,344	23 and verandah	53,062	50	1,263
9	12,000	8	1,500	24	19,023	25	761
10 and N. Sick Room	16,356	14	1,168	25	19,023	25	761
11	22,320	26	858	26	19,023	25	761
12	23,880	28	853	27	19,023	25	761
13	28,236	41	683				
14	43,520	43	1,012	Total	686,681	717	
15	28,296	39	943				

Coast Hospital Auxiliary, Randwick.

Ward.	Cubic Space.	No. of Beds.	Cubic space per Bed.
26	23,415	24	975
28	23,415	24	975

These figures do not include 6 beds on the verandah of each ward.

TABLE III.—Discharges and Deaths during 1927, distributed under sex and age.

	Age.	0-5		6-10		11-15		16-20		21-30		31-40		41-50		51-60		61-70		71-80		81-90		Total sexes.		Total cases treated	Total deaths.	Mortality per cent.
	Sex.	M	F.	M	F.	M.	F.	M	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Male.	Female.			
1 *Infectious Diseases*—																												
Typhoid Fever—																												
Discharges		2	...	...	4	5	12	5	2	5	11	2	3	1	3	...	...	...	...	...	...	...	...	20	35	59	4	6·4
Deaths		...	...	...	...	...	...	...	...	...	1	2	...	...	...	...	1	...	...	...	...	...	...	2	2			
Measles—																												
Discharges		18	20	3	7	1	6	4	8	8	7	1	3	1	1	1	1	...	...	...	...	...	...	37	53	91	1	0·9
Deaths		...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1			
Scarlet Fever—																												
Discharges		246	320	204	477	107	283	76	161	65	288	26	60	8	23	1	5	...	...	...	...	...	...	733	1,617	2,403	53	2·2
Deaths		13	12	4	5	2	2	2	3	...	6	2	1	1	...	...	...	...	...	...	...	...	...	24	29			
Whooping Cough—																												
Discharges		12	18	4	2	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	16	22	43	5	11·2
Deaths		3	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	2			
Diphtheria—																												
Discharges		305	259	137	148	37	37	3	20	23	30	12	22	6	7	...	...	...	1	...	...	...	...	523	524	1,062	15	1·4
Deaths		4	7	...	1	...	...	...	1	1	...	...	...	...	...	...	...	1	...	...	...	...	...	6	9			
Influenza—																												
Discharges		...	2	3	4	5	5	7	9	9	44	7	14	11	10	4	7	...	1	...	1	...	1	46	98	145	1	0·7
Deaths		...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...			
Plague—																												
Discharges		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Deaths		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...			
Cerebro-spinal Meningitis—																												
Discharges		...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	1	1	3	1	33·3
Deaths		...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1			
2. *Other Diseases*—																												
Discharges		150	138	82	79	147	135	275	362	699	962	526	686	363	408	259	225	171	116	45	32	7	6	2,724	3,149	6,367	494	7·2
Deaths		8	11	3	4	8	8	9	5	17	33	35	39	53	40	49	43	52	36	24	16	1	...	259	235			
Totals		761	790	440	732	312	488	381	572	828	1,383	613	829	445	492	314	282	224	154	69	49	8	7	4,395	5,762	10,173	574	...

TABLE IV.—Showing Number of Cases of Diphtheria, Scarlet Fever, and Typhoid Fever notified within the Metropolis, and the percentage of these cases treated at the Coast Hospital, in each of the years 1902–1927 inclusive.

	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.
Diphtheria.													
Cases notified in Metropolis...	393	600	738	695	659	659	880	1,144	2,109	1,834	2,632	2,045	2,244
Cases treated at Coast Hospital...	64	92	301	313	267	389	360	500	909	974	1,284	994	1,057
Percentage ...	16·3	13·33	40·8	45·03	40·51	59·03	40·91	43·7	43·10	53·10	48·7	48·6	47·10
Scarlet Fever.													
Cases notified in Metropolis...	1,253	2,910	1,361	1,136	1,869	976	1,153	836	394	369	304	555	1,801
Cases treated at Coast Hospital...	313	585	371	284	503	336	420	339	150	134	108	287	715
Percentage ...	24·98	20·10	27·26	25·00	27·45	34·43	36·43	40·55	38·07	36·31	35·5	51·71	39·7
Typhoid Fever.													
Cases notified in Metropolis...	610	833	665	561	485	505	678	700	812	488	535	566	644
Cases treated at Coast Hospital...	144	166	178	139	84	101	118	96	85	66	67	77	81
Percentage ...	23·6	19·93	26·77	24·77	17·32	20	17·4	13·71	10·46	13·52	12·5	13·78	12·58

	1915.	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	1927.
Diphtheria.													
Cases notified in Metropolis...	2,551	2,829	2,576	2,399	988	1,825	2,916	1,807	1,722	2,115	1,626	2,048	2,112
Cases treated at Coast Hospital. ...	940	1,149	1,259	1,241	501	834	1,360	905	854	1,115	787	1,018	997
Percentage...	36·85	40·6	48·8	51·7	50·72	45·6	46·6	50·00	49·5	52·7	48·4	49·7	47·2
Scarlet Fever.													
Cases notified in Metropolis...	4,726	2,715	1,217	765	424	468	511	653	1,541	2,241	1,916	3,424	5,840
Cases treated at Coast Hospital. ...	1,224	968	564	333	174	167	174	220	622	1,045	842	1,668	2,183
Percentage...	25·9	35·7	46·3	43·5	41·04	35·6	34	35·0	40·4	46·6	43·9	48·7	37·4
Typhoid Fever.													
Cases notified in Metropolis	821	654	403	327	335	366	342	246	265	242	230	245	184
Cases treated at Coast Hospital. ...	104	79	21	41	20	56	49	33	51	58	50	60	33
Percentage...	12·67	12·0	5·2	12·5	5·97	15·3	14·3	13·4	19·2	23·9	21·7	24·4	18·0

TABLE V.—Duration of Stay in Hospital of cases of Typhoid Fever, Measles, Scarlet Fever, Whooping Cough, and Diphtheria.

Duration of Stay.	Typhoid Fever.			Measles.			Scarlet Fever.			Whooping Cough.			Diphtheria.		
	Cured.	Died.	Total.	Cured.	Died.	Total.	Cured.	Died.	Total.	Cured.	Died.	Total.	Cured.	Died.	Total.
1 week or less	...	1	1	41	...	41	6	33	39	3	4	7	43	8	51
1— 2 weeks..	1	1	2	32	1	33	16	6	22	7	1	8	146	2	148
2— 3 „ ...	...	1	1	6	...	6	116	3	119	4	...	4	364	...	364
3— 4 „ ...	3	1	4	2	...	2	772	3	775	6	...	6	233	2	235
4— 5 „ ...	9	...	9	2	...	2	1,022	3	1,025	4	...	4	104	1	105
5— 6 „ ...	18	...	18	4	...	4	175	...	175	9	...	9	59	...	59
6— 7 „ ...	6	...	6	...	...	...	95	1	96	4	...	4	30	...	30
7— 8 „ ...	7	...	7	2	...	2	56	1	57	1	...	1	19	...	19
8— 9 „ ...	4	...	4	...	...	...	24	1	25	...	...	...	14	...	14
9—10 „ ...	1	...	1	...	...	...	18	2	20	...	...	...	12	...	12
10—11 „ ...	3	...	3	...	...	...	15	...	15	...	...	...	6	...	6
11—12 „ ...	1	...	1	...	...	...	11	...	11	...	...	...	4	...	4
12—13 „ ...	...	...	...	...	...	...	9	...	9	...	...	...	2	...	2
13—14 „ ...	...	...	...	1	...	1	4	...	4	...	...	...	4	...	4
14—15 „ ...	...	...	...	...	...	...	3	...	3	...	...	...	2	...	2
15—16 „ ...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1
16—17 „ ...	...	...	...	...	...	...	1	...	1	...	...	...	1	...	1
17—18 „ ...	...	...	...	...	...	...	2	...	2	...	...	...	...	...	...
18—19 „ ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
19—20 „ ...	2	...	2	...	...	...	...	...	...	...	...	...	2	...	2
20—21 „ ...	...	...	...	...	...	...	1	...	1	...	...	...	1	...	1
21—22 „ ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
22—23 „ ...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2
23—24 „ ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
24—25 „ ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
25—26 „ ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
26—27 „ ...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...
27—28 „ ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
28—29 „ ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
29—30 „ ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
30—31 „ ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
31—32 „ ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
32—33 „ ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Over 33 „ ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	55	4	59	90	1	91	2,350	53	2,403	38	5	43	1,047	15	1,062

TABLE VI.—Fortnightly Admission of cases during 1927.

	Fortnight ending—																									Totals
	Jan.		Feb.		March.		April.		May.		June.			July.		Aug.		Sept.		Oct.		Nov.		Dec.			
	14	28	11	25	10	24	7	21	5	19	2	16	30	14	28	11	25	8	22	6	20	3	17	1	15	31	
Typhoid Fever	3	2	1	6	4	4	...	1	1	...	2	2	2	...	1	1	...	...	1	...	2	...	...	...	...	...	33
Measles	11	6	3	1	2	1	1	1	3	1	2	2	1	...	1	...	3	...	5	6	2	3	7	7	5	2	76
Scarlet Fever	86	77	85	74	76	62	95	59	56	45	72	85	97	99	97	96	101	110	113	141	135	106	114	90	11	1	2,153
Whooping Cough	2	2	2	3	2	1	2	...	8	...	1	1	...	3	...	...	...	1	2	...	...	1	...	1	1	1	34
Diphtheria	43	49	61	55	53	64	61	64	78	69	56	38	51	42	48	19	17	23	16	13	15	11	20	21	8	...	997
Influenza	2	1	2	3	...	1	1	3	2	1	5	6	11	6	6	6	3	13	14	7	7	10	8	7	12	4	141
Other Disease	254	270	258	236	215	260	255	221	247	252	272	262	251	289	243	251	238	252	231	252	274	228	272	272	314	327	6,699
Total	401	407	412	379	352	393	415	349	395	368	410	397	413	439	396	373	357	391	382	419	435	357	421	408	351	335	10,163

TABLE VII.—Return of the Number of Persons under Treatment, the Order of Disease for which they were treated, and the Number of Deaths in each Order during the year 1927. (Includes cases remaining in Hospital on 31st December, 1927.)

	Discharged during the year.				Remaining in on 31st December, 1927.	Total.	Average number of days in Hospital.
	Cured.	Relieved.	Un-relieved.	Died.			
CLASS 1.—GENERAL DISEASES.							
Typhoid Fever	55	...	...	4	6	59	45·2
Malaria	2	2	...	...	...	4	23·2
Measles	89	1	...	1	2	91	12·5
Scarlet Fever	2,315	34	1	53	167	2,403	31·8
Whooping-cough	27	11	...	5	2	43	23·6
Diphtheria	1,021	25	1	15	21	1,062	24·7
Influenza	143	1	...	1	5	145	19·8
Mumps	12	1	...	...	2	13	10·9
Dysentery	...	1	...	...	...	1	36·
Erysipelas	107	2	...	10	1	119	15·6
Other Epidemic Diseases	55	4	...	2	...	61	10·7
Purulent Infection and Septicæmia	1	2	...	7	1	10	14·7
Anthrax	1	...	...	...	...	1	16·
Tetanus	...	...	...	2	...	2	2·
Rickets	...	...	...	...	...	...	...
Lethargica	1	...	...	1	...	2	54·
Tuberculosis of the Lungs	45	8	...	16	17	69	35·6
,, Acute Miliary	...	1	...	1	1	2	26·2
,, Meningitis	...	...	...	1	...	1	14·
,, Pott's Disease	...	6	2	1	...	9	425·1
,, Hips	1	8	4	...	2	13	82·3
,, Other	2	2	1	1	1	6	88·2
Poliomyelitis	...	1	2	1	...	4	142·2
Syphilis—Primary	3	50	2	3	4	58	33·5
,, Secondary	...	16	1	...	2	17	25·4
,, Tertiary	...	24	2	...	3	26	44·3
,, Cerebral and other Diseases	...	3	...	2	1	5	18·0
,, II 2, III 9	...	...	...	...	...	...	...
Soft Chancre	8	3	...	...	...	11	21·2
Gonorrhœal Disease	31	458	5	...	41	494	27·4
Cancer, &c., of the Mouth	9	3	5	5	2	22	27·5
,, of the Stomach and Liver	...	7	12	23	...	42	25·
,, of the Peritonæum, Intestines, and Rectum	4	7	3	9	...	23	50·7
,, of the Female Genital Organs	2	12	6	5	...	25	39·9
,, of the Breast	5	2	2	2	...	11	21·8
,, of the Skin	7	4	1	...	...	12	30·7
,, of other Organs	4	11	9	9	...	33	42·6
Tumours	7	2	...	...	...	9	16·5
Acute Rheumatism	54	32	...	2	15	88	31·3
Chronic Rheumatism and Gout	13	40	1	1	...	55	22·3
Diabetes	90	...	...	16	17	106	35·9
Exophthalmic Goitre	2	3	1	3	1	9	38·8
Hodgkin's Disease	...	...	2	2	...	4	14·6
Anæmia, Chlorosis	3	16	2	10	3	31	45·3
Leprosy	...	...	...	...	...	...	...
Alcoholism, Acute and Chronic	16	14	...	1	1	31	24·4
Other Chronic Poisoning and Lead	5	3	...	1	...	9	37·
Other General Diseases	2	11	1	1	60	15	13·
Diseases of Spleen	...	...	1	...	...	1	16·
Addison's Disease	...	...	...	...	...	...	...
Diseases of Pituitary Glands	...	...	...	...	...	...	...
Total, Class 1	4,142	831	67	217	378	5,257	...
CLASS 2.—DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.							
Meningitis	1	1	...	3	1	5	20·2
Cerebro-spinal Meningitis	2	...	...	5	...	7	41·3
Other Diseases of the Spinal Cord	...	2	1	3	...	6	168·5
Cerebral Hæmorrhage	1	15	1	20	5	37	20·4
General Paralysis of Insane	...	...	1	...	...	1	26·2
Other forms of Mental Alienation	...	2	6	...	8	8	39·
Epilepsy	1	5	4	...	...	10	12·6
Chorea	4	1	1	1	3	7	58·8
Locomotor Ataxia	...	4	2	...	...	6	35·8
Neuralgia and Neuritis	12	18	4	1	1	35	25·1
Other Diseases of the Nervous System	19	33	3	2	...	57	20·6
Diseases of the Eye and Adnexa	4	2	...	...	...	6	18·2
Diseases of the Ear	28	16	2	3	...	49	19·1
Encephalitis	3	...	...	1	...	4	43·
Cerebral Embolism and Thrombosis	1	10	...	...	...	11	23·9
Infantile Convulsions under 5	...	...	1	...	1	1	2·
Total, Class 2	76	109	26	39	19	220	...
CLASS 3.—DISEASES OF THE CIRCULATORY SYSTEM.							
Angina Pectoris	...	1	...	...	...	1	13·
Acute Endocarditis	...	10	2	13	1	25	40·8
Organic Diseases of the Heart	1	93	2	44	2	140	43·4
Diseases of the Arteries, Atheroma, &c.	...	...	1	1	...	2	9·
Embolism and Thrombosis	...	1	...	...	...	1	66·
Diseases of the Veins (Varices, Ulcer, and Hæmorrhoids)	42	11	6	...	17	59	21·5
Diseases of the Lymphatic System	13	6	...	...	...	19	18·5
Hæmorrhage	...	1	...	...	...	1	7·
Pericarditis	...	...	...	2	...	2	14·5
Aneurism	...	1	1	...	...	2	25·
Arteriosclerosis	12	...	...	1	...	13	28·8
Other Diseases—Circulatory System	1	...	...	...	9	1	4·
Total Class 3	69	124	12	61	29	266	...

TABLE VII.—Return of the Number of Persons under Treatment, &c.—*continued.*

	Discharged during the year.				Remaining in on 31st December, 1927.	Total.	Average number of days in Hospital.
	Cured.	Relieved.	Un-relieved.	Died.			
CLASS 4.—DISEASES OF THE RESPIRATORY SYSTEM.							
Diseases of the Nasal Fossæ	53	16	...	...	...	69	8·7
Diseases of the Larynx	13	3	1	...	...	17	8·1
Capillary Bronchitis	...	...	...	...	...	...	...
Acute Bronchitis	42	4	...	1	7	47	18·2
Chronic Bronchitis	12	34	...	1	...	47	32·8
Broncho-Pneumonia	25	2	...	10	1	37	28·5
Pneumonia	240	6	...	70	29	316	22·5
Pleurisy	47	7	...	1	12	55	27·5
Asthma	4	27	...	...	6	31	19·3
Other Diseases of the Respiratory System	2	2	...	3	...	7	62·
Congestion and Gangrene of Lung	...	...	...	1	...	1	5·
Bronchitis, Unspecified	4	...	...	...	7	4	19·
Total, Class 4	442	101	1	87	62	631	...
CLASS 5.—DISEASES OF THE DIGESTIVE SYSTEM.							
Gastritis	19	14	...	...	...	33	13·6
Diseases of the Teeth and Gums	...	...	...	...	...	...	...
Diseases of the Mouth and its Associated Organs	19	7	...	1	...	27	11·8
Diseases of the Pharynx	428	13	1	1	...	443	8·3
Ulcer of the Stomach	23	19	2	8	...	52	23·9
Other Diseases of the Stomach (Cancer excluded)	7	13	1	...	...	21	13·7
Diarrhœa and Enteritis (children under two years only)	3	1	...	1	...	5	19·4
Diarrhœa and Enteritis (children over two years and adults)	28	...	...	1	...	29	14·3
Appendicitis	424	30	4	10	17	488	15·7
Hernia, Intestinal Obstruction	86	4	15	12	5	117	13·3
Other Diseases of the Intestines	82	24	2	2	...	110	19·9
Diseases of the Anus and Fæcal Fistulæ	...	...	...	...	...	...	...
Cirrhosis of the Liver	2	7	1	6	...	16	40·3
Biliary Calculi	56	24	5	6	...	91	25·3
Other Diseases of the Liver	29	12	...	2	...	43	20·6
Simple Peritonitis (non-puerperal)	5	12	3	5	...	25	17·
Hydatid undefined	3	3	1	1	1	8	66·4
Other Diseases of Digestive System	...	...	...	...	...	...	...
Œsophagus, Stricture of	1	...	...	...	...	1	2·
Ulcer of Duodenum	14	21	...	5	...	40	26·7
Total, Class 5	1,229	204	35	61	23	1,529	...
CLASS 6.—DISEASES OF THE GENITO-URINARY SYSTEM AND ADNEXA (NON-VENEREAL).							
Acute Nephritis	12	4	...	4	16	20	23·6
Uterine Hæmorrhage	7	2	...	...	...	9	13·7
Other Diseases of the Kidneys and their Adnexa	86	53	...	2	...	141	16·9
Calculi of the Urinary Passages	30	22	8	...	...	60	19·
Diseases of the Bladder	14	18	3	...	...	35	23·5
Other Diseases of the Urethra, Urinary Abscess, &c.	21	19	2	6	...	48	19·8
Diseases of the Prostate	12	22	...	4	6	38	29·2
Non-venereal Diseases of the Male Genital Organs	24	4	2	...	...	30	16·5
Salpingitis and Pelvic Abscess	82	78	6	3	12	169	24·8
Uterine Tumour (non-Cancerous)	17	3	4	2	...	26	26·9
Other Diseases of the Uterus	...	...	...	...	...	...	...
Cysts and other Ovarian Tumours	11	3	1	...	1	15	25·4
Other Diseases of the Female Genital Organs	50	34	8	...	20	92	20·4
Non-puerperal Diseases of the Breast (cancer excepted)	4	3	...	...	1	7	10·3
Chronic Nephritis	...	25	4	34	...	63	26·5
Total, Class 6	370	290	38	55	56	753	...
CLASS 7.—PUERPERAL CONDITIONS.							
Abortion	554	12	2	13	15	581	11·3
Ectopic Gestation	15	...	...	1	1	16	31·6
Hyperemesis	...	...	...	...	1	...	...
Pyelites	...	...	...	...	10	...	...
Hæmorrhage	3	1	...	...	...	4	12·
Retroversion	...	...	...	...	...	...	...
Albuminuria	...	1	...	...	...	1	4·
Pregnancy	40	9	1	...	...	50	13·2
Other Accidents of Labour	7	2	...	...	...	9	18·
Puerperal Diseases of the Breast	5	...	...	...	...	5	27·
Puerperal Septicæmia	18	2	...	14	...	34	44·9
Total, Class 7	642	27	3	28	27	700	...
CLASS 8.—DISEASES OF THE SKIN AND OF THE CELLULAR TISSUE.							
Gangrene	...	1	...	...	3	1	85·
Phlegmon, Acute Abscess	123	9	...	6	...	138	23·6
Other Diseases of the Skin and Adnexa	74	32	2	2	...	110	21·1
Scabies	...	...	...	...	...	...	...
Furuncle	8	3	...	...	1	11	13·3
Elephantiasis	...	...	...	...	...	...	...
Total, Class 8	205	45	2	8	4	260	...

TABLE VII.—Return of the Number of Persons under Treatment, &c.—*continued.*

	Discharged during the year.				Remaining in on 31st December, 1927.	Total.	Average number of days in Hospital.
	Cured.	Relieved.	Un-relieved.	Died.			
CLASS 9.—DISEASES OF THE ORGANS OF LOCOMOTION.							
Non-tuberculous Disease of the Bones	23	35	2	2	...	62	78·1
Arthritis and other Diseases of the Joints (Tuberculosis and Rheumatism excepted)	13	20	1	3	6	37	32·5
Other Diseases of the Organs of Locomotion	28	13	1	...	...	42	19·9
Total, Class 9	64	68	4	5	6	141	...
CLASS 10.—MALFORMATIONS.							
Congenital Malformations	14	5	6	2	...	27	22·5
Total, Class 10	14	5	6	2	...	27	...
CLASS 11.—DISEASES OF EARLY INFANCY.							
	1	1	...	...	...	2	27·8
Total, Class 11	1	1	...	...	...	2	...
CLASS 12.—OLD AGE.							
Senility	...	3	2	1	...	6	12·0
Total, Class 12	...	3	2	1	...	6	...
CLASS 13.—VIOLENCE.							
Lysol Poisoning	...	...	...	...	1	...	...
Scalds and Burns (other than fire)	7	2	...	1	2	10	23·5
Poisoning by Food (not ptomaine)	5	...	...	...	...	5	4·8
Bite of Snake or Insect	7	...	...	...	1	7	8·7
Firearms Accidents	1	1	...	...	...	2	6·5
Cutting Instruments	7	2	...	...	...	9	19·0
Burning by Fire	1	...	...	1	2	2	12·9
Falls	61	11	...	2	...	74	27·5
Crushings	5	1	5	...	...	11	46·7
Railways and Tramways	...	...	...	...	...	...	...
Injuries by Vehicles and Horses	...	1	...	...	13	1	16·2
Shock	1	...	...	...	...	1	3·0
Other Injuries	6	4	...	...	4	10	29·5
Assault	2	1	...	...	...	3	10·3
Fractures (not obtainable)	77	25	1	6	16	109	22·0
Other Acute Poisonings (except gas)	4	...	...	...	...	4	9·5
Total, Class 13	184	48	6	10	39	248	...
CLASS 14.—ILL-DEFINED DISEASES.							
Malnutrition	...	...	...	...	...	...	...
Debility	2	7	...	...	2	9	13·4
Marasmus	...	...	...	...	...	...	...
Observation	2	...	1	...	...	3	1·0
No disease	26	2	...	...	...	28	8·4
Nurslings with mothers, no disease	53	...	...	...	2	53	15·9
Mothers with nurslings, no disease	10	...	...	...	...	10	5·7
Total, Class 14	93	9	1	...	4	103	...
SUMMARY.							
Total, Class 1.—General Diseases	4,142	831	67	217	378	5,257	...
" 2.—Diseases of the Nervous System and of the Organs of Special Sense	76	100	26	39	19	250	...
" 3.—Diseases of the Circulatory System	69	124	12	61	29	266	...
" 4.—Diseases of the Respiratory System	442	101	1	87	62	631	...
" 5.—Diseases of the Digestive Organs	1,229	204	35	61	23	1,529	...
" 6.—Diseases of the Genito-Urinary System and Adnexa	370	290	38	55	56	753	...
" 7.—Diseases of the Puerperal Condition	642	27	3	28	27	700	...
" 8.—Diseases of the Skin and of the Cellular Tissue	205	45	2	8	4	260	...
" 9.—Diseases of the Organs of Locomotion	64	68	4	5	6	141	...
" 10.—Malformation	14	5	6	2	...	27	...
" 11.—Infancy	1	1	...	...	...	2	...
" 12.—Old Age	...	3	2	1	...	6	...
" 13.—Violence	184	48	6	10	39	243	...
" 14.—Ill-defined Diseases	93	9	1	...	4	103	...
Grand Total	7,531	1,865	203	574	647	10,173	...

TABLE VIII.—Operations performed during 1927.

NOTE.—"Recovered" means lived for at least ten days after operation.

	Recovered.		Died.		Total.
	Male.	Female.	Male.	Female.	
1. Alimentary.					
Repair of hare-lip	1	1	...	...	2
,, cleft palate	1	2	...	...	3
Oesophagoscopy	5	4	...	...	9
Removal of bone from oesophagus	...	1	...	...	1
Gastrostomy	5	1	1	...	7
Gastro-enterostomy	15	4	1	...	20
Removal of foreign body from stomach	1	...	...	...	1
Laparotomy	16	21	2	1	40
Oversewing gastric ulcer	10	...	2	...	12
Oversewing duodenal ulcer	1	...	...	...	1
Pyloro-plasty	2	1	...	...	3
Enterostomy	...	4	2	1	7
Cholecstectomy	2	22	...	1	25
Cholecystostomy	9	22	1	...	32
Choledochotomy	...	2	...	...	2
Cholecystenterostomy	2	...	...	...	2
Appendicectomy	191	239	5	2	437
Radical cure of faecal fistula	...	1	...	...	1
Excision of retro-peritoneal cyst	...	2	...	...	2
Enteroenterostomy	...	1	...	...	1
Draining abscess	18	13	3	1	35
Colostomy	10	4	3	2	19
Caecostomy	...	2	...	...	2
Drainage, abdominal hydatid	...	1	...	...	1
Fistula in ano	6	10	...	...	16
Fissure in ano	2	1	...	...	3
Sigmoidoscopy	2	...	...	...	2
Hernia—					
Inguinal	63	2	1	...	66
Femoral	2	6	...	...	8
Umbilical	...	2	...	...	2
Incisional	2	8	...	...	10
Bowel resection	2	...	...	...	2
	368	377	21	8	774
2. Genito-urinary.					
Nephrotomy	1	...	...	...	1
Nephrectomy	1	7	...	...	8
Nephrolithotomy	3	4	...	...	7
Uretero-lithotomy	1	...	...	...	1
Supra-pubic cystotomy	5	2	3	...	10
Diathermy to bladder	2	2	...	...	4
Cystoscopy	40	63	...	...	103
Prostatectomy	10	...	...	...	10
Varicocele	1	...	...	...	1
Hydrocele	10	...	...	...	10
Orchidectomy	4	...	...	...	4
Circumcision	51	...	...	...	51
Plastic on urethra	...	1	...	...	1
Nephropexy	...	2	...	...	2
Drainage of extravacation of urine	...	...	2	...	2
Dilatation of urethral stricture	7	1	...	...	8
External uretherotomy	1	...	...	...	1
	137	82	5	...	224
2A. Gynaecological.					
Colpo-perineorrhaphy	...	10	...	...	10
Colpotomy	...	23	...	1	24
Trachelorrhaphy	...	3	...	...	3
Diathermy to cervix uteri	...	4	...	...	4
Insertion of radium in cervix uteri	...	6	...	...	6
Curettage uteri	...	630	...	7	637
Induction of abortion	...	6	...	...	6
Reduction of inverted uterus	...	1	...	...	1
urettage cervix uteri	...	4	...	...	4
ysterectomy	...	26	...	...	26
nternal shortening	...	17	...	...	17
External shortening	...	1	...	...	1
Salpingectomy	...	67	...	...	67
Salpingo-oophorectomy	...	26	...	...	26
Ventro fixation	...	4	...	...	4
Oophorectomy	...	7	...	...	7
	...	835	...	8	843
3. Cellular and Cutaneous.					
Excision of ulcer	2	...	...	...	2
Incision	85	78	...	...	163
Avulsion of nail	2	8	...	...	10
Excision of cyst	4	7	...	...	11
Excision of warts	...	2	...	...	2

	Recovered.		Died.		Total.
	Male.	Female.	Male.	Female.	
3. Cellular and Cutaneous—continued.					
Curettage of sinus	1	1	...	...	2
Skin graft	7	...	...	...	7
Suture of wounds	5	...	...	...	5
	106	96	...	...	202
4. Osseous and Arthritic.					
Osteotomy	...	7	...	...	7
Sequestrectomy	15	8	...	...	23
Bone graft	1	...	...	...	1
Excision of coccyx	...	2	...	...	2
Excision of semi-lunar cartilage	1	...	...	...	1
Amputation of finger	2	2	...	...	4
Amputation of stump of leg	1	...	...	...	1
Amputation of leg	5	4	...	...	9
Suturing patella	...	1	...	...	1
Excision of gangloin of wrist	1	2	...	...	3
Tenotomy	2	2	...	...	4
Reduction of dislocations	1	1	...	...	2
Reduction of fractures	18	3	...	...	21
	47	32	...	...	79
5. Respiratory.					
Thoracotomy	18	8	1	...	27
Tracheotomy	1	1	...	1	3
Resection of nasal septum	11	3	...	...	14
Resection of turbinate bones	3	3	...	...	6
Removal of nasal polyp	7	4	...	...	11
Drainage hydatid of lung	1	2	...	...	3
Bronchoscopy	2	1	...	...	3
	43	22	1	1	67
6. Circulatory.					
Excision of varicose veins	1	...	...	...	1
Hæmorrhoidectomy	22	7	...	...	29
	23	7	...	...	30
7. Lymphatic and Glandular.					
Tonsils and adenoids	106	110	...	1	217
Adenoids	7	5	...	...	12
Thyroidectomy	...	3	...	1	4
Excision of gland	6	4	...	...	10
	119	122	...	2	243
8. New Growths.					
Excision of lip and glands	7	...	...	...	7
Epithelioma of skin	7	...	...	...	7
Excision of rodent ulcer	1	...	...	...	1
Excision of lower jaw	3	...	...	...	3
Excision of tongue and glands	2	...	...	...	2
Excision of tonsils and glands	1	1	1	...	3
Excision of papilloma of larynx	2	...	...	...	2
Excision of carcinoma of bowel	...	3	1	...	4
Excision of malignant rectum	1	...	...	...	1
Excision of breast	...	6	...	1	7
Excision of lipoma	...	1	...	...	1
Excision of benign tumour	4	13	...	...	17
Excision of sarcoma	...	1	1	...	2
	28	25	3	1	57
9. Miscellaneous.					
Paracentesis tympani	2	4	...	...	6
Draining frontal sinus	1	2	...	...	3
Draining mastoid antrum	12	5	...	...	17
Drainage of maxillary antrum	15	16	...	...	31
Application of plaster	8	5	...	...	13
Drainage of hydatid cyst	4	1	...	...	5
Examination under anesthetic	15	59	...	...	74
Cerebral decompression	2	2	...	...	4
Radical cure of meningocoele	1	...	...	...	1
Teeth extraction	5	1	...	...	6
Diathermy to lip	1	1	...	...	2
Diathermy to palate	1	...	...	...	1
Excision of ranula	...	1	...	...	1
Enucleation of eye	1	...	...	...	1
Lumbar puncture	2	1	...	...	3
Arrest of hæmorrhage	1	6	...	...	7
Removal of foreign body	4	6	...	...	10
	75	110	...	...	185

TABLE VIII.—Operations performed during 1927—*continued.*

Summary of Operations.

	Recovered.		Died.		Total.
	Male.	Female.	Male.	Female.	
1. Alimentary	368	377	21	8	774
2. Genito-urinary	137	82	5	...	224
2A. Gynæcological	...	835	...	8	843
3. Cellular and cutaneous	106	96	...	...	202
4. Osseous and arthritic	47	32	...	...	79
5. Respiratory	43	22	1	1	67
6. Circulatory	23	7	...	...	30
7. Lymphatic and glandular	119	122	...	2	243
8. New growths	28	25	3	1	57
9. Miscellaneous	75	110	...	...	185
	946	1,708	30	20	2,704

Anæsthetics used.

Kelene and æther, 1,628; ether, 365; chloroform and ether, 212; chloroform, 18; local, 99; intrapharyngeal ether, 170; kelene, 86; total, 2,578.

*70407—N

STATEMENT OF WORKING EXPENSES OF THE COAST HOSPITAL FOR THE YEARS 1926-27.

TABLE IX.—Maintenance and Treatment of Patients and Staff.

	1926.	Average.	1927.	Average.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
A. Salaries and Wages—				
1. Administrative	1,955 1 3		2,159 2 0	
2. Medical	3,923 15 9		3,959 7 2	
3. Clerical	2,068 8 7		2,961 0 6	
4. Dispensary	1,015 1 7		1,111 2 2	
5. Nursing	24,155 19 2		29,919 9 8	
9. Laundry	2,371 7 5		3,249 12 1	
10. Tradesmen and Mechanics	3,734 6 5		4,056 1 3	
11. Cleaning and General	10,611 12 5		12,274 2 7	
12. Farm and Garden	909 18 6		920 18 7	
13. X-ray	295 0 0		306 0 0	
	51,040 11 1	76 8 0	60,916 16 0	85 16 1
B. Provisions—				
1. Meat	3,303 18 3		3,613 19 6	
2. Milk	1,987 3 2		2,444 10 9	
3. Butter	2,155 14 11		2,576 10 10	
5. Bread and Flour	1,741 10 10		1,507 14 7	
6. Eggs	1,962 6 3		1,751 8 11	
7. Fish, fresh	1,052 19 3		1,530 17 10	
8. Poultry	1,289 5 2		1,351 8 2	
9. Groceries	5,213 18 10		4,458 15 7	
10. Vegetables and Fruit	2,059 3 2		1,489 16 2	
11. Malt Liquors	23 2 5		3 0 0	
12. Ice	69 2 0		95 0 10	
13. Cream	257 8 11		415 5 9	
	21,115 13 2	31 12 1	21,238 8 11	29 18 4
C. Drugs and Surgical Appliances—				
1. Drugs, &c.	5,253 7 10		5,577 15 4	
2. Dressings and Bandages	338 5 8		349 13 1	
3. Surgical Appliances, Renewals	463 11 7		176 1 9	
4. Surgical Instruments, Renewals	188 12 2		219 8 1	
5. Stimulants	332 7 4		324 17 6	
	6,576 4 7	9 16 11	6,647 18 9	9 7 1
D. Fuel, Light, and Power—				
1. Coal, Coke, and Wood	3,373 4 1		3,715 9 3	
4. Electricity	1,609 9 11		1,278 18 7	
5. Electrical Fittings, Renewals	175 9 3		276 15 3	
	5,158 3 3	7 14 1	5,271 3 1	7 8 5
E. Domestic—				
1. Bedding and Bed Linen	2,292 19 10		1,478 19 4	
2. Clothing	1,492 19 11		756 15 4	
3. Drapery	945 17 2		752 14 11	
4. Uniforms	515 11 8		336 5 7	
5. Renewals of Furniture	182 9 9		429 5 10	
6. Ironmongery and Cutlery, &c.	347 3 3		221 15 6	
7. Brushware, Earthenware, &c.	403 8 7		316 12 2	
8. Laundry Materials	379 18 9		475 19 3	
	6,560 8 11	9 16 5	4,768 7 11	6 14 4
F Printing and Stationery—				
1. Printing and Stationery	486 1 1		457 6 9	
3. Postage	76 15 0		100 7 0	
	562 16 1	0 16 10	557 13 9	0 15 8
G. Maintenance of Buildings and Grounds—				
1. Ordinary Repairs and Alterations	498 2 3		767 11 11	
2. Roadways and Grounds	47 14 5		169 13 10	
	545 16 8	0 16 5	937 5 9	1 6 5
J. Miscellaneous—				
1. Rates and Taxes	.....		.....	
2. Insurance	203 3 10		225 10 9	
3. Burials and Coffins	26 12 6		42 6 9	
4. Telephones	417 12 0		523 8 10	
7. Petty Expenses	372 0 8		653 1 1	
8. Unclassified	883 19 11		553 2 1	
	1,903 8 11	2 17 1	1,997 9 6	2 16 4
K. Extraordinary Expenditure—				
1. Surgical Instruments	161 9 8		4 7 0	
2. Appliances	60 0 0		62 0 0	
3. Machinery	14 19 8		17 16 5	
4. New Furniture	34 8 10		100 11 6	
5. New Buildings and Additions	.....		.....	
6. Miscellaneous	.....		.....	
7. Drapery	.....		.....	
8. Ironmongery	.....		.....	
9. Brushware	.....		.....	
10. Bedding and Bed Linen	.....		.....	
11. Special Repairs	.....		26 16 0	
	270 18 2	0 8 1	211 10 11	0 6 0

TABLE IX.—Maintenance and Treatment of Patients and Staff—*continued.*

	1926.	Average.		1927.	Average.
	£ s. d.	£ s. d.		£ s. d.	£ s. d.
L. Special Department—					
1. X Ray	365 15 8	0 11 0		350 16 11	
	365 15 8			350 16 11	0 9 11
M. Farm and Garden, Live Stock, &c.—					
1. Purchase of Horses and Cows	83 1 0			42 0 0	
2. Purchase of Fodder	2,099 13 3			1,916 1 3	
3. Miscellaneous	289 11 0			38 18 0	
	2,472 5 3	3 14 0		1,996 19 3	2 16 3
N. Auxilary Hospital—					
1. Salaries and Wages	.....			2,056 2 6	
2. Maintenance	.....			1,984 17 10	
3. Equipment	.....			1,976 14 1	8 9 6
				6,017 14 6	
Total Expenditure	96,572 1 9	144 10 11		110,912 5 2	156 4 4
Add value of goods received from other Institutions	4 9 6			5 17 0	
	96,576 11 3			110,918 2 2	
Deduct value of goods supplied to other Institutions	.....			28 0 0	
	96,576 11 3			110,890 2 2	
Add value of Stock on hand, 31st Dec., 1925	5,510 5 4		1926	6,054 1 9	
	102,086 16 7			116,944 3 11	
Deduct value of Stock on hand, 31st Dec., 1926	6,054 1 9		1927	5,236 2 3	
	96,032 14 10			111,708 1 8	
Deduct Extraordinary Expenditure, Cost of Out-door Patients Equipment Auxilary Hospital	1,879 5 1			4,143 2 9	
	94,153 9 9			107,564 18 11	
Average cost per occupied bed, General and Infectious Division, based on upkeep Expenditure	.....	140 18 7		.....	151 10 1
Deduct Collections paid to Revenue	8,312 8 6	.....		8,924 4 7	.....
	85,841 1 3	.....		98,640 14 4	.....
Net cost per occupied bed, General and Infectious Division	.....	128 9 9		.....	138 18 7

TABLE X.—Amount expended from the Vote of the Public Works Department not included in the foregoing statistics

	1926.		1927.	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Steam and Hot Water Services—				
Repairs—Steam and Hot Water Services	506 13 6	.....	32 15 4	.....
Repairs and Renewals of Boilers	19 6 7	.....	359 19 11	.....
Hot Water Services	219 16 0	.....	440 18 5	.....
Rebuilding Chimney Flues	18 3 11	.....	.....	.....
Total	764 0 0	764 0 0	833 13 8	833 13 8
Electric Light and Power Service—				
Electric Maintenance	183 12 0	.....	.....	.....
Total	183 12 0	183 12 0	.....	.....
General—				
Repairing Laundry Plant	220 0 0	.....	39 6 0	.....
Repairs and Renovations of Buildings	1,610 17 4	.....	2,122 13 2	.....
Erection, Herdsman's Cottage	45 0 0	.....	.....	.....
Repairs and Extensions Water Service	712 7 8	.....	.....	.....
New Buildings and Additions	153 2 8	.....	4,120 16 6	.....
Erection, New Weighbridge	.....	.....	624 10 5	.....
Renovations, Randwick Auxiliary Hospital	.....	.....	611 19 1	.....
Total	2,741 7 8	2,741 7 8	7,519 5 2	7,519 5 2
Grand Total £	3,688 19 8	3,688 19 8	8,352 18 10	8,352 18 10

TABLE XI.—SUMMARY TABLE, showing the work of the Coast Hospital and its cost each year, from 1884 to 1927.

Year.	No. of Patients admitted.	Average residence of discharged patients in days.	Rate of Mortality on cases treated.	Infectious Diseases included in foregoing columns.																		Average daily number.	Cost per occupied bed.			Wines, spirits, &c., cost per head (included in foregoing columns).		
				Typhoid Fever.		Variola.		Measles.		Scarlet Fever.		Whooping Cough.		Diphtheria.		Influenza.		Plague.		Erysipelas.		Other Epidemic Diseases.								
				Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.		£	s.	d.	£	s.	d.
1884	1,132	29·33	4·04	235	25	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	104·33	58	1	1½	2	3	2½
1885	1,204	37·06	7·05	285	50	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	150·05	51	16	8	1	11	2½
1886	1,278	41·06	9·38	392	53	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	146·33	52	0	8	1	10	0½
1887	1,726	42·05	9·21	286	36	...	...	18	...	43	...	...	...	...	...	...	...	...	...	...	...	1	...	198·56	42	14	1½	0	10	9½
1888	1,694	42·23	5·55	241	15	...	...	33	...	52	...	...	...	1	...	...	...	...	...	45	...	3	...	197·12	41	13	2	0	8	8
1889	1,813	39·09	5·44	342	24	...	...	10	1	21	...	36	2	7	2	...	...	...	...	52	2	2	...	198·09	44	17	4½	0	6	4½
1890	1,529	42·00	7·03	140	21	...	...	5	...	14	...	19	...	1	...	...	...	...	...	19	...	7	...	178·00	55	7	5	0	5	11
1891	1,748	40·00	3·23	88	8	...	...	1	...	22	...	25	2	4	...	...	...	...	...	31	...	7	...	193·00	50	2	6	0	5	2½
1892	1,644	44·06	4·04	61	10	...	...	2	...	39	...	29	2	6	3	...	...	...	...	24	...	16	...	200·03	44	17	11½	0	7	6½
1893	2,274	32·08	4·05	83	10	...	...	281	8	195	12	7	...	9	3	...	...	...	...	36	...	7	...	193·05	47	8	0	0	10	1
1894	2,158	27·06	4·03	143	12	...	...	7	1	118	9	28	3	9	3	...	...	...	...	36	3	26	...	176·04	55	7	4½	1	3	6½
1895	2,451	24·06	3·07	96	6	...	...	1	...	60	...	25	1	45	1	...	...	...	...	51	...	10	...	176·03	59	1	11	1	1	6½
1896	2,213	31·03	5·04	236	19	...	...	2	...	61	2	3	...	11	1	...	...	...	...	63	...	1	...	204·06	51	6	1½	1	4	4
1897	2,307	32·06	5·05	128	11	...	...	...	...	235	3	...	...	25	...	...	...	...	...	109	7	6	...	224·04	50	19	2½	1	9	10
1898	2,694	31·04	5·38	163	18	...	...	319	15	350	7	...	...	27	4	...	...	...	...	70	2	...	...	231·00	64	14	10½	1	14	3½
1899	2,359	36·30	4·79	148	13	...	...	10	...	134	2	42	10	25	2	...	...	...	...	54	...	8	...	224·25	73	10	11½	1	15	10
1900	2,513	30·10	5·20	247	25	...	...	29	...	116	2	2	...	7	2	...	...	...	...	33	2	4	...	214·40	72	18	8½	1	8	2½
1901	2,688	31·24	5·75	214	21	...	...	131	1	150	5	15	...	65	4	...	...	...	...	49	5	11	...	255·50	59	4	3½	0	16	1½
1902	2,672	30·94	6·29	144	5	...	...	73	...	313	20	26	...	64	5	...	...	128	26	109	8	6	...	256·85	66	9	4½	0	13	10½
1903	3,359	31·72	4·67	166	20	...	...	62	1	585	21	13	3	92	...	...	...	2	...	84	6	16	1	300·76	61	17	11½	0	5	2½
1904	3,439	30·94	5·17	178	24	...	...	81	1	371	11	40	4	301	11	...	...	10	4	113	5	44	...	305·16	63	2	11½	0	7	8½
1905	3,298	31·81	5·20	139	20	...	...	43	1	284	6	1	...	313	10	...	...	16	4	100	6	7	...	289·32	59	12	0½	0	8	4
1906	2,965	37·03	3·56	84	7	...	...	55	...	503	11	...	...	267	9	...	...	15	4	80	4	3	...	308·67	56	13	1½	0	4	0½
1907	3,051	37·16	5·93	101	12	...	...	157	5	336	5	93	20	389	23	...	...	41	11	58	...	...	...	307·41	58	17	8½	0	4	5½
1908	3,147	32·89	5·44	114	13	...	...	17	1	420	10	6	1	360	11	...	...	7	2	62	7	...	...	306·83	61	11	5	0	4	0½
1909	2,971	31·13	5·53	96	8	...	...	55	...	339	6	4	...	500	12	...	...	22	7	72	3	...	...	295·33	63	5	4½	0	4	1½
1910	3,538	30·52	5·39	85	7	...	...	189	12	150	6	74	15	909	18	...	...	...	...	40	3	41	...	312·66	62	2	0½	0	2	5½
1911	3,474	29·19	5·32	66	8	...	...	70	...	134	...	67	12	974	24	...	...	...	...	48	4	...	...	322·62	64	0	1½	0	4	0½
1912	4,170	29·54	5·76	67	8	...	...	475	46	108	4	29	5	1284	36	...	...	...	...	73	8	5	...	335·45	77	15	1½	0	4	1½
1913	3,702	31·83	5·13	77	10	4	...	93	...	287	7	64	14	994	28	...	...	...	...	48	5	22	...	335·51	87	6	6½	0	3	3½
1914	4,032	32·35	3·81	73	12	6	...	82	1	628	7	36	4	977	10	...	...	...	...	34	1	20	...	373·11	74	7	5	0	1	0½
1915	4,806	30·09	4·12	123	10	22	...	357	2	1279	19	4	...	925	35	...	...	...	...	42	8	12	3	440·00	69	5	7	0	2	3½
1916	4,618	32·29	3·07	59	8	14	...	206	1	835	22	53	9	1101	32	...	...	...	...	55	1	244	...	447·00	77	4	11	0	4	1½
1917	4,320	36·49	3·73	16	2	4	...	147	6	498	4	21	4	1328	11	...	...	...	...	79	7	207	...	433·12	94	10	9	0	4	4
1918	4,556	39·60	4·20	31	6	1	...	323	13	314	9	63	8	1251	13	...	...	...	...	92	10	38	...	513·41	98	12	2	0	4	8
1919	5,556	20·67	8·13	25	1	1	...	62	3	213	5	20	1	571	10	2,966	313	...	...	66	2	20	...	385·2	159	0	4	0	8	3
1920	5,945	29·72	7·37	61	5	...	...	581	62	212	1	130	18	904	14	83	...	...	...	86	13	44	...	477·62	159	0	0	0	5	7
1921	6,450	29·3	5·6	49	12	...	...	36	4	174	...	40	4	1360	15	215	16	1	1	102	4	52	...	522·3	156	17	8	0	7	7
1922	6,894	27·54	5·6	33	15	...	...	163	5	229	3	37	2	905	11	118	1	29	6	109	7	514	3	520·16	149	12	4	0	5	8
1923	8,289	34·38	6·37	48	5	...	...	642	35	607	3	32	5	855	13	170	3	...	...	195	12	258	...	563·47	141	10	2	0	13	2
1924	8,171	24·35	5 31	51	4	...	...	85	...	1024	9	39	7	1107	16	158	1	...	...	111	4	79	...	575·29	153	1	1	0	13	0
1925	8,458	23·61	6·41	50	4	...	...	252	11	842	12	89	11	787	3	94	...	...	...	98	4	43	3	578·06	143	9	2	0	11	3
1926	10,175	23·74	5·9	60	4	...	...	701	35	1668	38	46	5	1018	13	251	5	...	...	76	5	62	...	668·09	140	18	7	0	9	10
1927	10,163	27·8	5·6	33	4	...	...	76	1	2183	53	34	5	1997	15	141	1	...	...	109	10	59	2	709·96	151	10	1	0	9	1

2.—LEPER LAZARET.

THIRTY-SEVENTH REPORT ON LEPROSY IN NEW SOUTH WALES FOR THE YEAR ENDED 31st DECEMBER, 1927.

The Medical Superintendent of the Coast Hospital to the Director-General of Public Health.

The Coast Hospital, Sydney, N.S.W.

Sir,

On 1st January, 1927, 15 persons remained under detention at the lazaret. (*See* Appendix A.)

During the year 2 persons were reported to the Board under the Public Health Act, 1902, Part III, as being suspected lepers, and after careful inquiry were duly certified as suffering from leprosy, and admitted to the lazaret by warrant of the Board, and 2 persons were readmitted.

Two deaths occurred during the year, viz.:—A.R., N.S.W., admitted in 1908 (Case CXVII), and C.S.C., admitted in 1907 (Case CXIII).

The total number of persons admitted since 1883, when patients first began to be received (though the notification of leprosy was first made compulsory and the detention of lepers provided for by law only towards the end of 1890), is 173.* Distributed under nationalities, the account stands as follows:—

	Admitted.	Readmitted.	Discharged.	Repatriated.	Died.	Remaining in at 31 Dec., 1927.
Whites, of European descent—						
New South Wales	44	3	15	.....	25	7
Victoria	2	.....	.....	.....	2	.....
Queensland	3	.....	1	.....	1	1
Northern Territory	1	.....	1	.....	.....	.....
New Zealand	1	.....	.....	.....	1	.....
Fi	2	.....	1	.....	1	.....
England	12	.....	3	.....	8	1
Ireland	8	.....	2	.....	5	1
Scotland	1	.....	1	.....	.....	.....
Germany	4	.....	1 absconded.	1	2	.....
Belgium	1	.....	.....	.....	1	.....
U.S. America	1	.....	.....	.....	1	.....
Greece	2	.....	.....	1	.....	1
Malta	2	.....	1 absconded.	.....	1	.....
Sweden	1	.....	.....	.....	.....	1
France	1	.....	.....	.....	1	.....
Coloured patients—						
New South Wales	2	.....	1	.....	.....	1
West Indies	1	.....	1 (in 1885).	.....	.....	.....
India	4	.....	1 absconded.	1	2	.....
China	56	.....	2	33	19	2
Java	1	.....	.....	.....	1	.....
New Caledonia	1	.....	.....	.....	1	.....
Pacific Island	18	.....	.....	5	11	2
Egypt	1	.....	.....	1	.....	.....
Zanzibar	1	.....	1 (to Hong Kong at own request).	.....	.....	.....
Syria	2	.....	1	1	.....	.....
	173	3	33	43	83	17

* This is the number of persons admitted; it does not agree with the highest number given in Appendix B in Roman numerals which indicates the number of cases observed, whether admitted or merely described and recorded.

Thus the number remaining in the lazaret on 31st December, 1927, was 17 persons; 14 males and 3 females.

Appendix A shows particulars of each case under detention since the year 1883, and in Appendix B are given the usual notes of the new patients received during 1927, of patients discharged or died during the year, and a survey of the condition of patients remaining in at the end of the year.

Every opportunity has been offered to members of the medical profession to visit the lazaret for the purpose of seeing such patients as were formerly under their care, or for study of the disease.

The following statements show the expenditure for the year, and the sources from which it has been defrayed :—

STATEMENT showing the Working Expenses of the Lazarets (for men and for women) at Little Bay for the year 1927.

	£	s.	d.
Salaries	1,886	11	0
Provisions	630	4	1
Fruit and vegetables	58	15	5
Uniforms, clothing, &c.	174	12	2
Printing and stationery	5	3	0
Fuel and light	167	0	0
Wines, ales, &c.	59	6	9
Ironmongery, brushware, &c.	28	0	6
Drugs	107	18	7
Sundries	240	11	0
	£3,358	2	6

Average number of patients resident, 15·7, being equal to an average of £213 17s. 9d. per inmate per annum.

STATEMENT showing the total Expenditure of the Lazarets (for men and for women) at Little Bay during the year 1927, and from what sources the amounts were paid.

EXPENDITURE.	£	s.	d.	HOW PAID.	£	s.	d.
To working expenditure, as per statement.	3,358	2	6	From vote—Maintenance of lepers by Department of Public Health	2,493	9	0
				Transfers from Coast Hospital stock	864	13	6
Total .....£	3,358	2	6	Total .....£	3,358	2	6

The needs of the patients have been carefully supplied by experienced attendants and nurses, under direct supervision of the Medical Superintendent and the Matron of the Coast Hospital, and, as in the past, every means have been adopted to alleviate their sufferings and to mitigate the hardships of their detention.

I have, &c.,

R. J. MILLARD,

Medical Superintendent.

APPENDIX A.

RETURN showing Particulars of Lepers detained at Little Bay, New South Wales, since the year 1883

Name.	Sex.	Native of—	Occupation.	Admission. Age on	Admission. Date of	Where from.	No. of Case in Clinical Notes.	Died or Discharged.
A.H. ...	Male ...	China	Gardener	42	19 April, 1883	Parramatta Asylum	.....	Died, 15 May, 1886.
J.H. ...	„ ...	„	„	32	19 „ „	„ ...	.....	Died 27 June, 1886.
A.H. ...	„ ...	„	„	34	12 June, „	„ ...	.....	Died, 20 April, 1886.
A.M. ...	„ ...	„	Butcher	32	28 Oct., „	Tenterfield	XIV	Returned to China, 14 Aug., 1896.
A.P. ...	„ ...	„	Storekeeper	27	28 „ „	Willow Creek	XV	
G.H. ...	„ ...	„	Labourer	37	27 „ 1884	Sydney	.....	†Died, 24 Dec., 1886.
K.K. ...	„ ...	„	„	24	21 Dec., „	Bathurst	.....	Died, 28 April, 1885.
J.B. ...	„ ...	West Indies ...	„	51	22 Sept., 1885	Bermagui	.....	‡Discharged, 29 Dec., 1885.
A.Y. ...	„ ...	China	Gardener	29	23 Dec., „	Sydney	.....	Died, 6 Feb., 1890.
C.B. ...	„ ...	„	„	32	29 Jan., 1886	Alexandria	XVI	Returned to China, 14 Aug., 1896.
A.S. ...	„ ...	„	Tin-miner	42	20 Feb., „	Cooper's Creek	.....	Died, 12 Nov., 1890.
C.T. ...	„ ...	Java	Groom	24	14 Aug., „	Castle Hill, Parramatta.	XVII	Died, 8 Sept., 1926.
A.L. ...	„ ...	China	Gardener	44	20 May, 1887	Bathurst	.....	Died, 12 April, 1891.
Y.S. ...	„ ...	„	Carpenter	31	20 April, 1888	Sydney	XVIII	Returned to China, 14 Aug., 1896.
F.G. ...	„ ...	N.S.W.	Plasterer	27	21 Aug., „	„	I	Died, 25 Sept., 1892.
A.Y. ...	„ ...	China	Gardener	29	30 Sept., „	Inverell	XIX	Returned to China, 14 Aug., 1896.
L.P. ...	„ ...	„	Carpenter	18	22 Dec., „	Sydney	XX	
H.K. ...	„ ...	„	Miner	28	23 Mar., 1889	Enfield	XXI	
H.B. ...	„ ...	N.S.W.	„	17	17 Dec., „	Mudgee	II	Died, 13 May, 1894.
H.R. ...	„ ...	„	Labourer	28	8 Aug., 1890	Richmond River ...	III	Died, 29 May, 1901.
A.G. ...	„ ...	„	Schoolboy	14	18 „ „	Balmain	IV	Discharged 1/5/95. Died 21/7/25.
E.U. ...	„ ...	„	Labourer	23	16 Jan., 1891	Sydney	V	Died, 1 May, 1898.
H.S. ...	„ ...	„	Mariner	41	23 „ „	Newtown	VI	Died, 4 Feb., 1891.
A.L. ...	„ ...	China	Gardener	30	26 Feb., „	Newcastle	XXIII	Died, 28 Dec., 1895.
M.R. ...	Female	N.S.W.	Domestic duties ...	33	§11 Mar., „	Surry Hills	VII	Died, 20 June, 1892.
T.W. ...	Male ...	China	Cook	29	6 Aug., „	Narrandera	XXV	Returned to China, 14 Aug., 1896.
W.C. ...	„ ...	„	Labourer	40	27 „ „	Sydney	XXIV	
A.H. ...	„ ...	„	Storekeeper	25	18 Sept., „	Mudgee	XXII	
J.L. ...	„ ...	Tanna	Labourer	25	8 Dec., „	Clarence River	XXVI	Died, 7 May, 1901.
R.W. ...	„ ...	N.S.W.	Carpenter	47	24 „ „	Narrabri	VIII	Died, 27 Mar., 1896.
I.L. ...	Female	„	Domestic duties ...	53	§18 „ „	Waverley	IX	Died, 16 June, 1899.
A.S. ...	Male ...	China	Cabinetmaker	28	21 April, 1892	Sydney	XXVII	Died, 29 June, 1892.
C.D. ...	„ ...	N.S.W.	Carpenter	24	30 „ „	Gunnedah	X	Died, 17 Aug., 1900.
S.P. ...	„ ...	England.....	Commercial traveller	49	7 June, „	Sydney	XI	Died, 28 May, 1898.
H.G. ...	„ ...	China	Wood-cutter	47	19 Sept., „	„	XXVIII	Returned to China, 14 Aug., 1896.
M.E.K.	Female	N.S.W.	Domestic duties ...	43	21 „ „	North Sydney	XII	Died, 23 July, 1897.
L.P.H.	Male ...	China	Gardener	44	12 Oct., „	Manly	XXIX	Returned to China, 14 Aug. 1896
W.W. ...	„ ...	Fiji	Schoolboy	13	27 „ „	Sydney	XIII	Died, 26 Jan., 1901.
A.L. ...	„ ...	China	Gardener	35	3 Nov., „	Bombala	XXXI	Returned to China, 17 July, 1897
A.Q. ...	„ ...	„	Dealer	39	15 „ „	„	XXXII	Returned to China, 14 Aug., 1896.
J.C. ...	„ ...	„	.....	38	29 „ „	Sydney	XXXIII	Died, 2 Aug., 1893.
A.G. ...	„ ...	„	Labourer	26	7 Dec., „	Parramatta	XXX	Returned to China, 14 Aug., 1896.
G.Y. ...	„ ...	„	Cook	68	21 „ „	Sydney	XXXIV	
A.P. ...	„ ...	„	Hawker	33	21 Jan., 1893	Parramatta	XXXV	
M.M. ...	Female	New Zealand...	.....	24	27 Feb., „	Fiji	XXXVI	Died, 10 Sept., 1895.
A.T. ...	Male ...	China	Bushman	28	15 April, „	Cooma	XXXVII	Returned to China, 14 Aug., 1896.
N.G. ...	„ ...	N.S.W.	Miner	61	21 „ „	Parramatta Asylum	XXXVIII	Died, 4 April, 1896.
A.M. ...	Female	„	Housewife	35	7 Sept., „	Balmain	XXXIX	Died, 13 Mar., 1896.
P.M. ...	Male ...	India	Hawker	47	3 Nov., „	Newcastle	XL	Died, 22 Mar., 1899.
E.R. ...	Female	N.S.W.	Domestic duties	16	18 „ „	West Maitland	XLI	Died, 21 Sept., 1900.
C.H.M.	Male ...	Germany	Station overseer	65	25 Jan., 1894	Sydney	XLII	Died, 8 July, 1898.
W.H.D...	„ ...	Queensland ...	.....	21	18 April, „	„	XLIII	Died, 29 Nov., 1896.
G.N. ...	„ ...	New Caledonia	Pearl-diver	20	16 July, „	„	XLIV	Died, 1 Sept., 1895.
H.J.T....	„ ...	N.S.W.	Bushman	52	10 Oct., „	„	XLV	Discharged, 5 Sept., 1902.
K.J. ...	„ ...	India	Hawker	30	30 Nov., „	„	XLVI	Died, 2 Aug., 1895.
J.T. ...	„ ...	England.....	Labourer	70	4 April, 1895	Coast Hospital	XLVIII	Died, 6 Nov., 1897.
T.O'R.	„ ...	Ireland	„	70	2 Oct., „	Sydney	LIII	Died, 8 Nov., 1895.
W.F. ...	„ ...	„	Clerk	40	8 „ „	„	LII	Died, 8 Nov., 1896.
H.J. ...	„ ...	China	Hawker	31	21 Jan., 1896	Coast Hospital	LV	Returned to China, 14 Aug., 1896.
H.Y. ...	„ ...	„	Gardener	26	4 Feb., „	„	LIV	
A.T. ...	„ ...	„	„	31	25 Dec., „	Oxley	LVI	Returned to China, 17 July, 1897.
F.R. ...	„ ...	Belgium	Mechanic	55	16 Feb., 1897	Coast Hospital	LVIII	Died, 23 June, 1897.
H.W. ...	„ ...	U.S.A.	Mariner	57	12 Nov., „	Lord Howe Island..	LIX	Died, 14 May, 1911.
W.W. ...	„ ...	N.S.W.	Labourer	19	26 Feb., 1898	Wollongong	LXI	Died, 21 Feb., 1900.
A.B. ...	„ ...	„	„	20	22 Mar., „	Gunnedah	LXIV	Died, 7 July, 1901.
R.C. ...	„ ...	„	Butcher	27	9 July, „	Wollongong	LXII	Died, 30 April, 1903.
A.G. ...	Female	China	Housewife	38	23 Sept., „	Waterloo	LXVI	Died, 4 Feb., 1901.
J.F.D. ..	Male ...	N.S.W.	Labourer	26	11 July, 1899	Lismore	LXVII	Died, 30 Mar., 1907.
C.P. ...	„ ...	China	Scullerymaid	22	14 April, 1900	Sydney	LXVIII	Died, 16 May, 1903.
B.A. ...	„ ...	Aoba Island ...	Labourer	35	26 Feb., 1901	Murwillumbah	LXIX	Returned to Aoba, 1 Dec., 1902.
C.T. ...	Female	Germany	Housewife	29	23 April, „	Lismore	LXX	Died, 14 Dec., 1903.
D.N. ...	Male ...	N.S.W.	Labourer	18	4 June, „	Glen Innes	LXXI	Died, 28 Feb., 1905.
J.S.	„ ...	„	Farmer	52	20 „ „	Miller's Forest	LXXII	Discharged, 28 Feb., 1902.
D.L. ...	„ ...	England.....	Labourer	46	20 „ „	Rookwood Asylum	LXXIII	Died, 15 Dec., 1902.
F.H. ...	„ ...	„	Seaman	75	4 July, „	Sydney	LXXIV	Died, 5 July, 1905.
A.R. ...	„ ...	China	Labourer	25	30 Oct., „	„	LXXV	Returned to Hongkong, 6 Aug., 1904.
A.T. ...	„ ...	„	„	35	4 Dec., „	„	LXXVI	
G.Y. ...	„ ...	„	Miner	...	8 Jan., 1902	„	LXXVII	Died, 17 Jan., 1902.
J.G. ...	„ ...	N.S.W.	Grazier	57	13 „ 1903	„	LXXVIII	Died, 31 Aug., 1904.
M.S. ...	„ ...	Ireland	Miner	45	20 Feb., „	Parramatta Asylum	LXXIX	Died, 19 Feb., 1908.
F.H.L.	„ ...	China	Gardener	32	10 Mar., „	Enfield	LXXX	Returned to Hongkong, 6 Aug., 1904.
G.M. ...	„ ...	England.....	Farmer	52	7 April, „	Cudgen	LXXXI	Discharged, 31 Mar., 1900.

* These are all natives of New South Wales of European descent. † This patient was transferred to a Hospital for the Insane on 2nd April, 1895, where also his death occurred. ‡ See note * to Appendix A. § Date of report. These patients were afterwards removed to Little Bay. ¶ Of European descent.
Patients remaining under treatment have their initials shown in black-faced type.

RETURN showing Particulars of Lepers detained at Little Bay, New South Wales, since the year 1883—*continued.*

Name.	Sex.	Native of—	Occupation.	Admission. Age on.	Admission. Date of.	Where from.	No. of Case in Clinical Notes.	Died or Discharged.
†F.C.	Male	Fiji	School	17	7 April, 1903	Fiji	LXXXII	Discharged, 29 Mar., 1913
A.S.	"	China	Wood-cutter	31	21 " "	Canterbury	LXXXIII	Returned to Hongkong, 6 Aug., 1904.
S.V.	"	Zanzibar	Seaman	22	5 May, "	Sydney	LXXXIV	
T.B.	"	China	Cook	37	30 June, "	Canterbury	LXXXV	Died, 14th March, 1911
W.M.	"	Buka Buka	Labourer	36	3 Nov., "	Tweed River	LXXXVI	
*F.E.B.	"	N.S.W.	Drover	27	25 " "	"	LXXXVII	
*G.M.S.	Female	"	Housewife	19	9 Feb., 1904	Lismore	LXXXVIII	
*V.M.W.	"	"		17	31 Mar., "	Sydney	LXXXIX	Discharged, 11th Jan., 1915
D.D.	Male	"	Teamster	54	19 April, "	Botany	XC	Discharged, 20 Sept., 1909.
A.M.	"	China	Farmer	24	3 May, "	Tumut	XCI	Returned to Hongkong, 6 Aug., 1904.
E.B.	"	Mallicolo	Labourer	39	10 " "	Tweed River	XCII	Returned to native island, 9 May, 1908.
W.T.	"	England		65	4 July, "	Sydney	XCIII	Discharged, 20 Sept., 1906.
G.W.	"	China	Labourer	32	27 Sept., "	Narrabri	XCIV	Returned to Hongkong, 13 June, 1905.
*R.B.	"	N.S.W.	Coach-painter	23	11 Oct., "	Newtown	XCV	Discharged, 22 March, 1912.
H.F.	"	China	Miner	45	24 Jan., 1905	Emmaville	XCVI	Ret'd to Hongkong, 13 June, 1905.
F.M.	"	Lifu	Labourer	66	7 Feb., "	Tweed River	XCVII	Died, 8 Jan., 1907.
A.S.	Female	Egypt	Housewife	38	7 Mar., "	Sydney	XCVIII	Returned to Egypt, 23 June, 1905.
T.H.	Male	Ireland	Bullock-driver	65	11 July, "	Coast Hospital	XCIX	Discharged, 19 Dec. 1905. Readmitted 13 Aug., 1907. Again discharged, 22 Feb., 1919.
J.W.	"	Tanna	Labourer	40	11 " "	Maclean	C	Died, 30 Oct., 1906.
T.A.	"	Ambrym	"	35	11 " "	"	CI	
H.G.	"	Gala	"	35	14 Nov., "	Tweed River	CII	Died, 18th Feb., 1915.
G.B.	"	Vanua Lava	"	38	9 Jan., 1906	"	CV	Died, 31 Aug., 1912.
G.A.	"	Ambrym	"	35–40	15 Aug., "	"	CVI	Returned to native island, 1 Dec., 1908.
A.M.	"	China	Gardener	30	4 Sept., "	Nyngan	CVII	Returned to Hongkong, 9 Nov., 1906.
L.A.	"	Ambrym	Labourer	35	9 Oct., "	Tweed River	CVIII	Returned to native island, 9 May, 1908.
C.B.	"	China	Hawker	48	9 " "	Sydney	CIX	Returned to Hongkong, 9 Nov., 1906.
A.M.	"	"	Wood-cutter	58	9 " "	Glen Innes	CX	
W.D.	"	Lifu	Gardener	30	20 Nov., "	Turramurra	CXI	Died, 2 April, 1910.
P.S.	"	India	Hawker	35	19 Jan., 1907	Nowra	CXII	Absconded, 18 May, 1907.
C.S.C.	Female	Victoria		40	16 April, "	Maroubra	CXIII	Died, 30 Sept., 1927.
Ah J.	Male	China	Hawker	40	17 Sept., "	Sydney	CXIV	Died, 14 May, 1924.
H.F.	"	"	Cabinet-maker	40	29 Oct., "	Warren	CXV	Died, 5 May 1913.
F.P.	"	England	None	68	14 Jan., 1908	Sydney	CXVI	Died, 11 Aug., 1909.
A.R.	Female	N.S.W.	School	7	14 " "	Lismore	CXVII	Died, 9 March, 1927.
T.W.C.	Male	"	Farmer	45	18 Mar., 1909	Manilla	CXVIII	Died, 2 Nov., 1910.
P.J.	"	Syria	Hawker	54	10 Nov., "	Yalgogrin	CXIX	Repatriated, 1 Feb., 1911.
A.Z.	"	Greece	Scullerman	17	11 Oct., 1910	Sydney	CXXII	Repatriated, 1 Feb., 1911.
J.C.	"	England	Miner	48	15 Nov., "	"	CXXIII	
J.A.	"	Syria	Hawker	35	29 " "	"	CXXIV	Discharged, 15th April, 1920.
C.M.	"	Tonga	Gardener	45	8 June, 1911	North Sydney	CXXV	Died, 26 April, 1923.
T.L.	"	China	Cabinet-maker	49		Botany	CXXVI	Died, 8 Oct., 1911 (before transfer)
M.B.	Female	Ireland	Teacher	33	7 Nov., 1911	Lismore	CXXVII	Died, 10th July, 1915.
S.C.	Male	China	Cabinet-maker	40	21 May, 1912	Boolaroo, N.S.W.	CXXVIII	
L.J.T.	"	N.S.W.	School	13	14 Aug., "	Lismore	CXXIX	Discharged, 21 July, 1916.
S.M.	"	Mallicolo	Labourer	50	27 " "	Maclean	CXXX	Died, 23 April, 1919.
J.F.	"	N.S.W.	Van-driver	28	19 Sept., "	Glebe	CXXXI	Discharged, 1 January, 1920. Readmitted 7 Nov., 1927.
W.D.	"	"	Fisherman	22	24 June, 1913	Ulladulla, S. Coast	CXXXII	Discharged, 10 Feb., 1921.
J.M.	"	New Hebrides	Labourer	60	28 Nov., "	Tweed River	CXXXIII	Died, 17 March, 1917.
J.C.M.	"	N.S.W.	Miner	26	28 Jan., 1914	Romeville, W. Maitland	CXXXIV	Died, 17th June, 1915.
W.B.	"	England	Dealer	33	4 Mar., "	Sydney	CXXXV	Died, 14th August, 1915.
A.C.P.	"	N.S.W.	School	15	23 June, "	Lismore	CXXXVI	Discharged, 12 October, 1922. Readmitted 16 Jan., 1925.
E.W.	"	South Sea Islands	Labourer	50	17 Nov., "	Cudgen	CXXXVII	
H.H.	"	England	Labourer	36	19 May, 1915	Hornsby	CXXXVIII	Died, 7 January, 1924.
A.D.	Female	New Hebrides	Domestic	19	1 Sept., "	St. Kilda, Victoria	CXXXIX	Died 18th July, 1923.
C.F.	Male	China	Cabinet-maker	50	18 Dec., "	Waterloo, N.S.W.	CXL	Discharged, 10 March, 1917.
L.F.	"	England	Showman	45	9 Mar., 1916	Campbelltown	CXLI	Discharged, 2 June, 1917.
F.H.	Female	China	Gardener	48	25 May, "	Sydney	CXLII	Died, 15 June, 1916.
D.M.	Male	N.S.W.	Publican	46	25 " "	Armidale	CXLIII	Discharged, 19 May 1917.
W.J.P.	"	"	School	12	25 Nov. "	Lismore	CXLIV	Disch. 5 November, 1924. Readmitted 1 July, 1927.
E.L.P.	"	"	"	11	25 " "	"	CXLV	Died, 27 December, 1922.
E.M.	"	Germany		56	3 April, 1917	Liverpool, N.S.W.	CXLVI	Repatriated as Prisoner of War, 27 May, 1919.
C.W.	"	England		80	14 " "	Sydney	CXLVII	Died, 18 February, 1923.
C.D.	Female	N.S.W.	Domestic	54	30 Oct., "	Casino, N.S.W.	CXLVIII	Discharged, 12 June, 1920.
P.P.	Male	Greece	Cafe-proprietor	33	21 Feb., 1918	Melbourne, Vic.	CXLIX	
J.C.	"	Ireland	Miner	84	5 Feb., 1919		CL	Died, 19 November, 1920.
M.T.	Female	Victoria	Housewife	63	25 Feb., "	Sydney	CL(A)	Died, 1 May, 1919.
J.P.	Male	Malta	Labourer	25	18 June, "		CLI	Absconded, 14 Sept., 1919.
J.S.	"	"	"	30	22 Dec., "	Kempsey	CLII	Died, 29 July, 1921.
A.S.	"	China	Gardener	64	3 Aug., 1920	Kandos N.S.W.	CLIII	Died, 2 August, 1923.
C.T.P.	"	"	Labourer	30	19 Oct., "	Nauru Island, S. Pacific	CLIV	Discharged, 25 April, 1921.
E.T.D.	"	N.S.W.	Teamster	32	10 Nov., "	Bellingen, N.S.W.	CLV	Discharged 1 Dec., 1925.
T.F.	"	Ireland	Civil servant	57	20 Dec., "	Hobart, Tas.	CLVI	Discharged, 18 June, 1921.
A.W.	Female	Sweden	Seamstress	62	18 Feb., 1921	Newcastle	CLVII	
D.A.	Male	N.S.W.	Teamster	71	26 May, "	Newcastle	XC	Died, 16 July, 1921.
J.C.	"	N.S.W.	Fisherman	22	18 Aug., "	Tilba Tilba	CLVIII	
A.S.	Female	Queensland	Domestic	20	19 Jan., 1922	Redfern	CLIX	Returned to Peel Island, Queensland, 20 March, 1922.

* Native of New South Wales, of European descent. † Of European descent. ‡ Omitted in error from Annual Report for 1919.

RETURN showing particulars of Lepers detained at Little Bay, New South Wales, since the year 1883—*continued.*

Name.	Sex.	Native of—	Occupation.	Admission.		Where from.	No. of Case in Clinical Notes.	Died or Discharged.
				Age on.	Date of.			
Y.M.B....	Male ...	France	Labourer	67	7 June, 1922.	Hunter's Hill	CLX	Died, 12 August, 1922.
E ...	,, ...	Ceylon	Sailor	24	13 Dec. ,,	Not fixed	CLXI	Repatriated, 26 June, 1923.
R.B. ...	,, ...	N.S.W.	Coach-painter	42	18 June, 1923.	Taree, N.S.W.	XCV	Died, 5 August, 1923.
C.E.B. ...	,, ...	Northern Terr.	Garage-proprietor	35	11 Aug. 1924.	Darwin, N.T.	CLXII	Discharged 16th Sept., 1925.
H.L.S. ...	,, ...	N.S.W.	Invalid-pensioner...	37	26 Oct., ,,	Liverpool Asylum ..	CLXIII	
J.B.	,, ...	Ireland	Bush worker ...	61	28 Jan., 1925.	Liverpool	CLXIV	
A.C.	,, ...	Germany	Importer	45	6 Mar., ,,	Sydney	CLXV	Absconded, 21 August, 1925.
K..... ...	,, ...	Hawaii	Musician	...	7 ,, ,,	,, ...	CLXVI	Repatriated, 11 March, 1925.
A.M. ...	,, ...	China.....	School	12	12 ,, ,,	,, ...	CLXVII	Repatriated, 16 December, 1925.
A D.	,, ...	N.S.W.	,, ...	7	21 April, ,,	,, ...	CLXVIII	Discharged, 1 December, 1925.
Wong Toe	,, ...	China.....	Gardener	46	22 Nov., ,,	Clarence River ...	CLXIX	
H.P.	,, ...	N.S.W.	Farmer	39	14 Dec., ,,	Queensland	CLXX	Discharged, 9 Sep., 1926.
G.T.	,, ...	Scotland	Chemist.....	56	8 May, 1926.	Sydney.	.....	Discharged, 21 July, 1926.
E.S.C. ...	Female	Queensland ...	Domestic	33	27 April, 1927.	Hunter's Hill	CLXXI	
A.R.B. ...	Male ...	N.S.W.	Farm labourer.....	41	6 July, ,,	Croydon	CLXXII	

NOTES.—(a) The cases of a few other persons who, for one reason or other, were never admitted to the lazaret, have been mentioned in the course of this series of Reports, and are additional to those shown in this Table. (b) On comparison with the reports for early years, differences in ages or dates of admission of some coloured patients will be observed. Those now given are the correct ages and dates. Patients remaining under treatment have their initials shown in black-faced type.

RETURN showing admissions, discharges, &c., of Patients suffering from leprosy for the years 1916–1927.

	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	1927.
In Lazaret on 1st January.....	22	25	24	24	24	24	22	21	16	15	17	15
Admitted during the year	5	3	1	4	4	3	3	1	2	8	1	4
Died during the year.....	1	1	...	2	1	2	2	5	2	...	1	2
Discharged	1	3	1	2	3	1	2	...	1	4	2	...
Repatriated	...	...	...	...	...	2	...	1	...	2	...	...
Remaining in Lazaret on 31st December — Total	25	24	24	24	24	22	21	16	15	17	15	17
Remaining in Lazaret on 31st December — Males	21	19	19	19	20	17	16	12	11	13	11	14
Remaining in Lazaret on 31st December — Females ...	4	5	5	5	4	5	5	4	4	4	4	3

Birthplaces of Lepers.—The inmates of the Lazaret at the close of the year 1927 were of the following nationalities:—New South Wales, 7; Australian aboriginal, 1; Queensland, 1; England, 1; Ireland, 1; Sweden, 1; Pacific Islands, 2; China, 2; Greece, 1. Total, 17.

Working Expenses of Lazaret.—During the year 1927 the total cost of the management of this Institution was £3,358 2s. 6d. Calculated on the average number of inmates, the average cost per inmate per annum was £213 17s. 9d.

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APPENDIX B.

I.—New Cases.

Case CLXXI.—E.S.G., f., born 1894; admitted 27th April, 1927.

History.—Born in Queensland, she has lived mostly in that State, but has frequently visited New South Wales. Has been under medical treatment for sciatica and joint pains some six years. She came from Queensland to Sydney in April, 1927, and was admitted to the Royal Prince Alfred Hospital, where it was found that she had leprosy. She says that her father, mother and six brothers and sisters are all alive and well. She has been occupied with domestic duties, and is not aware of any contact with leprosy.

On admission she had the signs of advanced nodular leprosy as follows:—

Face.—Eyebrows almost hairless; face generally dusky. Nodules on malar eminences.

Trunk.—No obvious signs.

Upper limbs.—Ulnar nerves tender; anæsthesia of hands; hands cyanosed; fingers swollen.

Lower limbs.—Right peroneal nerve very tender; skin of right leg glossy and discoloured; anæsthesia of feet; small ulcer over right external malleolus.

B. Leprœ were found in mucus from right nostril and in a film made from left forearm.

Treatment.—E.C.C.O. injections ·5 cc. twice a week. Severe abdominal pain in May—probably intestinal colic; frequently in bed; has become progressively worse. Weight in last six months of the year diminished from 6 st. 10 lb. to 5 st. 9 lb.

Case CLXXII.—A.R.B., m., born 1886; admitted 6th July, 1927.

History.—Says he was born in Sydney and lived there till 1907. Then to Queensland, where for nine years he was a shop assistant. Enlisted from Queensland, went on active service, and was invalided home in 1918 for bronchitis. After this he was employed as a carpet layer, until he went to the country some two or three years ago; since when he has been a bush worker and rabbit trapper.

In 1918 and 1919 he had nodules or pimples on his neck and face; at this time the blood gave a Wassermann reaction, and he was treated for syphilis, though sections of the nodules showed acid-fast bacilli. He is said to have improved greatly under this treatment. A blood test in 1922 gave a negative Wassermann result.

On admission.—An advanced nodular case.

Head.—Forehead and cheeks are grossly infiltrated, and there are many small pink nodules, some of which are tender. Nose is partially obstructed. Huskiness of voice suggests laryngeal involvement.

Trunk.—Many large areas of pigmentation on front and back.

Upper limbs.—Gross infiltration of skin of upper arms and forearms. Ulnar nerves hard. Hands cyanosed, deformed and ulcerated.

Lower limbs.—Gross infiltration of skin of legs and feet; hands and feet are partially anæsthetic, and he says they do not sweat.

B. Leprœ was obtained in abundance from forehead and in nasal mucus.

Blood taken on admission gave negative result to Wassermann and Kahn tests.

Treatment and Course.—He was given Chaulmoogra Oil internally but has gradually become worse. His body weight has fallen from 8 st. 9 lb., on admission, to 7 st. 13 lb., on 1st November. He has developed frequent crops of fresh nodules, and an abscess formed in the ball of right foot, and had to be opened. Infiltration of the prepuce has obstructed micturition.

II.—Readmissions.

Case CXXXI.—J.F., m., born 1884; admitted 19th September, 1912; discharged on parole 1st January, 1920; readmitted 7th November, 1927.

After discharge in 1920 he failed to report regularly for examination, and was lost sight of.

On readmission:—

Head.—Forehead bears scab of a large ulcer. No eyebrows nor eyelashes. Chronic conjunctivitis. Both corneal opaque. Perception of light only. Much infiltration of face and ears. Nose deformed. Right nostril blocked.

Trunk.—Much macular staining back and front.

Upper Limbs.—Left—Ulceration about elbow and fingers; hand swollen; fingers flexed. Right—Less affected than left.

Lower Limbs.—Much ulceration of left calf and foot, and of right calf. Anæsthesia of both.

Case CXLIV.—W.J.P., m., born 1904; admitted 25th November, 1916; discharged on parole 5th November, 1924; readmitted 1st June, 1927.

On readmission:—

Face.—Nodule below left eyebrow. Infiltration of forehead. Left iritis.

Trunk.—Many patches of infiltration and numerous small nodules on buttocks.

B. Leprœ abundant in fluid from nodule of left eyebrow. Is taking Chaulmoogra Oil, 90 minims daily.

IV.—Deaths.

Case CXIII.—C.S.C., f., born 1867; admitted 16th April, 1907. As stated in last year's report this patient has been steadily failing through cancer of the breast. She became progressively thinner and weaker, and died on 30th September, 1927.

Case CXVII.—A.R., f., born 1901; admitted 14th January, 1908. The steady decline described in last report continued, and she died on 9th March, 1927.

V.—Progress Report on other Patients remaining in on 31st December, 1927.

Case LXXXVII.—F.E.B., m., born 1876; admitted 25th November, 1903. Has become less active. Left facial hemiparesis is more marked, and there is considerable ectropion with conjunctivitis. Body weight: 10 st. 11 lb. in January, 11st. 4 lb. in August, and 10 st. 7 lb. in December.

Case LXXXVIII.—G.M.S., f., born 1885, admitted 9th February, 1904. Leprosy remains quiescent and bodily health good. Body weight in January 15st. 6lb; in December 14st. 13lb.

Case CI.—T.A., m., born 1870, admitted 11th July, 1905. No fresh signs. Body weight: 11st. 10lb.

Case CXXIII.—J.C., m., born 1862; admitted 15th November, 1910. Has become much enfeebled, with considerable cyanosis. Left eye has only bare perception of light; right eye blind through keratitis. Voice husky from laryngytis.

Case CXXVIII.—S.C., m., born 1872. Admitted 21st May, 1912. Condition remains about the same.

Case CXXXVI.—A.C.P., m., born 1898; admitted 23rd June, 1914. Was out on parole 12th October, 1922, to 16th January, 1925. Liable to attacks of iritis. Vision steadily failing. Body weight: January, 9 st. 4 lb.; December, 9 st. 11 lb.

Case CXXXVII.—E.W., m., born 1864; admitted 17th November, 1914. No fresh signs. General health good. Body weight: January, 9 st. 9 lb.; December, 10 st. 2 lb.

Case CXLIX.—P.P., m., born 1887; admitted 21st February, 1918. The disease has shown less activity. The nodules on the face after suppurating and disfiguring him bodily, formed crusts, which now have mostly cleared off. But he is almost blind and his arms and legs are cyanosed and swollen. Body weight is fairly constant at about 9 st.

Case CLVII.—A.W., f., born 1859; admitted 18th February, 1921. Has been very miserable. Facial paralysis is more marked, and there is cardiac weakness. Body weight averages about 8 st. 7 lb.

Case CLVIII.—J.C., m., born 1899; admitted 18th August, 1921. Liable to exacerbations in which fresh nodules appear and there is pyrexia. Usually in good health. Body weight averages 9 st. 4 lb.

Case CLXIII.—H.L.S., m., born 1887; admitted 22nd October, 1924. No fresh signs. In September films made from left elbow tip were found to contain *B. Leprœ*. Body weight averages 9 st. 9 lb.

Case CLXIV.—J.B., m., born 1864; admitted 28th January, 1925. Much illhealth during the year Asthmatic dyspnœa. Exacerbation of leprosy in December, with many painful nodules on several regions of body. Body weight averages 9 st.

Case CLXIX.—W.T., m., born 1879; admitted 22nd November, 1925. Frequent small crops of fresh nodules, but general health is good. Body weight averages 8 st.

3.—DAVID BERRY HOSPITAL.

Berry, New South Wales.

REPORT of the Secretary for the year ending 31st December, 1927.

Administrative Staff.—Visiting Medical Officer, A. L. Stafford, M.B., Ch.M.; Matron, Miss D. G. Cawood; Secretary, A. F. Hale.

Resident Staff.—Matron, 1 Sister, 1 Staff Nurse, 5 Pupil Nurses, Cook, Laundress, 2 Female Attendants, 1 Indoor Male Attendant, 1 Outdoor Male Attendant, 1 Inmate Male Worker.

Number of Wards and Beds.—Wards, 6; Beds, 26 (22 beds, 4 cots).

General Cases.—Ward 1 (12,144 cubic feet), 10 beds, 1 cot; ward 2 (9,936 cubic feet), 8 beds, 1 cot; ward 3 (2,016 cubic feet), 1 bed; ward 4 (2,016 cubic feet), 1 bed.

Infectious Cases.—Ward 5 (2,160 cubic feet), 1 bed, 1 cot; ward 6 (2,160 cubic feet), 1 bed, 1 cot.

Sir,

I have the honour to submit herewith the annual report of this hospital for the year 1927 :—

Admissions and Discharges, 1927.—Remaining in on 1st January, 1927, 14; admitted during 1927, 288; births, 3; total, 305. Discharged, 181; deaths, 12; remaining in on 31st December, 1927, 22. Average daily number resident, 17. Annual cost of Maintenance, £4,177; average cost per bed, £245 14s. 1d.

In-patients.—The total number of patients treated was 305, compared with 319 for the previous year; the daily average was the same as 1926, viz., 17.

Out-patients.—The number of out-patients who received relief was 78, as against 75 for 1926.

Anæsthetics.—The total number of operations performed was 167 (major 69, minor 98); 44 visits were made by the Nowra doctors in connection with operations: Dr. Foy, 14; Dr. Rodway, 6; the late Dr. Whitfield, 5; Dr. Ryan, 18; Dr. Francis, 1.

Infectious Cases.—Seventeen infectious cases were admitted, viz., Diphtheria, 9; Scarlet Fever, 7; Measles, 1.

Collections.—The collections for the year amounted to £430 8s. 2d., compared with £510 11s. 2d. for the preceding year.

Hot Water Service.—An up-to-date Hot Water Service was installed during the year and is proving a great benefit.

Buildings.—The buildings are in a fair state of preservation, very few repairs were found necessary during the period under review, but an overhaul for repairs and renovation is advisable.

Grounds.—In good order.

Staff.—The Institution is at present in charge of Dr. Stafford, Visiting Medical Officer, and Miss D. G. Cawood, Resident Matron, and the work has been carried out most harmoniously throughout the year.

A. F. HALE,
Secretary.

4.—MONTROSE MATERNITY HOSPITAL.

Lucas-road, Burwood.

REPORT FOR 1927.

Honorary Medical Officers.—G. R. Walker, M.B., Ch.M.; G. C. Harper, M.B.; J. H. R. McCutcheon, M.B., Ch.M.; W. M. A. Fletcher, M.B.; Mast. Surg.

Matron.—Miss E. M. Copeman. *Staff Nurses.*—Two (general nursing and obstetric certificates), and staff of certificated nurses undergoing obstetric training; 1 cook; 1 housemaid.

Number of Wards and Beds.—Ward A, 4,377 cubic feet, 4 beds, 4 cots; Ward C, 77,037 cubic feet, 8 beds, 8 cots. There have been 1,836 admissions to "Montrose" since it was opened as a maternity hospital in 1920.

Admissions and Discharges.—Remaining in hospital 31st December, 1926, 6; mothers admitted during 1927, 298; discharged, 297; died, 1; number of births, 258; miscarriages, 3; remaining in hospital on 31st December, 1927, 6. Average daily number resident, 8. Annual cost of maintenance, £1,622 Average cost per bed, £202 15s. 0d.

1927 was a fairly busy year, the months from April to October being particularly so. There were 33 more births than in 1926. I regret to report that one death occurred during the year. The patient was unconscious when admitted and died a few hours after.

During the year Dr. A. L. Lance resigned his position of Honorary Medical Officer, owing to ill-health. The vacancy has been filled by the appointment of Dr. W. M. A. Fletcher.

The obstetric trainees all passed the hospital examination, but one unfortunately failed in the State Registration examination.

A clinic has been commenced for out-patients, one of the Honorary Medical Officers attending at the hospital every Wednesday afternoon. A special room for this clinic is very necessary, as at present one of the wards has to be used for patients requiring examination.

E. M. COPEMAN,
Matron.

5.—FERNLEIGH PRE- AND POST-MATERNITY REST HOME.

Victoria-street, Ashfield.

Honorary Medical Staff.—A. L. Lance, M.B., Ch.M.; J. H. R. McCutcheon, M.B., Ch.M.; G. R. Walker, M.B., Ch.M.; G. C. Harper, M.B.

Resident Staff.—Matron, Miss L. D. Meares; Head Nurse, Miss Alcock.

Number of Beds and Wards.—Ward A, 6,543 cubic feet, 6 beds, 6 cots; Ward B, 6,480 cubic feet, 7 beds, 3 cots; Ward C, 4,104 cubic feet, 4 beds; total, 17 beds, 9 cots.

Annual Return of Admissions and Discharges.—Remaining in on 31st December, 1926, 5 mothers, 4 babies; admitted during 1927, 208 mothers, 114 babies; discharged, 213 mothers, 115 babies; remaining in on 31st December, 1927, 8 mothers, 3 babies. Daily average number resident, 10.

Annual cost of maintenance, £1,424; average cost per occupied bed, £142 18s.

The year has been very busy, principally owing to the majority of the babies being underfed. Treatment was given the mothers, and the results obtained were very satisfactory.

Sincere thanks are due to the medical staff who visit the Home when called upon.

Sufficient eggs and vegetables are produced for use in the Home, any surplus being sent to Montrose Maternity Hospital.

Matron.

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6. LADY EDELINE HOSPITAL FOR BABIES.

Greycliffe, Vaucluse.

ANNUAL REPORT FOR YEAR ENDED 31st DECEMBER, 1927.

Visiting Medical Officer, Dr. L. R. PARKER.

Honorary Staff of Consultants.—Sir Charles Clubbe, Consulting Surgeon; Dr. T. Storie Dixson, Consulting Physician; Dr. R. Norman Paul, Consulting Dermatologist; Dr. Cyril Shepherd, Consulting Ophthalmic Surgeon; Dr. R. S. Godsell, Consulting Ear, Nose, and Throat Surgeon.

Nursing Staff.—Matron, Miss H. J. Turner; two Staff Nurses and ten Pupil Nurses.

Number of Wards and Beds.—Ward 1 (4,330 cubic feet), 12 cots; Ward 2 (5,000 cubic feet), 15 cots; Ward 3 (4,000 cubic feet), 4 cots and 4 beds; Flowers Ward (1,500 cubic feet), 5 cots; Isolation Ward (2,500 cubic feet), 5 cots and 1 bed; verandah cots, 6. Total—5 Wards; 47 cots, 5 beds.

Return of Admissions and Discharges.—Remaining in hospital on 1st January, 1927, 31 babies and 9 mothers. Admitted during the year, 162 babies. Discharged, 146; died, 19; total number treated, 193. Remaining in hospital 31st December, 1927, 28 babies. Daily average of cots occupied, 29. Average length of stay in hospital, 10 weeks. Mothers accommodated within the hospital, 61; babies attending as out-patients, 137. Dressings of wounds, mostly accidents in adjoining park, 57.

Annual cost of maintenance and treatment, £2,698. Average cost per occupied bed, £93 0s. 8d.

VISITING MEDICAL OFFICER'S REPORT.

Admissions to "Greycliffe" in 1927 numbered 162, although the total number treated was 193. Nineteen deaths occurred, making a 12 per cent. ratio on the number of admissions. This is practically identical with results of last year, and as stated in my report on that year's work, it seems impossible in the light of present knowledge to get a better result with the class of patient which is generally admitted to "Greycliffe," who, it must be remembered, is a case of chronic malnutrition on to which a more or less severe epidemic infection has engrafted itself.

L. R. PARKER, V.M.O.

The following table shows the ages on admission of all babies treated during 1927, the number of deaths, and duration of stay in hospital of fatal cases :—

	3 months.	3—6 months.	6—9 months.	9-12 months and over.	Total.
	67	62	41	21	193
Died	13	5	1	0	19
Duration of stay in hospital of fatal cases	6 hours ...1 22 ,, ...1 2 days ...2 4 ,, ...1 8 ,, ...1 12 ,, ...1 26 ,, ...1 40 ,, ...2 7 weeks ...1 2 months...2	1 hour ...1 ..... 17 days ...1 27 ,, ...1 30 ,, ...1 ..... 3 months...1	3 days ...1	....	
	13	5	1	0	19

MATRON'S REPORT.

Nature of Cases under Treatment.—Acute gastro-enteritis, 28 (8 deaths); acute enteritis, 33 (2 deaths); chronic enteritis, 11; malnutrition-enteritis, 63 (3 deaths); malnutrition-gastritis, 13; broncho-pneumonia, 6 (1 death); ile colitis, 7; eczema, 7; prematurity, enteritis, 4 (1 death); otitis media, 4; infantile convulsions, 2; purulent ophthalmia, 2; pertussis, 1, vaccine treatment successful; cerebral meningitis, 2 (died, 2). Total cases treated, 193; deaths, 19.

Two cases of measles developed soon after admission and were transferred to the Coast Hospital; 3 nurses contracted scarlet fever and were transferred to the Coast Hospital; 2 were treated for suspicious throats at the Coast Hospital. Fumigation and thorough disinfection followed all cases of infection. One baby contracted scarlet fever and was also treated at the Coast Hospital.

The sewing guild, which is conducted by a committee of social ladies, continues to assist in keeping up stocks of baby garments, the hospital supplying materials; Mrs. Cameron still organises this useful work. The guild meets twice a week and members are very interested.

The *Sun* Toy Fund supplied the babies with a wonderful collection of toys and other useful articles at Christmas, giving added brightness and cheerfulness to the whole Institution.

H. TURNER,
Matron.

7.—STRICKLAND CONVALESCENT HOSPITAL FOR WOMEN, CARRARA, ROSE BAY.

Report of the Matron for the year ended 31st December, 1927.

Visiting Medical Officer.—Dr. L. R. Parker.

Resident Staff.—Matron, Miss S. G. Hartley; 1 Senior and 1 Junior Nurse.

Number of Wards and Beds.—No. of wards, 9; No. of beds, 32.

Ward A, 4,038 cubic feet; Ward B, 8,557 cubic feet; Ward C, 4,038 cubic feet; Ward D, 3,477 cubic feet; Ward E, 3,477 cubic feet; Ward F, 7,334 cubic feet; Ward G, 3,477 cubic feet; Ward H, 1,736 cubic feet; Ward I, 2,232 cubic feet.

This hospital is utilised for women convalescent after severe illnesses.

Annual Return of Admissions and Discharges.—Number of patients remaining in on 1st January, 1927, 24; admitted during year, 608; discharged, 603. Total number treated during 1927, 632; Average daily number of beds occupied, 31. Annual cost of maintenance, £2,619; average annual cost per bed, £84 9s. 8d.

The year has been satisfactory. Many improvements made to the building and furnishings have added much to the comfort of both patients and inmate workers.

Portion of the grounds is utilised for a dairy herd, the milk from which supplies the infants at the Lady Edeline Hospital for Babies, and practically all that is used at "Carrara."

S. G. HARTLEY,
Matron.

8.—DENISTONE HOUSE CONVALESCENT HOSPITAL FOR MEN, EASTWOOD.

Annual Report for the Year ended 31st December, 1927.

Visiting Medical Officers.—Drs. D. Guthrie Hunter and W. Sinclair (resigned).

Resident Staff.—Matron, Miss I. M. Shiell; Nurse, 1; Attendant, 1.

Number of rooms used as wards, 7; indoor beds, 29.

Annual Return of Admissions and Discharges.—Patients in hospital, 31st December, 1926, 20; admitted during 1927, 299; discharged, 295; remaining in hospital, 31st December, 1927, 24; total number under treatment during the year, 319; daily average number resident, 22; annual cost of maintenance and treatment, £2,348; average cost per bed, £106 14s. 6d.

Denistone House is 387 feet above sea level, and is well suited for a convalescent hospital, patients deriving great benefit from their stay. Since the opening of the institution in 1915 there have been 3,907 admissions.

Usually sufficient eggs, milk and vegetables are produced to meet all requirements.

Improvements.—The greater part of the hospital was painted and renovated during the year.

Dr. Sinclair resigned from the medical staff, having accepted other honorary appointments.

I. M. SHIELL,
Matron.

9.—WATERFALL SANATORIUM.

Report of the Medical Superintendent for the year ended 31st December, 1927.

Honorary Staff.

Honorary Consulting Physician, Dr. S. H. MacCulloch; Honorary Physicians Dr. Cecil Purser and Dr. E. W. Fairfax.

Resident Administrative Staff.

Medical Superintendent, Dr. H. W. Palmer; Senior Medical Officer, Dr. E. L. Fitzgerald; Junior Medical Officer, Dr. J. M. Rainbow; Manager, Mr. R. C. Rowe; Matron, Miss K. Walsh; Clerk and Storekeeper, Mr. A. Douglass.

Constitution of Hospital Staff on 31st December, 1927.

Medical and Administration: Medical Superintendent, Senior Medical Officer, Junior Medical Officer, Manager, Matron, Clerk. *Nursing*: Sub-matron, 4 Sisters, 29 Nurses. *General*: 1 Foreman, 4 Artisans, 1 Motor Driver, 4 Male Cooks, 15 Attendants, 1 Female Cook, 2 Servants.

Number of Wards and Beds.

No. of Wards.	Capacity in cubic feet.	No. of Beds and Cots.	Cubic feet to each Bed.	No. of Extra Beds in Open Air.	No. of Ward.	Capacity in cubic feet.	No. of Beds and Cots.	Cubic feet to each Bed.	No. of Extra Beds in Open Air.
1	28,800	28	1,028	3	Boys	Open ward	...	.....	12
2	28,800	28	1,028	4	10	Open ward	...	.....	11
3	28,800	28	1,028	4	A	28,800	28	1,028	12
4	28,800	28	1,028	4	B	28,800	28	1,028	12
5	21,600	18	1,200	3	C	28,800	28	1,028	.....
6	21,600	18	1,200	7	D	28,800	28	1,028	.....
7	28,800	28	1,028	4	Chalets	.....	.....	.....	20
8	28,800	28	1,028	3					
9	Open ward	...	.....	26		Total ...	316	.....	125

Total number of beds for adult male patients—In wards, 273; in chalets, 20, for boys, 12; total, 305. Beds (in wards) for female patients, 131. Total accommodation for patients, 441; an increase of 24 beds (12 male beds (boys), and 12 female beds) over the number available in 1926.

Admission and Discharge of Patients for 1927.

Number of patients remaining in on 1st January, 1927, 432; admitted during 1927, 537; total number under treatment, 969; discharged cases ("arrested" cases, 22; "much improved" cases, 109; "improved" cases, 223; "unimproved" cases, 33) 387; died, 173; remaining in residence at 31st December, 1927, 409; average daily number of occupied beds, 416; total cost of maintenance, £40,036 3s.; average annual cost per inmate, £96 4s. 9d. (compared with £98 18s. 8d. in 1926).

Condition on discharge and average residence in days of the 387 discharged patients—average residence of all discharged cases, 313 days.

	No. of Patients.	Average Residence.
		Days.
Disease arrested	22	620
Much improved	109	452
Improved	223	243
Unimproved	33	120
Total	387	313

Condition of Patients on admission and discharge during 1927.

Condition on Admission.	Arrested.	Much Improved.	Improved.	Unimproved.	Died.	Total.
Incipient	7	12	16	3	8	46
Moderately Early	8	41	83	8	26	166
Moderately Advanced	7	55	122	22	102	308
Far Advanced	...	1	2	...	37	40

Arrested Cases.—Have no sign of active disease, temperature normal, no sputum, and able to do a fair amount of work.
Much Improved.—Have slight signs of disease, temperature normal, may have little sputum, but can do light work.
Improved.—Disease more or less active, but have improved generally.
Unimproved.—No apparent improvement or disease progressing.

Ages of patients discharged and died during 1927.

Years, 1 to 9	Years, 10 to 19	Years, 20 to 29	Years, 30 to 39	Years, 40 to 49	Years, 50 to 59	Years, 60 to 69	Years, 70 to 79
8	41	132	142	139	69	32	6

OCCUPATIONS of Patients Discharged or Died during 1927.

Occupation.	Number.	Occupation.	Number.	Occupation.	Number.
Labourers	99	Children	30	Building trade	17
Housewives	88	Clerks	28	Tailoring	14
Home duty	71	Shop assistants	28	Seamen	13
Mechanics	36	Stewards	26	Other outdoor workers	13
Trades, indoor	33	Miners, coal	21	Professions	9
Factory hands	31	,, quartz	3		

BIRTHPLACES of Patients Discharged or Died during 1927.

Country.	Number.	Country.	Number.
New South Wales	320	British Dominions	13
Other States of the Australian Commonwealth	54	European countries	30
England	94	United States of America	1
Scotland	23	China	1
Ireland	18	New Caledonia	1
Wales	5		

TABLE of Yearly Results for ten years, 1918 to 1927.

Year.	Total Patients Treated.		Total Discharges.				Died.
	In Residence beginning of year.	Admitted during year.	Arrested.	Much Improved.	Improved.	Unimproved.	
1918 ...	308	493	57	67	128	26	173
1919 ...	349	439	59	77	162	17	177
1920 ...	356	480	77	80	112	41	150
1921 ...	376	556	59	107	147	67	190
1922 ...	362	548	63	111	102	114	164
1923 ...	356	569	42	78	159	83	167
1924 ...	396	598	43	70	203	90	192
1925 ...	396	587	47	115	195	31	158
1926 ...	437	548	53	69	212	32	187
1927 ...	432	537	22	109	223	33	173

GENERAL REVIEW OF YEAR'S WORK.

During the year there were 969 patients under treatment, namely, 660 males and 309 females. At the beginning of 1927 there were 298 male and 134 female patients in residence, and during the year 362 males and 175 female patients were admitted; 251 males and 136 females were discharged, and 114 males and 59 females died.

There remained in residence on the 31st December, 1927, 409 patients (295 males and 114 females).

Of the 387 discharged patients, 22 were arrested cases having no signs of active disease, 109 were much improved and able to return to ordinary light work, 223 were somewhat improved, while 33 were not benefited by their stay at Waterfall.

Treatment was mainly along ordinary sanatorium lines, though tuberculin bacillary emulsion was used in several cases. Ostellin again proved of little benefit to our patients, as our food is rich in vitamines, and if cod liver oil is indicated, the whole oil is far preferable to any concentrated preparation of any of its active contents. Insolation treatment and heliotherapy were used in special cases, and a portion of one of the verandahs was divided off for this purpose.

Messrs. Parke Davis and Co. supplied us with sufficient sanocrysin for test on a number of specially selected cases. Sixteen cases in all were fully tested, seven having a second course later in the year. Most of the cases selected were recently infected and fairly early cases, though with marked physical signs, and all had tubercle bacilli in their sputum. In all the cases tested sanocrysin failed to cause any noticeable improvement. A full report of cases treated with sanocrysin is attached (p. 177).

The results for 1927 compare favourably with the results for the last ten years, though there were fewer arrested cases than in previous years. However, there was a large increase in those much improved, and if these two classes are taken together the variation is slight. In view of the type of case admitted to Waterfall, and the number of incurable cases carried over from year to year, the results are satisfactory.

Treatment of children has always been very successful, and this year it has been so again. Boys now have their own ward, which was opened in November, and they are kept away from all adult patients. Girls have still to be housed in the women's wards, but as far as possible they are kept apart from the adults. The children have their special school mistress, who supervises their time in school and their games during school hours.

No new methods have been discovered during the past year by which tuberculosis can be controlled, but a start has been made to definitely systematise and co-ordinate all the different agencies in this State dealing with this problem.

During the year Dr. Baret, who had previously filled the position of Assistant Medical Officer at this Sanatorium, was appointed Acting Director of the Division of Tuberculosis, which was set up in the Department of Public Health.

The Advisory Board for the Control of the Campaign against Tuberculosis, which includes representatives of all the institutions dealing with this disease, held its first meeting towards the end of the year. The spirit of co-ordination so strongly evidenced by the different representatives augurs well for the success of the activities of the Board. These activities, however, will need to receive the financial and other support of the Government if the campaign against tuberculosis is to meet with the desired success.

Local Requirements.—Owing to the unsatisfactory condition of the finances last year, no action was taken to meet requirements so long overdue, and which were strongly recommended by the Parliamentary Committee of Enquiry in 1926. As these requirements were regarded as urgently needed two years ago, the lack of them is doubly felt now.

X-ray Plant.—Modern methods of treatment of tuberculosis are not possible without the aid of a suitable X-ray plant and artificial light apparatus. These plants should be installed without delay.

New Buildings and Improvements.—Up-to-date laundry machinery, including a new steam boiler, has been installed in the laundry building erected last year, and an attendant placed in charge. The installation has greatly reduced the working cost of this section.

A second large open air ward for inmates was completed by staff labour, and the Boys' ward was also finished. The old laundry building was demolished, and with the material obtained from it, a start has been made to erect new stables on a site more remote from the hospital buildings. As soon as these are completed, the existing objectionable stable buildings will be demolished.

Special attention has been given to the kitchen, and the renovating and painting of the hospital buildings and wards.

Amusements and Recreation.—The patients have been well catered for by in-door entertainments, including concerts, cinema, billiards and games, and we have to thank the many friends and visiting artists who have so kindly assisted. Out-door games consisted of bowls for men, croquet for women, cricket and tennis for the children.

The wireless installation has given a good deal of pleasure to the bed patients, but unfortunately it has frequently caused disappointment through breakdowns, which have been rectified as quickly as possible.

Vegetables Grown by Patients.—As in previous years, a number of patients, sufficiently recovered, were allotted garden plots, and all vegetables grown by them were purchased by the management at current market rates. In all, eighteen patients worked on these plots during the year, and raised vegetables to the value of £415. All the vegetables were bought and made use of by the Sanatorium.

Visiting Dentist.—The requirements of the patients have been met by the fortnightly visits of the dental surgeon who occupies a whole day attending to the dental needs of the patients.

Shortage of Accommodation.—The pressure on the available accommodation for patients has been worse this year than ever before. To meet the demands, it was necessary to place extra beds in wards which were already occupied by more than their proper number of patients. This great demand for beds, together with the number of absolutely helpless cases we were forced to admit early in the year, taxed our nursing staff to breaking point, and the extra assistance then asked for has not yet been obtained.

If this Sanatorium is to fulfil its proper functions in the scheme of co-ordination adopted by the Board for the control of the campaign against tuberculosis, it must be properly equipped and reserved for suitable cases. There is urgent need for the provision of a number of hospital beds for helpless cases nearer Sydney. These cases being in need of proper medical and nursing attention might be provided for in special wards in connection with the general hospitals.

H. W. PALMER,
Medical Superintendent.

Report on Sanocrysin Treatment at Waterfall Sanatorium, 1927.

Supplies of sanocrysin having been provided by Messrs. Parke, Davis & Co., in March and September, 1927, 16 specially selected patients were placed under treatment, 9 having one complete course, and 7 having a second full course of sanocrysin. The first course started on April 28th, 1927, and 5 men and 7 women were selected. Eight of these cases were of recent origin, but with marked physical signs in their chests, and with tubercle bacilli in their sputum. The other 4 cases were of longer duration, but with recent relapses, having active signs of disease present. Of the 8 early cases 4 had before treatment shown little sign of definite improvement, and it was considered that if improvement took place in these cases a better opinion could be formed as to the value of sanocrysin. Unfortunately no improvement was noticeable in these cases.

Treatment closely followed the directions issued.

Report of Individual Cases.

Case 1.—H.G. aged 36 years. Under treatment three months and improving slowly. Prior to commencing sanocrysin treatment, temperature 98·4, sputum 3½ oz., Tb. bacilli present, blood stains, urine 69 oz., while chest signs showed active disease on left, and quiet lesions on the right side. The initial dose given was ·05 grm. sanocrysin dosage increased at five days interval, till 1 grm. dose was reached. This dose was repeated three times, when the course was considered complete.

On four occasions the temperature reached 99 while crepitations increased on two occasions. Twice there was headache, and vomiting took place within a minute of receiving the injection when 1 grm. dose was given. Bleeding was unaffected, while sputum, urine or the number of tubercle bacilli present in the sputum were unaltered. Patient put on 3 lb. in weight and his physical signs had altered, being drier but more pronounced. His real condition was not definitely improved.

*70107—P

Case 2.—E.G., aged 39 years. Under treatment two weeks, temperature 100, sputum 10 oz. thin mucous, Tb. positive, urine 36 oz., chest physical signs right upper lung marked congestion, full of crepitations, left upper lung deficient breath sounds, with a number of dry crepitations. Had similar injections to Case 1, but course ceased 11th July, 1927. As with the previous case 1 grm. doses gave rise immediately to cerebral vomiting. The only other inconvenience was the sore arm caused when the injection leaked out of the vein into the tissues. This caused considerable pain.

After treatment temperature was normal, sputum 2 oz. containing numerous tubercle bacilli. Chest signs showed both upper lobes still slightly active with distant Br. breathing, while there was posteriorly no improvement.

Case 3.—J.R.M., aged 31 years. Under treatment six weeks, improving slowly, sputum to 2 oz., urine 30 oz., temperature 98, chest signs of left cavity with crepitations all over left side, right side fairly quiet. First treatment ceased on 23rd July, 1927.

Result of four last doses was to cause arm to swell, with headache. While patient feels much better temperature varies to 100 at night, and instead of left side of chest being active the right now is active. Tubercle bacilli are still present.

On 17th October, 1927, a second course of sanocrysin was given, similar to the first, but the results were identical to those obtained with the first. Patient still has tubercle present in his sputum, while both lungs are still active.

Case 4.—J.C., aged 30 years. Under treatment four weeks, improving slowly, sputum absent at times, at other times to 2 oz., Tb. bacilli, temperature 99·4, urine 33 oz., anaemic, chest signs, weak breathing over both sides, with scattered crepitations and a few moist rales. With the early doses this patient gave mild reactions, headache and rise of temperature to 100·4 and sputum scanty. When dose of ·6 grm. was given temperature rose to 102 on the second day and remained up for a week. Treatment of first course finished on 23rd July, 1927. Result of treatment was certainly negative, as temperature remained to 101 for five weeks, sputum 2 to 3 oz., and number of Tb. bacilli were increased. This patient also suffered with sore arms and cerebral vomiting immediately after injection. This patient had also the second course but was only given to ·75 grms., but results were the same though the vomiting and sore arms were more severe.

Case 5.—R.C.G., aged 19 years. Under treatment eighteen months, not improving, temperature 100 to 99·6, sputum 3 oz., pulse 100 to 120, Tb. bacilli numerous, chest right side very active, while left side slightly affected but quiet. Each injection gave rise of temperature within four hours, but temperature soon fell and other disturbances were slight till dosage reached ·9 grm. Then, one hour after the injection, rigor temperature 103 cerebral vomiting. Attacks lasted about twelve hours.

After treatment, chest was drier on right side but much worse on the left side sputum, 6 oz., Tb. bacilli still numerous.

Case 6.—M.W., 31 years. Under treatment six weeks, temperature falling from 104 to 101, sputum 1½ oz., Tb. bacilli present, chest signs very active on right side, less so on left. With each injection this patient gave a temperature reaction with slight headache, and once vomited.

After treatment sputum increased to 2 oz., Tb. bacilli were still present and chest condition more extensive though fewer crepitations.

Case 7.—M.P., aged 20 years. Under treatment two months, not improving, temperature 101·4, sputum 1 oz., Tb. bacilli present, chest signs very active both lungs. Each injection gave a mild rise of temperature with slight headache, and at first the amount of sputum increased. After this course improvement was very slight, and Tb. bacilli were in no way influenced. A second course was given beginning 17th October, 1927, but reactions were more marked, and cerebral vomiting and headache frequent. After treatment patient was failing, losing of weight marked, and chest condition much worse.

Case 8.—D.W., aged 18 years. Under treatment three and a half months, improving slowly. Chest condition very active, left side restricted breathing, sputum varied from ½ to 3 oz., temperature 99·4, Tb. bacilli. Each injection gave slight rise of temperature with occasional headache. After treatment appeared somewhat improved, but chest condition little altered, and sputum or Tb. bacilli not influenced. A second course was given in October, but as in the previous case reactions were more marked, and at the end of treatment no improvement in any respect was noticeable.

Case 9.—G.S., aged 18 years. Under treatment six months, little improvement, temperature 98·6, sputum 1 oz., Tb. bacilli present. Chest signs very active on right, less extensive on left. On receiving ·5 grm. temperature rose to 101° taking eleven days to fall to 99·6. Sputum at first increased to 5 oz., but later fell to 1 oz.,Tb. bacilli were not influenced. Headaches did not occur during this course of treatment, and little improvement occurred. A second course was taken in October, and in this case also reactions were marked with cerebral vomiting and slight rigors. Results—Loss of weight, chest more active, sputum increased, and tubercle still numerous.

Case 10.—A.P., aged 20 years. Under treatment two and a half months, improving, temperature 98·6, sputum ½ oz., chest harsh breathing over both upper lungs. Early injections caused headaches and rise of temperature to 100·4. Chest became dry with little sputum, but cough very irritable.

Case 11.—I.L., aged 17 years. Under treatment seven months, some improvement. Temperature 98·6, sputum 1 oz., Tb. bacilli in sputum, chest signs active on right side and fairly quiet on left side. Had reactions in temperature to 100·4, mild headaches. Had second course of sanocrysin in October, with more definite reactions, cerebral vomiting occurring. Pains in spine and pleurisy frequent. After treatment chest was worse, sputum 1 oz., and Tb. bacilli.

Case 12.—M.O., aged 21 years. Under treatment twelve months. Temperature 99; sputum nil, but had contained Tb. bacilli. Had improved up to a certain point, but was then stationary. Chest, though quiet, was apt to break down. In this case reactions were mild, sputum did not return, but there was no great improvement in general health.

Case 13.—A.P., aged 20 years. Under treatment two weeks; temperature 99. Tb. bacilli in sputum 1 oz., chest signs early over both upper lobes of lungs. Reactions were marked, but mild. Temperature rose to 100, with increase of lung crepitations. After treatment condition of right side of chest was worse but left side was drier.

Case 14.—D.M., aged 16 years. Was an acute case, ill three months; sputum 3 oz., temperature 100. General condition was fairly good, but not likely to recover, without specific. Treatment had, if anything, an injurious effect on her, so had to be discontinued after the fifth dose. Patient died later.

Case 15.—J.C.C., aged 27 years. Ill twelve months, with active signs over left lung, with slight involvement on right. Sputum 4 oz., Tb. bacilli present; lost 7 lb. in weight. Under treatment one month, slight improvement. After treatment put on 2 lb., but condition of the lung not altered nor Tb. bacilli not diminished.

Case 16.—A.J., aged 24 years. Under treatment two months, improving. This case was an early case with few physical signs in chest, but with cough sputum 1 oz., containing numbers of Tb. bacilli. X-ray showed mottling over right apex, with marked interrupted breathing over this area. Condition did improve, but there was no diminution of the sputum or disappearance of the Tb. bacilli.

From the above results, I think that it is evident that very little curative action can be claimed from the treatment of tuberculous patients with sanocrysin. While all reactions were mild, cerebral vomiting took place frequently, especially with the higher doses, and was objectionable. The quantity of urine and sputum varied within small limits during the initial doses, but did not diminish, nor was it ultimately affected. In no case were the numbers of tubercle bacilli reduced. In only three cases did the patient put on weight.

When one remembers that the cases were kept confined to bed, under sanatorium conditions, the slight amount of improvement can be easily explained.

Four control cases, all of whom had been refused sanocrysin treatment, on account of being too far advanced, compared favourably with these cases after treatment, but it is unnecessary to make a comparison owing to the definite want of improvement in the cases treated.

In the light of our experience with sanocrysin in the treatment of tuberculosis, we reluctantly feel that it does not in any way prove to be a cure for this disease.

H. W. PALMER,
Medical Superintendent.

10.—LIDCOMBE STATE HOSPITAL AND HOME FOR MEN.

Report of the Medical Superintendent for the year ended 31st December, 1927.

Honorary Visiting Staff.

Honorary Staff Surgeon, Dr. H. C. Rutherford Darling, M.D., M.S., F.R.C.S.; Honorary Assistant Surgeons, Dr. J. A. Lawson, M.B., Ch.M.; Honorary Ear, Throat, and Nose Surgeon, W. A. Dunn, M.R.C.S., Eng.; Honorary Ophthalmic Surgeons, Falkner J. Blaxland, M.D.; A. L. North, M.B., Ch.M.; Honorary Neurologist, Andrew Davidson, M.D.; Honorary Dermatologist, A. Chapman, M.B., Ch.M.

Administrative Staff.

Medical Superintendent, R. A. Fox, M.B., Ch.M.; Senior Medical Officers, Dr. E. J. Brooks, M.B., Ch.M., Dr. F. J. Williams, M.B., B.S.; Manager, R. J. Brown; Dispenser, W. Lunney; Matron, Miss E. M. E. Mance; Sub-matron, Miss M. A. Hall; Clerk, A. T. Lord; Assistant Clerk, A. Rattray.

Constitution of Hospital Staff on 31st December, 1927.

Medical Superintendent, two Resident Medical Officers, Dispenser, Manager, two Clerks, Matron, Sub-matron, thirty-three Nurses, Chief Attendant, Chief Night Attendant, forty-seven Attendants, Ambulance Driver, Storekeeper, Assistant Storekeeper, two Engineers, Fitter, Foreman, two Carpenters, Plumber, Herdsman, two Out-door Attendants, three Cooks, Gardener.

Number of Wards and Beds.

Hospital Division.		General Division.		Total Accommodation.	Number of Beds.
Ward No.	Number of Beds.	Dormitories.	Number of Beds.		
				Hospital Division—	
2	83	5	68	Wards A-I	412
3	63	6	71	,, 2, 3, and 4	191
4	45	7	76	,, Chest Division.....	54
A	50	8	70	,, EP	90
B	50	9	70	Block 21	60
C	50	10	68		
D	50	20	92		807
E	28	Outside Locations.	42		
F	52			*General Division—*	
G	50			Dormitories, 5-10	423
H	37			,, 20	92
I	45			,, Outside locations	42
Chest.	54				
EP.	90				557
Block 21.	60				
15	807	7	557	Total	*1,364

* This total does not include 176 stretcher beds (Hospital Division, 93; General, 83) installed to meet urgent demands for additional accommodation.

Admissions and Discharges.

Remaining in on 1st January, 1927, 1,412; admitted during 1927, 4,098; discharged, 3,367; died, 650; remaining in on 31st December, 1927, 1,493; Hospital Division, 927; dormitories, 566.

Average daily number of persons resident, 1923, 1,487; 1924, 1,485; 1925, 1,485; 1926, 1,457; 1927, 1,490.

Total cost of maintenance and treatment of patients and inmates for 1927, £89,016 12s. 4d. Average annual cost of patients and inmates, £59 14s. 10d.

Work of Honorary Medical Officers.—The Department is under a deep debt of gratitude to those medical officers who have attended the Institution throughout the year in an honorary capacity and rendered much valuable assistance in the treatment of patients.

We are very fortunate in having obtained and in retaining the services of Dr. Darling, who upholds and augments our surgical tradition so well initiated and carried on by the late Hon. Dr. Nash, M.L.C.

In Dr. Lawson, our Hon. Assistant Surgeon, the surgical work of the Hospital has a very staunch and capable friend, always available, and one who has proved his value on countless occasions, mainly emergencies.

Dr. Chapman, our Hon. Dermatologist, is an invaluable acquisition, the application of his knowledge combined with his regular attendances call for grateful recognition.

Our Hon. Ophthalmic Surgeons, Drs. Blaxland, G. A. Brookes, and North, have done excellent work during the year, and have spared themselves in neither time nor trouble in dealing with their cases. Near the end of the year Dr. G. A. Brookes resigned from the honorary staff, and his departure is sincerely regretted. Dr. A. L. North, who had proved an extremely satisfactory *locum tenens* during Dr. Blaxland's absence earlier in the year, was appointed to fill the gap created by Dr. Brookes' retirement from the work.

The work of Dr. Dunn in the ear, nose, and throat cases, has been most helpful, and calls for grateful appreciation.

The following operations were carried out during the year :—Dr. Darling, 133; Dr. Blaxland, 1; Dr. G. A. Brookes, 39; Dr. North, 46; Dr. Dunn, 8.

The Resident Medical Staff performed 183 major and minor operations.

Massage Department.—Our Massage Department continues to do valuable service, the time of two members of the staff being almost fully taken up by this work. 406 patients were given treatment, with the following results :—Recovered, 219; relieved, 130; unrelieved, 20; under treatment at the end of the year, 37.

Recreation for the Inmates.—The cinema installed a few years ago has been the means of providing regular amusement. The apparatus is the property of the Institution, and by the generosity of the Universal Film Manufacturing Co. (Australasia) Ltd., in providing programmes free of cost, an entertainment has been given once a week throughout the year.

In addition to the above, first-rate concerts and other entertainments have been provided almost every Saturday night. The management and inmates are grateful to the many kind friends who have come, often at much inconvenience to themselves, to provide these entertainments.

Special thanks are due to the "Smith" Family for their annual distribution of Christmas Cheer, and for special gifts of gramophones for use in the wards.

The wireless installation at the Chest Ward, provided by the Auburn Returned Soldiers' and Sailors' League, has been a source of great pleasure to the patients in that division, and the billiard-recreation room has proved a boon to the patients in the Chest Ward.

The bowling green at the Chest Ward is largely availed of by the patients there, and is much appreciated.

Diet.—In addition to providing diet in accordance with the approved scale, the medical lists have been sufficiently liberal to include the full requirements of all who were unable to partake of the scale allowance.

Accommodation.—The accommodation in all sections of the Institution has been taxed to the utmost throughout the year. The hospital wards, in particular, have been constantly overcrowded, many beds having to be temporarily improvised on the floors and on verandahs.

Early in the year Dormitory No. 21 was transformed into a convalescent hospital ward, providing for 60 patients. This increased our hospital accommodation to 807, but reduced our dormitory space by ninety-three beds.

The standard number of beds in all hospital wards (including the new convalescent ward) at the end of the year was 807, whereas the average daily number of patients throughout the year was 906, being 99 over normal accommodation—the extra numbers have been provided for by improvising beds on the verandahs and floor beds in the wards, with much resultant discomfort to patients and added difficulty to the medical and nursing staff in the efficient carrying out of their work.

This elasticity in temporary provision of beds has reached its limit, no more beds can be crowded into the existing floor space, and additional buildings are urgently needed if our open gate to the ever-increasing influx of patients is permitted to continue.

The depletion of our dormitory accommodation by the transforming of Block 21 into a hospital ward has been severely felt—additional stretcher beds have had to be crowded into the gallery of the church building and into the special diet room, and repeated transfers of batches of inmates to George-street Home had to be made from time to time to keep our inmates within the limits of the available beds.

Additional dormitory accommodation is most urgently needed to provide for the aged and infirm who are not in need of active hospital treatment and for our active working inmates.

Out-door Section.

Farm and Dairy.—An area of approximately 50 acres is constantly under cultivation for the purpose of providing green fodder for the dairy herd. During the year 226 tons of various green crops were provided.

The cows yielded 62,043 gallons of milk, which fully met the requirements of the institution. This compares with 60,908 gallons in 1926.

In the dairy herd the Friesian class predominates, the quality of these animals being demonstrated by the number of prizes and awards secured by them at the Royal Agricultural Society's Show for some years past. Continued efforts are being made to build up the standard of milk production, and the results from the young stock passed into the milking stage have been most gratifying. The health of the herd continues good, the result of the latest tuberculin tests being 100 per cent. sound.

In October, 1926, the forage sheds at the dairy were unfortunately destroyed by fire, and up to the end of the year the work of rebuilding had not commenced. The want of shelter has caused excessive deterioration in the quality of the feed, and much discomfort to the men handling the feed, as both feed and men have been exposed to all weathers.

Vegetable Garden.—105,053 lb. of vegetables were raised in the gardens, as compared with 106,668 lb. in 1926. The appointment of a skilled vegetable gardener to give full time to this work has been asked for, and such an appointment is required to enable the maximum of results to be obtained.

Piggery.—As forecasted in last year's report the condition of the piggery indicates a considerable improvement during the year, the profits from the industry showing £605, as against £184 for 1926. We were fortunate in avoiding the prevalent swine fever epidemic, which wiped out so many of the piggeries in Cumberland. Much constructional work, such as fencing, &c., still remains to be done in our new piggery.

R. A. FOX,
Medical Superintendent.

R. J. BROWN,
Manager.

11.—LIVERPOOL STATE HOSPITAL AND HOME FOR MEN.

Report of Medical Superintendent for year ended 31st December, 1927.

Honorary Visiting Staff.—Honorary Ear, Nose, and Throat Surgeon, Richard Arthur, M.B., M.L.A.; Honorary Dermatologist, W. A. McDonald, B.A., M.B., Ch.M.; Honorary Medical Officer, J. Pirie, L.R.C.P., L.R.C.S., Edin., L.R.C.P.S., Glas.

Staff—Medical Superintendent, Donald Wallace, M.A., M.B., Ch.M.; Junior Medical Officer, C. R. O'Brien, M.B., Ch.M.; Manager, J. J. Ranshaw; Dispenser, A. J. Baker; Matron, L. W. McIntosh; Clerk, E. G. Partridge; Nurses, 11; Attendants, 21; other male staff, 10.

Constitution of Hospital Staff on 31st December, 1927.—Medical Superintendent, Junior Medical Officer, Manager, Matron, Submatron, 10 Nurses, Clerk, Storekeeper, Dispenser, Engineer, Foreman, Carpenter, Plumber, Painter, Gardener, Chief Attendant, 20 Attendants, Baker, and 2 Cooks.

Number of Wards and Beds.

Hospital Division.		General Division.		Total Accommodation.	No. of Beds.
Ward No.	No. of Beds.	Dormitories.	No. of Beds.		
A	30	1	10		
B	29	2	21		
C	25	3	25		
D	30	4	43	Hospital Division	299
E	30	5	43		
F	30	6	26		
G	28	7	42		
K	10	8	22		
L	10	9	34		
M	22	10	6	General Division	426
N	17	11	50		
R	21	12	52		
S	17	13	52		
Total—13	299	13	426	Total	725*

*This total does not include 19 inmate workers' beds located in outbuildings.

Admissions and Discharges for Year ended 31st December, 1927.

Number of persons in residence on 1st January, 1927, 677; admitted, 2,591; total, 3,268; discharged, 2,337; died, 167; in residence on 31st December, 1927, 764; average daily number, 722. Total cost of maintenance and treatment, £39,377 10s. Average annual cost per inmate, £54 10s. 9d.

Summary of Patients treated in the various Wards during 1927.

Hospital Section.	In Hospital, 1st January, 1927.	Admitted during year.	Discharged during year.	Died during year.	In Hospital, 31st December, 1927.
Cancer Wards	37	80	25	60	32
Venereal ,,	42	425	422	...	45
General ,,	180	630	541	87	182
Totals	259	1,135	988	147	259
District Ward	20	168	150	20	18
Grand Total	279	1,303	1,138	167	277

Out-Patients.—The number of district patients seeking relief in the out-door department shows a slight increase—67—on last year's figures. There were recorded 4,924 attendances, including 2,061 dressings and operations in the district ward. Since the appointment of a junior medical officer this work has been carried out by our own staff. The valuable services of the Honorary Medical Officer (Dr. Pirie) have been available from time to time as required.

Venereal Wards.—The accommodation in these wards was greatly overtaxed during the year. The provisions of the Venereal Diseases Act have been carefully carried out.

Dr. McDonald, Honorary Dermatologist, paid regular visits at intervals of two weeks, thus giving valuable assistance in the venereal clinic.

Inmate Accommodation.—The number of inmates in December attained the grand total of 764, which exceeds by 22 the highest record of any previous year.

Hospital Wards.—The general hospital accommodation was again fully utilised. The much needed hot and cold water service has now received Ministerial sanction. During the year a special floor was laid down in Ward B. This has proved very satisfactory, especially as regards cleanliness and cheerfulness. As the basis in this type of floor consists of sawdust, the finished work retains in great measure the resiliency of wood, and is thus comfortable as regards the feet of those in attendance.

Recreation for Inmates.—Through the generosity of Sun Newspapers Ltd., wireless apparatus was installed in both cancer wards, and in the General Division in the recreation hall and two of the hospital wards. This provision is generally appreciated by the inmates. There has been no lack of offers from persons interested in the institution to arrange entertainments, and concerts have been given throughout the year at frequent intervals. Special mention should be made of the visit of the "Smith Family" at Christmas time when, in addition to entertaining the inmates, gifts of books, cane lounges and gramaphone records were made to the institution.

Farm and Dairy.—The need for green and uncooked vegetables and fresh unboiled milk as a corrective of the regulation institutional diet has been kept in view in directing the operations of the vegetable garden and dairy. The quantities produced compare very favourably with those recorded for 1926.

Urgent Improvements Required.

District Ward.—The urgent need for supplying this ward with suitable lavatory accommodation, bathrooms, &c., is again strongly emphasised.

Cancer Wards.—The provision of laundry premises with steam equipment for these wards is still an urgent necessity.

Accommodation for Nursing Staff.—The question of the erection of quarters for the matron and nursing staff in the old Moore College grounds is still in abeyance. It would be of considerable benefit to the hospital and to the members of the nursing staff, who are at present obliged to live away from the institution, if this work were proceeded with at an early date.

D. WALLACE,
Medical Superintendent.

Manager's Review of the Out-door Work for the year ended 31st December, 1927.

The supply of inmate labour was fairly well maintained throughout the year and satisfactory progress was made with the out-door work.

Dairy Farm.—The quantity of milk produced was 20,215 gallons. The herdsman's cottage is ready for occupation, and this section should benefit greatly by the appointment of a herdsman, which has now received Ministerial sanction.

Piggery.—Unfortunately an epidemic of swine fever was responsible for a considerable set-back in this section. The sales during the year amounted to £737 16s. 10d.

Farm, Vegetable Garden and Orchard.—A successful season was experienced in this section. Green feed to the value of £150 7s. 6d. was grown on the farm, while the yield of vegetables was 73,635 lb., and fruit 7,903 lb.

Bakery.—The usual high standard of quality was maintained. The total bread consumption was 232,962 lb., buns, 208 dozen; cake, 18,920 lb.

Condition of Buildings.—All institution buildings were maintained in a reasonable state of efficiency. The painting of the dormitories in the main block was completed and the interior of the whole of this block now presents a very creditable appearance.

Garden and Grounds.—The condition of the gardens and grounds has been well maintained throughout the year.

J. J. RANSHAW,
Manager.

12.—NEWINGTON STATE HOSPITAL AND HOME.

Annual Report for the year ended 31st December, 1927.

Honorary Medical Staff.—Hon. Surgeon, Walter A. Sharpe, M.S.F.R.C.S. Edin.; Hon. Ophthalmic Surgeon, Dr. L. Stanton-Cook; Hon. Ear, Throat and Nose Surgeon, Herbert H. Johnson, M.D. Surg. Uni., Sydney; Hon. Neurologist, A. Davidson, M.D.

Staff.—Visiting Medical Officer, Francis H. Furnival, M.R.C.S. Eng., L.S.A. Lond.; Medical Officer, Lottie Sharfstein, M.B.; Manager, William Megarvey; Matron, Emily Wood; Clerk and Storekeeper, Charles G. Grove; Clerk, E. Curran; Dispenser, Miss K. M. Legg.

Constitution of Staff on 31st December, 1927.—Visiting Medical Officer, Medical Officer, Manager, Matron, Clerk and Storekeeper, Clerk, Dispenser, 30 Nurses, Housekeeper, Seamstress, Cook, 2 Housemaids, Carpenter, Plumber, Herdsman, Gardener, Night Patrol, 2 Engineers, Fireman, Foreman, Outdoor Attendant. A Dentist visits weekly.

Admissions and Discharges.—Number of inmates on 1st January, 1927, 673; admitted during year, 1,251; discharged, 1,055; died, 200; remaining in on 31st December, 1927, 669. Average daily number resident, 678. Total cost of maintenance and treatment of patients, £32,252 15s. 2d. Average annual cost per inmate, £47 11s. 5d.

Number of Wards and Beds.—Hospital Division.—Wards: A, 43; B, 42; C, 10; C2, 10; D, 15; E, 14; F, 51; G, 56; H, 60; H1, 4; J1, 29; J2, 27; Isolation, 12; Cottages, 49. Yard Division.—Dormitories: No. 1, 36; No. 2, 39; No. 3, 38; No. 4, 39; No. 5, 38; No. 6, 38; No. 7, 39; No. 8, 39 beds. Total beds, 728 (Wards, 422; Dormitories, 306).

Hospital Division Summary.—Patients in hospital 1st January, 1927, 316; admitted during year, 820; discharged, 816 (recovered, 235; relieved, 333; unrelieved, 48; died, 200).

Classification of Diseases Treated.—General diseases, 165; alimentary, 34; circulatory, 85; respiratory, 112; genito-urinary, 27; nervous, 100; osseous and arthritic, 8; skin and glands, 109; wounds, fractures, &c., 43; miscellaneous, 11; senility, 122.

Review of Year's Work.

During the year the following appointments were made:—Dr. L. Stanton-Cook, Ophthalmic Surgeon; Miss G. McKern, Sub-Matron.

Substantial repairs to Sutherland-street, which connects the traffic of this institution with Parramatta-road, have been carried out by the Auburn and Lidcombe councils with the aid of a special grant by the Minister of Public Health.

The Public Works Department has made alterations to the hot water and steam services which will result in a considerable saving of fuel.

The artisans assisted by inmate workers have carried out the painting and repairs to buildings where possible, and several additions to buildings have been made for the comfort of the patients and more convenient working.

Several of the buildings used as hospitals are out of date and need replacing or remodelling. A large expenditure is necessary.

The patients have been adequately catered for in regard to entertainment. Throughout the year thirty concert parties have visited, and a picture entertainment has been provided each alternate week by Messrs. Rowe and Williams. The Australian Films Ltd. provided the films.

The "Smith Family" have visited on several occasions, and distributed presents and books to the patients.

In June last the fifth annual Fancy Dress Ball was held, and gave much pleasure to about 350 inmates.

Farm and Dairy Operations.—Approximate value of vegetables produced, £369; milk, £3,031.

Revenue collections for theyear amounted to £7,860, comprising sale of pigs, £383; cows, calves, &c., £98; tallow, £121.

W. MEGARVEY,
Manager.

13.—STATE HOME FOR AGED AND INFIRM MEN, GEORGE-STREET, PARRAMATTA.

Report of the Officer-in-Charge for the year ended 31st December, 1927.

Staff.

Visiting Medical Officer—Dr. W. S. Brown.

Officer-in Charge, C. A. Warner. Attendants, 5.

Number of beds in hospital, 39; in dormitories, 307; total, 346.

Admissions and Discharges.—Remaining in on 31st December, 1926, 239; admitted during the year, 1,985; discharged, 1,929; died, 9. Remaining in on 31st December, 1927, 286. Average daily population, 261. Total cost of maintenance, 1927, £8,533 0s. 9d. Average annual cost per inmate, £32 13s. 10d.

Number in hospital on 31st December, 1926, 22; admitted during year, 71; discharged, 60; died, 9; remaining in hospital 31st December, 1927, 24; number of visits by Visiting Medical Officer, 248; inmates seen, 2,452, of whom 298 were transferred to other institutions.

The following articles were made in workshops during the year:—99 coats, 226 pairs of trousers, 200 vests, 98 pillow slips, 248 towels, 17 flannel shirts.

The Department of Public Works have put in two new 1½ inch water pipes from mains to meter in recreation room and meter at the house.

The ceiling of mess room has been repaired where necessary, and the ceiling of bath mess room and scullery have been painted with two coats of Standard white paint.

In addition to the number of inmates daily, 750 casuals have been provided with meals and bed during the year.

Regular monthly visits were made by the Senior Attendant and myself. The conduct and discharge of duties by the Staff has been satisfactory.

C. A. WARNER,
Officer-in-Charge.

14.—STATE HOSPITAL AND HOME FOR THE BLIND AND MEN OF DEFECTIVE SIGHT AND SENILITY, MACQUARIE-STREET, PARRAMATTA.

Staff.

Visiting Medical Officer ... ... Dr. W. S. Brown.

Officer-in-Charge ... ... Mr. H. A. Pyne.

Total Number of Beds.—228.

Admissions and Discharges.—Remaining in on 31st December, 1926, 182; admitted during 1927, 2,136; total, 2,318. Remaining in on 31st December, 1927, 182; daily average number resident, 191·14. Total cost of maintenance and treatment of inmates, £7,019 19s. 11d.; average cost per inmate, £36 15s. 1d.

Dental Work carried on by a qualified dentist; monthly visits.

Bakery.—Bread and currant cake were made in the Home, the output totalling 1,042,106 lb. of bread and 50,618 lb. of currant cake, the whole of which was distributed to the State Hospitals at Waterfall, Rookwood, Newington, George-street and Macquarie-street Homes; 754 dozen buns was also distributed at Easter to the above institutions.

General.—Inmates' clothing, bedding, &c., with the exception of boots and hats, are made in the Home by inmate labour. All carpentry work, repairs to building, painting, bricklaying, &c., are carried out under the supervision of the Officer-in-Charge.

The Visiting Medical Officer attended on 310 occasions.

H. A. PYNE,
Officer-in-Charge.

15.—STATISTICAL SUMMARY.

Table I.—Summarised Statement of Expenditure:—Montrose Maternity Hospital, Fernleigh Rest Home, Lady Edeline Hospital for Babies, and Carrara and Denistone Convalescent Homes, for the year ended 31st December, 1927.

Head of Expenditure.	Montrose Maternity Hospital.	Fernleigh Rest Home.	Lady Edeline Hospital for Babies.	Carrara Convalescent Hospital.	Denistone Convalescent Hospital.	Totals.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Salaries	977 0* 0	861 0 0	1,004 0 0	954 0 0	803 0 0	4,599 0 0
Gratuities	39 0 0	18 0 0	188 0 0	182 0 0	201 0 0	628 0 0
Provisions	359 0 0	351 0 0	890 0 0	925 0 0	861 0 0	3,386 0 0
Insurance	4 0 0	3 0 0	6 0 0	4 0 0	5 0 0	22 0 0
Telephone	19 0 0	8 0 0	27 0 0	19 0 0	35 0 0	108 0 0
Stimulants	9 0 0	3 0 0	6 0 0	7 0 0	5 0 0	30 0 0
Drugs	40 0 0	11 0 0	70 0 0	30 0 0	30 0 0	181 0 0
Disinfectants	5 0 0	3 0 0	8 0 0	5 0 0	5 0 0	26 0 0
Fuel	75 0 0	60 0 0	182 0 0	130 0 0	73 0 0	520 0 0
Light	32 0 0	45 0 0	173 0 0	73 0 0	66 0 0	389 0 0
Hardware	5 0 0	5 0 0	14 0 0	35 0 0	14 0 0	73 0 0
Clothing, &c.	15 0 0	12 0 0	20 0 0	30 0 0	32 0 0	109 0 0
Cows and horses	.....	.....	.....	.....	.....	.....
Travelling expenses, &c.	9 0 0	16 0 0	25 0 0	12 0 0	16 0 0	78 0 0
Repairs, &c.	15 0 0	10 0 0	40 0 0	45 0 0	30 0 0	140 0 0
Postage	4 0 0	3 0 0	6 0 0	5 0 0	4 0 0	22 0 0
Forage	.....	.....	.....	135 0 0	148 0 0	283 0 0
Sundries	15 0 0	15 0 0	39 0 0	28 0 0	20 0 0	117 0 0
Total	1,622 0 0	1,424 0 0	2,698 0 0	2,619 0 0	2,348 0 0	10,711 0 0
Average daily number of patients	8	10	29	31	22	100
Average cost per occupied bed ..... £	202 15 0	142 18 0	93 0 8	84 9 8	106 14 6	107 2 2

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15. TABLE II.—SUMMARY STATEMENT of Expenditure, State Hospital and Homes of Lidcombe, Liverpool, and Newington, Parramatta Homes (George Street and Macquarie Street), and Waterfall Sanitorium, for the year ended 31st December, 1927.

Head of Expenditure.	Lidcombe.	Liverpool.	Newington.	Waterfall Sanatorium.	Parramatta.		Total.
					George-street.	Macquarie-street.	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Salaries, Wages, and Gratuities (including expenses of Administration)	32,178 14 2	18,403 5 9	12,669 10 8	15,887 15 3	2,426 14 9	2,756 7 7	84,322 8 2
Provisions	29,451 10 3	11,222 2 5	9,353 16 4	16,792 8 7	4,077 18 0	2,786 12 5	73,684 8 0
Alcohol	820 14 1	277 7 5	81 2 7	41 4 0	6 10 0	.....	1,226 18 1
Drugs, Dressings, Disinfectants and Surgical Appliances	4,174 9 8	999 7 8	1,029 11 11	721 16 0	24 13 6	223 6 1	7,173 4 10
Fuel and Lighting	4,019 11 8	1,551 9 10	2,474 6 11	1,694 9 4	411 17 2	517 17 1	10,669 12 0
Water	24 0 0	12 6 10	832 4 8	394 13 6	5 15 6	2 13 8	1,271 14 2
Burials (including ground fees)	447 4 4	145 10 11	44 5 0	18 15 0	12 10 0	12 0 0	710 5 3
Hardware	3,270 17 0	288 7 6	680 6 11	726 9 1	74 6 1	512 3 9	5,192 10 4
Clothing, Linen, Blankets, &c.	10,234 11 7	2,676 16 8	2,542 4 3	2,174 12 10	775 10 9	914 15 7	19,318 11 8
Fodder	5,391 15 9	1,448 8 4	2,840 9 11	391 2 10	42 3 2	.....	10,114 0 0
Furniture and Fittings	610 5 7	507 11 9	504 7 3	100 2 6	139 18 3	66 2 10	1,928 8 2
Railway Expenses	412 14 4	163 9 0	547 1 8	176 4 4	70 13 8	27 13 0	1,397 16 0
Repairs and Maintenance of Buildings	294 13 4	735 15 7	281 17 2	1,277 12 5	93 0 4	78 14 11	2,761 13 9
Printing, Stationery, and Postage	292 4 10	32 5 1	54 16 6	203 1 10	20 16 6	10 8 6	613 13 3
Sundries	454 5 7	448 11 8	184 16 11	260 5 3	25 17 11	87 8 3	1,461 5 7
Total	92,107 12 2	38,912 16 5	34,120 18 8	40,860 12 9	8,208 5 7	7,636 3 8	221,846 9 3
Stock on hand 31st December, 1926	6,273 11 4	5,485 15 6	2,743 2 2	2,486 16 11	1,214 19 5	1,369 1 2	19,573 6 6
Grand Total	98,381 3 6	44,398 11 11	36,864 0 10	43,347 9 8	9,423 5 0	9,005 4 10	241,419 15 9
Deduct—							
Stock on hand 31st December, 1927	8,314 3 6	3,957 18 6	2,494 4 7	3,070 10 10	815 9 0	1,761 8 11	20,413 15 4
Proceeds of Sales, Etc.	1,050 7 8	1,963 3 5	2,117 1 1	240 15 10	74 15 3	223 16 0	4,769 19 3
Total Deductions	9,364 11 2	5,021 1 11	4,611 5 8	3,311 6 8	890 4 3	1,985 4 11	25,183 14 7
Total Cost	89,016 12 4	39,377 10 0	32,252 15 2	40,036 3 0	8,533 0 9	7,019 19 11	216,236 1 2
Average daily population	1,490	722	678	546	261	191	3,888
Average annual cost per inmate £	59 14 10	54 10 9	47 11 5	73 6 6	32 13 10	36 15 1	55 12 4
Annual contributions towards maintenance £	10,920 7 3	3,499 0 7	5,401 0 0	1,233 15 5	719 18 3	1,433 16 9	23,207 18 3

SECTION IV.

Eighteenth Report of the Microbiological Laboratory (Government Bureau of Microbiology) for the Year 1927.

CONTENTS.

SECTION IV.

Eighteenth Report of the Microbiological Laboratory (Government Bureau of Microbiology) for the year 1927.

The Principal Microbiologist to The Director-General of Public Health.

Sir,

I have the honour to submit the accompanying report dealing with the work performed in the Microbiological Laboratory during 1927.

The work of the laboratory continues to increase steadily. The examinations in 1927 numbered 36,558, an increase of 5,525 over 1926, when the figures were 31,033.

Plague.—No case of human or animal plague occurred in 1927. As usual during periods of freedom from plague the number of rats submitted for examination decreased, the figures being 7,437 as compared with 8,711 in 1926, and 30,038 in 1922, when plague was present in Sydney.

Rat Leprosy.—During the year a rat suffering from rat leprosy was submitted for examination. A description of this case, together with the case submitted in 1926, is published on p. 205.

Tuberculosis.—The number of examinations of sputa and other material for the presence of tubercle bacilli (3,100) showed a slight increase over that for 1926 (3,044).

Diphtheria.—There was a slight increase in the number of swabbings examined, 4,398 as compared with 4,129 for the previous year.

As intimated in the last two reports the great increase of routine work has rendered it impossible for the staff of the laboratory to continue the supervision of Schick test work in country towns. Each group of children tested necessitated the absence of one of the senior members of the staff for at least a week, hence it was found necessary to hand over the active testing to an officer outside the laboratory, which now only concerns itself with the preparation of sterile saline used in the test as required by the officer in charge of the work.

Scarlet Fever.—During the year the Commonwealth Serum Laboratories supplied this department with a limited amount of material for testing purposes.

The material consisted of serum for the Schultz Charlton test, concentrated antitoxin for treatment, and two samples of toxin for Dick testing. A summary of the work carried out with this material appears on p. 194 of this report.

Typhoid.—The number of cases of typhoid fever notified during 1927 is the lowest on record since notification was introduced in 1898. This is reflected in the number of Widal reactions and examinations for typhoid bacilli that were undertaken during the year. Widal reactions decreased from 628 in 1926 to 474 in 1927, and examinations for typhoid bacilli decreased from 358 in 1926 to 246 in 1927. However, in addition to the routine specimens examined in 1927, this report includes the examinations of specimens from Goulburn Gaol (592) in connection with the outbreak of typhoid fever reported on in the 1926 Annual Report (p. 146), and this combined total shows a considerable increase on the figures for 1926.

Venereal Diseases—Syphilis.—The serological tests for syphilis include both Wassermann reaction and Kahn test, and the combined increase in these tests is 4,600. 7,300 Wassermann reactions and 5,629 Kahn tests were performed, as against 6,002 Wassermann reactions and 3,464 Kahn tests in 1926.

Gonorrhœa.—In both smears and complement deviation tests the figures show a decided increase, namely, 3,928 smears were examined during the year, as against 3,372 in 1926; and 2,726 complement deviation tests were performed, as against 2,145 for the previous year.

The complement deviation test has now reached a high degree of accuracy, so much so that on more than one occasion when smears were negative and the complement deviation reaction strongly positive, further and prolonged search of the slides has revealed that the first result was incorrect.

The increase in numbers of serological examinations, namely, 15,655 examinations carried out on 7,306 specimens, as compared with 11,611 examinations of 6,035 specimens in 1926, indicates a greater use of laboratory facilities in checking results of treatment, rather than a spread of infection. Notified cases of gonorrhœa have decreased from 4,491 in 1926 to 4,134 in 1927, while those of syphilis only show the slight increase of 78, the figures for the two years being 1,257 in 1927, compared with 1,179 in 1926.

Histological Examinations showed an increase of 86—1,294 in 1926, and 1,380 in 1927.

Bio-chemical tests of blood and urine rose from 619 in 1926 to 911 in 1927, an increase of 292. The increase of both bio-chemical and serological tests will shortly necessitate the appointment of additional staff to cope with the work.

General examinations of urine numbered 746 in 1926 and 920 in 1927, an increase of 174.

Medico-legal Work showed an increase of 31 specimens (54 in 1926, 85 in 1927). This increase, though numerically slight, represents great inroads on the time of the officers engaged in the work, not only in the time required for the actual examination, but also for the subsequent attendance at the courts. Many of the examinations are long and tedious, and it is not unusual for examinations required in a single case to occupy the whole time of an officer for more than a week.

Seasonal Prevalence of Flies.—An investigation into the seasonal prevalence of house flies has been commenced in this laboratory and a preliminary note appears on p. 205 of this report.

Milk Examinations for Tubercle Bacilli and Bacterial Content.—The testing of milk from suburban dairies for tubercle bacilli was continued, and between July, 1927, and February, 1928, 220 samples were tested by guinea-pig inoculation, and in no instance was evidence of tuberculosis found on post-mortem. The samples were also examined for bacterial content. The absence of tubercle bacilli is noteworthy when compared with city supplies of other countries and has been commented on in the Annual Report for 1923, p. 144. A summary of the examinations to date is given on p. 197.

Staff Changes.

Death of Dr. E. W. Ferguson.—I have to record with deep sorrow the death on 19th July, 1927, of Dr. E. W. Ferguson, who had held the post of Principal Microbiologist from 1920. A photograph of Dr. Ferguson and a short note of his career is given at the beginning of the Report.

Mr. A. B. Duffy, Senior Laboratory Assistant, became seriously ill in August, and was granted extended sick leave.

Dr. I. M. Mackerras was appointed as Assistant Microbiologist in January and Mr. H. V. Justelius as temporary Laboratory Assistant in August, 1927.

Need for Additional Staff and Extension of Accommodation.—As pointed out in previous reports the heavy increase in the work of the laboratory has not been accompanied by a commensurate increase in the staff, and it has become a matter of urgency that the staff should be added to without delay, and that the Laboratory accommodation should be considerably extended.

E. L. MORGAN,
Principal Microbiologist.

STAFF.

Principal Microbiologist.—Ernest Leslie Morgan, M.B., Ch.M.

Assistant Microbiologists.—Elsie Jean Dalyell, M.B.; Marie Montgomerie Hamilton, M.B., Ch.M.; Ian Murray Mackerras, M.B., Ch.M., B.Sc.; Robert Grant, F.C.S.; Ethel Corry Pinkerton, B.Sc.

Laboratory Assistants.—Austin Burton Duffy (Senior Assistant), John Owen Sergeant, James Flynn, John Downie Stanners, Henry Aldrich Gotto, Arthur James Williamson, Henry Vere Justelius (temporary), Lionel Henry Snell (Junior Assistant).

Laboratory Attendants.—Alfred Anderson, Henry John Moseley, John William Foster (temporary), Albert Victor Lynch (temporary).

Office Staff.—Florence Stuart Wearne, Clerk and Librarian; Hazel E. Andrews, Daphne I. Saunders, Jessie Fort, shorthand writers and typistes; Merton Simpson, temporary messenger.

1927.—PART I.—TABLE showing the Routine Examinations made for the Various Branches of the State Department of Public Health, other Government Departments, Subsidised Hospitals, &c.

	Number of Examinations. Comparative Statement.	
Department of Public Health—	1926.	1927.
Microbiological Laboratory	19,753	22,722
Coast Hospital	3,229	3,186
Liverpool State Hospital	1,266	1,369
Lidcombe State Hospital	495	792
Newington State Hospital	114	160
Waterfall Sanatorium	.....	4
Medical Officer of Health, Newcastle	34	32
Commonwealth Government	123	266
State Departments—		
Agriculture and Stock	6	2
Chief Secretary (Fisheries)	1	1
Education Department	376	43
Government Stores Department	31	36
Police Department	41	63
Prisons (Long Bay Gaol, Goulburn Gaol, &c.)	205	862
Public Works Department	217	96
Railways and Tramways	10	1[illegible]
State Insurance Office	.....	0
Workers' Compensation Commission	.....	17
Public Hospitals and Institutions other than State Hospitals	5,118	6,868
Municipal and Shire Councils	14	23
	31,033*	36,558
Total Examinations—	1926.	1927.
General	31,033	36,558
Rats for Plague	8,711	7,437
Grand Total	39,744	43,995

IN the following Statement the Routine Work is divided into sections to disclose the purposes for which the various examinations were made :—

A.—Microbiological Examinations.	Number of Examinations. Comparative Statement.			
1. Of materials from diseased persons and animals—	1926.		1927.	
Actinomycosis	10		9	
Bilharzia	.....		2	
Dengue fever	.....		1	
Diphtheria (swabbings)	4,129		4,398	
,, (toxicity tests)	234		228	
,, (Schick tests)	822		.....	
Dysentery	8		7	
Filaria	2		1	
Gonorrhœa (urines and smears)	3,372		3,928	
,, (complement deviation test)	2,145		2,726	
Hookworm	2		.....	
Hydatids (sputa, smears, &c.)	32		45	
,, (complement deviation test)	64		20	
Leprosy (human)	4		16	
,, (rat)	1		1	
Malaria	25		22	
Meningitis	71		96	
Mastitis (bovine)	5		5	
Plague (human)	1		1	
Scarlet fever	.....		1	
Syphilis (Wassermann reactions)	6,002		7,300	
,, (Kahn's flocculation test)	3,464		5,629	
,, (Spirochætes)	11		16	
Tetanus	3		1	
Tinea	5		11	
Tuberculosis	3,044		3,100	
Typhoid (Widal reactions)	628		474	
,, (urine and fæces)	355		238	
,, (miscellaneous, waters, milks, &c.)	3		8	
,, (urine and fæces, special examinations at Goulburn Gaol).	.....		592	
Unclassified "No growths," from pus, &c.	1,010		1,049	
Typhus	6		1	
Vincent's Angina	.....		37	
Whooping cough	.....		2	
		25,458		29,965
2. Examinations for Anthrax—				
Human beings	2		6	
Shaving brushes	8		3	
Animals (sheep, cattle, &c.)	1		2	
		11		11

	Number of Examinations. Comparative Statement.			
	1923.		1927.	
Brought forward	.....		.....	
A.—*Microbiological Examinations*—continued—				
3. Of Materials, &c.—				
Disinfectants	37		40	
Barbers' utensils	.....		1	
Sewage, effluents, &c.	11		1	
Chemical closets	.....		2	
Rag flock	.....		2	
Water	278		175	
Air contamination	77		.....	
		403		222
4. Examinations of Foods for bacterial contamination—				
Bread	3		3	
Cheese	.....		1	
Cream	.....		4	
Dripping	.....		1	
Flour	.....		1	
Meat	1		.....	
Milk—				
Special bacterial counts, Sydney milk supply	406		.....	
,, ,, ,, including examination for tubercle bacilli, Sydney milk supply	.....		220	
Testing keeping qualities of bottled milk	.....		35	
Miscellaneous milks for bacterial counts, &c.	16		19	
Nuts	.....		1	
Oysters	5		.....	
Plum pudding	1		.....	
Soup (kidney)	3		.....	
Starch	.....		2	
Tomato paste	.....		1	
Yeast	.....		2	
		435		290
5. Examinations for Food Poisoning	25		13	
		25		13
B.—*Pathological Examinations.*				
1. Of Animals—				
Mammals	8		15	
Birds	1		4	
Fish	2		1	
		11		20
2. Of Body Fluids—				
Blood for full and differential count	378		373	
Blood for blood typing	13		2	
Chemical Examinations—				
Bloods for sugar	619		356	
,, urea			137	
,, ,, and creatinin			35	
Urines for sugar			187	
,, urea			186	
Miscellaneous			10	
Urine (general examinations)	746		920	
Fæces	57		53	
Test meal	2		21	
Calculus	1		6	
		1,816		2,291
3. Of Tissues—				
Malignant tumours	391		415	
Tubercular	903		16	
Other conditions			949	
		1,294		1,380
C.—*Examinations of Parasites.*				
Ecto-parasites (fleas, ticks, &c.)	804		1,459	
Endo-parasites (round and flat worms)	7		7	
Insects (including flies and mosquitoes) and spiders	17		19	
		828		1,485
D.—*Medico-Legal Examinations.*				
Examination of Exhibits for—				
Blood stains	11		20	
Gonococci	5		7	
Seminal stains	33		37	
Spermatozoa	4		16	
Other examinations	1		4	
Poison tests	.....		1	
		54		85
E.—*Examination of Specimens for Preparation of Vaccines.*				
Preparation of Autogenous Vaccines from sputa, urine, acne pustules, boils, wounds, and other septic conditions	693		676	
Examination of diphtheria toxin used in Schick testing	2		.....	
Silicosis experiments	2		.....	
Examination of insect spray	1		.....	
Special Investigation—				
Seasonal prevalence of flies	.....		120	
		698		796
Total	31,033*		36,558	

* Figures in 1923 report should be 31,033 not 30,627.

PART II.—REPORTS OF INVESTIGATIONAL WORK, 1927.

1.—ROUTINE EXAMINATION OF RODENTS AND THEIR ECTOPARASITES.

(I. M. Mackerras and Robert Grant.)

The routine examination of rats for the presence of plague was continued. These examinations have been carried out with two short breaks since 1900.

In 1927 no infected animals were found. The number of rats caught and examined has steadily decreased since 1922, with the freedom of the city from plague. In 1922, 30,038 were examined; and the numbers gradually decreased to 8,711 in 1926, and 7,437 in 1927.

Species of Fleas.—A total of 1,459 fleas was collected from the 7,437 rats examined, and were determined as belonging to six species, namely:—*Xenopsylla cheopis* (477), *Leptopsylla musculi* (760); *Ceratophyllus fasciatus* (213), *Ctenocephalus felis* (or *canis*) (5), *Pulex irritans* (1), *Echidnophaga* sp. (3); total (1,459).

Fleas Collected from Rodents Examined in the Microbiological Laboratory, 1909–1927.—A statement is included (Table III) showing the number and percentage species of fleas collected from rats and mice examined in the Laboratory from 1909–1927.

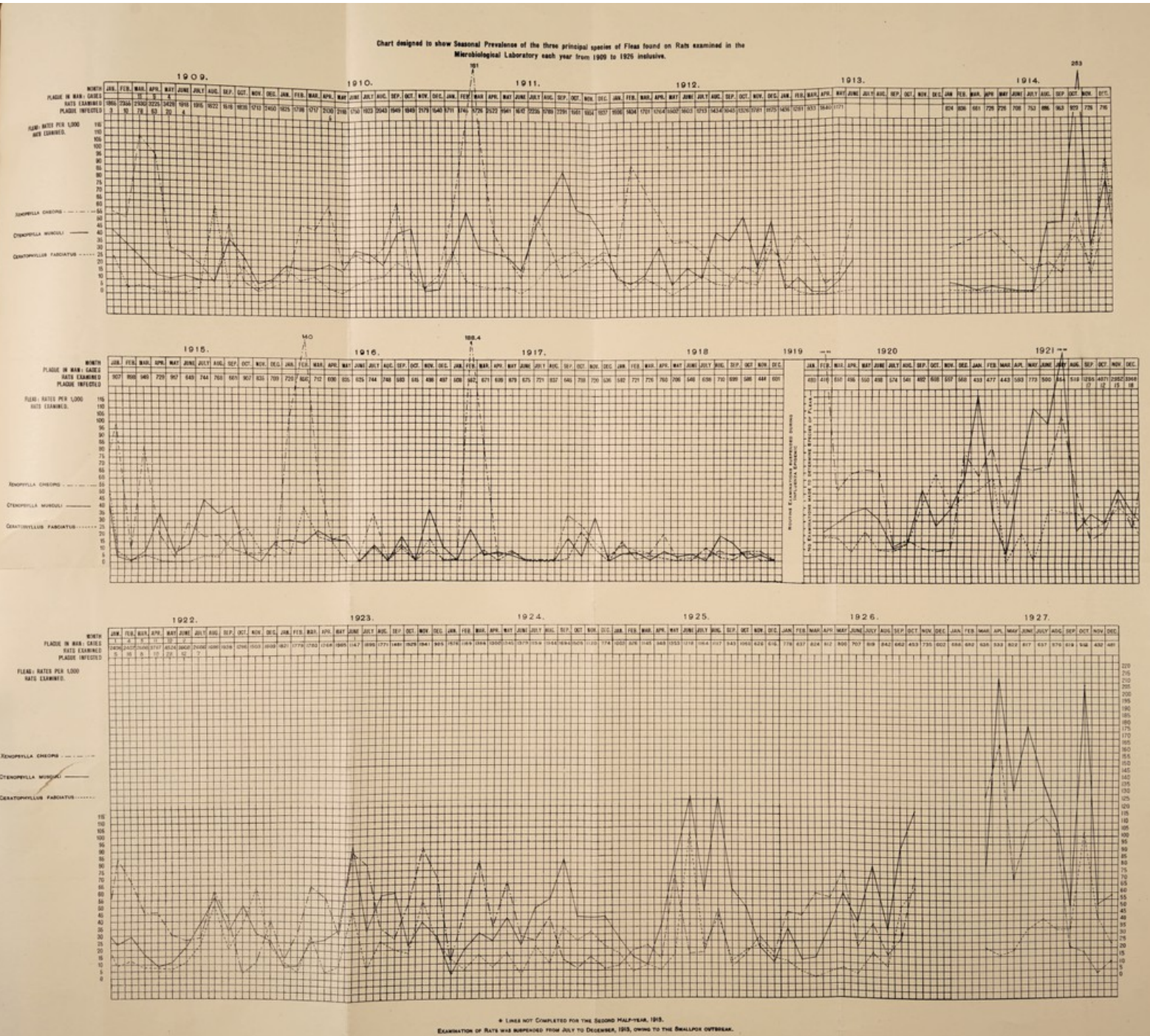
Three specimens of *Echidnophaga* sp. (probably *myrmecobii*) were found on one *R. norvegicus*. This rare species has only been recorded in 1922, when a single specimen was taken from *R. rattus*.

The graph on p. 193 shows a distinct increase in the number of fleas collected per 1,000 rats. This, however, is probably a reflection of the increased diligence in collecting the fleas, made possible by the reduced number of rats examined, rather than an indication of an actual numerical increase. The preponderance of *Leptopsylla musculi* is rather unusual, but was paralleled in 1914, 1921, 1925 and 1926.

Table I.—Showing the number and species of Rats examined each week, and the number and species of Fleas collected on them.

1927. Week ended—	Species of Rats Examined.				No. with Plague.	Species of Fleas and Hosts on which they were found.																								Total No. of Fleas Collected.
						Xenopsylla cheopis.				*Ctenopsylla musculi.*				*Ceratophyllus fasciatus.*				*Ctenocephalus felis or canis.*				*Pulex irritans.*				*Echidnophaga sp.*				
	R. norvegicus.	*R. rattus.*	*M. musculus.*	Total.		*R. norvegicus.*	*R. rattus.*	*M. musculus.*	Total.	*R. norvegicus.*	*R. rattus.*	*M. musculus.*	Total.	*R. norvegicus.*	*R. rattus.*	*M. musculus.*	Total.	*R. norvegicus.*	*R. rattus.*	*M. musculus.*	Total.	*R. norvegicus.*	*R. rattus.*	*M. musculus.*	Total.	*R. norvegicus.*	*R. rattus.*	*M. musculus.*	Total.	
1 January	...	...	...	...	...	Fleas were not collected during this period.																								
8 ,,	14	106	9	129	...																									
15 ,,	11	113	9	133	...																									
22 ,,	28	132	7	167	...																									
29 ,,	31	151	12	194	...																									
5 February	16	200	20	236	...																									
12 ,,	9	108	8	125	...																									
19 ,,	14	188	6	208	...																									
26 ,,	9	134	15	158	...																									
5 March	...	70	7	77	...	...	3	...	3	...	7	...	7	...	4	...	4	...	...	...	...	...	...	...	...	...	...	...	...	14
12 ,,	11	82	10	103	...	5	36	...	41	...	15	...	15	1	6	...	7	...	...	...	...	...	...	...	...	...	...	...	...	63
19 ,,	15	166	20	201	...	...	18	...	18	...	8	...	8	...	1	...	1	...	1	...	1	...	...	...	...	...	...	...	...	28
26 ,,	27	112	22	161	...	...	20	...	20	...	19	...	19	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	40
2 April	6	114	25	145	...	...	6	...	6	...	11	...	11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	17
9 ,,	22	150	11	183	...	...	24	...	24	...	43	...	43	...	3	...	3	...	...	...	...	...	...	...	...	...	...	...	...	70
16 ,,	7	82	8	97	...	...	12	...	12	...	11	...	11	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	24
23 ,,	4	72	10	86	...	11	17	...	28	5	22	...	27	1	1	...	2	...	...	...	...	...	...	...	...	...	...	...	...	57
30 ,,	5	118	15	138	...	...	18	...	18	...	22	...	22	...	4	...	4	...	...	...	...	...	...	...	...	...	...	...	...	44
7 May	6	156	31	193	...	3	26	...	29	...	30	...	30	1	5	...	6	...	...	...	...	...	...	...	...	...	...	...	...	65
14 ,,	25	192	20	237	...	3	20	...	23	...	37	...	37	...	5	...	5	...	1	...	1	...	1	...	1	...	...	...	...	67
21 ,,	11	151	22	184	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
28 ,,	5	117	13	135	...	...	6	...	6	...	43	...	43	...	5	...	5	...	...	...	...	...	...	...	...	...	...	...	...	54
4 June	22	184	10	216	...	...	29	...	29	...	36	...	36	...	6	...	6	...	1	...	1	...	...	...	...	...	...	...	...	72
11 ,,	4	73	12	89	...	...	11	...	11	...	22	...	22	...	6	...	6	...	...	...	...	...	...	...	...	...	...	...	...	39
18 ,,	18	184	10	212	...	...	27	...	27	...	58	...	58	...	7	...	7	...	...	...	...	...	...	...	...	...	...	...	...	92
25 ,,	3	179	22	204	...	...	22	...	22	...	30	...	30	...	9	...	9	...	...	...	...	...	...	...	...	...	...	...	...	61
2 July	22	176	17	215	...	...	36	...	36	...	23	...	23	...	2	...	2	...	...	...	...	...	...	...	...	...	...	...	...	61
9 ,,	28	80	11	119	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16 ,,	15	132	21	168	...	14	8	...	22	9	16	...	25	12	4	...	16	...	...	...	...	...	...	...	...	...	...	...	...	63
23 ,,	13	105	21	139	...	...	8	...	8	...	25	...	25	...	7	...	7	...	1	...	1	...	...	...	...	...	...	...	...	41
30 ,,	31	98	36	165	...	...	7	...	7	...	15	...	15	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	23
6 August	3	91	20	114	...	...	21	...	21	...	26	...	26	...	4	...	4	...	...	...	...	...	...	...	...	...	...	...	...	51
13 ,,	7	90	17	114	...	...	12	...	12	...	14	...	14	...	8	...	8	...	...	...	...	...	...	...	...	...	...	...	...	34
20 ,,	26	87	14	127	...	...	17	...	17	...	6	...	6	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	24
27 ,,	29	86	24	139	...	...	9	...	9	...	18	...	18	...	6	...	6	...	...	...	...	...	...	...	...	...	...	...	...	33
3 September	29	92	20	141	...	2	3	...	5	3	4	...	7	4	4	...	8	...	...	...	...	...	...	...	3	...	...	3	...	23
10 ,,	29	63	8	110	...	1	4	...	5	1	10	...	11	...	5	...	5	...	...	...	...	...	...	...	...	...	...	...	...	21
17 ,,	23	83	30	136	...	...	3	...	3	...	14	...	14	...	8	...	8	...	...	...	...	...	...	...	...	...	...	...	...	25
24 ,,	20	113	11	144	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1 October	15	133	22	170	...	...	3	...	3	...	12	...	12	...	15	...	15	...	...	...	...	...	...	...	...	...	...	...	...	30
8 ,,	14	102	14	130	...	...	...	...	...	...	4	...	4	...	9	...	9	...	...	...	...	...	...	...	...	...	...	...	...	13
15 ,,	5	89	14	108	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
22 ,,	22	99	18	139	...	...	3	...	3	7	36	...	43	1	17	...	18	...	...	...	...	...	...	...	...	...	...	...	...	64
29 ,,	18	80	15	113	...	...	3	...	3	22	26	...	48	2	8	...	10	...	...	...	...	...	...	...	...	...	...	...	...	61
5 November	6	75	19	100	...	...	...	...	...	...	6	...	6	...	4	...	4	...	...	...	...	...	...	...	...	...	...	...	...	10
12 ,,	6	79	16	101	...	...	1	...	1	...	9	...	9	...	3	...	3	...	...	...	...	...	...	...	...	...	...	...	...	13
19 ,,	5	62	15	82	...	...	...	...	...	...	7	...	7	...	11	...	11	...	...	...	...	...	...	...	...	...	...	...	...	18
26 ,,	9	56	7	72	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3 December	9	108	12	129	...	...	4	...	4	...	15	...	15	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	20
10 ,,	16	92	14	122	...	...	...	...	...	...	1	...	1	...	9	...	9	...	...	...	...	...	...	...	...	...	...	...	...	10
17 ,,	9	152	18	179	...	...	1	...	1	...	12	...	12	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	14
24 ,,	9	90	46	145	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
31 ,,	3	2	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	754	5,849	834	7,437	...	39	438	...	477	47	713	...	760	22	191	...	213	...	5	...	5	...	1	...	1	3	...	...	3	1,459

Chart designed to show Seasonal Prevalence of the three principal species of Fleas found on Rats examined in the Microbiological Laboratory each year from 1909 to 1926 inclusive.



* Lines not Completed for the Second Half-year, 1915.

Examination of Rats was suspended from July to December, 1913, owing to the Smallpox outbreak.

TABLE II.—Showing the numbers of Rats and Mice examined each month and the seasonal variation in the species of Fleas infesting them. The accompanying graph shows the seasonal prevalence for the period 1909–27.

1927. Month.	Cases in human beings.	Species of Rats.				No. plague infected.	No. of Fleas collected.	*Xenopsylla cheopis.*		*Ctenopsylla musculi.*		*Ceratophyllus fasciatus.*		*Ctenocephalus canis or felis.*		*Pulex irritans.*		*Echidnophaga sp.*	
		R. norvegicus.	*R. rattus.*	*M. musculus.*	Total.			Gross.	Per 1,000 Rats.	Gross.	Per 1,000 Rats.	Gross.	Per 1,000 Rats.	Gross	Per 1,000 Rats.	Gross.	Per 1,000 Rats.	Gross.	Per 1,000 Rats.
January	...	86	557	45	688	...	...	...	...	...	...	...	...	...	...	...	...	...	...
February ...	...	46	592	44	682	...	...	...	...	...	...	...	...	...	...	...	...	...	...
March	...	58	505	75	638	...	145	82	128·52	49	76·80	13	20·37	1	1·56	...	...	...	...
April	...	39	444	50	533	...	212	88	165·10	114	213·88	9	16·88	1	1·87	...	...	...	...
May	...	57	675	90	822	...	186	58	70·56	110	133·82	16	19·46	1	1·21	1	1·21	...	...
June	...	55	696	66	817	...	264	89	108·93	146	178·70	28	34·27	1	1·22	...	...	...	...
July	...	91	456	90	637	...	188	73	114·59	88	138·14	26	40·81	1	1·57	...	...	...	...
August	...	85	408	83	576	...	142	59	102·43	64	111·11	19	32·98	...	...	...	...	...	...
September ...	...	106	430	83	619	...	69	13	21·00	32	51·69	21	33·92	...	...	...	...	3	4·84
October	...	61	386	65	512	...	168	9	17·58	107	208·98	52	101·56	...	...	...	...	...	...
November ...	...	27	345	60	432	...	41	1	2·31	22	50·94	18	41·66	...	...	...	...	...	...
December ...	...	43	355	83	481	...	44	5	10·39	28	58·21	11	22·86	...	...	...	...	...	...
Total	...	754	5,849	834	7,437	...	1,459	477	64·13	760	102·19	213	28·64	5	·67	1	·13	3	·40

TABLE III.—Showing the number of Rats annually examined from the first appearance of plague at Sydney in 1900 to 31st December, 1927.

Year.	Period of Rat Examination.	Rats examined.				Mice examined.			Infected.							Percentage of infected to total examined.		
		Norvegicus.	Per cent.	*Rattus.*	Per cent.	*Musculus.*	Per cent.	Total examined	*Norvegicus.*	Per cent.	*Rattus.*	Per cent.	*Musculus.*	Per cent.	Total infected.	N.	R.	M.
1900 1901 1902	.....	.....	.....	*1900—First plague outbreak, 19th January to 9th August. *1901–2—Second plague outbreak, 12th Nov., 1901, to 8th June, 1902.														
1903	1st May to 15th Aug.	8,695	...	...	...	5,976	...	14,761	Rats. 111	...	...	...	Mice. 50	...	161	...	...	...
1904	1st Mar. to 3rd Dec.	12,169	27·76	8,225	18·76	23,428	53·48	43,822	108	44·26	73	29·92	62	25·41	243	·76	1·16	0·26
1905	Year.	11,383	53·72	5,081	17·81	14,831	46·47	31,895	78	55·32	45	31·91	18	12·77	141	·79	·88	·13
1906	,,	9,275	31·49	8,694	29·52	11,478	38·97	29,447	46	26·44	89	51·15	39	22·41	174	·49	1·02	·34
1907	,,	8,628	27·2	10,749	33·9	12,244	38·7	31,621	57	26·03	143	65·29	19	8·68	219	·66	1·3	·15
1908	,,	7,622	28·39	9,207	34·29	10,020	37·32	26,849	82	46·86	78	44·57	15	8·57	175	1·075	·84	·14
1909	,,	6,752	25·26	11,259	42·08	8,726	32·66	26,737	22	12·36	138	77·53	18	10·11	178	·32	·22	2·06
1910	,,	5,701	24·98	10,076	44·15	7,044	30·87	22,821	4	80·	1	20·	...	...	5	·07	1·00	...
1911	,,	6,025	26·45	10,830	47·55	5,919	26·	22,774	...	...	...	...	...	...	...	...	...	...
1912	,,	6,510	37·82	7,922	46·18	2,722	16·	17,154	...	...	...	...	...	...	...	...	...	...
†1913	,,	5,020	47·29	5,477	51·59	118	1·1	10,615	...	..	...	...	...	...	...	...	...	...
1914	,,	3,732	39·58	5,487	58·14	220	2·33	9,439	...	...	...	...	...	...	...	...	...	...
1915	,,	3,592	37·13	5,946	61·48	135	1·89	9,673	..	...	...	...	...	...	...	...	...	...
1916	,,	2,807	35·33	4,967	62·58	167	2·1	7,941	...	...	...	...	...	...	...	...	...	...
1917	,,	3,026	36·76	5,110	62·08	95	1·15	8,231	...	...	...	...	...	...	...	...	...	...
1918	,,	2,601	33·43	5,109	65·67	69	·88	7,779	...	...	...	...	...	...	...	...	...	...
‡1919	,,	849	26·82	2,303	72·76	13	·41	3,165	...	...	...	...	...	...	...	...	...	...
1920	,,	2,707	40·6	3,960	59·4	...	...	6,667	...	...	...	...	...	...	...	...	...	...
1921	,,	5,588	33·59	10,270	61·74	775	4·59	16,633	24	38·71	37	59·67	1	1·61	62	·42	·36	·12
1922	,,	8,433	28·09	12,822	42·68	8,783	29·25	30,038	43	50·6	13	33·73	13	15·67	86§	·50	·23	·14
1923	,,	3,749	19·55	10,147	52·91	5,280	27·53	19,176	...	...	...	...	...	...	...	...	...	...
1924	,,	1,896	11·59	10,954	66·99	3,501	21·41	16,351	...	...	...	...	...	...	...	...	...	...
1925	,,	1,529	12·72	8,059	67·05	2,481	20·23	12,019	...	...	...	...	...	...	...	...	...	...
1926	,,	970	11·14	6,446	74·	1,295	14·86	8,711	...	...	...	...	...	...	...	...	...	...
1927	,,	754	10·14	5,849	78·65	834	11·21	7,437	...	...	...	...	...	...	...	...	...	...
	Total.....	121,318	28·41	185,549	28·13	120,128	43·46	426,995	464	36·17	634	49·37	185	14·45	1,283	·41	·43	·17

*Destroyed 1900-1902, 215,286. No record was kept during this period of the actual number of rats examined, but they all belonged to one of two species—*R. norvegicus* and *R. rattus*. The infected specimens were all *R. norvegicus*. Of the 215,286 rats destroyed between 1900 and 1902, there were about an equal number of each species, *R. rattus* predominating along the wharf area, and *R. norvegicus* inland.

†Examination of rats was suspended during the months of August, September, and October, owing to an outbreak of smallpox.

‡Examination of rats was greatly curtailed owing to the influenza epidemic.

§ 89 Plague infected animals were found, comprising 86 rats and mice, 2 cats, and 1 guinea-pig.

2. SCARLET FEVER: IMMUNISATION TESTS, N.S.W.

(E. L. Morgan.)

At the beginning of the year Dr. F. G. Morgan of the Commonwealth Serum Laboratories forwarded for testing purposes a small supply of scarlet fever toxin, scarlet fever antitoxin for the Schultz Charlton test, and concentrated antitoxin for treatment of scarlet fever cases.

Two lots of scarlet fever streptococcal toxin were forwarded. (*a*) Toxin made from a strain of scarlet fever streptococcus isolated by Dr. Kelsey (Fairfield strain). (*b*) Toxin prepared from a strain of streptococcus isolated from the finger of the nurse at Chicago by Drs. George and Gladys Dick (Dick strain).

Opportunities for using the material were scanty, and I am indebted to Dr. R. J. Millard and Dr. K. Kirkland, of the Coast Hospital; Dr. H. G. Wallace, Medical Officer of Health, Newcastle; Dr. R. Angel Money, Superintendent of the Royal Prince Alfred Hospital; and Dr. Leo Flynn and Dr. H. J. Daly, of Lewisham Hospital, for their active assistance in obtaining the results.

Schultz Charlton Test.

This test was first carried out on a patient who developed a typical scarlet rash two days after a radical mastoid operation. The wound was packed with iodoform gauze and doubt was expressed as to whether the condition was scarlet fever or an iodoform rash. The test was positive and subsequently the patient ran a typical scarlet fever course, ending up with desquamation. The remaining ampoules of unconcentrated antitoxin were handed over to Dr. Millard and below is a summary by Dr. Kirkland of his observations on its use.

Three dilutions of antitoxin were used—$\frac{1}{5}$, $\frac{1}{20}$ and $\frac{1}{100}$—about ·5 c.c. of each being injected, usually into the skin around the umbilicus. The average area of blanching was about the size of a shilling. The blanching was not complete except in one case referred to by Dr. Kirkland, where the antitoxin was injected a week before the patient developed true scarlet. The appearance was that of a whiter background than that of the surrounding rash with faint mottling still visible on the blanched area.

In no case was a positive reaction noted at the site of injection of one of the dilutions and not at the others. In many of the cases the area of blanching was more distinct at one or other of the sites, but this was not constant and occurred at the sites of injection of the $\frac{1}{5}$, $\frac{1}{20}$ or $\frac{1}{100}$ dilutions indiscriminately. Dr. Kirkland attributes any differences noted to the probability of subcutaneous rather than intradermal injection or to the fact that the rash itself was slightly more distinct at one area than another.

Note by Dr. Keith Kirkland, Coast Hospital.—The tests were made with serum produced and supplied by the Commonwealth Serum Laboratory and were applied to fifty patients. These were selected so that in the majority the rash was typical and except in cases particularly noted the exanthem stage had not been apparent for more than three days. Of the series forty-two cases or 84 per cent. of patients suffering from scarlet fever clinically gave a positive reaction.

This percentage though in accord with results published by Dr. Scholes might have been higher as an inspection of the cases giving a negative test will show.

Case 1 had a rash for one day only, but on injection with the diagnostic antitoxin, it had become very faint so that a positive result would have been hard to detect.

Cases 2, 3 and 4 had typical rashes for two days only and a positive result should have been appreciated.

Case 5 was a man who incidentally had to be operated on for appendicitis, whose rash was five days old and fading when tested.

Case 6 similarly had a faint rash four days old.

Case 7 had a typical rash three days old when tested.

Case 8 had a typical rash, two days old, but the last few drops of one dilution only were available for the test.

Thus, in Cases 1, 5 and 6 a positive result could hardly have been expected.

Dr. Scholes has stated that a positive result or localised blanching of the rash should appear in from four to twelve hours and remain for twenty-four hours.

I think that in no case did the test show any positive result under twelve or fifteen hours and it was not uncommon for the areas of blanching to remain for two or even three days.

Three dilutions of the antitoxin were used, viz., 1 : 5, 1 : 20 and 1 : 100 and it cannot be said that any one dilution appeared more satisfactory as a reagent than the others.

It is worthy of mention that in three cases giving definitely positive reactions the rash had been present in two cases for four days and the other for five days, so that it appears that the test would in some cases be of positive diagnostic significance until that period had elapsed.

Of the patients giving a positive test, four were particularly interesting.

Case A was admitted as doubtful scarlatina with a very faint, atypical rash one day old. The test performed on admission was negative, but the patient was treated as scarlatina with other definite cases. Seven days after admission this patient developed a typical scarlatinal rash and the skin at the sites of injection of one week before was blanched in a very marked degree. The test showed that the patient did not have scarlet fever on admission, but subsequently developed it.

Case B was admitted before any tests were made and developed a secondary rash twenty-one days after the first exanthem, and then gave a positive Schultz-Charlton test.

Case C was apparently infected by a patient who, 37 days before, had had a rash following severe burns. This burnt patient had been moved from the infectious division to a general medical ward, and C's bed was next to his.

Case D was admitted in the puerperium with a four days old baby and clinically had scarlet fever.

It is regrettable that at the time the tests were done so few doubtful cases with good rashes were available. No case of burns with a rash was admitted nor were any patients with so-called septic rashes of other origin available for investigation.

In conclusion it would appear that the Schultz-Charlton test is of very considerable value in diagnosis, as almost 90 per cent. of well defined cases gave a positive test.

2. *Concentrated Antitoxin for Treatment.*

Owing to the limited amount available, instead of using this material on alternate cases, it was only used in severe cases. Dr. Millard is of opinion that the serum is of decided value, but is desirious of obtaining a further supply of antitoxin before giving a definite opinion as to its efficacy.

3. *Dick Tests.*

In carrying out these tests a dilution of 1/1,000 of both strains of toxin was used. Of this dilution 0·2 c.c. was injected intravenously into the right arm of each patient. A similar amount of toxin, which was previously heated to 100° C. for one hour, was injected into the left arm as a control.

In deciding on the dilution reference was made to the paper of Dr. Kelsey* in the case of the Fairfield strain, while in the case of the Dick strain, Dr. F. G. Morgan, of the Commonwealth Serum Laboratories, suggested 0·2 c.c. of 1/1,000 dilution. Beyond trying this dilution on myself and producing no reaction, there was insufficient time to carry out further standardisation.

(*a*) *Toxin, Fairfield strain.*—Below is a summary by Dr. Wallace, Medical Officer of Health, Newcastle, on the results of carrying out 227 Dick tests at the Mental Hospital.

Another sample of this strain was used by Dr. Money, Superintendent of the Royal Prince Alfred Hospital, and a report by him was published in the Medical Journal of Australia*†. It will be noted that in Dr. Wallace's series a case of scarlet fever developed in a boy aged sixteen who gave a negative reaction.

TABLE I, showing the results of the Dick Test on 227 persons at the Mental Hospital, Newcastle. Date of test, 28th December, 1926.

Age	Males.		Females.		
	Tested.	Positive.	Tested.	Positive.	
Under 1 year	Nil	Nil	Nil	Nil	
1— 2 years	Nil	Nil	Nil	Nil	
2— 3 ,, ...	6	4	3	3	
3— 4 ,, ...	3	3	1	1	
4— 5 ,, ...	1	1	8	2	
5—10 ,, ...	37	13	26	7	[1] One boy, aged 16, who gave a negative reaction, developed scarlet fever on 25th Sept., 1927.
10—15 ,, ...	48	19	19	9	
15—20 ,, ...	16[1]	3	10	4	
20—30 ,, ...	12	6	9	3	
30—40 ,, ...	8	1	7	3	
40—50 ,, ...	2	...	2	2	
50—60 ,, ...	6	2	3	1	
	139	52=37·4%	88	25=29·7%	

(*b*) *Toxin, Dick Strain.*—An opportunity arose of testing the Dick strain of toxin at Lewisham Hospital. Cases of scarlet fever were occurring haphazardly amongst the nursing sisters and staff, so the superintendent, Dr. Flynn, and one of the honorary doctors, Dr. Daly, agreed to try passive immunisation on a large scale.

TABLE II, showing the results of Dick Tests on Scarlet Fever Patients and Employees of Lewisham Hospital, the latter graded in age groups.

Scarlet Fever Patients.			Staff.					
Patients.	Time since onset of illness.	Dick test.	Age group.	Number tested.	Positive.	Negative.	Pseudo (b) positive.	Pseudo (b) negative.
A	5 days.	Negative.	1–10.....	2	...	2	...	...
B	6 ,,	,,	15–20.....	27	5	21	...	1
C	14 ,,	,,	20–30.....	87	25	56	2	4
D	15 ,,	,,	30–40.....	35	6	28	...	1
E	20 ,,	,,	40–50.....	15	2	13	...	...
F	22 ,,	,,	Over 50(a)	11	...	11	...	...

(a) Percentage of positives, excluding patients, 22-6. (b) In these groups it was difficult to be certain of the correct reading.

* Medical Journal of Australia, Vol. 2, 1926, 518. † Ibid Vol. 2, 1927, 193.

It is very interesting to note that of 11 people over fifty all gave negative tests, and of 26 over forty only 2 gave positive tests.

This series included 20 people who gave a history of scarlet fever. Of these 2 gave positive Dick tests. Both were over forty and both stated they had had scarlet fever during their childhood. Immunisation was carried out with Parke Davis & Co.'s Scarlet Fever Streptococcus Antitoxin Conc. I advised at least 5 c.c. at one injection, but the medical officers concerned divided the dose, giving 2 c.c., followed seven days later by a further 3 c.c. Thirty-six of those who gave positive Dick tests received injections of antitoxin, and of these 9 showed definite after effects attributed to the serum. One subsequent case of scarlet fever occurred amongst the 177 tested, and this was in a Dick negative person, a female aged 23, who gave a straight-out negative. She developed scarlet ten days after being tested. Other measures taken to combat the epidemic were: (*a*) Closure of hospital to visitors; (*b*) closure of hospital to all except urgent cases.

Difficulty was experienced in obtaining consents for retesting in those who were immunised, and the only four who consented were the resident medical officers, all of whom had given very typical positive reactions. On retesting all four gave negative Dick tests four days after receiving antitoxin.

During the following three weeks two fresh cases of scarlet developed in hospital patients, but there have been no further cases amongst the staff. Considerable difficulty was experienced in interpreting the result on those who gave pseudo reactions. We adopted the plan of reading as positive those cases in which the area on the test arm was greater than that on the control arm, and if this standard be accepted the two results classed as pseudo-positive were quite definite. From my experience with the Schick test I am satisfied that this is not always reliable, faint positives being sometimes missed, and it is probable that in reading Dick tests this must always constitute a slight source of error.

Comparing the results of the tests with Fairfield strain and Dick strain (the Royal Prince Alfred Hospital figures are omitted on account of the small number tested), the former gave 38·3 per cent. positives, while the latter gave 22·6 per cent.

In the former case the tests were carried out mainly on persons under twenty, and in the latter case mainly on persons over twenty. In the groups of comparable ages there does not appear to be a marked divergence in the results.

Following tests with both strains of toxin a case of scarlet fever developed in a negative reactor, but this does not appear to be sufficient justification for increasing the amount used in the tests (·2 c.c. of 1:1000 dilution with both strains) as similar results have occasionally been reported elsewhere and not all strains of streptococci produce toxin capable of picking out all susceptible persons.

The results tend to show that an epidemic can be quickly controlled by Dick tests and passive immunisation when outbreaks of scarlet fever occur in restricted communities such as hospitals or institutions.

Sufficient toxin for active immunisation has not yet been made available. The serum reactions following passive immunisation are such that the general public is not likely to accept this method of immunisation, even if advocated, and in view of the short duration of immunity it is only in exceptional circumstances, such as outbreaks amongst the nursing staffs of hospitals, that passive immunisation is likely to be of value. Until supplies of toxin are available for active immunisation it does not appear practicable to undertake the control of scarlet fever outbreaks in schools, except by exclusion of susceptible children.

INVESTIGATIONS INTO THE SYDNEY MILK SUPPLY.*

(E. L. Morgan.)

1. Examination of suburban milk for—
   (*a*) Tubercle bacilli;
   (*b*) Total bacterial content.
2. Examination of the keeping qualities and the bacterial content of bottled milk supplied by large distributing companies (country milk).

(A) Tubercle Bacilli.

In the annual report for 1923 (p. 142) the late Dr. E. W. Ferguson reported on the investigation of 117 suburban milks for tubercle bacilli. In that series Dr. Ferguson reported that of 100 inoculated guinea-pigs which survived to the full term, and which were representative of seventy-five samples from as many dairies, only one animal was found with suspicious lesions.

Owing to pressure of other work the examinations were interrupted in 1923. An attempt to continue them was made in 1925–1926, and milk from 23 dairies (1,240 cows) was tested by guinea-pig inoculation.

In this second series a sample of milk from one dairy, which at that time was milking 23 cows, was found to contain tubercle bacilli on guinea-pig inoculation.

This dairy was subsequently visited, and all the cows (then 32) were subjected to the tuberculin test Two cows reacted, and these were destroyed. It was stated that one of the cows had been brought into the herd after collection of the infected sample.

The inspector who carried out the tuberculin test reported as follows:—

> "The tuberculin test was applied to this dairy, and 32-head of cattle were tested, of which 2 reacted. The post-mortem examination showed one cow to be slightly affected in the mesenteric glands; in the other cow the left pharyngeal gland, lungs, bronchial and mediastinal glands and mesenteric glands were affected. In neither case was the udder affected."

The examinations were again interrupted in 1926, owing to absence of members of the staff through serious illness, and were not resumed until early in August, 1927, following on the appointment of an assistant for this work. The work was carried on continuously throughout the remainder of the year, and a tabulated statement of the results is given below. The series comprise 220 samples from 121 suburban dairies, on which were some 3,650 milking cows.

In addition to inoculation of guinea-pigs for the purpose of detecting the presence of tubercle bacilli, a total bacterial count was made of each sample, and, after concentration, slides were searched for the presence of acid fast bacilli. The method of concentration used is that described by Douglas and Meanwell† and is as follows:—

> "To 10 c.c. of milk in a centrifuge tube provided with a rubber-capped screw top, 0·5 c.c. of trypain solution was added (Allen and Hanbury's liquor trypaini co. was used). The tubes were incubated at 56 deg. C. for three hours, or 37 deg. C. for six hours; after cooling, to each tube 5 c.c. of ether were added, the cap screwed firmly and the tube was shaken thoroughly at least 200 times, and subsequently centrifuged for twenty minutes at 4,000 revolutions per minute. The liquid now consisted of three layers, the ether containing dissolved fat at the surface, a clear fluid below, and, between the two, a gelatinous disc which contained all the acid-fast bacteria. A platinum loop was inserted into the lower clear layer and a loopful of the gelatinous disc removed on to a slide. The preparation was smeared with a drop of distilled water and allowed to dry at room temperature (the slides should not be heated). When dry the slides were placed without further treatment into alcohol and ether for two hours at room temperature, and then stained by the Ziehl-Nielsen method in the usual manner.
>
> "The bacilli stained red were shown clearly against a light blue background, and, if granulated, the granules were easily seen."

This test was included for the purpose of checking as far as possible the result of the guinea-pig inoculation consequent upon the infrequent presence of tubercle bacilli in the Sydney milk. This was previously commented on by the late Dr. Ferguson.‡

In the 220 samples of milk from cows tested since August, 1927, no tubercle bacilli have been found. Details of the test are given below.

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* Bacteriological Examinations of Milk at various stages in transit to consumer ... ... Ann. Rept. 1909, 109.
Bacteriological aspects of the milk supply of Sydney ... ... ,, 1913, 243.
Bacteriological examination of milk ... ... ,, 1920, 166.
Sydney milk supply ... ... ,, 1921, 91.
Daily bacterial content of milk during winter months ... ... ,, 1923, 129.
Bacterial content of milk from suburban dairies ... ... ,, 1922, 134.
Examination of suburban milk for *tubercle bacilli* ... ... ,, 1923, 142.
Bacterial content of suburban and country milk ... ... ,, 1926, 153.

† Brit. Jour. Exp. Path., vol. 6, 1923, p. 203.

‡ Annual Rept. Dir. Gen. Public Health, N.S.W., 1923, p. 142.

TABLE showing Results of Examination of 220 Samples of suburban Milk collected between August, 1927, and February, 1928.

File No. of District.	File No. of Dairy.	Sample No.	Date Sample Taken.	Laboratory Papers.	Total Colonies per cc.. (Agar Plate Count).	Lactose Fermenters: acid and gas present in dilution.	Predominating Organisms.	Microscopical Examination. Concentration Method for T.B., &c.	Guinea-pig Inoculation for T.B.			No. of cows milked.
									Serial No. of Pig.	Date of Inoculation.	Result.	
A1.	A	1	12–9–27	27/13307–12...	209,000	1 c.c.	Staphylococci	Negative	6686 6687	7–9–27	Negative	26
	B	1	12–9–27	27/13307–12...	32,660	None	Staphylococci	Negative	6682 6683	7–9–27	Negative	28
		2	29–9–27	27/14042–6 ...	108,400	1/10 c.c.	Coliform, also moulds	Negative. Few Streptococci.	.....	.....	.....	31
	C	1	12–9–27	27/13307–12...	28,240	1/10 c.c.	Staphylococci	Negative	6684 6685	7–9–27	Negative	30
		2	26–9–27	27/13857–9 ...	82,400	1/10 c.c.	Staphylococci	,, ...	.....	.....	.....	28
	D	1	26–9–27	27/13857–9 ...	2,272,000	1/1,000 c.c. ...	Coliform	Negative, Streptococci	.....	30–9–27	Negative	...
		2	29–9–27	27/14042–6 ...	23,400	1/1,000 c.c. ...	Staphylococci	Negative. Few Streptococci.	.....	30–9–27	,,	35
		3	29–9–27	27/14042–6 ...	27,000	1/10 c.c.	Staphylococci	Negative	.....	30–9–27	,, ...	35
		4	28–10–27	27/15249	19,600	1/10 c.c.	Staphylococci	Negative	.....	29–10–27	,, ...	29
	E	1	26–9–27	27/13857–9 ...	13,740	1/10 c.c.	Staphylococci	Negative	.....	27–9–27	Negative	26
	F	1	19–9–27	27/14042–6 ...	20,600	1/100 c.c. ...	Staphylococci and B. zopfii.	Negative	.....	30–9–27	Negative	12
		2	29–9–27	27/14042–6 ...	20,700	1/10 c.c.	Staphylococci and B. zopfii.	Negative	.....	30–9–27	,, ...	12
		3	28–10–27	27/15249	27,200	1/1,000 c.c. ...	Coliform and B. zopfii	Negative. Few Leucocytes and Streptococci.	.....	30–10–27	,, ...	12
B1.	A	1	3–1–28	28/62–9	295,000	1/10 c.c. ...	Lactics	Negative	.....	4–1–28	Negative.	...
	B	1	18–10–27	27/14697–706	460,000	1/100,000 c.c.	Coliforms	Negative	.....	19–10–27	Negative.	14
		2	14–12–27	27/17484–91...	287,000	1/1,000 c.c. ...	Staphylococci	Negative	.....	.....	,, ...	11
		3	14–12–27	27/17484–91...	860,000	1/100 c.c.	Staphylococci and B. zopfii.	Negative. Fair number of Leucocytes.	.....	.....	.....	11
	C	1	14–12–27	27/17484–91...	21,000	1/100 c.c. ...	Staphylococci	Negative	.....	15–12–27	Negative	27
		2	27–1–28	28/1350–6.....	189,000	1/1,000 c.c. ...	Staphylococci	Negative. Fair number of Leucocytes.	.....	.....	.....	28
	D	1	18–10–27	27/14697–706	44,200	1/10 c.c.	Staphylococci	Negative	6682 6683	19–10–27	Negative	20
		2	27–1–28	28/1340/–4 ...	23,000	1/10 c.c.	Staphylococci	Negative. Streptococci	.....	.....	.....	19
	E	1	18–10–27	27/14697–706	134,000	1/100 c.c. ...	Staphylococci and B. zopfii.	Negative	.....	19–10–27	Negative	21
		1	19–1–28	28/997–1003...	444,000	1/100,000 c.c.	Coliforms	Negative	.....	.....	.....	25
	F	1	1–11–27	27/15356–8 ...	1,032,000	1/10 c.c.	Staphylococci	Negative	.....	3–11–27	Negative	12
		2	27–1–28	28/1350–6.....	10,000	1/100 c.c. ...	Staphylococci	Negative. Fair number of Leucocytes.	.....	.....	.....	14
	G	1	3–1–28	28/62–9.....	2,688,000	1/100,000 c.c.	Coliform and B. zopfii	Negative	.....	5–1–28	Negative	2
	H	1	18–10–27	27/14697–706	852,000	1/10 c.c. ...	Staphylococci	Negative	6884 6885	20–10–27	Negative	25
		2	27–1–28	28/1340–4.....	4,300	1/100 c.c. ...	Staphylococci	Negative	.....	.....	.....	24
	J	1	19–1–28	28/997–1003...	700,000	1/1,000 c.c. ...	Lactics	Negative. Few Leucocytes.	.....	29–1–28	Negative	18
		2	27–1–28	28/1340–4.....	79,000	1/1,000 c.c. ...	Staphylococci and B. zopfii.	Negative	.....	.....	.....	17
	K	1	6–12–27	27/17155–7 ...	4,560,000	1/1,000 c.c. ...	B. zopfii	Negative	.....	8–12–27	Negative	18
		2	19–1–28	28/997–1003...	414,000	1/1,000 c.c. ...	Staphylococci and few B. zopfii.	Negative	.....	.....	.....	20
		3	27–1–28	28/1350–6.....	36,000	1/100 c.c. ...	Staphylococci	Negative	.....	.....	.....	20
	L	1	6–12–27	27/17155–7 ...	500,000	1/1,000 c.c. ...	Staphylococci	Negative	.....	8–12–27	Negative	8
		2	19–1–28	28/997–1003...	1,360,000	1/1,000,000 c.c.	Coliforms	Negative	.....	.....	.....	8
		3	27–1–28	28/1350–6.....	810,000	1/10,000 c.c.	Coliform	Negative. Few Streptococci and Leucocytes.	.....	.....	.....	27
	M	1	19–1–28	28/997–1003...	Too numerous to count.	1/100,000 c.c.	Coliform and B. zopfii	Negative. Fair number of Leucocytes.	.....	29–1–28	Negative	2
		2	27–1–28	28/1350–6 ...	250,000	1/10,000 c.c....	B. zopfii	,, ,, ...	.....	.....	.....	2
	N	1	19–1–28	28/997–1003...	Too numerous to to count.	1/100,900 c.c.	Coliforms	Negative	.....	29–1–28	Negative	11
		2	27–1–28	28/1350–6.....	1,200,000	1/10,000 c.c.	Coliform and B. zopfii	.....	.....	.....	.....	11
	O	1	21–10–27	27/14962–8 ...	31,600	1/10 c.c.	Staphylococci	Negative	.....	22–10–27	Negative	10
		2	11–11–27	27/15890–3 ...	1,296,000	1/10 c.c.	Staphylococci	Negative	.....	.....	.....	14
	P	1	3 –1–28	28/62–9	378,000	Nil	Staphylococci	Negative	.....	5–1–28	Negative	2
	Q	1	3–1–28	28/62–9.....	167,000	1/100 c.c. ...	Lactics	Negative	.....	5–1–28	Negative	2
	R	1	14–12–27	27/17484–91...	280,000	1/10 c.c.	Staphylococci	Negative. Fair number of Leucocytes.	.....	16–12–27	Negative	18
		2	14–12–27	27/17484–91...	21,600	Nil	Staphylococci	Negative.	.....	.....	.....	18
	S	1	3–1–28	28/62–9.....	616,000	1/100,000 c.c.	Coliforms	Negative	.....	5–1–28	Negative	2
	T	1	11–11–27	27/15890–3 ...	1'972,000	1/100,000 c.c.	Coliform	Negative. Few Leucocytes and fair number Streptococci.	.....	12–11–27	Negative	18
		2	14–12–27	27/17484–91...	204,000	1/100,000 c.c.	Coliforms	,, ,, ...	.....	.....	.....	18
	U	1	18–10–27	27/14697–706	668,000	1/100 c.c.	Staphylococci	Negative	.....	20–10–27	Negative	8
		2	11–11–27	27/15890–3 ...	2,656,000	1/1,000 c.c. ...	Staphylococci and B. zopfii.	Negative	.....	.....	.....	10
	V	1	1–11–27	27/15356–8 ...	746,000	1/100 c.c. ...	Staphylococci and B. zopfii.	Negative	.....	3–11–27	Negative	37
		2	3–1–28	28/62–9	3,300	1/10 c.c.	Lactics	Negative	.....	.....	.....	19
	W	1	1–11–27	27/15356–8 ...	92,800	1/10,000 c.c.	Staphylococci and Coliform.	Negative	.....	3–11–27	Negative	9
		2	27–1–28	28/1350–6.....	10,600	1/1,000 c.c. ...	Staphylococci	Negative	.....	.....	.....	10

TABLE showing Results of Examination of 220 Samples of Suburban Milk—*continued.*

File No. of District.	File No. of Dairy.	Sample No.	Date Sample Taken.	Laboratory Papers.	Total Colonies per c.c. (Agar Plate Count).	Lactose Fermenters: acid and gas present in dilution.	Predominating Organisms.	Microscopical Examination, Concentration Method for T.B., &c.	Guinea-pig Inoculation for T.B.			No. of cows milked.
									Serial No. of Figs.	Date of Inoculation.	Result.	
B1.	X	1	6-12-27	27/17155-7 ...	4,120,000	1/1,000 c.c. ...	Staphylococci and B. zopfii.	Negative. Few Leucocytes and Streptococci.	.....	7-12-27	Negative	30
		2	3-1-28	28/62-9.....	640,000	1/1,000 c.c. ...	Staphylococci	,, ,, ...	.....	.....	.....	28
	Y	1	21-10-27	27/14962-8 ...	1,812,000	1/1,000 c.c. ...	Staphylococci	Negative	.....	23-10-27	Negative	12
		2	27-1-28	28/1340-4.....	22,800	1/100 c.c. ...	Staphylococci	Negative, ...	.....	.....	.....	15
	Z	1	3-1-28	28/62-9.....	2,384,000	1/10,000 c.c.	Staphylococci and B. zopfii.	Negative. Streptococci fairly numerous.	.....	5-1-28	Negative	10
	AA	1	19-1-28	28/997-1003...	501,000	1/100,000 c.c.	Coliform	Negative. Fair number of Streptococci.	.....	29-1-28	Negative	3
		2	27-1-28	28/1340-4.....	193,000	1/10,000 c.c.	Coliform	Negative	.....	.....	.....	...
	BB	1	21-10-27	27/14962-8 ...	3,520,000	1/10 c.c.	Staphylococci	Negative	.....	23-10-27	Negative	17
		2	11-11-27	27/15890-3 ...	78,000	1/1,000 c.c. ...	Staphylococci	Negative	.....	.....	.....	17
	CC	1	18-10-27	27/14697-706	440,000	1/100 c.c.	Staphylococci	Negative. Few Leucocytes.	.....	20-10-27	Negative	10
		2	14-12-27	27/17484-91...	46,200	1/10,000 c.c.	Coliform	Negative	.....	.....	.....	13
		3	14-12-27	27/17484-91...	39,200	1/100,000 c.c.	Coliform	Negative	.....	.....	.....	13
I2.	A	1	25-10-27	27/15057-9 ...	14,200	1/10,000 c.c.	Coliform	Negative. Few Leucocytes and streptococci.	.....	27-10-27	Negative	60
	B	1	18-10-27	27/14697-706	1,740	None	Staphylococci	Negative	.....	20-10-27	Negative	13
		2	21-10-27	27/14962-8 ...	6,280	1/100 c.c.	Staphylococci	Negative	.....	.....	.....	14
	C	1	14-12-27	27/17479-80...	500,000	1/100 c.c.	Staphylococci	Negative	.....	16-12-27	Negative	13
	D	1	21-10-27	27/14962-8 ...	30,800	1 c.c.	Staphylococci	Negative	.....	23-10-27	Negative	16
		2	14-12-27	27/17479-80...	208,000	1/100 c.c.	Staphylococci	Negative	.....	.....	.....	18
	E	1	18-10-27	27/14697-706	16,200	1/1,000 c.c. ...	Staphylococci	Negative. Few Streptococci and fair number of Leucocytes.	.....	20-10-27	Negative	23
		2	25-10-27	27/15057-9 ...	14,560	1/10,000 c.c.	Coliform	,, ,, ...	.....	.....	.....	23
	F	1	18-10-27	27/14697-706	440,000	1/100,000 c.c.	Coliform	Negative	.....	20-10-27	Negative	29
		2	25-10-27	27/15057-9 ...	1,380,000	1/100,000 c.c.	Coliform	Negative	.....	.....	.....	28
	G	1	18-10-27	27/14697-706	2,160,000	1/100 c.c.	Staphylococci	Negative	.....	20-10-27	Negative	36
		2	21-10-27	27/14962-8 ...	72,800	1/1,000 c.c. ...	Staphylococci	Negative	.....	.....	.....	38
B3.	A	1	14-9-27	27/13426-7 ...	24,000	1/10 c.c.	Staphylococci	Negative. Many Leucocytes and Streptococci.	6563 6564	6-8-27	Negative	7
		2	23-9-27	27/13819-20...	164,000	1 c.c.	Staphylococci	,, ,, ...	.....	.....	.....	6
	B	1	23-9-27	27/13819-20...	4,000,000	1/1,000 c.c. ...	Coliform	Negative. Many pus cells and Streptococci.	6559- 6562	6-8-27	Negative	130
		2	31-8-27	27/12911-2 ...	6,240	1 c.c.	Staphylococci	,, ,, ...	.....	.....	.....	120
C1.	B	1	3-2-28	28/1736-41 ...	6,500	1/10 c.c.	B. zopfii	Negative. Few Leucocytes.	.....	5-2-28	Negative	16
		2	9-2-28	28/2129-35 ...	724,000	1/1,000 c.c. ...	B. zopfii	,, ,, ...	.....	.....	.....	16
	E	1	9-2-28	28/2129-35 ...	1,108,000	1/100 c.c.	Lactics	Negative	.....	11-2-28	Negative	9
	M	1	9-2-28	28/2129-35 ...	7,200,000	1/1,000,000 c.c.	Coliform and B. zopfii	Negative. Fair number of Leucocytes and Streptococci.	.....	11-2-28	Negative	45
	N	1	3-2-28	28/1736-41 ...	160,000	1/10,000 c.c....	Coliform	Negative	6877 6878	4-2-28	Negative	21
	O	1	3-2-28	28/1736-41 ...	56,400	1/10,000 c.c....	Staphylococci and B. zopfii.	Negative	.....	4-2-28	Negative	32
	Q	1	13-2-28	28/2250-2.....	1,260,000	1/100,000 c.c.	Coliform	Negative	6895 6896	15-2-28	Negative	28
	S	1	6-12-27	27/17151-2 ...	258,000	1/1,000 c.c. ...	Coliform	Negative	.....	7-12-27	Negative	26
	U	1	9-2-28	28/2129-35 ...	37,700	1/100 c.c.	Staphylococci	Negative	.....	10-2-28	Negative	34
	Y	1	28-11-27	27/16718-20...	2,614,000	1/10,000 c.c....	Staphylococci	Negative	.....	29-11-27	Negative	32
		2	9-2-28	28/2129-35 ...	108,000	1/100,000 c.c.	Coliform	Negative	.....	.....	.....	34
	Z	1	9-2-28	28/2129-35 ...	17,200	1/10,000 c.c....	Coliform	Negative	.....	10-2-28	Negative	...
	BB	1	3-2-28	28/1736-41 ...	800,000	1/1,000 c.c. ...	Staphylococci	Negative	.....	4-2-28	Negative	80
	CC	1	13-2-28	28/2250-2.....	1,336,000	1/100,000 c.c.	B. zopfii	Negative	.....	14-2-28	Negative	24
	FF	1	6-12-27	27/17151-2 ...	486,000	1/1,000 c.c. ...	Staphylococci	Negative	.....	7-12-27	Negative	30
	HH	1	13-2-28	28/2250-2.....	33,000	1/10 c.c.	Staphylococci	Negative	.....	14-2-28	Negative	6
	JJ	1	9-2-28	28/2129-35 ...	814,000	1/10,000 c.c....	Coliform and B. zopfii	Negative	.....	10-2-28	Negative	86
	KK	1	28-11-27	27/16718-20...	414,000	1/10,000 c.c....	Staphylococci	Negative	.....	29-11-27	Negative	30
		2	3-2-28	28/1736-41 ...	11,600	1/1,000 c.c. ...	Staphylococci	Negative	.....	.....	.....	34
	OO	1	28-11-27	27/16718-20...	1,684,000	1/10,000 c.c....	Staphylococci	Negative	.....	29-11-27	Negative	25
		2	3-2-28	28/1736-41 ...	1,840,000	1/1,000 c.c. ...	Staphylococci	Negative	.....	.....	.....	23
B1.	A	1	17-8-27	27/12305-9 ...	73,000	1/10 c.c.	Staphylococci	Negative	6604 6605	18-8-27	Negative	19
		2	4-10-27	27/14138-43...	43,300	1/10 c.c.	Staphylococci	Negative	.....	.....	.....	15
	B	1	18-8-27	27/12349-51...	65,000	1/100 c.c.	Staphylococci and Coliforms	Negative	6612 6613	19-8-27	Negative	6
		2	4-10-27	27/14138-43...	425,000	1/1,000 c.c. ...	Staphylococci	Negative	.....	.....	.....	8
	C	1	30-8-27	27/12831-5 ...	360	1 cc.	Staphylococci	Negative	6596 6597	17-8-27	Negative	4
		2	11-10-27	27/14448-58...	25,200	None	Staphylococci	Negative	.....	.....	.....	2

TABLE showing Results of Examination of 220 Samples of Suburban Milk—*continued.*

File No. of District.	File No. of Dairy.	Sample No.	Date Sample Taken.	Laboratory Papers.	Total Colonies per c.c. (Agar Plate Count).	Lactose Fermenters: acid and gas present in dilution.	Predominating Organisms.	Microscopical Examination. Concentration Method for T.B., &c.	Guinea-pig Inoculation for T.B.			No. of cows milked.
									Serial No. of Pig.	Date of Inoculation.	Result.	
	D	1	23-8-27	27/12485-9 ...	45,000	1 c.c.	Staphylococci	Negative	6620 6621	23-8-27	Negative	12
		2	11-10-27	27/14448-58...	17,500	None	Staphylococci	Negative	.....	.....	.....	...
	E	1	17-8-27	27/12305-9 ...	77,000	1/10,000 c.c....	Lactics and coliforms	Negative. Few leucocytes.	6606 6607	18-8-27	Negative	7
		2	30-9-27	27/14066-70...	472,000	1/1,000 c.c. ..	Coliforms	Negative	.....	.....	.....	10
	F	1	11-10-27	27/14448-58...	7,040,000	1/100,000 c.c.	Coliform	Negative. Few leucocytes and streptococci.	6656 6657	27-8-27	Negative	38
	G	1	24-8-27	27/12555-9 ...	250	None	Staphylococci	Negative	6630 6631	23-8-27	Negative	1
		2	11-10-27	27/14448-58...	1,350	1 cc..	Staphylococci	Negative	.....	.....	.....	1
	H	1	24-8-27	27/12555-9 ...	320,000	1/10 c.c.	Staphylococci	Negative	6628 6629	23-8-27	Negative	4
		2	4-10-27	27/14138-43...	26,800	None	Staphylococci	Negative	.....	.....	.....	6
	J	1	24-8-27	27/12555-9 ... (Evening milk).	288,000	None	Staphylococci	Negative. Few leucocytes.	6632 6635	23-8-27	Negative	6
		2	24-8-27	27/12555-9 ... (Morning milk.)	550,000	1/1,000 c.c. ...	Staphylococci, coliforms and B. mesentericus group.	,, ,, ...	.....	.....	.....	6
		3	30-9-27	27/14066-70...	407,000	1/100 c.c.	B. zopfii	,, ,, ...	.....	.....	.....	19
	K	1	29-8-27	27/12788-90...	936,000	1/1,000,000c.c.	Coliforms	Negative. Few leucocytes.	6654 6655	27-8-27	Negative	27
		2	11-10-27	27/14448-58...	144,000	1/10,000 c.c....	Coliforms	,, ,, ...	.....	.....	.....	34
	L	1	14-10-27	27/14604-9 ...	5,600	1 c.c.	Staphylococci	Negative Few leucocytes.	.....	15-10-27	Negative	58
	M	1	17-8-27	27/12305-9 ...	48,000	1 c.c.	Staphylococci	Negative	6608 6609	18-8-27	Negative	11
		2	30-9-27	27/14066 70...	16,040	1 c.c.	Staphylococci	Negative. Few leucocytes.	.....	.....	.....	30
	N	1	30-8-27	27/12831-5 ...	1,760	1 c.c.	Staphylococci	Negative	6598 6599	17-8-27	Negative	2
		2	11-10-27	27/14448-58...	214,000	1/10 c.c.	Staphylococci	Negative	.....	.....	.....	2
H1	P	1	30-8-27	27/12831-5 ...	354,000	1/10 c.c.	Coliforms	Negative	6594 6595	17-8-27	Negative	15
		2	14-10-27	27/14604-9 ...	14,400	1/10 c.c.	Staphylococci	Negative	.....	.....	.....	14
	Q	1	18-8-27	27/12349-51...	46,000	1/100 c.c.	Staphylococci	Negative	6610 6611	19-8-27	Negative	24
		2	30-9-27	27/14066-70...	16,200	1 c.c.	Staphylococci	Negative	.....	.....	.....	21
	R	1	24-8-27	27/12555-9 ...	3,000	1/10 c.c.	Staphylococci	Negative	6636 6637	23-8-27	Negative	7
		2	14-10-27	27/14604-9 ...	7,760	1 c.c.	Staphylococci	Negative	.....	.....	.....	4
	S	1	17-8-27	27/12305-9 ...	2,500	1/10 c.c.	Staphylococci	Negative	6602 6603	18-8-27	Negative	23
		2	4-10-27	27/14138-43...	1,580	None	Staphylococci	Negative	.....	.....	.....	14
	T	1	23-8-27	27/12485-9 ...	132,000	1 c.c.	Staphylococci	Negative	6616 6619	23-8-27	Negative	66
		2	23-8-27	27/12485-9 ...	258,000	1/10 c.c.	Staphylococci	Negative	.....	.....	.....	60
		3	14-10-27	27/14604-9 ...	135,200	1/100 c.c.	Staphylococci	Negative	.....	.....	.....	...
	U	1	30-8-27	27/12831-5 ...	656,000	1/1,000 c.c. ...	Coliforms	Negative	6588 6591	17-8-27	Negative	31
		2	14-10-27	27/14604-9 ...	3,670	1/10 c.c. ...	Staphylococci	Negative	.....	.....	.....	42
	V	1	18-8-27	27/12349-51...	6,000	1 c.c.	Staphylococci	Negative	6614 6615	19-8-27	Negative	6
		2	4-10-27	27/14138-43...	2,200	None	Staphylococci	Negative	.....	.....	.....	6
	W	1	23-8-27	27/12485-9 ...	6,080	None	Staphylococci	Negative	6624 6625	23-8-27	Negative	2
		2	11-10-27	27-14448-58...	1,376,000	1/1,000 c.c. ...	Coliform	Negative	.....	.....	.....	2
	X	1	17-8-27	27/12305-9 ...	2,918,000	1/100,000 c.c.	Lactics and coliforms	Negative. Fair number of leucocytes and streptococci.	6600 6601	19-8-27	Negative	11
		2	30-9-27	27/14066-70...	189,400	1/1,000 c.c. ...	Coliforms	Negative	.....	.....	.....	14
	Y	1	30-8-27	27/12831-5 ...	112,000	1/10 c.c.	Lactics	Negative	6592 6593	17-8-27	Negative	28
		2	14-10-27	27/14604-9 ...	640,000	1/100,000 c.c.	Coliforms	Negative	.....	.....	.....	22
	Z	1	23-8-27	27/12485-9 ...	18,000	1/1,000 c.c. ...	Staphylococci and coliforms.	Negative	6622 6623	23-8-27	Negative	17
		2	4-10-27	27/14138-43...	69,000	1/10 c.c.	Staphylococci	Negative. Few leucocytes.	.....	.....	.....	20
	A	1	25-8-27	27/12629-33...	128,000	1/100 c.c.	Staphylococci and coliforms.	Negative	6645 6646	24-8-27	Negative	27
		2	11-10-27	27/14448-58...	25,200	1/100 c.c.	Staphylococci and sporers.	Negative	.....	.....	.....	21
	B	1	11-10-27	27/14448-58...	3,160	1/10 c.c.	Staphylococci	Negative	6649 6650	24-8-27	Negative	19
	C	1	29-8-27	27/12788-90...	51,000	1 c.c.	Staphylococci	Negative	6658 6659	27-8-27	Negative	21
		2	11-10-27	27/14448-58...	27,240	None	Staphylococci	Negative	.....	.....	.....	18
K1	D	1	25-8-27	27/12629-33...	3,683,000	1/100 c.c.	Lactics and coliforms	Negative. Fair number of leucocytes and a few streptococci.	6643 6644	24-8-27	Negative	18
	E	1	25-8-27	27/12629-33...	248,000	1/10 c.c.	Staphylococci	Negative	6647 6648	24-8-27	Negative	30
		2	11-10-27	27/14448-58...	32,800	1/1,000 c.c. ...	Staphylococci and coliforms.	Negative	.....	.....	.....	30
	F	1	29-8-27	27/12788-90...	496,000	1 c.c.	Staphylococci	Negative	.....	30-8-27	Negative	38

TABLE showing Results of Examination of 220 Samples of Suburban Milk—*continued.*

File No. of District.	File No. of Dairy.	Sample No.	Date Sample Taken.	Laboratory Papers.	Total Colonies per c.c. (Agar Plate Count).	Lactose Fermenters: Acid and Gas present in Dilution.	Predominating Organisms.	Microscopical Examination, Concentration Method for T.B., &c.	Guinea-pig Inoculation for T.B.			No. of cows milked.
									Serial No. of Pig.	Date of Inoculation.	Result.	
M1	A	1	6-12-27	27/17153-4 ...	601,000	1/1,000 c.c. ...	Staphylococci	Negative	.....	5-12-27	Negative	80
	B	1	6-12-27	27/17153-4 ...	152,800	1/10,000 c.c....	Staphylococci	Negative. Fair number of leucocytes.	.....	5-12-27	Negative	12
R1	A	1	1-9-27	27/12939-42...	105,200	1/1,000 c.c. ...	Coliform	Negative	6565	8-8-27	Negative	8
		2	20-9-27	27/13625-9 ...	518,200	1/100,000 c.c.	Coliform	Negative	6566	.....	.....	8
	B	1	1-9-27	27/12939-42...	6,820	1 c.c.	Staphylococci	Negative	6567	8-8-27	Negative	15
		2	20-9-27	27/13625-9 ...	3,060	1/1,000 c.c. ...	Staphylococci	Negative	6568	.....	.....	15
	C	1	31-8-27	27/12911-2 ...	3,810,000	1/100 c.c.	Coliforms and lactics	Negative. Fair number of leucocytes and a few streptococci.	6577 6578	10-8-27	Negative	5
		2	14-9-27	27/13426-7 ...	137,500	1/10 c.c.	Staphylococci	Negative. A few streptococci.	.....	.....	.....	9
R2	A	1	14-12-27	27/17481-3 ...	3,200,000	1/10,000 c.c....	Staphylococci and B. zopfii.	Negative. Fair number of leucocytes and streptococci.	.....	12-12-27	Negative	70
		2	10-1-28	28/391-6	672,000	1/10,000 c.c....	Coliform	Negative. A few leucocytes.	.....	.....	.....	63
	B	1	7-11-27	27/15659-70...	592,000	1/100 c.c.	Lactics	Negative	.....	8-11-27	Negative	21
		2	7-11-27	27/15659-70...	183,000	1/100 c.c. ...	Staphylococci	Negative	.....	.....	.....	21
	C	1	10-1-28	28/391-6	706,000	1/10,000 c.c.	Staphylococci	Negative	.....	11-1-28	Negative	16
		2	17-1-28	28/793-8	356,000	1/100 c.c.	Staphylococci	Negative	.....	.....	.....	17
	D	1	7-11-27	27/15659-70...	1,200,000	1/10,000 c.c....	Coliform and B. zopfii	Negative. A few leucocytes.	.....	8-11-27	Negative	37
		2	10-1-28	28/391-6	10,600	1/10 c.c.	Staphylococci	" " ...	.....	.....	.....	35
	E	1	14-12-27	27/17481-3 ...	55,000	1/10,000 c.c....	Coliform	Negative	.....	16-12-27	Negative	22
		2	10-1-28	28/391-6	250,000	1/10 c.c.	Staphylococci	Negative	.....	.....	.....	23
	F	1	7-11-27	27/15659-70...	221,000	1/1,000 c.c. ...	Staphylococci and B. zopfii.	Negative. Fair number of leucocytes and streptococci.	.....	9-11-27	Negative	17
		2	7-11-27	27/15659-70	36,600	1/100 c.c.	Staphylococci	" " ...	.....	.....	.....	17
	G	1	7-11-27	27/15659-70...	240,000	1/1,000 c.c. ...	Staphylococci	Negative	.....	8-11-27	Negative	18
		2	7-11-27	27/15659-70...	792,000	1/100 c.c.	Staphylococci and B. zopfii.	Negative	.....	.....	.....	46
	H	1	10-1-28	28/391-6	30,800	1/1,000 c.c. ...	Staphylococci	Negative	.....	12-1-28	Negative	47
		2	17-1-28	28/793-8	12,400	1/10 c.c.	Staphylococci	Negative	.....	.....	.....	...
	J	1	11-11-27	27/15886-9 ...	648,000	1/10,000 c.c....	Coliform and B. zopfii	Negative. A few streptococci.	.....	14-11-27	Negative	45
		2	28-11-27	27/16715-7 ...	37,300	None	Staphylococci	Negative	.....	.....	.....	45
	K	1	7-11-27	27/15659-70...	3,824,000	1/1,000 c.c. ...	Staphylococci	Negative	.....	8-11-27	Negative.	29
	L	1	7-11-27	27/15659-70...	81,000	1/10,000 c.c....	Coliform	Negative	.....	8-11-27	Negative	46
		2	7-11-27	27/15659-70...	165,000	1/100,000 c.c.	Coliform and B. zopfii	Negative	.....	.....	.....	46
	M	1	17-1-28	28/793-8	18,700	1/100 c.c. ...	Staphylococci	Negative	.....	18-1-28	Negative	28
	N	1	11-11-27	27/15886-9 ...	50,000	1/10,000 c.c....	Coliform	Negative	.....	14-11-27	Negative	49
	O	1	7-11-27	27/15659-70...	16,500	1/100 c.c.	Staphylococci	Negative	.....	8-11-27	Negative	36
		2	10-1-28	28/391-6	15,000	1/100 c.c.	Staphylococci	Negative	.....	.....	.....	36
	P	1	11-11-27	27/15886-9 ...	19,000	1/1,000 c.c. ...	Staphylococci	Negative	.....	14-11-27	Negative	32
		2	28-11-27	27/16715-7 ...	10,800	1/100 c.c.	Staphylococci	Negative	.....	.....	.....	32
	Q	1	14-12-27	27/17481-3 ...	740,000	1/100,000 c.c.	Coliform	Negative	.....	16-12-27	Negative	70
		2	17-1-28	28/793-8	278,000	1/10 c.c.	Staphylococci	Negative	.....	.....	.....	10
	R	1	7-11-27	27/15659-70	810,000	1/10,000 c.c.	Coliform	Negative	.....	9-11-27	Negative	27
		2	17-1-28	28/793-8	161,000	1/10,000 c.c....	B. zopfii	Negative	.....	.....	.....	...
	S	1	17-1-28	28/793-8	244,000	1/10,000 c.c....	Staphylococci and Coliforms.	Negative	.....	19-1-28	Negative	16
	T	1	11-11-27	27/15886-9 ...	88,000	1/1,000 c.c. ...	Staphylococci	Negative	.....	14-11-27	Negative	28
		2	28-11-27	27/16715-7 ...	86,000	1/1,000 c.c. ...	Staphylococci	Negative	.....	.....	.....	28
W1	A	1	12-9-27	27/13307-12...	78,200	1/100 c.c.	Staphylococci	Negative	6670	5-9-27	Negative	40
		2	22-9-27	27/13788-91A	31,500	None	Staphylococci and B. zopfii.	Negative. A few leucocytes.	6671	.....	.....	64
	B	1	9-9-27	27/13284-6 ...	209,000	1/10,000 c.c....	Coliform	Negative. Fair number of leucocytes and streptococci.	6674-6679	6-9-27	Negative	414
		2	9-9-27	27/13284-6 ...	30,580	1/1,000 c.c. ...	Coliform	" " ...	.....	.....	.....	414
		3	9-9-27	27/13284-6 ...	29,280	1/1,000 c.c. ...	Coliform	" " ...	.....	.....	.....	414
		4	22-9-27	27/13788-91A	81,000	1/10,000 c.c....	Coliform	" " ...	.....	.....	.....	414
		5	22-9-27	27/13788-91A	1,040,000	1/1,000,000 c.c.	Coliform	" " ...	.....	.....	.....	414
	C	1	12-9-27	27/13307-12...	113,600	1/100 c.c.	Staphylococci	Negative	6672	5-9-27	Negative	23
		2	22-9-27	27/13788-91A	35,300	1 c.c.	Staphylococci	Negative	6673	.....	.....	24
	D	1	12-9-27	27/13307-12...	34,600	1/100 c.c.	Staphylococci	Negative	6666-6669	5-9-27	Negative	87
		2	22-9-27	27/13788-91A	131,200	1/1,000 c.c. ...	Coliform	Negative	.....	.....	.....	190
W2	A	1	1-9-27	27/12939-42...	28,840	1/10 c.c.	Staphylococci	Negative	6569-6572	8-8-27	Negative	40
		2	20-9-27	27/13625-9 ...	39,200	1/1,000 c.c. ...	Staphylococci	Negative	.....	.....	.....	40
	B	1	20-9-27	27/13625-9 ...	53,800	1/100,000 c.c.	Coliform	Negative. Fairly numerous pus cells and streptococci.	6579 6580	11-8-27	Negative	48
		2	21-10-27	27/14962-8 ...	2,176,000	1/100,000 c.c.	Coliform	" " ...	.....	.....	.....	50
	C	1	1-9-27	27/12939-42...	72,000	1 c.c.	Staphylococci	Negative	6573 6574	2-9-27	Negative	30
		2	20-9-27	27/13625-9 ...	24,600	1 c.c.	Staphylococci	Negative	.....	.....	.....	30

(B)—Bacterial Counts.

The Pure Food Act specifies that milk shall not contain more than 1,000,000 micro-organisms per cubic centimetre from October to April, inclusive; and not more than 500,000 during the five colder months—May, June, July, August, and September.

In the fifty dairies in the foregoing series where the bacterial counts exceeded 600,000, check counts were made on fresh samples after the dairy had been inspected and the dairyman advised as to any faulty methods. Notes of the conditions found on inspection and the bacterial content of a later sample are given below:—

Dairy A1–D. 28/9509.—10–5–1928.—Day dull; no appreciable breeze. Number of cows milked—28. Four milkers (hand), own family. Cows' udders said to be washed. Water supply convenient. Dairy buildings situate about 50 yards from road frontage. Road surface not made, and of a stony and sandy nature. Yard surroundings of dwelling somewhat untidy, old papers being littered about. Two cattle dogs at large, access to milking shed possible. Portion of cow-paddock of sandy nature, drainage from milking shed flowing therein. Sample of milk and pad from sediment tester taken.

Check count.—Total colonies per c.c.—60,000.

Dairy B1–F. 28/10528.—24–5–1928.—Showery weather, slight breeze. Number of cows milked—15. Hand milking, two milkers. Milking shed open to east. Yards on eastern side. Cows' udders to be clipped and regularly washed. Sample taken, 1·30 p.m. Delivered, 4·15 p.m.

Check count.—Total colonies per c.c.—84,000.

Dairy B1–K. 28/10762.—25–5–1928.—Wet weather. Number of cows milked—17. Hand milking, three milkers. These premises adjoin those of B1–Y, whose cow-yard is on western side. It is possible that during west winds, dust from B1–Y invades B1–K. A trade war between these parties makes it difficult to arrive at some arrangement satisfactory to all. This matter will receive further attention. Sample taken, 12 noon. Delivered, 3 p.m.

Check count.—Total colonies per c.c.—424,000.

Dairy B1–L. 28/10762.—28–5–1928.—Cloudy weather, rain overnight. Number of cows milked—6. Milking done by proprietress. Tidy shed. Sample taken, 2·45 p.m. Delivered, 4 p.m.

Check count.—Total colonies per c.c.—2,000.

Dairy B1–M. 28/10762.—28–5–1928.—Showery weather. Number of cows milked—2. Milking done by proprietors. Clean premises, surrounded by about 3 acres of grazed land. Sample taken, 11·15 a.m. Delivered, 4 p.m.

Check count.—Total colonies per c.c.—42,000.

Dairy B1–N. 28/10762.—28–5–1928.—Cloudy morning, fresh breeze, rain overnight. Number of cows milked—10. Hand milking, two milkers. Premises well laid out. More care to be exercised in milking. Sample taken, 2·30 p.m. Delivered, 4 p.m.

Check count.—Total colonies per c.c.—72,000.

Dairy B1–O. 28/10763.—25–5–1928.—Wet weather. Number of cows milked—15. Hand milking, two milkers. Premises well laid out. Sample taken, 2 p.m. Delivered, 3 p.m.

Check count.—Total colonies per c.c.—640,000.

Dairy B1–T. 28/10528.—24–5–1928.—Showery weather, no wind. Number of cows milked—16. Hand milking, two milkers. Cows' udders to be clipped, and all milk to be conveyed to milk-room immediately on being drawn from cows. Sample taken, 12·15 p.m. Delivered, 4·15 p.m.

Check count.—Total colonies per c.c.—107,000.

Dairy B1–U. 28/10762.—28–5–1928.—Cloudy weather, rain overnight. Number of cows milked—10. Hand milking, two milkers. Water supply from tanks and well. City water not available. Metal milk strainer out of repair, cloth being used temporarily. Sample taken, 1·15 p.m. Delivered, 4 p.m.

Check count.—Total colonies per c.c.—550,000.

Dairy B1–X. 28/10528.—24–5–1928.—Showery weather, no wind. Number of cows milked—31. Hand milking, three milkers. Milking shed open to north-west. Some horses fed in yard on open side. To be skated and yard swept. Milk not cooled or aerated before delivery. Sample taken, 1 p.m. Delivered, 4·15 p.m.

Check count.—Total colonies per c.c.—1,192,000.

Dairy B1–Y. 28/10763.—25–5–1928.—Wet weather. Number of cows milked—12. Hand milking, two milkers. More attention necessary in cleansing of cows' udders. New milk-room in course of construction. Sample taken, 11·30 a.m. Delivered, 3 p.m.

Check count.—Total colonies per c.c.—42,000.

Dairy B1–Z. 28/10762.—28–5–1928.—Cloudy morning, fresh breeze, rain overnight. Number of cows milked—10. Cows milked by proprietor. For some time cows had access to small waterhole on premises through broken fence. Now securely fenced off. Sample taken, 2 p.m. Delivered, 4 p.m.

Check count.—Total colonies per c.c.—126,000.

Dairy B2–F. 28/9653.—11–5–1928.—Dull morning, showery earlier. Number of cows milked—31. Hand milking, three milkers. Water supply convenient. Udders wiped with moist cloth prior to milking. (These dairy premises, on account of unsuitability of site, are to be closed during current year on expiration of lease.) Sediment tester used and pad taken. Sample taken, 12 noon. Delivered, 4 p.m.

Check count.—Total colonies per c.c.—112,000.

Dairy B2–G. 28/9653.—11–5–1928.—Cloudy morning, some rain earlier. Number of cows milked—45. Hand milking, three milkers. Milking shed open to the west, and cow-yard on western side. Water supply convenient and cows' udders said to be washed. Sample taken, 11·50 a.m. Delivered, 4 p.m.

Check count.—Total colonies per c.c.—128,000.

Dairy B3–B. 28/9509.—14–5–1928.—Cloudy morning, fresh breeze from west. Number of cows milked—99. Hand milking; udders washed. Well constructed and well kept premises, erected on sand hill. Milk pumped from milk-room to room above to be cooled, then flowing by gravitation to vat in milk-room. Conveyed from cooler to vat on return journey per medium of half piping (tin). Improvement can be effected here by use of full pipe. Sample and sediment tester used. Sample taken, 11·30 a.m. Delivered, 2 p.m.

Check count.—Total colonies per c.c.—2,880.

Milk is received at this dairy (B3–B) from two other dairies situated about 30 miles west of Sydney. Both these premises were inspected on 25 March, 1928, and reported on as follows:—

1. P.C. supplies milk to B3–B. The high count of lactics and coliforms would be due to the milk being old, which view is supported by the fact that it comes from a dairy situated on the main western road near Rooty Hill, and transported by motor about 30 miles.

The premises are well situated, drainage good, as is the layout, but on last personal inspection the construction was found to be defective.

Possibly this milk was the previous day's milking or it may have been held over by the retailer, B3–B.

Check count, 14–5–28.—Total colonies per c.c.—5,580,000.

2. A.M. This is also a country dairy situated some few miles further out in same direction. It is a well run dairy, and transport is also by motor.

The high Staphylococci count points to the milk being more recently drawn than that of P.C.

Check count of milk delivered to B3–B on 14 May, 1928.—Total colonies per c.c.—34,000.

Dairy C1–E. 28/10177.—21–5–1928.—Number of cows milked—11. Hand milking, two milkers. Sample taken from milk cart on roadside, 1·45 p.m. Delivered, 3·30 p.m.

Check counts.—18–5–28.—Total colonies per c.c.—19,000.

28–8–28.—Total colonies per c.c.—59,100.

Dairy C1–M. 28/10048. 21–5–1928.—Clear morning, slight breeze. Number of cows milked—54. Hand milking, three milkers. Premises well laid out. Water supply adequate. An additional milker is desirable at these premises, as it would ensure a more careful cleansing of cows' udders and underparts. Sample taken, 11·45 a.m. Delivered, 3·30 p.m.

Check count.—Total colonies per c.c.—896,000.

Dairy C1–Q. 28/10177.—21–5–1928.—Clear calm morning at time of sample. Number of cows milked—28. Hand milking, two milkers. Premises built during war time. Considerable quantity of second-hand material used. Premises, as a result, are not easy to keep clean. Sample taken, 12·30 p.m. Delivered, 3·30 p.m.

Check count.—Total colonies per c.c.—450,000.

Dairy C1–Y. 28/10177.—21–5–1928.—Number of cows milked—32. Hand milking, four milkers. Horse yard too near to milking shed. Yard surface surrounding milking shed and milk-room somewhat dusty—easily lifted in wind. Sample taken, 1·15 p.m. Delivered, 3·30 p.m.

Check count.—Total colonies per c.c.—39,000.

Dairy C1–CC. 28/10177.—21–5–1928.—Clear day, no wind. Number of cows milked—10. Milking done by family (mother and daughter). Dogs and fowls at large. Fowls in milking shed. Premises generally untidy. (This trader is ceasing business forthwith.) Sample taken, 2·15 p.m. Delivered, 3·30 p.m.

Check count.—Total colonies per c.c.—91,000.

Dairy C1–OO. 28/10300.—22–5–1928.—Clear morning, very slight breeze. Number of cows—25. Hand milking, three milkers. Well laid out premises. Milk to be taken to milk-room immediately on being drawn from cow.

Check count.—Total colonies per c.c.—8,800.

Dairy H1–F. 28/9653.—11–5–1928.—Dull day, showers earlier. Number of cows milked—40. Hand milking, three milkers. These premises are well laid out, and the high bacterial count from sample taken on 11 October, 1927, was a source of surprise. It was ascertained on enquiry that during the latter part of last year an employee was found to be very dirty in his methods of milking, and the dismissal that followed was prompt. Sediment tester used and pad taken. Sample taken, 1·30 p.m. Delivered, 4 p.m.

Check count.—Total colonies per c.c.—317,000.

Dairy H1–K. 28/10200.—22–5–1928.—Dull morning, very slight breeze. Number of cows milked—28. Hand milking, three milkers. The conveying of milk to milk-room immediately on being drawn from the cow will be an improvement at this dairy. Sample taken, 11 a.m. Delivered, 2·30 p.m.

Check count.—Total colonies per c.c.—258,000.

Dairy H1–U. 28/10048.—18–5–1928.—Number of cows milked—45. Hand milking, two milkers. Many of the cows' udders need clipping. This would help to prevent dust adhering when cattle are lying down. It would also facilitate washing of the udders. The proprietors promised to have this attended to immediately. Sample taken, 12·30 p.m. Delivered, 3 p.m.

Check count.—Total colonies per c.c.—88,000.

Dairy H1–W. 28/9970.—15–5–1928.—Cold west wind, dusty morning. Number of cows milked—34. Hand milking, two milkers. Udders said to be washed. Dairy premises about 300 yards from road frontage. Buildings well constructed. (This dairyman may be classed as one of the old school with certain fixed impressions re modern ideas. The use of Thomson's tester is likely, however, to be responsible for some hard thinking.) Sample taken, 12·30 p.m. Delivered, 3·45 p.m.

Check count.—Total colonies per c.c.—21,000.

Dairy H1–X. 28/10048.—18–5–1928.—Number of cows milked—11. Hand milking, two milkers. Small milking shed, open. Cow yards on western side. Sample taken, 1 p.m. Delivered, 3 p.m.

Check count.—Total colonies per c.c.—420,000.

Dairy K1–D. 28/9653.—11–5–1928.—Dull day, showers earlier. Number of cows milked—20. Hand milking, three milkers. These premises are situated between the roadway, Prince's Highway, and a large vegetable garden run by Chinese, where, of course, large quantities of stable manure are used. Flies are rather bad at this dairy during summer months, but the premises are well constructed and kept. Sediment tester used and pad taken. Sample taken, 1 p.m. Delivered, 4 p.m.

Check count.—Total colonies per c.c.—6,000.

Dairy R2—A. 28/9970.—15–5–1928.—Cold west wind, dusty morning. Number of cows milked—60. Hand milking, three milkers. Udders washed. Premises well laid out. Yard surface about milk-room and on western side of milking shed bricked, cow paddocks situated on east and southern sides—of sand. Sample taken, 11 a.m. Delivered, 3·45 p.m.

Check count.—Total colonies per c.c.—14,000.

Dairy R2–D. 28/9970.—15–5–1928.—Cold west wind, dusty morning. Number of cows milked—28. Hand milking, five milkers. Premises old, but well kept. Yard surface bricked. Cow paddocks of sand. Sample taken, 1 p.m. Delivered, 3·45 p.m.

Check count.—Total colonies per c.c.—11,000.

Dairy R2–K. 28/9970.—15–5–1928.—Number of cows milked—32. Hand milking, three milkers. These premises were found to be in an unsatisfactory condition. Fowls and pigeons had free access to, and were found in, milking shed. Surroundings of milking shed were insanitary (drainage and manure accumulations); milk-room contained old garments, &c., and floor was covered with dust. A prosecution under the Pure Food Acts ensuing. Sample taken, 1·30 p.m. Delivered, 3·45 p.m.

Check count.—Total colonies per c.c.—66,000.

Dairy W1—B. 28/9709.—10–5–1928.—Day dull, no appreciable breeze. Number of cows milked—450. Hand milking, fifteen milkers. Cows' udders washed in weak solution of Condy's crystals before milking, and first few jets of milk from each cow discarded. The milk room at this dairy is within few feet of Eprom-road, a thoroughfare that carries a great amount of traffic, principally motor. The road surface is macadamized, with tar covering, with sand along edges, and it is possible that dust from the roadway and from passing loads may invade the milk-room. Sample of bulk milk taken, and Thomson's sediment tester used, and pad taken.

Check count.—Total colonies per c.c.—250,000.

Dairy W2–B. 28/9653.—14–5–1928.—Number of cows milked—36. Hand milking, two milkers. Milking shed door open to west. Cows enter and leave shed through this door. Sample taken and sediment tester used 1 p.m. from cart in street. No milk remaining on dairy. Sample drawn from cows about 10 a.m. Sample delivered 2 p.m.

Check count.—Total colonies per c.c.—16,000.

2. EXAMINATION OF THE KEEPING QUALITIES AND THE BACTERIAL CONTENT OF MILK SUPPLIED BY LARGE DISTRIBUTING COMPANIES (COUNTRY MILK) 28/7183–5.

The systematic search for tubercle bacilli so far has been confined to suburban dairies, but the radius will be extended as rapidly as circumstances allow to include all milk reaching Sydney from country districts. Suburban milk was given precedence as country supplies are usually pasteurised before delivery, either at country depots or on arrival in the city.

The country milk is handled by the large distributing companies, and from time to time samples are collected for bacterial counts. A short series of tests made in December, 1927, of bottled milk as delivered to customers is included below.

Reports on tests of the bacterial content of "company" (country) milk are included in the Departmental annual reports for 1913 (p. 243), 1920 (p. 166), 1921 (p. 129), 1922 (p. 129, 134), and 1926 (p. 153).

In the present series, samples of bottled milks were purchased in the ordinary way from Company A (11 samples), B–C (12 samples), and D (12 samples), for the purpose of determining whether the milk would be fit for use after keeping for 24 hours at room temperature during summer months.

For the first two weeks the samples of milk were kept on a bench in the incubator room, where the room temperature would range from 80 deg. to 90 deg. F. and would correspond to the temperature of a hot summer day. During the third week the samples were kept in a cool room, and as it was a week of cool weather the temperature in the room would not have exceeded 80 deg. F.

A bacterial count was made by the plating method when the samples were received. All samples from Company D gave counts of under 100,000; two samples from Company B–C gave counts of over 100,000, and four samples from Company A gave counts of over 100,000—one of these counts was over 1,000,000. Bacteriologically, with one exception, all the samples were satisfactory and the majority (those under 100,000) good.

Only two of the 35 samples were fit for household use after 24 hours, the remainder being either clotted or sour. No improvement was noted when the samples were kept in the cooler room.

Detailed results are appended :—

TABLE giving Results of Examination of Bottled Milk for Keeping Qualities and Bacterial Count, December, 1927.

Sample No.	Date.	Company A. (11 samples.)	Company B–C. (12 samples.)	Company D. (12 samples.)
		Samples 1–8 inclusive. After plating the milks were kept in the incubation room (temperature 82·4 deg. Fahr.) until they coagulated.		
1	7–12–27	When received reaction slightly acid. 9 a.m. on 8–12–27 coagulated. Total colonies per c.c.—13,000. Predominant organism—Staphylococci. Lactose fermenters: acid and gas in 1/10 c.c.	When received reaction neutral. 4·30 p.m. fluid. 9 a.m. on 8–12–27 coagulated. Total colonies per c.c.—112,000. Predominant organisms—Staphylococci and Lactics. Lactose fermenters: acid and gas in 1/100 c.c.	When received reaction neutral. 4·30 p.m. fluid. 9 a.m. on 8–12–27 fluid. 3 p.m. coagulated. Total colonies per c.c.—30,400. Lactose fermenters: acid and gas in 1/1,000 c.c. Predominant organisms—Staphylococci and Lactics.
2	8–12–27	When received reaction neutral. 9 a.m. on 9–12–27 coagulated. Total colonies per c.c.—31,000. Predominant organism—Staphylococci. Lactose fermenters: acid and gas in 1/10 c.c.	When received reaction slightly acid. Total colonies per c.c.—6,500. Predominant organism—Staphylococci. Lactose fermenters: acid and gas in 1/100 c.c.	When received reaction neutral. 9–12–27 not coagulated, but sour. 10–12–27 coagulated. Total colonies per c.c.—5,900. Predominant organisms—Coliform and Staphylococci. Lactose fermenters: acid and gas in 1/100 c.c.
3	9–12–27	10–12–27 coagulated. Total colonies per c.c.—19,000. Predominant organism—B. zopfii. Lactose fermenters: acid and gas in 1/10 c.c.	When received reaction neutral. 10–12–27 coagulated. Total colonies per c.c.—6,900. Predominant organisms—Coliform and Staphylococci. Lactose fermenters: acid and gas in 1/100 c.c.	10–12–27 sour, but not coagulated. 12–12–27 coagulated. Total colonies per c.c.—11,430. Predominant organisms—Coliform and Staphylococci. Lactose fermenters: acid and gas in 1/10 c.c.
4	12–12–27	When received reaction slightly acid. 13–12–27 sour cheesy odour, but not coagulated. 12 noon coagulated. Total colonies per c.c.—1,440,000. Predominant organism—Coliform. Lactose fermenters: acid and gas in 1/1000 c.c.	When received reaction slightly acid. 9 a.m. on 13–12–27 coagulated. Total colonies per c.c.—3,400. Predominant organism—Coliform. Lactose fermenters: acid and gas in 1/1000 c.c.	When received reaction neutral. 9 a.m. on 13–12–27 sour smell, but not coagulated. 14–12–27, nasty sour smell, still fluid. 15–12–27 coagulated. Total colonies per c.c.—2,200. Predominant organism—Staphylococci. Lactose fermenters: acid and gas in 1/100 c.c.
5	13–12–27	When received reaction neutral or slightly acid. 14–12–27 sour and coagulated. Total colonies per c.c.—25,400. Predominant organism—Staphylococci. Lactose fermenters: acid and gas in 1/10 c.c.	When received reaction slightly acid. 14–12–27 sour and coagulated. Total colonies per c.c.—552,500. Predominant organism—Lactics. Lactose fermenters: acid and gas in 1/100 c.c.	When received reaction slightly acid. 14–12–27 sour, but not coagulated. 15–12–27, coagulated. Total colonies per c.c.—36,800. Predominant organism—Staphylococci. Lactose fermenters: acid and gas in 1/10 c.c.
6	14–12–27	When received reaction slightly acid. 15–12–27 coagulated. Total colonies per c.c.—432,000. Predominant organisms—Coliform and B. zopfii. Lactose fermenters: acid and gas in 1/10,000 c.c.	When received reaction slightly acid. 15–12–27 coagulated. Total colonies per c.c.—16,000. Predominant organism—Lactics. Lactose fermenters: acid and gas in 1/10 c.c.	When received reaction slightly acid. 15–12–27 sour smell, but not coagulated. 16–12–27 coagulated. Total colonies per c.c.—44,800. Predominant organisms—Coliform and Lactics. Lactose fermenters: acid and gas in 1/10,000 c.c.
7	15–12–27	When received reaction neutral. 16–12–27 coagulated. Total colonies per c.c.—20,800. Predominant organism—Coliform. Lactose fermenters: acid and gas in 1/10 c.c.	When received reaction slightly acid. 16–12–27 coagulated. Total colonies per c.c.—1,500. Predominant organism—Coliform. Lactose fermenters: acid and gas in 1/100 c.c.	When received reaction neutral. 16–12–27 sour, but not coagulated. Clotted 12·30 p.m. Total colonies per c.c.—5,400. Predominant organism—Coliform. Lactose fermenters: acid and gas in 1/100 c.c.
8	19–12–27	When received reaction slightly acid. 17–12–27 coagulated. Total colonies per c.c.—132,000. Predominant organism—Coliform. Lactose fermenters: acid and gas in 1/1,000 c.c.	When received reaction slightly acid. 17–12–27 coagulated. Total colonies per c.c.—27,000. Predominant organism—Coliform. Lactose fermenters: acid and gas in 1/10,000 c.c.	When received reaction slightly acid. 17–12–27 not coagulated. 19–12–27 coagulated. Total colonies per c.c.—410. Predominant organism—Staphylococci. Lactose fermenters: acid and gas in 1/10 c.c.
		Samples 9–12 inclusive. After plating the milks were kept at room temperature (75 deg. Fahr.) until coagulation occurred.		
9	19–12–27	When received reaction slightly acid. 20–12–27 coagulated. Total colonies per c.c.—12,400. Predominant organism—Staphylococci. Lactose fermenters: acid and gas in 1/100 c.c.	When received reaction slightly acid. 20–12–27 coagulated. Total colonies per c.c.—57,600. Predominant organisms—Staphylococci and Coliform. Lactose fermenters: acid and gas in 1/1000 c.c.	When received reaction neutral. 20–12–27 sour odour, but not coagulated. 21–12–27 sour odour, still fluid. 22–12–27 coagulated. Total colonies per c.c.—24,800. Predominant organisms—Coliform and Lactics. Lactose fermenters: acid and gas in 1/1000 c.c.
10	20–12–27	When received reaction neutral. 21–12–27 coagulated. Total colonies per c.c.—528,000. Predominant organism—Coliform. Lactose fermenters: acid and gas in 1/1,000 c.c.	When received reaction neutral. 21–12–27 coagulated. Total colonies per c.c.—11,133. Predominant organism—Lactics. Lactose fermenters: acid and gas in 1/1,000 c.c.	When received reaction neutral. 21–12–27 sour, but not coagulated. 22–12–27, 9 a.m. clotting. Total colonies per c.c.—2,600. Predominant organism—Staphylococci. Lactose fermenters: acid and gas in 1/10 c.c.
11	21–12–27	When received reaction neutral. 22–12–27 sour, but still fluid; 12 noon coagulated. Total colonies per c.c.—18,000. Predominant organism—Staphylococci. Lactose fermenters: acid and gas in 1/10 c.c.	When received reaction neutral. 22–12–27 sour, but not coagulated. 3 p.m. coagulated. Total colonies per c.c.—330. Predominant organism—Staphylococci. Lactose fermenters: acid and gas in 1 c.c.	When received reaction slightly acid. 22–12–27 sour, but not coagulated. 23–12–27 coagulated. Total colonies per c.c.—430. Predominant organism—Staphylococci. Lactose fermenters: acid and gas in 1/10 c.c.
12	22–12–27	.....	When received reaction neutral. 23–12–27 not coagulated at 9 a.m. Coagulated at 10 a.m. Total colonies per c.c.—740. Predominant organism—Coliform. Lactose fermenters: acid and gas in 1/100 c.c.	When received reaction neutral. 23–12–27 slightly sour, but not coagulated. 24–12–27 coagulated. Total colonies per c.c.—8,480. Predominant organism—Staphylococci. Lactose fermenters: acid and gas in 1/100 c.c.

4. LEPROSY-LIKE DISEASE IN SYDNEY RATS.

(E. L. Morgan).

Rat leprosy is a comparatively rare disease amongst the rats of Sydney. Between 1904 and 1912, five cases* were found by this Department amongst 146,708 rats examined (*vide* the Annual Report of the Director-General of Public Health for 1913, page 186).

From 1913 to 1927, 150,159 rats have been examined, and only two further cases (Rats 6 and 7, see details below) have been found. This gives a figure of seven infected rats in 306,867 examined, or an incidence ratio of approximately 1 in 40,000 rats, or, as all the infected rats are considered as *R. norvegicus*, a case incidence of approximately 1/17,000 for this species.

In the Report for 1913 the figure given was 1 case in 100,000 rats examined. It would appear, however, that in arriving at this estimate mice as well as rats were included, and the total also included rats destroyed prior to 1904. As the disease was first described in 1903, I have only taken into consideration the rats examined from the beginning of 1904 to the end of 1927.

In the Sydney metropolitan area rats are trapped throughout the year, and those examined by this Department can be regarded as a fair average sample. Particulars of the last two infected rats are as follow :—

Rat 6—*26th February*, 1926.—Shot at premises situated at 82 Pittwater-road, Manly (species not identified). In a note accompanying the specimen the Manly Health Inspector stated:—"This body gave off a most putrid stench, even while alive." On examination there was a large ulcer on the left shoulder extending from the middle line of the back to the leg. A smaller ulcer was present on the back opposite the right hind leg. Scanty hair was present on the surface of the ulcerated areas. No abnormality was noted in the internal organs ; the body, however, was badly decomposed. Smears from both ulcers showed the presence of numerous acid-fast bacilli.

Rat 7—*10th May*, 1927.—This rat was caught on the water front at Glebe Point and submitted for examination by the Health Inspector ; it was a three-quarter grown *Rattus norvegicus* ; there were three separate ulcerated areas on the skin—one on the left side of the abdomen slightly raised and circular, about 1½ inch in diameter, one on the left rump about ½-inch in diameter, and the third, an irregularly shaped ulcer on the right shoulder, about 1 inch in length and ½ inch in diameter. The surface of the lesions was practically hairless. The internal organs were normal. Smears from two of the lesions showed the presence of numerous acid-fast bacilli. Sections were cut from the abdominal lesion and showed the tumour to be composed of large polyhedral cells, some of which had large oval or irregular nuclei, while the majority had small round compact nuclei. The stroma consisted of strands of young fibrous tissue containing numerous blood vessels. Foci of necrosis and haemorrhage were scattered throughout the tissue. In sections stained by Ziehl Neilsen's method practically every cell contained enormous numbers of acid-fast bacilli, while further bacilli were lying free between the cells.

These two rats were from widely separated areas, Pittwater and Glebe Point being at least 10 miles apart, and separated from each other by Sydney Harbour.

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5. THE SEASONAL PREVALENCE OF HOUSE-FLIES IN SYDNEY, NEW SOUTH WALES—PRELIMINARY REPORT.

(I. M. Mackerras).

During the past twelve months an attempt has been made to construct a reasonably accurate graph showing the seasonal variation in numbers of house-flies (*Musca domestica*) in the Sydney district. It is hoped at a later stage to correlate this prevalence curve with meteorological and other physical factors, and with the prevalence of certain infectious diseases, in the epidemiology of which house-flies are believed to play an important part.

While the curve obtained is suggestive, it is highly desirable that its form and the influences affecting it should be confirmed by the results of several consecutive years' investigations before any but the most tentative inferences should be drawn. The present report is solely intended to present the data obtained for one year in sufficient detail to be of value to other workers who may pursue the subject.

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* Rat 1 (Sydney) 20/4/1904— Leprosy Report, 1904, p. 13.
,, 2 (Ultimo) 2/5/1910 } Report of Bureau of Microbiology, 1910–11, p. 49.
,, 3 (Sydney) 4/12/1911 }
,, 4 (Sydney) 11/1/1912 } Report of Director-General of Public Health, 1913, p. 186.
,, 5 (Sydney) 22/8/1912 }

Methods.

It was expedient that the technique should be as simple and inexpensive as possible and a preliminary investigation did not reveal any special merit from the point of view of the present investigation in the more elaborate types of fly-trap. Consequently the simple "tanglefoot" fly-papers, measuring 14 in. x 8 in. and having an effective adhesive surface of approximately 90 square inches, were used. For convenience of handling and transport, the papers were fastened in shallow boxes made of strong cardboard and measuring 14½ in. x 8½ in. x 1 in. The papers were fastened face to face, one to the top and the other to the bottom, in such a way that the boxes could be closed up without danger of the sheets adhering to one another and damaging the attached flies. The presence of the shallow sides of the box did not appear to affect adversely the attractiveness of the fly-paper.

Twelve observation centres were at first chosen, the number later being reduced to ten, and the Baby Health Centres attached to the Department of Public Health were selected as most suitable and convenient for the work. A box was issued to each of these centres each Monday and exposed for seven days, being collected for counting and replaced by a fresh box on the following Monday. Thus an area of approximately 180 square inches of attractive adhesive material of reasonably constant quality was exposed in each of ten fairly constant situations throughout the year.

Counts were made in the following districts:—Alexandria, Chippendale, Rose Bay, Burwood, Campsie, Mosman, Hornsby, St. Peters, Rockdale and Hurstville. Kogarah and North Sydney were at first also included, but it was later found convenient to reduce the number to ten. These centres were chosen that the observations might be distributed over a wide and representative area and to determine if possible, whether broad environmental differences had any influence on the local prevalence of house flies.

RESULTS.

Musca domestica L.

Observations were commenced on the 17th October, 1927, and weekly counts have been made without significant interruption to the present time. The presentation of this report has been delayed until a complete year's observations could be included, *i.e.*, until 15th October, 1928.

The total number of *M. domestica* counted during the twelve months was 38,654, made up as follows:—Alexandria, 1,454; Chippendale, 6,284; Rose Bay, 5,847; Burwood, 9,611; Campsie, 2,574; Mosman, 604; Hornsby, 1,075; St. Peters, 7,409; Rockdale, 3,199; Hurstville, 597.

There are considerable weekly variations in the graphs for the various centres and also in the total weekly flies from the various centres. There does not seem to be any close correlation between these variations, and it would appear probable that they are caused partly by the limited accuracy of the method and partly by actual local fluctuations in the number of *M. domestica* due to local environmental variations. It has, unfortunately, not been possible hitherto to keep accurate records of changes in the local environment.

Two sources of error must be considered. Firstly, the attractiveness of the trap varies according to the number of flies adherent to it, being least attractive when first exposed and becoming more and more attractive as flies are captured until it is fairly crowded, when its effectiveness decreases. This would, probably only to a slight degree, adversely affect the number of flies recorded from those localities in which flies are either very scanty or very numerous. In the second place, a variation in the flies recorded from a single station where they are numerous will produce a marked alteration in the total for the ten stations, perhaps completely obscuring a minor trend which may be shown by several other stations.

The total count, however, is large and the general trend of the graph is rather striking, particularly the curve of the monthly averages. The results are certainly sufficiently encouraging to warrant further investigation.

Fannia canicularis L.

Records of this species were also kept and the results of these are shown in the last column of the tables and in the graphs. The numbers were always much smaller than those of *M. domestica* and it was not considered worth while to prepare curves for individual centres. A definite rise was observed in autumn and a greater rise in spring; for the rest of the year this species was distinctly scanty, though a few were always taken.

Other Insects.

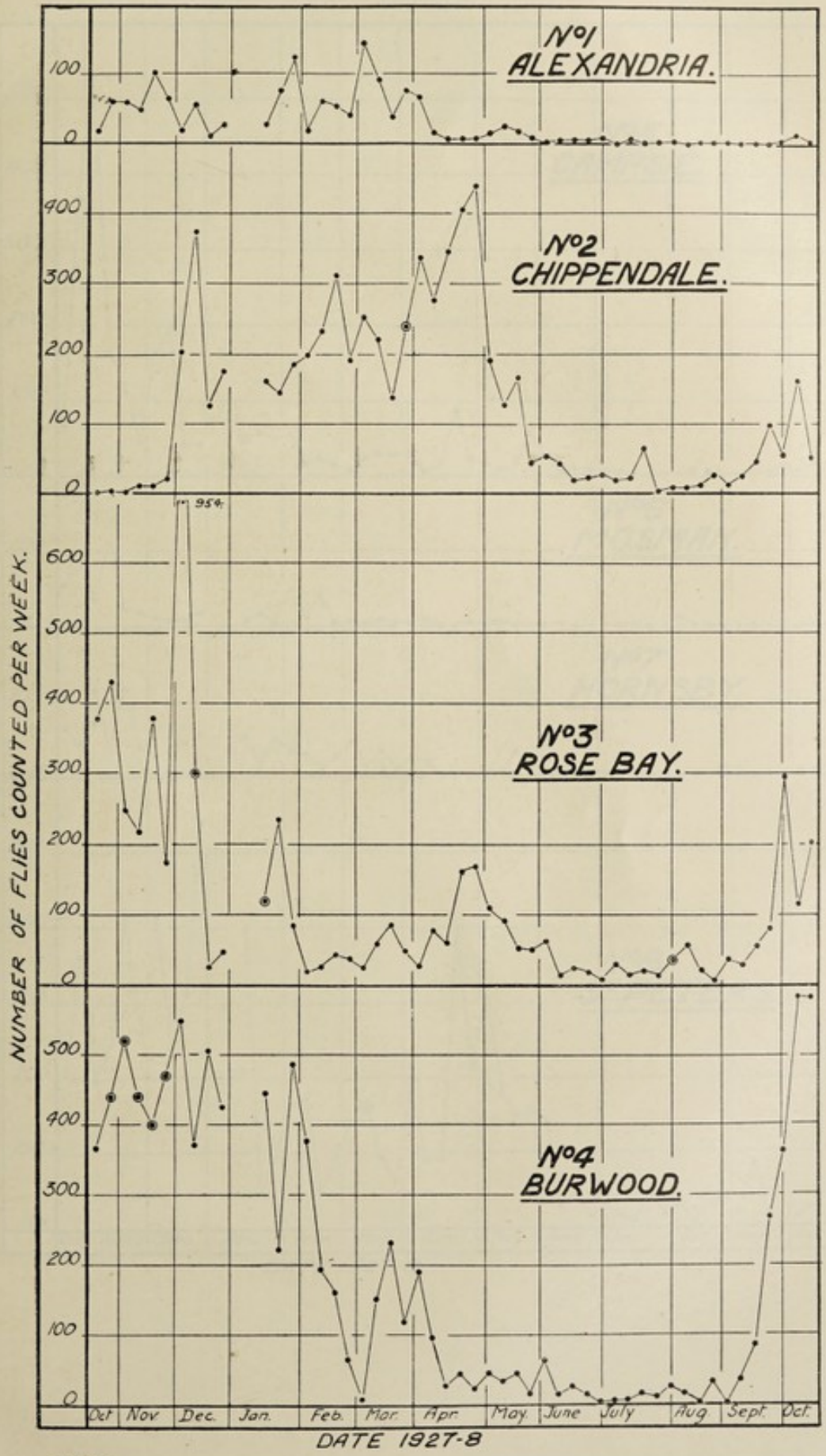
Apart from *M. domestica* and *F. canicularis*, other insects were more or less frequently found on the traps, but none of these occurred in sufficient numbers or sufficiently constantly to be worth counting. A list of the species found is, however, not without interest.

Diptera:—Musca domestica, Fannia canicularis, Muscina stabulans, Helina regina, Calliphora stygia, C. augur, C ? tibialis, C. erythrocephala, C. ochracea, Lucilia sericata, Chrysomyia (2 sps.), *Phoridæ* (2 sps.), Acalyptrate Muscoids (several species), *Neoexaireta spinigera*, Empididæ (1 sp.), *Anopheles annulipes* (1 ♀, Carlton, 26th April, 1928; 1 ♀, Chippendale, 24th September, 1928), *Culex fatigans* (males and females from several localities from November to 5th June), *Aedes* (*Ochlerotatus vigilax* (1 ♀, Burwood, 13th February, 1928). *Chironomidæ, Psychodidæ, Tipulidæ, Cecidomyiidæ* (one or two species of each).

Other insects comprised termites, several undetermined moths, cockroaches, and a few species of Coleoptera, including one large Clerid.

A few spiders were also taken, principally jumping spiders of the family Saltidæ.

GRAPHS SHOWING PREVALENCE OF HOUSE FLIES IN THE SYDNEY DISTRICT.



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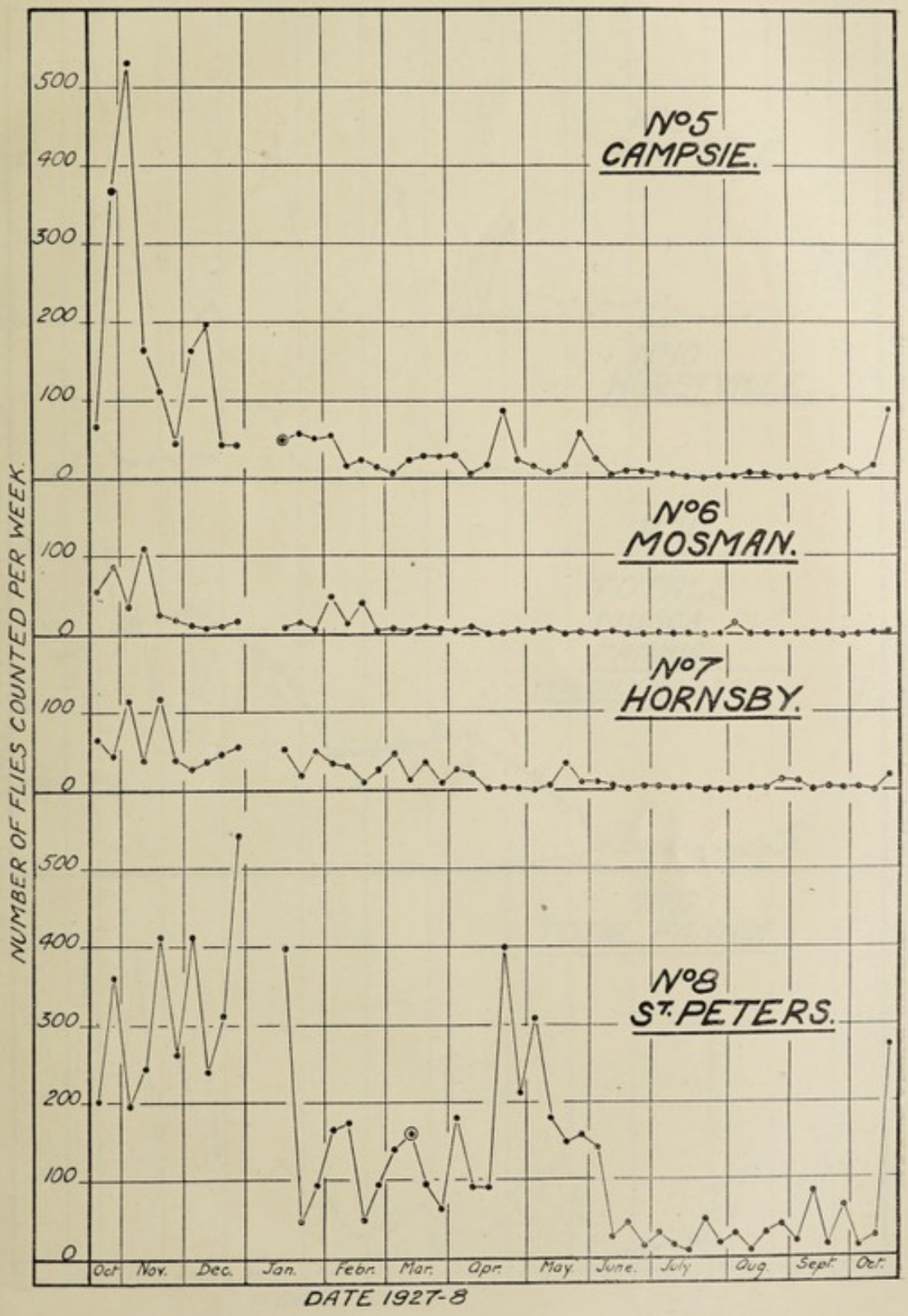
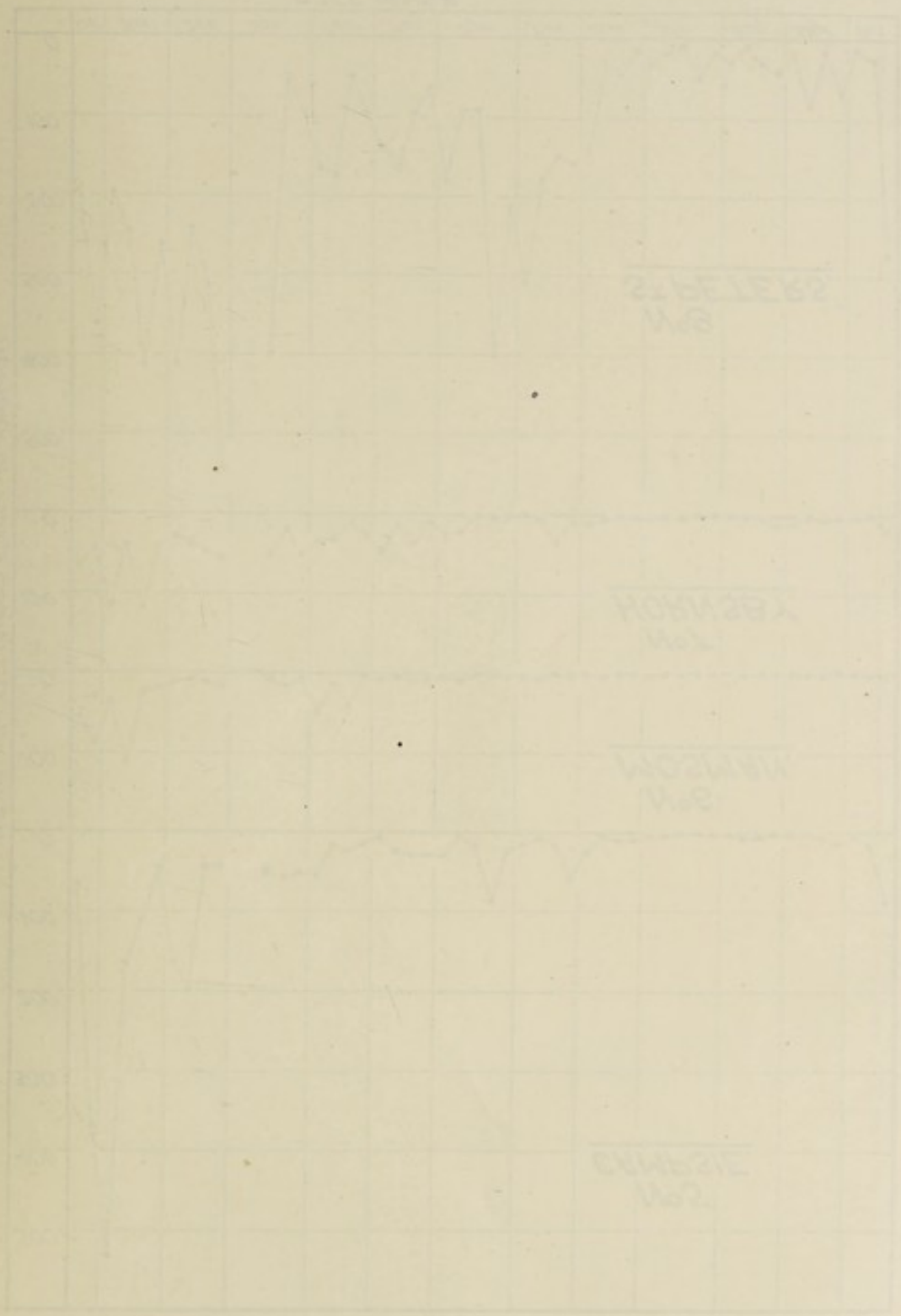
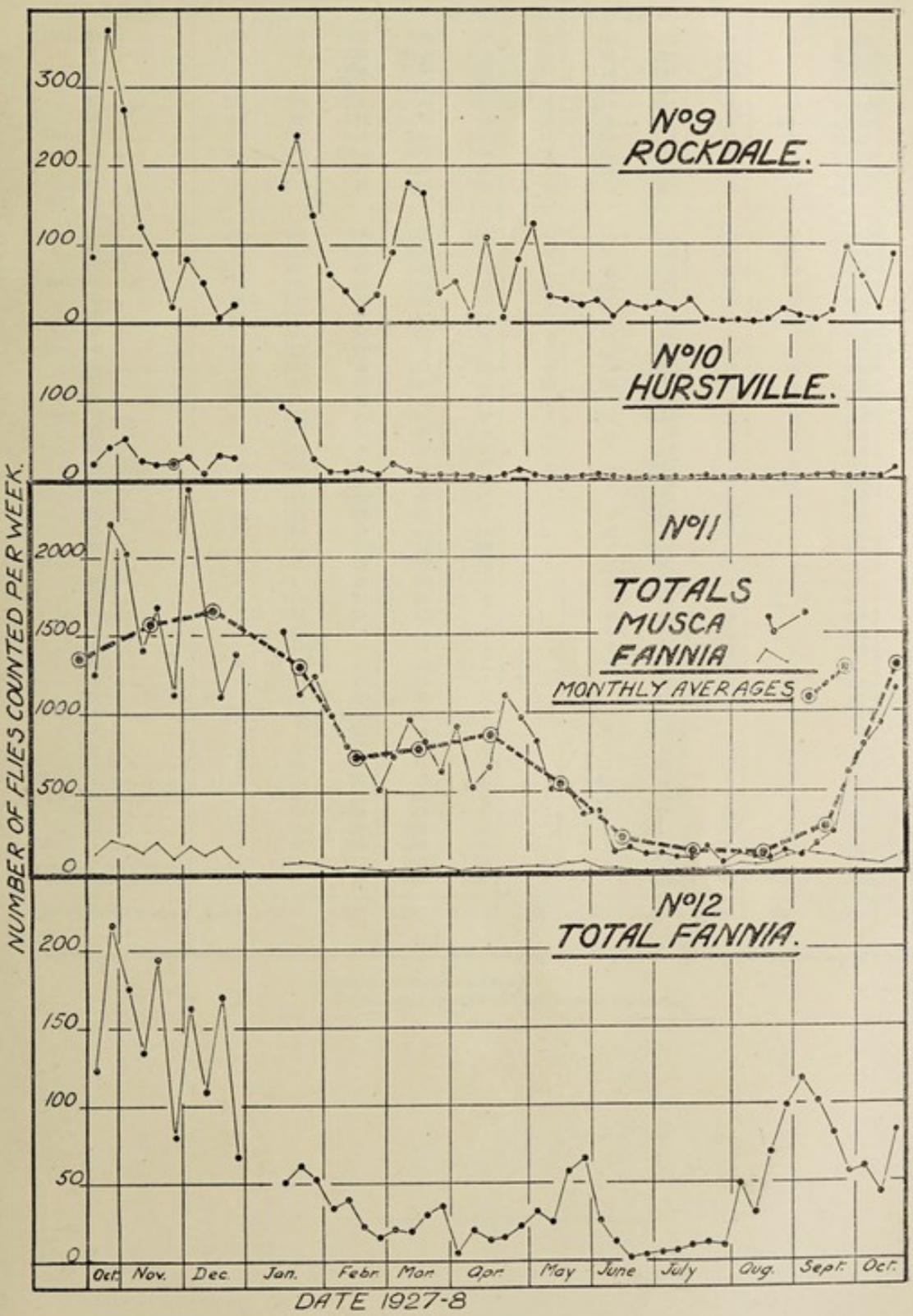
GRAPHS SHOWING PREVALENCE OF HOUSE FLIES IN THE SYDNEY DISTRICT.





GRAPHS SHOWING PREVALENCE OF HOUSE FLIES IN THE SYDNEY DISTRICT.



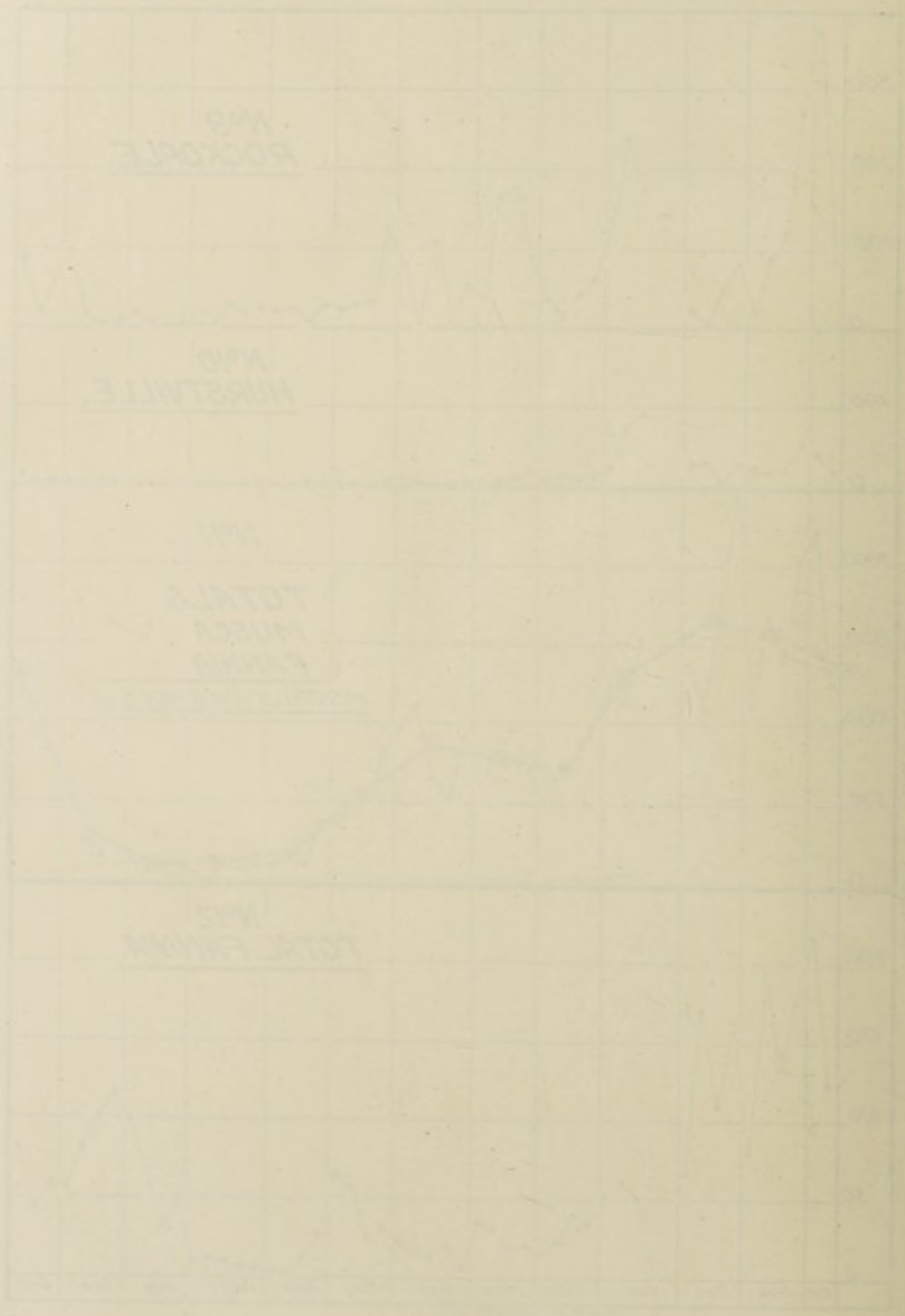


Table showing Weekly Counts of House Flies trapped in the Sydney District, 17th October, 1927, to 17th October, 1928.

Flies for week ending—	Alexandria.	Chippendale.	Rose Bay.	Burwood.	Campsie.	Mosman.	Hornsby.	St. Peters.	Rockdale.	Hurstville.	Total—Musca.	Total—Fannia.
Oct. 24	19	1	378	367	68	55	65	202	85	20	1,260	123
,, 31	61	2	429	(440)	368	88	43	361	373	41	2,206*	216
Nov. 7	60	1	248	(520)	531	34	114	197	270	52	2,027*	175
,, 14	49	10	215	(440)	165	110	38	244	122	23	1,416*	134
,, 21	102	10	387	(400)	111	26	118	414	89	19	1,676*	194
,, 28	64	20	173	(470)	44	19	38	262	20	(20)	1,130*	80
Dec. 5	19	202	954	548	164	11	26	412	81	28	2,445	163
,, 12	56	374	(300)	371	198	8	36	240	50	8	1,641*	108
,, 19	10	126	25	506	43	10	46	314	5	30	1,115	169
,, 26	27	175	47	425	42	18	55	542	22	27	1,380	67
Jan. 2	...	...	...	...	...	...	...	...	...	...	...	...
,, 9	...	...	...	...	...	...	...	...	...	...	...	...
,, 16	27	161	(120)	446	(50)	9	51	399	171	92	1,526*	51
,, 23	77	144	234	221	58	16	18	48	237	75	1,128	62
,, 30	126	185	83	487	51	6	49	95	136	26	1,244	53
Feb. 6	18	198	18	378	55	49	32	166	60	8	982	34
,, 13	61	232	25	194	16	14	30	175	39	7	793	40
,, 20	56	312	42	161	23	40	10	49	15	12	720	22
,, 27	41	191	38	66	14	5	26	96	34	5	516	15
Mar. 5	145	252	22	9	7	7	45	140	89	17	733	20
,, 12	91	220	59	152	23	6	12	(160)	177	10	910*	18
,, 19	38	138	86	231	29	10	33	95	164	4	828	29
,, 26	77	(240)	48	119	27	6	8	62	38	4	629*	35
Apr. 2	67	337	27	191	30	4	25	180	51	4	916	5
,, 9	15	277	78	97	6	9	20	91	7	3	603	19
,, 16	7	345	60	28	18	1	2	91	107	1	660	13
,, 23	8	405	161	45	87	1	2	400	5	5	1,119	15
,, 30	7	440	168	23	24	6	2	212	80	11	973	22
May 7	13	191	110	45	17	3	...	309	126	5	819	31
,, 14	24	128	91	33	8	5	6	180	33	1	509	24
,, 21	19	164	52	45	16	...	32	148	29	1	506	57
,, 28	9	42	50	14	59	2	9	159	21	3	368	65
June 4	2	52	62	62	26	2	10	141	27	4	388	25
,, 11	2	41	12	16	5	3	5	27	8	2	121	12
,, 18	4	18	23	25	9	...	1	46	24	...	150	2
,, 25	5	21	17	13	9	...	4	14	18	1	102	3
July 2	7	26	8	3	6	1	4	31	23	...	109	5
,, 9	...	19	28	4	6	...	2	15	17	1	92	6
,, 16	6	21	12	5	2	...	4	9	28	...	87	9
,, 23	1	65	18	14	1	...	...	48	3	2	152	12
,, 30	1	4	12	10	3	...	...	19	3	...	52	9
Aug. 6	2	9	(35)	25	3	13	...	30	2	...	119*	49
,, 13	...	8	56	14	6	...	2	8	...	...	94	30
,, 20	3	12	20	2	5	...	2	31	3	1	79	69
,, 27	2	26	6	31	2	...	11	41	17	2	138	98
Sept. 3	2	12	37	3	2	...	10	20	9	...	95	116
,, 10	...	15	28	34	1	1	1	86	3	2	171	101
,, 17	2	45	55	85	7	1	3	25	15	3	241	81
,, 24	1	99	79	268	14	...	2	65	97	1	626	66
Oct. 1	4	56	295	362	6	...	4	12	58	4	801	58
,, 8	14	161	115	582	19	1	...	24	19	...	935	43
,, 15	3	51	201	581	90	4	19	274	89	12	1,324	82
Totals for 12 months	1,454	6,284	5,847	9,611	2,574	604	1,075	7,409	3,199	597	38,654	2,935

( ) Numbers in brackets estimated.

* Totals marked by an asterisk contain estimated numbers.

6. *Amendments to the International Rules of Zoological Nomenclature.**

Upon unanimous recommendation by the International Commission on Zoological Nomenclature, the International Zoological Congress which met at Budapest, Hungary, September 4–9, 1927, adopted a very important amendment to Article 25 (Law of Priority) which makes this Article, as amended, read as follows (the italic part represents the amendment ; the part not in italic represents the old wording) :—

ARTICLE 25. The valid name of a genus or species can be only that name under which it was first designated on the condition—

(*a*) That (*prior to January* 1, 1931) this name was published and accompanied by an indication, or a definition, or a description ; and

(*b*) That the author has applied the principles of binary nomenclature.

(*c*) *But no generic name or specific name published after December* 31, 1930, *shall have any status of availability (hence also, of validity) under the rules, unless and until it is published either—*

(1) *With a summary of characters (seu diagnosis ; seu definition ; seu condensed description) which differentiate or distinguish the genus or the species from other genera or species ;*

(2) *Or with a definite bibliographic reference to such summary of characters (seu diagnosis ; seu definition ; seu condensed description). And further—*

(3) *In the case of a generic name, with the definite unambiguous designation of the type species (seu genotype ; seu autogenotype ; seu orthotype).*

The purpose of this amendment is to inhibit two of the most important factors which heretofore have produced confusion in scientific names. The date, January 1, 1931, was selected (instead of making the amendment immediately effective) in order to give authors ample opportunity to accommodate themselves to the new rule.

The commission unanimously adopted the following resolution :—

(*a*) It is requested that an author who publishes a name as new shall definitely state that it is new, that this be stated in only one (i.e., in the first) publication, and that the date of publication be not added to the name in its first publication.

(*b*) It is requested that an author who *quotes* a generic name, or a specific name, or a subspecific name shall add at least once the author and year of publication of the quoted name or a full bibliographic reference.

The foregoing resolution was adopted in order to inhibit the confusion which has frequently resulted from the fact that authors have occasionally published a given name as " new " in two to five or more different articles of different dates—up to five years in exceptional cases.

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* Reprinted from the Public Health Reports, United States Public Health Service (1927), Vol. 42, p. 2639, in which publication it is requested that the matter be given as wide publicity as possible.

[18 Plates.]

Sydney : Alfred James Kent, Government Printer—1928.