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SECTION XXX.

PUBLIC HYGIENE.

§ 1. Introduction.

1. **General.**—Though the safeguarding of the public health as an organised department of governmental activity is of comparatively modern growth, few branches of administration have expanded more rapidly than the one relating to that subject. The loss of potential wealth incurred through preventable diseases and deaths is of grave concern to the nation, and is a matter which has received an increased amount of attention during the last few years both from the Commonwealth and State Governments, and from the Health and other authorities in Australia. Numerous Acts of Parliament have been passed dealing with various aspects of the subject of public hygiene.

§ 2. The Public Health Acts.

1. **General.**—The most important statutes relating generally to the subject of public hygiene are the Commonwealth Quarantine Act and the Health Acts which have been passed in each State. The general trend of public health legislation has been referred to in previous issues of the Official Year-Book (see No. 12, pp. 1050–1).

2. **Commonwealth.**—The Commonwealth Department of Health, which was created on the 3rd March, 1921, and commenced its administration as from the 7th March, 1921, is controlled by the Commonwealth Minister of Health. The Department of Health was formed by the extension and development of the Commonwealth Quarantine Service, the Director of Quarantine becoming the Commonwealth Director-General of Health and Permanent Head of the Department.

The functions of the Department of Health are defined by an Order-in-Council gazetted on the 3rd March, 1921, as follows:—

The administration of the Quarantine Act.
The investigation of causes of disease and death and the establishment and control of laboratories for this purpose. The control of the Commonwealth Serum Laboratories and the commercial distribution of the products manufactured in those laboratories.
The methods of prevention of disease.
The collection of sanitary data, and the investigation of all factors affecting health in industries.
The education of the public in matters of public health.
The administration of any subsidy made by the Commonwealth with the object of assisting any effort made by any State Government or public authority directed towards the eradication, prevention, or control of any disease.
The conducting of campaigns of prevention of disease in which more than one State is interested.
The administrative control of the Australian Institute of Tropical Medicine.
The administrative control of infectious disease amongst discharged members of the Australian Imperial Forces.
Generally to inspire and co-ordinate public health measures.
Any other functions which may be assigned to it.

As a result of the creation of this Department, the Australian Institute of Tropical Medicine at Townsville, and the campaign in connexion with hookworm disease, are now under the control of the Commonwealth Department of Health. The organisation of the Department in respect of other functions is proceeding.

3. **New South Wales.**—The Department of Public Health is controlled by the Minister of Public Health. The Director-General of Public Health is the chief executive officer, and is assisted by various staffs—medical, bacteriological, chemical, veterinary, dairy inspection, meat inspection, sanitary, pure food, and clerical. Briefly put, the work of the Department extends over the whole of the State, and embraces all matters relating to public health and the general medical work of the Government, the Director-General of Public Health holding the position of Chief Medical Officer of the Government as well as being permanent head of the Department.

The Board of Health has certain statutory duties imposed upon it by various Acts of Parliament, and the Director-General is President of the Board. These duties consist largely in supervision of the work of local authorities (Municipal and Shire Councils), so far as that work touches upon public health matters connected with the following Acts :— Public Health Act 1902, Public Health (Amendment) Acts 1915 and 1921, Dairies Supervision Act 1901, Noxious Trades Act 1902, Cattle Slaughtering and Diseased Animals and Meat Act 1902, Pure Food Act 1908, and Private Hospitals Act 1908. The Board further possesses certain powers connected with public health matters under the Local Government Act 1919. The Board of Health is a nominee Board, created in 1881 and incorporated in 1894.

The Director-General of Public Health acts independently of the Board of Health as regards the State hospitals and asylums, and the various public hospitals throughout the State which receive subsidies from the Government.

4. **Victoria.**—In this State the Public Health Acts are administered by a Commission composed of the Chief Health Officer and six members appointed by the Governor-in-Council. The medical and sanitary staffs of the Commission consist of (*a*) the chief health officer, who is also chairman, (*b*) six district health officers and three assistant health officers, (*c*) chief sanitary engineer and assistant sanitary engineer, three building surveyors and four building inspectors, and (*d*) ten health inspectors. The main function of the Commission is to enforce the execution of the Health Acts by the local municipalities, but it has been found advisable to supplement this supervisory function by an active policy of inspection as to the sanitary condition of various districts, and the sampling of articles of food. The supervision of the sanitary condition of milk production is under the Dairy Supervision Branch of the Department of Agriculture, but distribution is supervised by the Commission. Acts administered by the Department of Public Health are :—The Health Acts, in which are now included the Adulteration of Wine Act, the Pure Food Act, the Meat Supervision Act, and the Cemeteries Act, in which is now included the Cremation Act. The Department administers also the Midwives Act, the Goods Act, and the Venereal Diseases Act. Under the last-mentioned Act it has been made compulsory for all persons affected with venereal disease to place themselves under the care of a duly qualified medical practitioner. Persons other than medical practitioners are prohibited from treating these diseases, or from supplying drugs or medicines. Registered pharmaceutical chemists may, however, dispense prescriptions to patients of medical practitioners. The Act contains various sections—with appended penalties for contravention—designed to check the spread of venereal diseases. A special clinic for the treatment of infected persons was opened in Melbourne in June, 1918. Between 17th June, 1918, and 31st December, 1921, 9,143 cases were treated, attendances numbering 287,985. It may be mentioned that the Act provides a heavy penalty in the event of the failure of a medical practitioner to notify cases of these diseases.

5. **Queensland.**—The Public Health Acts 1900 to 1917 are administered by the Commissioner of Public Health under the Home Secretary. The executive staff of the Department includes a health officer, a medical officer for the tuberculosis bureau, two

medical officers for enthetic diseases, fourteen food and sanitary inspectors, one staff nurse, in addition to rat squads in Brisbane. Northern offices, in charge of inspectors, are located at Rockhampton, Townsville, and Cairns, whilst another inspector is stationed at Toowoomba. A laboratory of micro-biology and pathology, in charge of a medical director, is controlled by the Department, and performs a wide range of micro-biological work for the assistance of medical practitioners and the Department.

One function of the Department is to stimulate and advise local sanitary authorities on matters pertaining to the Health Acts, and, where necessary, to rectify or compel rectification, at the cost of the local authority, of sanitary evils produced by local inefficiency or apathy. Its powers and responsibilities were widely increased by the Amending Acts of 1911, 1914, and 1917.

Under statutory powers a scheme is in operation for dealing with venereal disease throughout the State. It includes compulsory notification, free treatment, and the free supply of salvarsan and allied remedies at all public hospitals. Compulsory segregation of venereally infective persons of either sex may be effected on occasion.

6. **South Australia.**—The Central Board of Health in South Australia consists of five members, three of whom (including the chairman, who is permanent head of the Department) are appointed by the Governor, while one each is elected by the city and suburban local Boards and the country local Boards. The Health Act 1898 provides that the municipal and district councils are to act as local Boards of Health for their respective districts. There are 183 of these local Boards under the general control and supervision of the Central Board. A chief inspector and two inspectors under the Health and Food and Drugs Acts periodically visit the local districts, and see generally that the Boards are carrying out their duties. There is also a chief inspector of food and drugs (under the Food and Drugs Act 1908), who, in company with an analyst, visits country districts, and takes samples of milk, which are analysed on the spot. There are two nurse inspectors employed in advising and assisting local Boards in connexion with outbreaks of infectious diseases. In the outlying districts there are fifteen inspectors directly responsible to the Board.

7. **Western Australia.**—The legislation in this State is the Health Act 1911, with the amending Acts of 1912 (2), 1915, 1918, and 1919, which have been partly consolidated and reprinted as "The Health Act 1911-19." The central authority is the Department of Public Health, controlled by a Commissioner, who must be a qualified medical practitioner. The local authorities comprise :—(*a*) Municipal Councils, (*b*) Road Boards where the boundaries of a Health District are conterminous with those of a Road District, and (*c*) Local Boards of Health, composed of persons appointed by the Governor for a certain period. These Local Boards are only utilized where neither Municipal Councils nor Road Boards are available. Generally speaking, the Act is administered by the local authorities, but the Commissioner has supervisory powers, also power to compel local authorities to carry out the provisions of the Act. In cases of emergency the Commissioner may exercise all the powers of a local health authority in any part of the State.

All the usual provisions for public health legislation are contained in the Act, and, in addition, provision is made for the registration of midwifery nurses, the medical examination of school children, the control of public buildings (*i.e.*, theatres, halls, etc.), the control of food, and the provision of standards therefor.

The amending Act of 1915 deals exclusively with venereal diseases. The main features are :—(1) that none but qualified medical practitioners shall treat these diseases; (2) that all patients shall promptly place themselves under skilled treatment; and (3) that advertisements of medicines and appliances for the treatment of these diseases, of sexual infirmities, etc., shall no longer be published. For the carrying out of these objects the Act provides *inter alia* :—(*a*) For the notification (without name and address) of cases to the Commissioner of Public Health; (*b*) for the notification to the Commissioner of patients who discontinue treatment before receiving a certificate of

cure; (*c*) for the exercise by the Commissioner, in certain circumstances, of compulsory powers against persons who neglect treatment; (*d*) for the provision of free treatment at hospitals, and at the hands of salaried or subsidised medical practitioners.

A penalty of £50, or imprisonment with hard labour for six months, is provided for any person who knowingly infects any other with any venereal disease, or does anything likely to lead to that result.

The 1918 amending Act includes important amendments to that part of the principal Act dealing with venereal diseases. The general principles remain unaltered, but details are much improved.

8. **Tasmania.**—Under the Director of Public Health Act 1920, the office of Director of Public Health is established, and the person holding the office of Chief Health Officer under the Public Health Act 1903 at the time of the passing of the first-named Act is the Director of Public Health, and is also the Permanent Head of the Department. This officer is charged with very wide functions and powers, and in the event of the appearance of dangerous infectious disease (small-pox, plague, etc.) in the State, is vested with supreme power, the entire responsibility of dealing with such an outbreak being taken over by him from the local authorities. Local executive is vested in local authorities, who possess all legal requirements for the efficient sanitary regulation of their districts. Controlling and supervisory powers over these bodies are possessed by the Department of Public Health, whereby many of the powers conferred upon them may be converted into positive duties. One function of the Department is to advise local authorities on matters pertaining to the Health Act, and, where necessary, to rectify sanitary evils produced by local inefficiency or apathy. The Department has four full-time inspectors, who assist and instruct the local sanitary inspectors, but full-time district health officers are not provided for. The number of local authorities under the Public Health Act has been reduced to forty-nine since the Local Government Act 1906 came into force. All parts of Tasmania are now furnished with the administrative machinery for local sanitary government.

The Public Health Act 1917 deals with venereal diseases. Medical practitioners are required to report persons suffering from such diseases. Such notification, however, does not disclose the names or addresses of the patients, this information being given to the Department by medical practitioners only if patients fail to consult or attend for a period of six weeks.

Regulations under the Public Health Act 1903, as amended, for checking or preventing the spread of any infectious disease, came into force in February, 1918.

The Places of Public Entertainment Act 1917 is administered by the Director of Public Health under the Minister. This Act provides, *inter alia*, for the licensing and regulation of places of public entertainment, for the appointment of a censor or censors of moving pictures and for the licensing of cinematograph operators. Comprehensive regulations have been framed under the Act. Inspectors under the Public Health Act 1905 are Inspectors of Places of Public Entertainment under this Act.

§ 3. Inspection and Sale of Food and Drugs.

1. **Introduction.**—The importance of securing a pure and wholesome supply of food and drugs is recognised by both the Commonwealth and State Parliaments. Under the Acts referred to later, and the regulations made thereunder, the importation of articles used for food or drink, of medicines, and of other goods enumerated, is prohibited, as also is the export of certain specified articles, unless there is applied to the goods a "trade description" in accordance with the Act. Provision is made for the inspection of all prescribed goods which are imported or which are entered for export.

2. **Commonwealth Jurisdiction.**—Under Section 51 (i) of the Commonwealth Constitution Act 1900, the Commonwealth Parliament has power to make laws with respect to trade and commerce with other countries and among the States. By virtue of that power, the Commerce (Trade Descriptions) Act 1905, and the Customs Act 1910, to which reference has already been made in another part of this book (see pp. 457, 458), were passed.

3. **State Jurisdiction.**—The inspection and sale of food and drugs is also dealt with in each State, either under the Health Acts or under Pure Food Acts. There is, in addition, in the several States, a number of Acts dealing with special matters, such as the adulteration of wine and the supervision of meat. The supply and sale of milk are also subject to special regulations or to the provisions of special Acts. A brief statement of the general objects of these Acts appeared in previous issues of the Year Book (see No. 12, p. 1054).

4. **Food and Drug Standardisation.**—Conferences with the object of securing uniformity in these matters were held in Sydney in 1910, and in Melbourne in 1913. The resolutions of the latter conference were submitted to the Premiers' Conference held in Melbourne in March, 1914, and in conformity with the determinations arrived at, each State issued regulations which have had the effect of ensuring uniformity throughout the Commonwealth.

5. **The Sale and Custody of Poisons.**—In Victoria, New South Wales, Western Australia, and Tasmania, the enactments for regulating the sale and use of poisons are administered by the Pharmacy Boards in the respective States. In South Australia, the sale of poisons is provided for by regulations under "The Food and Drugs Act 1908," administered by the Central Board of Health. In Queensland, the sale of poisons is under the control of the Health Department.

In New South Wales and Tasmania the Government subsidises the Pharmacy Board, in order to enable it to carry out the provisions of the Poisons Act. The subsidy to the Victorian Board was withdrawn in March, 1921, provision having been made for the payment of a 10s. licence fee under the Poisons Act 1920.

No persons, other than legally qualified medical practitioners and registered pharmaceutical chemists, are permitted to sell poisons without special licence from the bodies administering the legislation in the respective States. These licences are issued to persons in business distant from four to five miles from a registered chemist, on production of certificates from medical practitioners, police, or special magistrates or justices as to the applicant's character and fitness to deal in poisons. Annual licence fees, ranging from 5s. to 40s., are charged in the several States. By a new regulation, made in New South Wales on 17th December, 1920, provision is made for an annual licence fee of 10s. 6d. Prior to this the Pharmacy Board issued licences free of charge. New poisons regulations were approved in Queensland on 1st April, 1920, amongst which are stringent restrictions on the sale of cyanide of potassium.

The special conditions attaching to the sale of poisons are alluded to on p. 1055 of Official Year Book No. 12.

Partial exemptions from the regulations are made in some States in the case of sales of poisons for agricultural, horticultural and photographic purposes in so far that any person may sell them subject to the restrictions as to the class of container and the manner in which they may be sold. The sale of what are generally known as industrial poisons, such as sulphuric acid, nitric acid, hydrochloric acid, soluble salts of oxalic acid, etc., is governed by regulations, as also is the sale of poisons for the destruction of rats, vermin, etc. Under the existing laws these poisons are allowed, in most of the States, to be sold by anyone. The Victorian Parliament, in December, 1920, passed an amending Poisons Act, in which the word "wholesale" has for the first time been defined as meaning "sale or supply for the purposes of re-sale," providing for an annual fee of 10s. and the issuing of licences to dealers in exempted poisons. A new principle is introduced into the Victorian Poisons Act of 1920. Certain drugs are declared to be "potent drugs" and may only be sold by pharmaceutical chemists. These drugs include acetanilid, adrenalin, oil of tansy, pituitary extract, thyroid gland preparations, and any serum or vaccine for human use.

§ 4. Milk Supply and Dairy Supervision.

1. **General.**—In Official Year Book No. 12 and preceding issues allusion is made in general terms to the legislation in force in the various States to ensure the purity of the milk supply and of dairy produce generally, but limits of space preclude the repetition of this information in the present issue.

2. **Number of Dairy Premises Registered.**—The following table shews so far as the particulars are available the number of dairy premises registered and the number of cattle thereon. Compulsory registration is not in force throughout the whole area of the various States.

DAIRY PREMISES REGISTERED AND CATTLE THEREON, 1921.

Particulars.	N.S.W.	Victoria.	Q'land. (a)	S. Aust.	W. Aust.	Tasmania.
Premises registered ..	20,527	17,118	13,500	1,365	929	(b)
Cattle thereon ..	923,535	165,486	448,634	8,615	11,079	(b)

(a) For year 1920. (b) Not available.

3. **New South Wales.**—The provisions of the Dairies Supervision Act 1901 extend to the whole of the Eastern and Central Divisions of this State and to all important dairying districts further inland. Other districts are brought under the operation of the Act by proclamation from time to time. Every dairyman, milk vendor, and dairy factory or creamery proprietor is required, under penalty, to apply for registration to the local authority for the district in which he resides, and also to the local authority of every other district in which he trades. Registrations must be applied for before commencing to trade and must be renewed annually. The Chief Dairy Inspector is in charge of all inspectorial work under the Dairies Supervision Act 1901, and has assisting him fourteen qualified dairy inspectors, each in charge of a district. During 1919, samples of milk numbering 3,502, and of food and drugs numbering 822, were taken from the vendors for examination, and 10,717 dairy premises were inspected. Where necessary, warnings and prosecutions followed. A sum of nearly £2,000 was imposed in fines for adulteration, want of cleanliness, etc.

4. **Victoria.**—The inspection and supervision in Victoria of dairies, dairy farms, dairy produce, milk stores, milk shops, milk vessels, dairy cattle and grazing grounds are provided for by the Dairy Supervision Act 1915, administered by the Minister of Agriculture. Under the Health Act, however, the Department of Public Health is empowered to take samples of food (including milk, cream, butter, cheese, and other dairy products) for examination or analysis, and to institute prosecutions in case of adulterated or unwholesome food. By the end of the year 1920, 117 municipal districts, comprising about one-third of the area of the State, had been brought under the operation of the Dairy Supervision Act. The municipal councils have the option of carrying out the administration of the Act themselves or of deciding that the work should devolve upon the Department of Agriculture; up to the present all the municipalities in which the Act has been proclaimed have elected for Departmental administration.

5. **Queensland.**—The control and supervision of the milk supply, of dairies, and of the manufacture, sale, and export of dairy produce in Queensland are provided for by the Dairy Produce Act 1920, administered by the Department of Agriculture and Stock. These Acts and the regulations made thereunder apply only to prescribed districts, which comprise the whole of the coastal district from Rockhampton down to the New South Wales border, and the Darling Downs, Maranoa, Mackay, and Cairns districts.

6. **South Australia.**—The Food and Drugs Act 1908, and the Regulations made thereunder, provide for the licensing of vendors of milk, and the registration of dairies, milk stores and milk shops. The Metropolitan County Board carries out the requirements of the metropolitan area. In the country, the majority of local authorities have not made statutory provision for the licensing of vendors of milk and the registration of dairy premises; and, in consequence, the Central Board of Health provides for such under the Act.

7. **Western Australia.**—Control of dairies throughout the State is in the hands of the Public Health authorities under the provisions of the Health Act. The inspectors under the Act supervise the sanitary condition of the premises, the examination of herds being carried out by officers of the Department of Agriculture for the Health Department. Inspection of herds is made at regular intervals, and the tuberculin test is applied in cases of suspected disease.

8. **Tasmania.**—Local authorities are responsible for the dairies in their respective districts. By-laws for the registration and regulation of dairies have been drafted by the Public Health Department, and in the majority of cases have been adopted by the local authorities. By the Food and Drug Act, which came into force in March, 1911, milk sampling is carried out by the local authorities. During 1913, attention was drawn by circular to the requirements of local authorities with regard to dairies, and a special report is now required before licences are granted. An Act also provides for the registration and inspection of dairies and other premises where dairy produce is prepared, and regulates the manufacture, sale, and export of dairy produce.

§ 5. Prevention of Infectious and Contagious Diseases.

1. **General.**—The provisions of the various Acts in regard to the compulsory notification of infectious diseases and the precautions to be taken against the spread thereof may be conveniently dealt with under the headings—(*a*) Quarantine; (*b*) *Notifiable Diseases*; and (*c*) *Vaccination*.

2. **Quarantine.***—Under the Commonwealth Quarantine Act 1908, the systems of State quarantine formerly in operation were abolished, and a branch of the Department of Trade and Customs, under the immediate control of a Director of Quarantine, was created on 1st July, 1909. Amending Quarantine Acts were passed in 1912, 1915, and 1920, correcting certain imperfections in the original Act, and conferring additional powers. The Quarantine Act is now administered by the Commonwealth Department of Health, which came into being on the 7th March, 1921, the Director of Quarantine becoming the Director-General of Health. Uniformity of procedure has been established throughout the Commonwealth in respect of all vessels, persons, and goods arriving from oversea ports or proceeding from one State to another, and in respect of all animals and plants brought from any place outside Australia. In regard to inter-state movements of animals and plants, the Act becomes operative only if the Governor-General be of opinion that Federal action is necessary for the protection of any State or States; in the meantime the administration of inter-state quarantine of animals and plants is left in the hands of the States.

(i) *Transfer of Quarantine Stations.* The transfer from the States to the Commonwealth of the quarantine stations, for the purposes of human quarantine, at the following places, has been effected:—(*a*) *New South Wales.* North Head (near Sydney). (*b*) *Victoria.* Point Nepean (near Melbourne) (*c*) *Queensland.* Colmslie and Lytton (near Brisbane), and Thursday Island. (*d*) *South Australia.* Torrens Island (near Adelaide). (*e*) *Western Australia.* Woodman's Point (near Fremantle), Albany, and Broome. (*f*) *Tasmania.* Bruni Island (near Hobart). Animal quarantine stations in each of the States have also been transferred to the Commonwealth. New buildings

* From information furnished by the Commonwealth Director-General of Health.

and improvements are in course of construction at several of the transferred stations. New stations have been constructed at Darwin, Thursday Island, Townsville, and Bunbury.

(ii) *Administration of Act.* The administration of the Act in respect of the general division, *i.e.*, vessels, persons, and goods, and human diseases, is under the direct control of the Commonwealth in all States except Tasmania. A medical chief quarantine officer, with assistant quarantine officers, has been appointed in each State. This officer is charged with responsible duties, and is under the control of the Director-General of Health. In Tasmania, the chief health officer of the State acts as chief quarantine officer, and payment is made to the State for his services. The administration of the Act in the Northern Territory has been combined with that of Queensland under the chief quarantine officer for the North-eastern division. The administration of the Acts and Regulations relating to oversea animal and plant inspection and quarantine is carried out by the officers of the State Agricultural Departments acting as quarantine officers.

(iii) *Chief Provisions of Act.* The Act provides for the inspection of all vessels including air-vessels, from oversea, for the quarantine, isolation, or continued surveillance of infected or suspected vessels, persons, and goods, and for the quarantining and, if considered necessary, the destruction of imported goods, animals, and plants. The obligations of masters, owners, and medical officers of vessels are defined, and penalties for breaches of the law are prescribed. Power is given to the Governor-General to take action in regard to various matters by proclamation, and to make regulations to give effect to the provisions of the Act. Quarantinable diseases are defined as small-pox, plague, cholera, yellow fever, typhus fever, leprosy, or any other disease declared by the Governor-General, by proclamation, to be quarantinable. "Vessel" is defined as "any ship, boat or other description of vessel or vehicle used in navigation by sea or air." "Disease" in relation to animals means certain specified diseases, or "any disease declared by the Governor-General, by proclamation, to be a disease affecting animals." "Disease" in relation to plants means "any disease or pest declared by the Governor-General, by proclamation, to be a disease affecting plants." The term "plants" is defined as meaning "trees or plants, and includes cuttings and slips of trees and plants and all live parts of trees or plants and fruit."

(iv) *Proclamations.* The proclamations so far issued specify the diseases to be regarded as diseases affecting animals and plants; appoint first ports of landing for imported animals and plants and first ports of entry for oversea vessels; declare certain places beyond Australia to be places infected, or as places to be regarded as infected with plague; prohibit the importation (*a*) of certain noxious insects, pests, diseases, germs, or agents, (*b*) of certain goods likely to act as fomites, and (*c*) of certain animals and plants from any or from certain parts of the world; fix the quarantine lines, and define mooring grounds, in certain parts of Australia.

(v) *General.* At present, instead of all oversea vessels being examined in every State, as was formerly the case, those arriving from the south and west are now examined only at the first port of call, and pratique is given for the whole of the Commonwealth except in cases of suspicious circumstances, while vessels arriving from the northern routes are examined only at the first and last ports. It is expected that the restrictions placed upon oversea vessels will be further removed as the machinery of quarantine is improved. The present freedom from certain diseases which are endemic in other parts of the world would, however, appear to justify the Commonwealth in adopting precautionary measures not perhaps warranted in the already infected countries of the old world.

3. **Notifiable Diseases.**—Provision exists in the Health Acts of all the States for precautions against the spread and for the compulsory notification of infectious diseases. When any such disease occurs, the Health Department and the local authorities must at once be notified. In some States notification need only be made to the latter body. The duty of giving this notification is generally imposed, first, on the head of the house to which the patient belongs, failing whom on the nearest relative present, and, on his default, on the person in charge of or in attendance on the patient, and on his default, on the occupier of the building. Any medical practitioner visiting the patient is also bound to give notice.

(i) *Notifiable Diseases Prescribed in each State.* In the following statement those diseases which are notifiable in each State are indicated by a cross :—

DISEASES NOTIFIABLE UNDER THE HEALTH ACTS IN EACH STATE.

Particulars.	N.S.W.	Vic.	Q'land.	S.A.	W.A.(d)	Tas.(e)
Acute lobar pneumonia	..	..	..	(g)	+	..
Anthrax	..	+	..	+	+	..
Ankylostomiasis	..	+	+	..	..	..
Beri-beri	..	..	..	..	+	..
Bilharziasis	..	+	+	+	+	+
Bubonic plague	+	+	+	+	+	+
Cerebro-spinal fever	+	+	+	+	..	..
Cerebro-spinal meningitis	+	+	+	+	+	+
Chancroid (soft chancre)	+	+(b)	+	..	+	+
Cholera	..	+	+	+	+	+
Continued fever	..	+	+	..	+	..
Diphtheria	+	+	+	+	+	+
Dysentery	..	+	+(c)	..	+	..
Encephalitis lethargica	..	+	..	..	..	..
Enteric fever	+	+	+	+	+	+
Erysipelas	..	..	+	+	+	..
Favus	..	..	..	+	..	..
Gleet	+	..	..	..	..	..
Gonorrhœa	+	+(b)	+	..	+	+
Gonorrhœal ophthalmia	+	..	..	..	..	..
Hæmaturia	..	+	+	..	+	+
Infantile paralysis	+	+	+	..	+	+
Infective granuloma of the pudenda	+	+(b)	+	..	+	..
Influenza	..	..	+(h)	+(g)	+	..
Leprosy	+	+	+(j)	+	+	+
Malarial fever	..	+	+	+	+	+
Measles	..	..	..	+	..	..
Membranous croup	+	+	+	+	+	..
Ophthalmia neonatorum	..	+(b)	..	..	+	+
Pneumonic influenza	..	..	+(h)	+(g)	+	..
Polioencephalitis	..	+	..	..	..	..
Poliomyelitis anterior acuta	+	+	+	+	+	+
Puerperal fever	..	+	+	+	+	+
Pulmonary tuberculosis (phthisis)	+(a)	+	+	+	+	+
Relapsing fever	..	..	+	+	+	..
Scarlet fever	+	+	+	+	+	+
Scarlatina	+	+	+	+	+	+
Septicæmia	..	+	..	..	+	..
Small-pox	+	+	+	+	+	+(f)
Syphilis	+	+(b)	+(i)	..	+	+
Trichinosis	..	..	..	+	..	..
Tuberculosis	..	+	..	..	..	..
Tuberculosis in Animals	..	..	..	+	..	..
Typhoid	+	+	+	+	+	+
Typhus fever	..	+	+	+	+	+
Venereal Warts	+	..	+	..	..	..
Whooping cough	..	..	..	+	..	..
Yellow fever	..	+	+	+	+	..

(a) In metropolitan and certain proclaimed districts. (b) Under the Venereal Diseases Acts. (c) Thursday Island area only. (d) Other diseases enumerated as notifiable under "The Health Act 1911" of this State are pyæmia, and Malta, dengue, low and Colonial fevers. (e) Venereal diseases are notifiable under "The Public Health Act 1917." (f) Chicken-pox has been declared a notifiable disease to render certain its differential diagnosis from small-pox. (g) In South Australia influenza vera is notifiable, and any febrile toxic-septicæmic condition similar to influenza, including pneumonic influenza. (h) Notifiable in certain areas only. (i) Primary and secondary stages only. (j) Notifiable under "The Leprosy Act 1892."

(ii) *Duties of Authorities.* As a rule the local authorities are required to report from time to time to the Central Board of Health in each State as to the health, cleanliness, and general sanitary state of their several districts, and must report the appearance

of certain diseases. Regulations are prescribed for the disinfection and cleansing of premises, and for the disinfection and destruction of bedding, clothing, or other articles which have been exposed to infection. Bacteriological examinations for the detection of plague, diphtheria, tuberculosis, typhoid, and other infectious diseases within the meaning of the Health Acts are continually being carried out. Regulations are provided in most of the States for the treatment and custody of persons suffering from certain dangerous infectious diseases, such as small-pox and leprosy.

(iii) *New South Wales.* The proclamation and notification of infectious diseases are dealt with in Part III. of the Public Health Act 1902. Special provision is made by that Act for the notification of small-pox and leprosy, and for the custody and treatment of lepers. Special reports dealing with outbreaks and the etiology of plague, leprosy, and small-pox have been published.

(iv) *Victoria.* Any infectious disease declared to be notifiable is notifiable throughout the State (Health Act 1919).

(v) *Queensland.* Under Part VII. of the Health Act 1900 1917, all cases of infectious diseases must be notified; special provision is made for notification of small-pox. Provision is made for the diagnosis of leprosy under the Leprosy Act 1892, and lepers are sent to Peel Island, Moreton Bay.

(vi) *South Australia.* In this State cases of infectious diseases must be reported to the local Board, under the provisions of Part VIII. of the Health Act 1898. The onus of notification is placed primarily on the head of the family, and, failing him, the nearest relative, the person in charge, or the occupier of the house; in any case, notification must be given by the medical practitioner attending.

(vii) *Western Australia.* The necessity for providing hospital treatment for infectious cases has been recognised by the Local Health authorities, and in several instances wards for the treatment of these cases have been erected.

(viii) *Tasmania.* Provisions regarding the prevention and notification of infectious diseases are contained in the Public Health Act 1903 and amending Acts.

4. Vaccination.—In the State of New South Wales there is no statutory provision for compulsory vaccination, though in all the other States of the Commonwealth such provision has been made. Jennerian vaccine for vaccination against small-pox is prepared at the Commonwealth serum laboratories in Melbourne. A considerable demand exists for the vaccine in the State of Victoria, but in the other States the normal requirements are small. During the years 1912, 1913, and 1914, the output of the vaccine in doses from the depot was respectively 65,000, 570,000, and 146,000. The number of doses issued in 1913 was, however, abnormal, and was due to the epidemic of small-pox which broke out in Sydney at the end of June, this being followed by large numbers of vaccinations in each State.

The following table shews, so far as particulars are available, the number of persons vaccinated in each State from 1916 to 1921 inclusive :—

NUMBER OF PERSONS VACCINATED IN EACH STATE, 1916 TO 1921.

Year.	N.S.W.(a)	Victoria.(b)	Q'land.	S. Aust.	W. Aust.	Tasmania.
1916	2,618	20,916	(c)	531	(c)	(c)
1917	4,663	19,759	(c)	251	(c)	(c)
1918	(c)	15,306	(c)	36	(c)	(c)
1919	324	14,031	(c)	8	(c)	(c)
1920	377	4,327	(c)	20	(c)	(c)
1921	(c)	3,915	(c)	..	(c)	(c)

(a) By officers of the Health Department and at public depots. (b) Children only, who were vaccinated under the Act, see (ii) below. (c) Returns not available.

(i) *New South Wales.* Although there is no provision for compulsory vaccination in this State, public vaccinators have been appointed. No statistics are available as to the proportion of the population who have been vaccinated, but a report of the Principal Medical Officer of the Education Department states that out of 55,740 children medically examined during 1919, 9,487, or 17 per cent., had been vaccinated.

(ii) *Victoria.* Compulsory vaccination, subject to a "conscience" clause, is enforced throughout the State, under Part VII. of the Health Act 1919. From the year 1873 up to 31st December, 1918, it is estimated that 72 per cent. of the children whose births were registered were vaccinated. Free lymph is provided. The number of children vaccinated in Victoria during 1921 was 3,915.

(iii) *Queensland.* Although compulsory vaccination is provided for in this State under Part VII. of the Health Act 1900-1917, its operation has not been proclaimed. Vaccination thus being purely voluntary, medical practitioners do not notify vaccinations. In the early part of 1912, the Queensland Government sent a medical expedition to the islands in Torres Straits. Over 1 200 natives were vaccinated with a view to reducing the risk of the introduction of small-pox from New Guinea. Information as to vaccinations in recent years is not available.

(iv) *South Australia.* The Vaccination Act 1882, which applies to South Australia and the Northern Territory, is administered by the vaccination officer of the State. Under this Act vaccination was compulsory, but in 1917 an Act to abolish compulsory vaccination was passed. The total number of vaccinations in 1920 was 20.

(v) *Western Australia.* In this State vaccination is compulsory under the Vaccination Act 1878, which, however, remains almost a dead letter, seeing that under the Health Act 1911, a "conscientious objection" clause was inserted, which is availed of by the majority of parents. The number of children vaccinated is very small. All district medical officers are public vaccinators, but they receive no fees for vaccinations.

(vi) *Tasmania.* All infants in Tasmania are nominally required under the Vaccination Act 1898 to be vaccinated before the age of 12 months, unless either (*a*) a statutory declaration of conscientious objection is made, or (*b*) a medical certificate of unfitness is received. Information in regard to vaccinations in recent years is not available.

5. **Commonwealth Serum Laboratories.**—The establishment for the preparation of Jennerian Vaccine situated at Royal Park, near Melbourne (formerly known as the "Calf Lymph Depot"), has been enlarged and extended. The institution is now designated the "Commonwealth Serum Laboratories." and forms a branch of the Commonwealth Department of Health. The list of bacteriological preparations produced by the laboratories has been extended so as to cover practically the whole range of biological products, and the institution is now a valuable national provision for the protection of public health and for the treatment of human and animal diseases. Price lists of the various products have been issued, and the institution is in full working order.

6. **Malaria and Bilharziasis.**—The control of returned sailors and soldiers suffering from malaria and bilharziasis, which was undertaken by the Commonwealth Department of Health at the request of the Departments of Defence and Repatriation, is still being carried out in conjunction with State Health Departments.

(i) *Malaria.* Steps were taken to have all recrudescences in returned sailors, soldiers and nurses in all parts of Australia notified direct to the Commonwealth Department of Health by the Medical Officers of the Repatriation Local Committees. Malaria is also notifiable to each State Health Department, except New South Wales, and particulars of such notifications are passed on to the Commonwealth Department of Health.

Treatment on intensive lines has been regularly carried out in connection with malaria recurrences in returned sailors and soldiers in order to effect a cure as rapidly as possible. Steps were also taken to prevent the settlement of malaria-infected individuals in localities such as irrigation areas, where mosquitoes, capable of carrying malaria, were known to exist.

From information received, it is evident that in the great majority of cases cure has now been established, and that where recrudescences do occur they have been greatly reduced in severity and frequency. The number of foci of infection has thus been very largely reduced and the danger of spread of malaria in the community correspondingly lessened. In the past two years less than ten instances of fresh cases of malaria attributable to infection contracted in Australia have been recorded. None of these have been in the families of returned soldiers.

(ii) *Bilharziasis.* With few exceptions the men who contracted this disease on active service have been brought in from all parts of Australia for expert re-examination and treatment.

The number of men whose medical history pointed to bilharzia infection on active service was 161. Of these 145 have been traced and dealt with, and fourteen were found not to have suffered from bilharziasis.

The great majority were found to be still highly infective. These were treated in hospital with full courses of tartar emetic by intravenous injection. As far as present results indicate, an effective cure has been obtained in these cases.

The men who have not yet been dealt with number sixteen. Of these, five have not been traced, and the remaining eleven either refused to submit to treatment, or failed to attend hospital for the intensive course of treatment. Further action is being taken in these cases.

The men who have suffered from this disease and have undergone treatment as indicated above, are still kept under periodical observation, but owing to the success of the measures already taken it is not anticipated that any extension of the disease to the general community is now likely to take place.

7. **Venereal Diseases.**—The Commonwealth, recognising the importance of effective control of venereal diseases, has provided a subsidy of £15,000 per annum to the various States to assist in the work of providing hospital treatment for, and administrative control of, venereal diseases. The supervision of this work in so far as it relates to the expenditure of this subsidy is controlled by the Commonwealth Department of Health.

§ 6. Tropical Diseases.

1. **Introduction.**—The remarkable development of parasitology in recent years, and the increase in knowledge of the part played by parasites in human and animal diseases, have shewn that the difficulties in the way of tropical colonisation, in so far as these arise from the prevalence of diseases characteristic of tropical countries, are largely removable by preventive and remedial measures. Malaria and other tropical diseases are coming more and more under control, and the improvements in hygiene which science has accomplished lend an entirely new aspect to the question of white settlement in countries formerly regarded as unsuitable for colonisation by European races. In Australia the most important aspect of this matter is at present in relation to such diseases as filariasis, malaria, and dengue fever, which, although practically unknown in the southern States, occur in many of the tropical and sub-tropical parts of the Commonwealth.

2. **Queensland.**—(i) *Transmission of Disease by Mosquitoes.* The existence of filariasis in Queensland was first discovered about thirty-six years ago. The parasite of this disease (and probably of dengue fever also), is transmitted by *Culex fatigans*, the mosquito most prevalent in Queensland. The *Stegomyia fasciata*, conveyer of yellow fever, is another common domestic mosquito throughout Eastern Queensland during the summer, but so far has never been infected from abroad. Occasional limited outbreaks of malaria occur in the northern parts of the State; one at Kidston, in 1910, resulted in 24 deaths. The infection was traced to newcomers from New Guinea. Allusion to the efforts made to deal with the mosquito, under the Health Act of 1911, will be found in Official Year Book No. 12, p. 1063. By an order in Council, the Local Authorities are now responsible for the taking of measures for the destruction, and the prevention of breeding, of mosquitoes.

(ii) *Australian Hookworm Campaign.* In 1916 the Commonwealth of Australia invited the International Health Board of the Rockefeller Foundation to conduct a hookworm survey of the Territory of Papua. Dr. J. H. Waite, of the staff of the Board, made the investigation in 1917, and found that half of all natives examined were infected with hookworm disease.

The work in Papua stimulated interest in the situation in Queensland, where cases of hookworm disease had been reported in the medical literature since 1889. In 1918 a hookworm campaign was undertaken jointly by the State of Queensland and the International Health Board under the direction of Dr. Waite. The prevalence of hookworm disease and its effects in retarding growth and development were found to be greater than had been supposed. The mental retardation in heavily infected school children increased with age as follows :—

Age at last birthday	.. 10	.. 11	.. 12	.. 13	.. 14	.. 15
Mental retardation in years	1.6	.. 2.2	.. 2.5	.. 3.2	.. 3.5	.. 4.5

In the case of children, growth and development took place in a remarkable way a soon as a cure was effected. It was found that the disease was responsible for anæmia dwarfing, retardation—physical and mental—and delay of sexual maturity.

At the end of 1918 the direction of the work in Queensland was taken over by Dr. S. M. Lambert, and on 1st October, 1919, the Australian Hookworm Campaign was begun. This larger project was supported jointly by the Commonwealth of Australia, the International Health Board of the Rockefeller Foundation, the State of Queensland, and the other States and Territories in which work was being done.

By 31st December, 1921, work had been carried on in all the States, Northern Territory, and the Territories of Papua and New Guinea. The total number of examinations and treatments, including those in Dr. Waite's survey in Papua and the earlier work in Queensland, was as follows :—

People examined for hookworm disease	210,752
Found to be infected with hookworms	48,381 (23%)
Treated free by the Australian Hookworm Campaign ..	33,144
Found to be cured on re-examination	7,961*

Endemic hookworm infection has been found in intermittent areas along the eastern coast of Australia from Cape York to Macksville in New South Wales. The higher summer rainfall in these areas appears to be chiefly responsible for the localisation of the infection. It is also found in the vicinity of Broome and Beagle Bay in Western Australia, around Darwin in the Northern Territory, and along the eastern coast of the Gulf of Carpentaria. The surveys of the Northern Territory and the lands bordering on the Gulf of Carpentaria have not been completed. In the Territory of Papua 59.2 per cent. of the natives were found to be infected, and in the Territory of New Guinea, 74.2 per cent. There is no endemic hookworm infection in Victoria, South Australia, Tasmania, the interior of Queensland, all of New South Wales except the north-eastern part, and all of Western Australia except the far north.

Metalliferous mines were examined in Victoria, South Australia, New South Wales, Tasmania, and Western Australia, and were found entirely free from hookworm infection. The examination of metalliferous mines in Queensland has not been completed, but no infection has been found in those already examined. Coal mines in Victoria, Tasmania, and Western Australia were free of infection. Examinations were begun in the coal mines of the Newcastle district at the beginning of the year 1922, and among 1,226 miners examined in about 25 mines only five infected miners were found. In the Ipswich Group of coal mines in Queensland, 31.5 per cent. of the miners were infected, and in the Howard-Torbanlea Group (Queensland) 75.8 per cent. were infected. Recommendations have been made with regard to the correction of the insanitary conditions responsible for these high infection rates.

* Only part of the people treated were re-examined to find out whether they were cured. The total number cured was, therefore, much larger than shewn.

Wherever operations are carried on by the Hookworm Campaign, emphasis is placed on the prevention of hookworm disease, in contrast to temporary relief through the curing of existing cases, and much work has been done to improve methods of night-soil disposal and teach the people the danger from soil pollution.

(iii) *Institute of Tropical Medicine, Townsville.* The Australian Institute of Tropical Medicine was founded at Townsville in January, 1910. Since 7th March, 1921, the Institute has been administered by the newly created Commonwealth Department of Health. During the first two years after its establishment the Institute was subsidised by the Commonwealth and Queensland State Governments, and was controlled by a committee consisting of representatives of both Governments and of the three Australian Universities—Sydney, Melbourne, and Adelaide. A director was appointed to organise the activities of the Institute, and after having accomplished a survey of Northern Australia and New Guinea, to advise as to the best centre where the work could be carried out most expeditiously. The staff consisted at first of the director and one laboratory assistant, but soon the necessity arose of appointing an entomologist. In 1913, after two years of preliminary work, the Commonwealth decided to increase considerably the grant to the Institute, and to take over the financial administration, which was vested in the Department of External Affairs, and later in the Home and Territories Department. The representatives of the three universities were retained as scientific advisers. The decision to increase the scope of the Institute was greatly influenced by a resolution passed by the Australasian Medical Congress in Sydney in 1911, recommending an organised inquiry into the various aspects likely to affect the establishment of a working white race in Australia. The increased subsidy made the appointment of a larger staff possible. The services of three qualified assistants were secured, and the Institute was housed in a ferro-concrete building, situated within the precincts of the Townsville Hospital. During the first two years a survey of tropical diseases existent in North Queensland was carried out; the incidence of human and animal parasites was investigated; and a number of problems which required elucidation were attacked. Amongst other suggestions a hookworm survey of Cairns and surrounding districts was recommended. The staff undertook research on "nodules in beef" and made an important discovery, which at first seemed destined to advance our knowledge, by proving that living larvæ could penetrate through the unbroken skin of the beast and could be found under special conditions on the surface. Research in the consequent fate of the larvæ and the search for an intermediary host, in which the larvæ could undergo further development, proved fruitless, although many possibilities, such as biting flies, aquatic insects, etc., were considered and excluded after patient research. It was shewn that the parasites of wild animals, such as reptiles, birds, and small mammals resembled on the whole those found and described from other parts of the tropics, but no new general features of any importance could be discovered. Attention was drawn to the prevalence in the dry western parts of North Queensland of keratosis, a skin disease, characterised by a thickening of the horny layer of the skin, which develops into a chronic ulcer, and is apt to give rise to skin cancers. The occurrence of similar conditions in old people with atrophic skin in other parts of the world has been well known, but in Queensland mostly young people become affected, and the condition has been attributed to the effect of sunlight and dry heat on a skin lacking in normal pigment. In the Torres Strait islands, the occurrence and prevalence of such diseases as malaria, filariasis, elephantiasis, yaws and others has been noted. The increase in the staff made more extended field work possible, and in the course of time different districts were visited in order to study the local prevalence of fever and disease. A survey of the whole of the coastal districts of British New Guinea was undertaken and yielded interesting results. The prevalence of the different types of malaria, of filariasis and of leprosy was mapped out, the existence of ankylostomiasis (caused by the American variety of the hookworm, which is widely distributed in the far East) was noted, and the occurrence of a number of hitherto undescribed diseases was observed. Amongst other diseases, a number of cases of gangosa, a condition that occurs not infrequently in some of the Pacific Islands, was encountered, and in the earliest stages of the disease a parasite was discovered which belongs to the genus of Blastomyces and was named Cryptococcus mutilans, on account of the mutilation brought about by it. The etiology of chronic conjunctival affections, so prevalent in Western Queensland,

was investigated, and it was proved that true trachoma existed in Western Queensland and that an acute conjunctivitis was the most important predisposing cause. The epidemiology and parasitology of the so-called "Mossman fever" were investigated, and it was found that the disease could be transmitted by direct inoculation of blood of patients in the early stage of the disease into monkeys. This observation indicated that this fever can be separated from other fevers which cannot be transmitted to these experimental animals. A survey of the tropical diseases amongst the Europeans and aborigines of the Northern Territory was undertaken, and with the exception of yaws and ulcerative granuloma, the comparative absence of any serious tropical disease was established. Malarial fever was almost entirely absent amongst the aboriginal population and, except in a few localities, rarely attacked the European population. Unfortunately the outbreak of the war greatly curtailed the activities of the Institute. The energy of several of the workers was directed towards duties directly connected with the war, and the staff was obliged to assist as far as possible in relieving the tension caused by the scarcity of medical men throughout North Queensland and Australia in general. Prior to the outbreak of the war the staff of the Institute had embarked on an enquiry on a larger scale into the physiological changes of a white race living under such climatic conditions as prevail in the coastal districts of tropical Australia. Special attention was paid to the blood conditions of the white population, to the metabolism and to the influence of exercise, in order to gain an insight into the effects of manual labour upon the human organism under tropical conditions. . At the same time the economic conditions as expressed in statistics were studied, and information collected in order to ascertain whether climatic conditions could be held responsible for any alterations of social conditions in North Queensland. An examination of the blood condition of school children, who had resided during the whole or most of their lives in Townsville, was carried out in order to obtain definite evidence whether any deterioration had taken place, in other words whether there existed amongst the North Queensland school children an anæmia which could be directly attributed to climatic conditions. The result of the investigation proved that the blood condition, as far as formed elements and colouring matter were concerned, did not differ in any way from that considered as normal in children born and bred in a temperate climate. In one respect, however, viz., in the relative preponderance of a certain type of cells—neutrophile leucocytes with a comparatively small number of nuclei—a definite alteration could be ascertained; the significance of this discovery is not yet clear. A biochemical investigation into the metabolism of a white race living in the Tropics was undertaken by estimating the different excretory substances in the urine of a number of subjects who had lived for some time in the tropics, and only quantitative variations from the averages obtained in temperate climates have been found. An extensive inquiry into the body temperature of a number of subjects under varying conditions has been carried out, and it was shown that during complete rest the rectal temperature did not show any variations from the limits of those observed in Europe, but a considerable rise was produced by slight muscular work, which rise was maintained for some time after the work had ceased. Further experiments into the gaseous metabolism, the mechanism of sweating, the influence of extreme wet bulb temperatures, etc., have been, and are still being carried out, and will in time furnish definite figures and facts in connexion with the solution of the question of the adaptation of a European race to conditions obtaining in the coastal districts of North Queensland. Researches have been carried out into diseases prevalent in North Queensland such as malaria, sprue, filariasis and others. A malarial survey of Cairns and the Innisfail district has been accomplished, and in the former case definite proposals have been submitted which when carried out faithfully would minimise the incidence of this infection. The staff of the Institute has also taken an active part in the hookworm campaign, undertaken by the Rockefeller Institute. A great deal of work has been done on the parasitic worms of men and beasts, and a great number of genera and species new to science have been described in various publications. General research has not been neglected, and a number of publications dealing with different subjects have been issued by the staff of the Institute. The entomological department has carried out a survey of mosquitoes and biting flies in Northern Australia and parts of British New Guinea. A special journey was made by the entomologist to the irrigation areas of New South Wales and Victoria, in order to ascertain the distribution of anophelines, to

which genus the malaria-transmitting mosquito belongs. The purpose of this survey was to advise as to whether the settlement of malaria-infected returned soldiers in these areas would form a menace by setting up conditions for the spread of this disease. Prior to the outbreak of war definite arrangements had been made to hold annually a course in tropical medicine and parasitology, but war conditions made the course impossible. In connexion with the Institute, the Townsville Hospital has set aside two wards containing twenty beds, which are under the direct control of the staff of the Institute, and are reserved for patients suffering from tropical complaints. Since their establishment, a number of cases have been admitted, treated, and their complaints investigated; amongst others, a number of returned soldiers and sailors suffering from a severe form of malarial fever were sent to the Institute for observation and treatment. The results of the work of the Institute were published at first in the form of an annual report, but later in various scientific journals, and have been re-issued from time to time in the form of "Collected Papers," which contain a variety of scientific investigations. The equipment has lately been perfected by installing electric power, and by providing additional accommodation for the breeding of small experimental animals, which are indispensable for the carrying out of scientific research. An extensive library on tropical medicine and other allied subjects has been collected since the inception of the Institute. The Institute extends hospitality to qualified workers who desire to investigate tropical disease or any problems in connexion with Northern Australia, and room and equipment are provided.

Further investigation on the effects of work under tropical conditions has been carried out on wharf lumpers working ships' cargo in the holds of vessels in Townsville during the summer months. These were controlled by readings of the dry and wet bulb thermometers and the katathermometer, both in the holds of ships and on the wharf, and at the same time rectal temperatures, blood pressure and pulse rate were taken. This investigation showed that climate has practically no effect on working men in the tropics. Further work on blood conditions in reference to the neutrophile leucocytes was carried out, this time on hookworm-infected children, and the results show that this infection has a definite effect in the blood formation and destruction. Work on the transmission of the dog filaria (*Dirofilaria immitis*) has been carried out, and it has been shown that dog fleas, as well as mosquitoes, are capable of acting as intermediate hosts. An extensive statistical inquiry into prevalence of diseases, birth rates and death rates in Queensland in comparison with Victoria and Tasmania was undertaken, and the result shows that Queensland is not more unhealthy than the southern parts of the continent. An examination of fæces from a number of healthy individuals showed that there are a considerable number of carriers of *Entamœba histolytica* (the dysentery amœba) in North Queensland; although there is practically no evidence that they cause disease, the findings are on the whole the same as in England. In the Entomological Department, considerable work has been done in extending knowledge of the distribution and breeding habits of mosquitoes and March flies. A physiologist was appointed, and took up his duties in September. He has begun work on the effects of the climate on apparently healthy individuals, in regard to metabolism, but has not yet had time to publish any results.

3. **Northern Territory.**—While the Territory is conspicuously free from most of the diseases which cause such devastation in other tropical countries, a slight amount of malaria exists, and, although such cases as occur very rarely end fatally, the Administration is taking measures for the destruction of mosquito larvæ wherever settlements or permanent camps are formed, while precautions are being taken to prevent the collection of stagnant water in such localities.

4. **Other States.**—In Western Australia it is stated that malaria is not known to exist south of the 20th parallel, while filariasis has never been discovered. Mosquito-borne diseases are unknown in Victoria, South Australia, or Tasmania, and it is stated that filariasis is uncommon in New South Wales, the only cases known being imported ones. Kerosene and petroleum have been successfully used, both by municipalities and private individuals, to destroy mosquitoes at various places in these States.

§ 7. Supervision of Infant Life.

Reference has been made in general terms in preceding issues of the Official Year Book to the activities of the States in this direction (see No. 12, p. 1067).

The number of infantile deaths and the rates of infantile mortality in each State are dealt with in Section V. of this volume (see page 100), and it will be convenient to shew here particulars for the year 1921, classified according to metropolitan and other districts in each State.

INFANTILE DEATHS AND RATES OF INFANTILE MORTALITY FOR METROPOLITAN AND OTHER DISTRICTS, 1921.

Districts.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	C'wealth. (b)
NUMBER OF INFANTILE DEATHS.							
Metropolitan ..	1,437	1,381	382	452	318	119	4,089
Other	1,981	1,201	719	332	293	330	4,856
RATE OF INFANTILE MORTALITY. (a)							
Metropolitan ..	62.38	73.82	61.81	73.64	80.55	75.17	68.62
Other	63.01	71.13	50.82	56.89	75.93	79.09	63.48

(a) *i.e.*, the number of deaths of infants under one year of age per thousand births.
(b) Exclusive of Territories.

It will be seen that in each State, with the exception of New South Wales and Tasmania, the rates of mortality are higher in the metropolitan than in other districts. The causes of "preventable" deaths may generally be attributed to milk poisoning, want of knowledge on the part of mothers, inability to nurse, and lack of the necessary medical facilities.

The figures in the foregoing table do not, however, completely represent the hygienic aspect of the question. For every infant death recorded there are probably three or four survivors who have sustained more or less serious permanent physical damage, quite apart from injuries at birth or congenital causes. It is stated that the far-reaching influence of the first year or two of life upon the whole subsequent physical welfare of the individual cannot be recognised too clearly, and it has been alleged that many serious defects and diseases occurring in later life may be credited to results ensuing from infantile disease. This is particularly the case in respect of digestive diseases.

§ 8. Medical Inspection of School Children.

1. **General.**—Reference to early efforts in the direction of securing an adequate physical record of school children will be found in Official Year Book No. 12, pages 1068–9, while Official Year Book No. 11, pages 1203 *et seq.* contains an account of the anthropometric records taken in connexion with military trainees.

2. **New South Wales.**—In this State, arrangements were made in May, 1907, for the medical inspection of school children in Sydney, and later in the year the work was extended to Newcastle. In 1911 the scheme was extended to the South Coast District and to a number of inland towns.

In 1913, the scheme of school medical inspection was re-organised so as to embrace every pupil in the State whose parents desired such medical inspection of their children.

Since this reorganisation was effected, two complete examinations have been made of the whole State, each school being revisited every three years. Of the 432,325 children examined, 263,232 (60 per cent.) were found to be suffering from physical defects needing treatment, which was obtained in 46 per cent. of those notified. Though this percentage of treatment as the direct result of medical inspection has risen during the two triennial periods from 40 per cent. to 53 per cent., nearly half of those requiring attention fail to receive the advantages of the ordinary facilities for treatment.

During the years 1918 and 1919, 70,003 and 55,740 children respectively were medically examined, exclusive of the number examined by the travelling hospital and the travelling dental clinics. The fall in the numbers for 1919 was due to the influenza epidemic, when the schools were closed for eleven out of the 42 working weeks of the school year.

Of the above totals, 44,205 (63.1 per cent.) and 35,826 (64.2 per cent.) were found suffering from physical defects. Of these 38,964 and 30,907 were treated, 21,098 and 16,374 being attended to by Departmental officers, while 17,865 and 14,533 were treated by outside agencies, including hospitals, lodge doctors, private practitioners, and dentists.

The number of children treated by the Departmental treatment schemes during 1918 and 1919 were as follows :—Travelling hospital, 2.281 and 2,539 ; six travelling dental clinics, 12,033 and 11,296 ; metropolitan dental clinic, 3,893 and 2,462 ; and the travelling ophthalmic clinic, 3,082 and 162 ; or a grand total of 21,289 and 16,459 respectively.

Full details of the system in operation will be found in Official Year Book No. 12 (pp. 1069, 1070).

3. **Victoria.**—Details regarding development of school medical inspection in this State are given in Official Year Book No. 12 (pp. 1070–1).

During the year ended 30th June, 1919. 3,954 children were examined, of whom 1,324 boys and 1,307 girls attended elementary and special schools, and 568 boys and 755 girls attended high schools. Teachers examined numbered 574, all of whom were women. A Dental Clinic, with three dental officers, is in operation.

The appointment of bush nurses has proved a boon in remote localities beyond convenient reach of medical aid.

4. **Queensland.**—In 1920. 20,923 children were examined, of whom 3,452 were found to be suffering from physical defects. (See also Official Year Book No. 12, p. 1071.)

The number of pupils dentally inspected during 1919 and 1920 was 16,294 and 16,392 respectively.

While adenoids and enlarged tonsils appear to be the principal defects throughout all the State schools, the children in the Northern and Western districts suffer largely from defective vision and trachoma. The work of the Ophthalmic Inspector is chiefly confined to these districts. The conclusion has been arrived at, as a result of the examinations, that such climatic conditions as dust, glare, heat, etc., so prevalent in the Western districts, which are often looked upon as the direct cause of serious blight or trachoma, are only predisposing causes, and can be safely ignored, provided elementary precautions are taken. The report of the Dental Inspectors, while still disclosing an appalling percentage of defects in the teeth of the children, shews a marked improvement.

5. **South Australia.**—(See also Official Year Book No. 12, p. 1071.)

During the year 1921, 3.452 children were examined, shewing a considerable percentage with defects of sight, hearing, nose and throat, sufficiently serious to interfere with their educational progress. In addition, the teeth of more than 2,700 children required urgent attention, having teeth in so bad a condition as to affect their general health. It was found that, while teeth were bad in all the schools examined, the other defects mentioned were exhibited in a considerably greater degree among the city children as compared with those living in country districts. In the Far North of the State, the teeth were better than in the metropolis ; but the visual ailments were more numerous, the eye-condition of the children born in the arid areas being very unsatisfactory.

6. **Western Australia.**—During 1917, a medical officer for schools was appointed, and inspections were carried out in some of the schools in that and the following year. The number of children examined was 6,072 in 1917, 4,804 in 1918, 3,316 in 1919, and 2,805 in 1920. (See also Official Year Book No. 12, p. 1072.)

7. **Tasmania.**—The credit of being the first State in the Commonwealth to provide for the medical inspection of schools and school children in a systematic way rests with Tasmania, where, under the direction of the Chief Health Officer and the Director of Education, about 1,200 children attending schools in Hobart were inspected in 1906. (See also Official Year Book. No. 12, p. 1072.)

Under the scheme in operation, practically all the primary school children of the State come under medical examination at least once in every two years. The examination in 1920 covered 5,179 children. During 1916 school dental clinics were established in Hobart and Launceston. In that year 3,282 individual children were examined, 4,573 in 1917, 4,449 in 1918, 3,068 in 1919, and 2,888 in 1920.

§ 9. Nursing Activities.

By means of various nursing organizations throughout the Commonwealth, the benefits of professional advice and oversight of trained nurses are conveyed to the homes of workers and settlers, where skilled assistance would probably be otherwise unprocurable. While charitable aid has been to some extent responsible for the inauguration and extension of these movements, the trend of the various undertakings is in the direction of eliminating the element of charity, and, by raising subscriptions on a co-operative basis, making the scheme self-supporting. Details of organization and administration vary in different localities. Since the first bush nurse was settled at Beech Forest, Victoria, in 1911, the system has made satisfactory progress. Government aid, in the shape of free railway travelling for nurses, small monetary grants for professional advice in schools, etc., is given. In 1920 the British Red Cross made available a sum of £150,000, of which £15,000 was placed at the disposal of the Red Cross in each State, the income to be applied to bush nursing for returned soldiers and sailors and their families. By the nursing organizations, baby clinics, etc., a vast amount of useful information and advice concerning diet, hygiene, etc., is disseminated throughout the Commonwealth.