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SECTION XXX.

PUBLIC HYGIENE.

§ 1. Introduction.

1. **General.**—Though the safeguarding of the public health as an organised department of administration is of comparatively modern growth, few branches of law 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. **State Legislation.**—In the first place there is a number of statutes, passed by the State Legislatures, such as Public Health Acts, Pure Food Acts, and Milk and Dairy Supervision Acts, providing, *inter alia*, for the constitution of Central Health Authorities, vested with definite powers, and furnishing the machinery necessary to enforce those powers. The general effect of this legislation has been to place local sanitary regulations and the execution of the Acts in the hands of the local authorities, subject to a general superintendence by a Government Department.

3. **Commonwealth Legislation.**—Secondly, by the enactment of the Commerce (Trade Descriptions) Act 1905, the Quarantine Act 1908-1915, and the Customs Act 1910, the Commonwealth Government has taken the first steps towards the exercise of its constitutional powers for the protection of the public health. All these Acts are administered by the Department of Trade and Customs.

4. **Scope of Enquiry.**—In addition to the statutes already referred to, account should be taken of a large body of legislation which relates more or less indirectly to the subject of public hygiene. It deals with a great variety of subjects and matters, such as factories, conditions of employment, mines, merchant shipping, prevention of fire, buildings, dangerous performances, and other matters. There is also a number of statutes which have been passed with the object of protecting and supervising infant life. Owing to exigencies of space it is not possible in this section to do more than give a brief description of the scope and results of the legislation relating to public hygiene in its more important aspects.

§ 2. The Public Health Acts.

1. **General.**—The most important statutes relating generally to the subject of public hygiene are the Health Acts which have been passed in each State. While the scope of these Acts differs considerably in some of the States, there is a general similarity in their chief provisions and range of operation. The administration of the Acts is carried on by either a Central Board or a Commissioner of Health under Ministerial control, while their actual execution is imposed on local Boards of Health or on the local authorities constituted under the various Local Government Acts. Ordinarily the central authority has general supervisory powers over local Boards and authorities, and has power to act in case of default by or in the absence of a local Board or authority as to any duty under the Act, and to recover all expenses incurred. The central authority may also make regulations, and the central and local Boards may make by-laws for various purposes generally specified in the Health Acts. It may be said that the chief functions of the Central Health Authorities are :—(a) the collection and dissemination of useful information relating to health and the prevention of disease, and (b) to control, stimulate, and, where necessary, to supplement the efforts of the local authorities.

Inspectors are sent to make reports on the hygienic conditions of country towns or districts with a view to assisting the local authorities with advice, and keeping the central department posted as to the activity or otherwise of these various bodies.

Rating powers for sanitary purposes are conferred on local authorities by the Local Government Acts.

The general powers of local authorities under the Acts extend to a variety of subjects and matters, including :—sewers and drains, sanitary conveniences, scavenging, cleansing, privies and cesspools, abatement of nuisances generally, offensive trades, public buildings, dwelling-houses and lodging-houses, hospitals, mortuaries, cemeteries and burial grounds, prevention of adulteration of food and drugs, unsound food, pollution of water, supervision of abattoirs and dairies, prevention of infectious diseases, and infant life protection.

2. *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) Act 1915, 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 1906. It may be mentioned that 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.

3. *Victoria.*—In this State the Public Health Acts are administered by a Board composed of two members nominated by the Governor-in-Council and of seven members elected by the municipal councils. The medical and sanitary staffs of the Board consist of (a) the medical inspector, who is also chairman, (b) one assistant medical inspector, (c) two engineering inspectors, (d) three building inspectors, and (e) five health inspectors. The main function of the Board 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 Board of Health. Acts administered by the Department of Public Health are :—The Health Acts, the Cemeteries Act, and the Meat Supervision Act. The Consolidated Health Act 1915 includes the Adulteration of Wine Act and the Pure Food Act. The Cremation Act is now included under the Cemeteries Act 1915. The Department administers also the Midwives 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 and 31st December of that year, 1,459 males were treated, attendances numbering 32,165. It may be mentioned that the Act provides a heavy penalty in the event of a medical practitioner failing to notify cases of these diseases.

4. **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, a medical officer for enthetic diseases, eleven food and sanitary inspectors, two staff nurses, in addition to rat squads in Brisbane. Northern offices, in charge of inspectors, are located at Rockhampton, Townsville, Cairns, and Mackay. A laboratory of microbiology and pathology, in charge of a medical director, is controlled by the Department, and performs a wide range of microbiological 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 Health Act of 1911-17.

A scheme for the limitation of venereal disease in the metropolitan area is in operation in Brisbane under statutory powers. 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. The Health Act Amendment Act 1917, has extended the venereal clauses to the whole State.

5. **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, 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 connection with outbreaks of infectious diseases. In the outlying districts there are fourteen inspectors directly responsible to the Board.

6. **Western Australia.**—The legislation in this State is the Health Act 1911, with three amending Acts 1912 (2) and 1915. The central authority is the Department of Public Health, controlled by a Commissioner, who must be a qualified medical practitioner. The local authorities constitute :—(a) Municipal Councils, (b) Road Boards which may be appointed as such, (c) Local Boards of Health, composed of persons appointed by the Governor for a certain period. These Local Boards are only utilised 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, and the medical examination of school children.

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.

7. *Tasmania*.—The Public Health Act 1903 vests central control in the Chief Health Officer, who is the permanent head of the Department of Public Health. He 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 three 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 fifty-one 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.

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.

§ 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. 556, 557), 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 sanitary condition of the milk supply is also subject to special regulations or to the provisions of special Acts.

(i) *General Objects of Acts.* The general objects of the Acts dealing with the inspection and sale of food and drugs are to secure the wholesomeness, cleanliness, and freedom from contamination or adulteration of any food, drug, or article, and for securing the cleanliness of receptacles, places, and vehicles used for their manufacture, storage, or carriage. The sale of any article of food or any drug which is adulterated or falsely described is prohibited, as also is the mixing or selling of food or drugs so as to be injurious to the health. A more detailed account of the various State Acts and of their administration and enforcement is given in previous issues of the Year Book (see No. 6, p. 1090).

(ii) *Inspection and Analysis.* Power is given to any authorised officer to enter any place for the purpose of inspecting any article intended to be used as a food or drug and also to inspect articles being conveyed through the streets, by water or by rail. He may take samples for examination or analysis, and may seize for destruction articles which are injurious to health or unwholesome. Chemical analyses and bacteriological examinations are made by qualified officers. Special provision is generally made in the Acts with regard to the sale of preservatives and disinfectants.

(iii) *Advisory Committees.* In New South Wales, Victoria, and South Australia Advisory Committees have been appointed for the purpose of prescribing food standards and for making recommendations generally with a view to carrying out the provisions of the Acts. The duty of enforcing these regulations is entrusted to the local authorities, but it is stated that up to the present comparatively few of the local councils seem to have realised the importance of guarding the food supplies of the people.

4. Food and Drug Standardisation.—With the object of securing uniformity of food and drug standards of the principal manufactured products sold in the Commonwealth, a conference, which was attended by representatives of the Commonwealth and all the individual States except Western Australia, was opened in Sydney on 8th June, 1910. The result of this conference was that several adoptions of standards of food and drugs, and labelling of articles for consumption were made, so as to obtain uniformity in the several States. In June, 1913, a second conference of the principal Health Officers of the Commonwealth and States was held in Melbourne. Emphasis was laid on the importance of fixing uniform standards throughout the Commonwealth for food and drugs, and of also securing uniformity of administration of the laws relating thereto. It was also urged that, as the uniform enforcement of standards throughout the Commonwealth depends to a great extent on the methods of analysis, the Commonwealth and State analysts should prepare standard methods for determination of the chemical standards adopted. The resolutions of the conference were submitted to the Premiers' Conference held in Melbourne in March, 1914. As a result of resolutions then adopted, each State has issued new 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 Poisons Act was formerly administered by the Police, but it is now administered by the Health Department.

In all the States the necessity of responsible control of poisons has been realised. The preamble to the Victorian Act, which State alone retains it, emphasises this necessity, and contains the key to the objects sought to be obtained. The preamble is as follows:—

“Whereas the unrestricted sale of poisons often leads to fatal accidents and the commission of crime: And whereas large quantities of arsenic, strychnine, and other poisons are used in Victoria for pastoral, agricultural, and other purposes, and fatal accidents occur by reason of the careless custody and use of such poisons by the owners thereof, or persons in their employ: And whereas it is expedient for the safety of the public to regulate the sale of poisons, and to make provision for the exercise of proper precautions in the use of same: Be it therefore enacted,” etc., etc.

In New South Wales and Victoria the Government subsidises the Pharmacy Board, in order to enable it to carry out the provisions of the Poisons Act. The subsidy is granted on the ground that the Act is passed for the public safety.

Generally, the poisons legislation throughout the Commonwealth seeks to protect the public, and aims at the prevention and detection of crime by restricting the class of persons allowed to deal in poisons, and by imposing conditions of sale. No persons, other than legally qualified medical practitioners and registered pharmaceutical chemists, are permitted to sell poisons without special license from the bodies administering the legislation in the respective States. These licenses 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 license fees, ranging from 5s. to 20s., are charged in the several States.

Special conditions are imposed which must be observed by sellers of poisons, namely:—special labelling, the use of special containers, entry in the poisons book of sales of the more dangerous poisons, presentation of a doctor's order by the purchaser where hypnotic and narcotic drugs are required, colouring of arsenic and strychnine, prohibition of sale of certain poisons to persons unknown to the seller. In South Australia, the regulations provide that vendors other than legally qualified medical practitioners, wholesale dealers, and registered pharmaceutical chemists, shall keep all poisons in a cupboard or room with the word “poisons” printed on the door. In Victoria, such vendors must keep poisons in the original package or container. The Victorian, Queensland, and South Australian regulations also provide that poisons are to be delivered in bottles distinguished by touch from ordinary medicine bottles or from bottles ordinarily used for beverages.

Poisons may be sold by correspondence. In such cases the letter ordering the poisons shall be preserved by the vendor and a memorandum of the date of the letter, by whom it is written, and the quantity and particulars of the poison therein ordered shall be entered in the poisons book, and no person shall sell any such poison so ordered to any person with whose signature he is not acquainted, unless such signature has been witnessed or purports to have been witnessed by a justice, clergyman, or public officer, or is authenticated by some person known to the vendor.

In Victoria, New South Wales, and Queensland, arsenic and strychnine are not permitted to be sold unless—in the case of arsenic or such preparation thereof—it is before the sale mixed with soot or indigo in the proportion of at least one ounce of soot in Victoria and Queensland, and one ounce of soot or half an ounce of indigo in New South Wales, to one pound of arsenic—and in the case of strychnine or such preparation thereof—it is before the sale mixed with Armenian bole or other red durable colouring matter.

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.

The careless custody of poisons by householders and others is a punishable offence in some of the States.

In each State provision is made for the infliction of stringent penalties in all cases of non-observance of the law.

§ 4. Milk Supply and Dairy Supervision.

1. **Introduction.**—Milk is pre-eminently the food which needs most careful protection, at each successive stage of its production, carriage, storage, and delivery, from exposure to infection from extraneous matter. The problem of obtaining a pure and clean milk supply has accordingly, during the last few years, demanded an increasing amount of attention from the Health authorities, and in each State special laws and regulations have been passed governing the supervision of dairy farms and dairies.

(i) *General Provisions of Acts and Regulations.* In general, it may be said that it is not lawful to sell or offer for sale any milk which is not fresh or wholesome, or which has been watered, adulterated, reduced, or changed in any respect by the addition of water or any other substance, or by the removal of cream. Regulations made under the Acts provide for the carrying-on of dairy farms, dairies, factories, and creameries, under proper and wholesome conditions; and supervisors and inspectors are appointed to enforce these provisions. Generally, the execution and enforcement of the Acts are left to the local authorities.

(ii) *Registration of Dairymen and Milk Vendors.* Dairymen, milk vendors, and dairy-factory or creamery proprietors are required, under penalty, to be registered. In some States registration must be applied for before commencing to trade; in other States it must be applied for within a specified time after the premises are first used.

(iii) *Inspection of Premises.* Dairy inspectors employed by the central departments traverse the principal dairying districts, and inspect dairy premises, dairy herds, appliances, and utensils, and ascertain in what fashion the various local authorities carry out the duties imposed on them. Regulations and instructions are issued by the central departments for the information and guidance of local authorities, dairymen, milk vendors, and others, as to precautions to be observed in order to protect milk from contamination, and to ensure cleanliness as to the structural arrangements, dimensions and ventilation of premises, and as to the care and health of dairy cattle. If an inspector is satisfied that any premises or apparatus used therein are unclean, or unfit for the purposes of dairy produce, he may require the owner to put the same in a proper and wholesome condition.

(iv) *Notification of Diseases.* Every dairyman or milk vendor is required to report immediately any case of certain prescribed infectious diseases occurring in any human being engaged at or residing on his premises. It is the duty of the local authority to take care that communication between all persons belonging to the infected household and the milk business in all its details is prevented. Cases of notifiable diseases occurring in animals at a dairy farm or dairy must also be reported immediately, and the owner must at once isolate the diseased animal. The sale of milk from an infected cow is prohibited, and, under certain circumstances, an inspector may order an infected animal to be branded or destroyed.

(v) *Analysis of Dairy Produce.* The local authority generally has power to enter premises and to take away samples of the milk, cream, butter, or cheese there found, and of the water supply therein, for the purpose of examination or analysis.

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 during the year 1918–19.

DAIRY PREMISES REGISTERED AND CATTLE THEREON, 1918–19.

| Particulars. | N.S.W. (1918.) | Victoria. | Q'land. (1918–19.) | S. Aust. (1918–19.) | W. Aust. (1918–19.) | Tasmania. |
|------------------------|-------------------|-----------|-----------------------|------------------------|------------------------|-----------|
| Premises registered .. | 18,435 | 12,662 | 13,341 | 1,025 | 927 | (a) |
| Cattle thereon .. | 936,681 | 107,949 | 341,181 | 5,885 | 8,539 | (a) |

(a) 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 Veterinary Inspector is in charge of all inspectorial work under the Dairies Supervision Act 1901, and has assisting him one assistant veterinary inspector and fourteen qualified dairy inspectors, each in charge of a district.

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 1915, 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, to institute prosecutions in case of adulterated or unwholesome food, and to carry out inspection of dairies, etc., in districts not yet proclaimed under the Act. By the end of the year 1918, 103 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 execution of the Act themselves or of electing for execution by the Department of Agriculture; up to the present all but one of the municipalities in which the Act has been proclaimed have elected for Departmental execution.

5. **Queensland.**—The control and supervision of the milk supply and of dairies and the manufacture, sale, and export of dairy produce in Queensland are provided for by the Dairy Produce Acts 1904 and 1911, 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 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 licenses 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 as to precautions against the spread and the compulsory notification of infectious diseases 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 and 1915, correcting certain imperfections in the original Act, and conferring additional powers. 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 interstate 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 interstate 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 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 of Quarantine. In Tasmania, the chief health officer of the State acts as chief quarantine officer, and

* From information furnished by the Federal Director of Quarantine.

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 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. "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 ports of Australia.

(v) *Regulations.* Regulations have been made prescribing the quarantine signal; the hours of clearance of vessels; forms of notices, orders, reports, and bonds to be used by masters, medical officers, quarantine officers, and importers; the period of detention of vaccinated and unvaccinated persons in quarantine; the conditions of removal of goods and mails; the method of disinfection of persons, animals, and infected or suspected articles; the notification of certain diseases, including venereal diseases; the conditions under which certain animals not prohibited may be imported; the sustenance charges for quarantined animals; the conditions of importations of hides, skins, wool, hair, bones, and animal manure; the method of carrying out the quarantining, disinfection, fumigation, and treatment of plants and packages. Regulations have also been made with the object of preventing the ingress to and the egress from vessels of rats and mice, and for the destruction of rats, mice, and other vermin.

(vi) *General.* The procedure has already been greatly simplified. 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 .. | .. | .. | .. | .. | + | .. |
| Bilharziosis .. | .. | .. | .. | + | + | + |
| Broncho-pneumonia .. | .. | .. | + | + | .. | .. |
| Bubonic plague .. | + | + | + | + | + | + |
| Cerebro-spinal fever .. | + | + | + | + | .. | .. |
| Cerebro-spinal meningitis .. | + | + | + | + | + | + |
| Chancroid (soft chancre) .. | .. | +(b) | + | .. | + | + |
| Cholera .. | .. | .. | + | + | + | + |
| Continued fever .. | .. | + | + | .. | + | .. |
| Diphtheria .. | + | + | + | + | + | + |
| Dysentery .. | .. | .. | +(e) | .. | .. | .. |
| Enteric fever .. | + | + | + | + | + | + |
| Erysipelas .. | .. | + | + | + | + | + |
| Favus .. | .. | .. | .. | + | .. | .. |
| Gonorrhœa .. | .. | +(b) | + | .. | + | + |
| Hæmaturia .. | .. | + | .. | .. | + | .. |
| Infantile paralysis .. | + | + | + | .. | + | + |
| Infective granuloma of the pudenda .. | .. | +(b) | + | .. | + | .. |
| Influenza .. | .. | + | + | .. | .. | .. |
| Leprosy .. | + | + | + | + | + | + |
| Malarial fever .. | + | + | + | + | + | .. |
| Measles .. | .. | .. | + | + | .. | .. |
| Membranous croup .. | + | + | + | + | + | .. |
| Ophthalmia neonatorum .. | .. | +(b) | .. | .. | + | + |
| Pneumonic influenza .. | .. | .. | + | (g) | + | + |
| Poliomyelitis anterior acuta .. | + | + | + | .. | + | + |
| Puerperal fever .. | .. | + | + | + | + | + |
| Pulmonary tuberculosis (phthisis) .. | +(a) | + | + | + | + | + |
| Relapsing fever .. | .. | + | + | + | + | .. |
| Scarlet fever .. | + | + | + | + | + | + |
| Scarlatina .. | + | + | + | + | + | + |
| Septicæmia .. | .. | + | .. | .. | + | .. |
| Small-pox .. | + | + | + | + | + | +(f) |
| Syphilis .. | .. | +(b) | + | .. | + | + |
| Trichinosis .. | .. | + | .. | + | .. | .. |
| Typhoid .. | + | + | + | + | + | + |
| Typhus fever .. | .. | + | + | + | + | + |
| 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.

(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 ætiology of plague, leprosy, and small-pox have been published.

(iv) *Victoria.* Under Part VI. of the Public Health Act 1915, the notification of cerebro-spinal fever or meningitis, continued, enteric and scarlet fever, diphtheria, infantile paralysis, influenza, membranous croup, poliomyelitis anterior acuta, pulmonary tuberculosis, scarlatina, puerperal fever, and typhoid is compulsory. An infectious disease cannot be declared notifiable unless it is prevalent; hence small-pox, cholera, etc., are not notifiable diseases. An Act, passed in 1907, requires medical practitioners and registrars to report all cases of notifiable diseases coming under their notice in any proclaimed district, and not merely those cases which occur in the district in which the practitioner or registrar is resident.

(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. No case of plague has occurred since 1908. Provision is made for the diagnosis of leprosy, 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, as amended in 1908.

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. With the exception of Victoria, the Vaccination Acts are, however, not generally enforced. 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, where infantile vaccination is compulsory, 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 shows, so far as particulars are available, the number of persons vaccinated in each State from 1914 to 1918 inclusive :—

NUMBER OF PERSONS VACCINATED IN EACH STATE, 1914 TO 1918.

| Year. | N.S.W.(a) | Victoria.(b) | Q'land. | S. Aust. | W. Aust. | Tasmania. |
|------------|-----------|--------------|---------|----------|----------|-----------|
| 1914 | 6,629(d) | 23,536 | 30,000 | 940 | 3,017 | (c) |
| 1915 | 4,080(d) | 24,186 | 58(e) | 854 | (c) | (c) |
| 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) |

(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. (d) Exclusive of the military. (e) At Health Department, Brisbane.

(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 94,918 children medically examined during 1914, 33,109, or 35 per cent., had been vaccinated.

(ii) *Victoria.* Compulsory vaccination is enforced throughout the State, under Part IX. of the Health Act 1890. From the year 1873 up to the present time, it is estimated that 72 per cent. of the children whose births were registered have been vaccinated. Free lymph is provided. The number of children vaccinated in Victoria during 1918 was 15,306.

(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 1918 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 1918 was 36.

(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 fee for vaccinations. Nearly 3,000 vaccinations were effected during 1914 at Bunbury owing to an outbreak of small-pox which occurred there in May of that year.

(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 Quarantine Service. Besides Jennerian vaccine, a large number of vaccines, serums, and other bacteriological products are prepared for the treatment of human and animal diseases. Price lists of the various products have been issued, and the institution is now in full working order.

§ 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, are of common occurrence 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-four 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. For many years efforts were made to deal with the mosquito question in the larger centres, but owing to the absence of statutory powers these had only limited success. Special provisions of the Health Act Amendment Act of 1911 remedied this defect, and extensive operations, involving oiling, drainage, tank screening, the use of larvivorous fish, and other measures were organised by the Department of Public Health. The actual cost of the work during 1913 amounted to £795, of which the metropolitan local authorities contributed £420. Some 50,000 square yards of natural breeding places were attended to weekly by a special mosquito squad, over 2,000 street gullies were oiled, and tank screening with fine wire gauze was steadily enforced on owners and occupiers. The work was continued through the winter, in order to reach the eggs and larvæ at their period of lowest vitality. Operations have been, however, partly discontinued from May, 1914, owing to the unwillingness of the municipal councils to incur the expenditure entailed. It is hoped, however, by the Health Department, that a rigorous campaign will again be conducted against this pest, not only in Brisbane, but in every other closely inhabited part of the State, as it is considered that closer communication between the State and other countries, brought about through war conditions, is resulting in the return to Queensland of soldiers and sailors suffering from malaria.

Queensland Hookworm Campaign. It has recently been found that infection by the hookworm (*Ankylostoma duodenale*) is more widely spread in Queensland than was popularly realised. Of 13,720 whites and 401 aborigines examined,* 20.3 per cent. and 76.3 per cent. respectively were found to be infected, the examination embracing the

* By Dr. J. H. Waite, of the Rockefeller Institute, U.S.A., who has supplied the particulars given, and is conducting a research upon the ravages of the disease and a campaign for its elimination.

region between Cooktown and Townsville. The detailed results were as follow :—Cooktown, 10.8 per cent., Mossman, 16.4 per cent.; Cairns, 17.7 per cent. of the persons examined: Townsville, 8.4 per cent. of the school children examined. In the sugar districts, the Cairns district shewed 25.2 per cent. cases of infection; Johnstone River 24.7 per cent.; Cardwell, 43.1 per cent.; and Herbert River, 32.1 per cent.

Analysed according to age, it was found that from six to eighteen years of age the infection was 41.9 per cent. of the cases examined, and for all other ages, 11.7 per cent. According to race, aboriginals shewed 76.3 per cent. of infection; Italians, 43.7 per cent.; other white races, 20.3 per cent. The severity of the disease, as indicated by the resulting anæmia, was shewn by 1,322 cases of examinations of hæmoglobin: these gave an average of 72.9 per cent. of the normal, and a minimum of 20 per cent. of the normal. The effect of the disease was to produce marked dwarfing, retardation—both physical and mental—sexual immaturity, and impotence. The mental retardation in children was found to increase with age as follows :—

| | | | | | | |
|-------------------------|-----|-----|-----|-----|-----|-----|
| Age last birthday .. | 10 | 11 | 12 | 13 | 14 | 15 |
| 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 quite a remarkable way as soon as cure was effected. Instruction given as to the necessary sanitation methods to safeguard the population from infection was appreciated and responded to. Since the hookworm can penetrate the skin very readily, it is essential that where the temperatures admit of its development, great care should be taken not to pollute the soil with human excreta. Experience has shewn that proper demonstrations of the origin and harmful effects of the disease are very effective in bringing about the personal hygiene through which the sources of infection can be minimised. (The above figures are provisional and may finally be modified.)

(ii) *Institute of Tropical Medicine, Townsville.* The Australian Institute of Tropical Medicine was founded at Townsville in January, 1910. 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 the grant to the Institute considerably, 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 shown 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.

During a short journey through the Torres Strait islands, the occurrence and prevalence of such diseases as malaria, filariasis, elephantiasis, yaws and others was pointed out.

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 agchylostomiasis (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, were 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 from amongst the aboriginal population and, except in a few localities, attacked rarely 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, namely, 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, but hitherto no marked variations from the averages obtained in temperate climates has 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 connection 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 connection 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 connection with Northern Australia, and room and equipment are provided.

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 Administrator 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 to destroy mosquitoes at various places in these States, both by municipalities and private individuals.

§ 7. Supervision of Infant Life.

It has been frequently stated in recent years that when the social, climatic, and industrial conditions are taken into consideration, the infantile mortality of Australia, particularly in the large towns, is much higher than it should be. It is now generally recognised, however, that infant mortality is largely attributable to parental ignorance and neglect, and that, in particular, improper feeding is accountable for perhaps the majority of infant deaths. In all the States of the Commonwealth, Acts have been passed with the object of generally supervising the conditions of infant life and of reducing the rate of infantile mortality, and in many of the large towns measures have been adopted by private individuals to spread among the mothers a knowledge of the best methods of feeding and caring for their infants. Milk institutes have also been established after the manner of the *Gouttes de Lait** in Europe, with the object of reducing the number of deaths of infants from milk poisoning in the summer months.

* Organised action in this direction commenced in 1894 in Belgium. The original Belgian Society is known as the "*Société des Gouttes de Lait*." The movement has become an international one, and branches of the Society have been founded all over Europe. Similar philanthropic work was commenced in the United States of America before 1894.

Reference has been made in a previous part of this book (see page 182) to the number of infantile deaths and the rates of infantile mortality in each State, and it will be convenient to shew corresponding particulars here for the year 1918, classified according to metropolitan and other districts in each State :—

INFANTILE DEATHS AND RATES OF INFANTILE MORTALITY FOR METROPOLITAN AND OTHER DISTRICTS, 1918.

| Districts. | N.S.W. | Vic. | Q'land. | S. Aust. | W. Aust. | Tas. | C'wealth. |
|--------------------------------------|--------|-------|---------|----------|----------|-------|-----------|
| NUMBER OF INFANTILE DEATHS. | | | | | | | |
| Metropolitan .. | 1,252 | 1,175 | 393 | 299 | 233 | 111 | 3,463 |
| Other .. | 1,741 | 776 | 74 | 283 | 173 | 210 | 3,897 |
| RATE OF INFANTILE MORTALITY.* | | | | | | | |
| Metropolitan .. | 62.48 | 71.61 | 69.69 | 54.70 | 68.71 | 82.84 | 66.06 |
| Other .. | 56.76 | 51.56 | 51.38 | 48.04 | 46.57 | 53.30 | 53.26 |

* i.e., the number of deaths of infants under one year of age per thousand births.

It will be seen that in each State 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.

The conditions regulating the employment of boys and girls in shops and factories are referred to in the section of this book dealing with *Industrial Unionism and Industrial Legislation* (Section XXVII.). Certain particulars have also been given in Section XXIV. (pages 894 to 896) of this book regarding Orphanages and Industrial and Reformatory Schools in Australia. In previous issues a short account has been given of the principal Acts which have been passed in each State dealing with the subject of child-life, and of the principal functions of the States' Children's Departments. (See Year Book No. 6, p. 1011).

§ 8. Medical Inspection of State School Children.

1. **Introduction.**—For many years medical officers of health and many others concerned in education generally have, from time to time, suggested the desirability of a medical inspection of school children. The State, which enforces school attendance under penalties, is also under the obligation of securing a satisfactory hygiene for the child during such attendance. Moreover, efficiency in education demands several things, viz., that the conditions under which the studies are made shall be physically and hygienically satisfactory; that there shall be no undue concentration of nervous effort on school work, and that the child shall be reasonably safeguarded against infection, etc. Only by an adequate scheme of medical supervision can these results be attained. It appears certain, from the results of the work so far undertaken in the several States by the Medical Inspectors, that, had the supervision of the children's health, more particularly with regard to dental and optic defects, been commenced some years previously, the number of rejects by the military authorities during the war would have been very materially reduced.

Several limited and isolated surveys of the physical proportions of Australian children have been made during the past 30 years in the various States. The first important systematic survey, however, was made in Sydney in 1901, and the results were reported by the Government Statistician of New South Wales to the Australasian Association for the Advancement of Science Conference in Hobart in 1902, and shewed that the Sydney boy was taller than the English boy, but that his chest expansion was small in comparison with European figures.

A series of measurements on 500 boys took place concurrently but independently in Hobart during 1901, which also gave similar results. It was recognised that the figures were based on limited numbers, but they at least challenged attention. The 1901 survey in Sydney, though small, was a valuable and suggestive contribution to anthropometric research in Australia, and may be regarded as the beginning of a systematic attempt to ascertain what characteristics of bodily form are exhibited in Australia. This enquiry roused considerable interest in the other States, and series of measurements have since been made in Western Australia, Tasmania, and South Australia, by various authorities, and in Victoria by the Education Department's medical officers. Each year since 1907 the Department of Education of New South Wales has carried out regular anthropometric measurements of the height and weight of school children. A card for each child allows his measurements for successive years to be recorded. The department perambulated the apparatus, each set serving about 20 schools, and the visits recur in the same month of each succeeding year. Data for the whole State have now been collected, and it is anticipated that a complete analysis of the results will shortly be published.

2. Co-ordination of Effort.—So far as it has been carried out, the medical inspection of school children tends to shew that in Australia, as in other lands, the hygiene, both of the schools and of the pupils therein, is more defective than is ordinarily recognised, and that not only preventable physical injury to the rising generation from school conditions can be avoided, but also instruction itself can be made more efficient by a proper regard to the demands of a good school hygiene. For the purpose of securing uniformity of procedure in the several States, the Commonwealth Government in 1907 formulated a scheme and communicated with the States asking their co-operation in obtaining measurements of school children with a view to establishing the relations between age, weight and height, chest measurement, etc. Delays occurred from various causes, but in a paper read at the Science Congress in Sydney in 1911, the subject was again brought under notice, and this led to the appointment by the congress of a committee of experts to encourage anthropometric research and to consider the organisation of a systematic survey of school children throughout Australia. The scheme was essentially identical with the former proposal of the Federal Government, but in the interim the report of the British Anthropometric Committee became available, thus making possible a method uniform with that of Great Britain, and rendering the results immediately comparable with those of Europe.

The Australian Anthropometric Committee drew up a memorandum setting forth the importance and object of the survey, and suggestions as to method for the use of teachers, physical trainers and others interested.

A description of the proposed survey will be found in previous issues of the Year Book (see No. 6, p. 1104).

On the coming into operation of the Defence Act of 1910, military training became compulsory in the Commonwealth, and advantage has been taken of the prescribed medical examination to make a systematic record of the height, weight, and chest measurement of each trainee. There can be no doubt that these anthropometric records will in time furnish valuable data for the study of Australian physical development. Further reference is made to this subject in Official Year Book No. 11, pages 1203 to 1209.

3. 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. The employment of part-time medical officers was discontinued, and a staff consisting of a principal medical officer and nine full-time medical officers was appointed. Arrangements were made to provide facilities whereby all school children found physically defective would have an opportunity of being treated by the Department's officers. With these additions, the staff of the medical branch consisted of twenty full-time medical officers, three part-time medical officers, seven full-time and six part-time dentists, besides nurses, dental assistants, and clerks. The work now being carried on by the medical branch may be classified under the following heads :—

(1) The medical inspection of all school children in the State, whether attending public or non-State schools; (2) The investigation of epidemics of infectious diseases affecting school children; (3) Inspection of school buildings; (4) Delivering of systematic courses of lectures at the training college; (5) Delivering lectures to the senior girls in all metropolitan schools on the care of babies, personal cleanliness, home hygiene, sick nursing, etc.; (6) Delivering lectures to parents; (7) The medical examination of candidates for admission to the teaching service; (8) Giving first treatment in the back-country schools to the eyes of scholars suffering from ophthalmia, and instructing the children and parents regarding future treatment and prevention; also supplying afflicted children with sufficient drugs to carry on the treatment; (9) Visitation by nurses to the parents of defective children in order to better secure the treatment of those children; (10) Preparation and publication of books, pamphlets, etc., dealing with important aspects of hygiene. Since the reorganization alluded to above, 332,220 children have been examined, and of these, 198,336, or nearly 60 per cent., were found to be suffering from physical defects needing treatment. It is stated that considerably less than half of these received treatment.

During the year 1917, 64,804 children were medically examined, exclusive of the number examined by the Travelling Hospital and Travelling Clinics, referred to hereafter. Of these children, 40,347, or 62.2 per cent. were found suffering from physical defects, and of these, 39,003 were treated, 23,288 being attended to by the Departmental officers, while 15,715 were treated by outside agencies, including hospitals, lodge doctors, private practitioners, and dentists.

During the year 1914 a Travelling Hospital and a Travelling Ophthalmic Clinic were inaugurated, being followed by the Metropolitan Dental Clinic and the Travelling Dental Clinic in 1915. At the end of 1917 the treatment schemes in operation consisted of (1) a Travelling Hospital, staffed by two medical officers, a dentist, and a nurse; (2) six Travelling Dental Clinics, each staffed by a dentist and a dental assistant; (3) a Travelling Ophthalmic Clinic; (4) a Dental Clinic in Sydney, staffed by six half-time dentists and three full-time dental assistants. Provision was made for further extensions, but owing chiefly to the war it was not found possible to obtain suitable officers. The Travelling Hospital works in those parts of the State where there are no resident doctors or dentists. The number of children treated by the Department's treatment schemes during 1917 was as follows :—Travelling Hospital, 1,947 children; Travelling Dental Clinics, 14,158 children; Metropolitan Dental Clinic, 3,576 children; and Travelling Ophthalmic Clinic, 2,909 children; Metropolitan General Treatment Clinic, 610 children, or a total of 23,200.

The Sydney University has established a special course for the training of school medical officers. It is expected that a supply of school medical officers, trained to meet the special requirements, will always be available in the future.

4. **Victoria.**—In Victoria three medical inspectors were appointed by the Education Department at the end of 1909, and a fourth was added in 1915. Owing to war requirements, however, the staff was reduced to two. Medical inspection in this State now includes (a) Medical examination of pupils in State high schools, higher elementary schools and elementary schools; (b) Medical examination of teachers; (c) Lectures on hygiene to teachers; (d) Reports on school buildings and equipment; (e) Investigations *re* epidemic diseases; (f) Supervision of work of school nurses, bush nurses, special schools, and of the cleansing and disinfecting of schools. Arrangements have been

made to examine children four times during their eight years of school life, beginning with children at their entrance to the infant schools. Complete records are kept of the various measurements made and physical and mental defects noted. Notices regarding defects and advice as to consultation of doctor, oculist, etc., are forwarded to parents. After an interval of six weeks the head teachers enquire as to what course of action parents have pursued, and a further enquiry is made four months later. Prior to the long vacation in December, urgent notice is sent to all parents or guardians of children who need treatment, calling attention to the necessity and importance of having defects remedied. In the metropolitan area the School Nurse visits parents, urges treatment, and makes arrangements for visits to public hospitals of children needing attention. During the year ended 30th June, 1918, 6,613 children were examined, of whom 2,116 boys and 2,006 girls attended elementary and special schools, and 1,292 boys and 1,199 girls attended high schools. Teachers examined numbered 716, all of whom were women.

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

5. **Queensland.**—In this State a systematic scheme for the inspection of State school children came into operation on 1st January, 1911, under which a Medical Branch of the Department of Public Instruction was created, consisting of a Medical Inspector of Schools, a School Nurse, and a Dental Inspector. To this staff were added an assistant Medical Inspector, an Ophthalmic Inspector, two assistant Dental Inspectors, and three part-time Medical Inspectors. Owing to difficulties resulting from war conditions certain modifications have been rendered necessary. The services of both medical inspectors were requisitioned by the military authorities, and the Ophthalmic Inspector was killed while on active service in France. During 1917, thirteen part-time medical inspectors were engaged, three of whom were stationed in the Brisbane district and the balance in the chief country centres. Three full-time School Nurses are also employed. While careful attention is given to the ordinary medical examination, special effort is directed to what is known as the "follow-up" scheme. This consists in keeping in close touch with all cases of physical defect until the necessary treatment has been given. In cases where parents are unable to pay for private treatment, arrangements are made to have the children attended to at a hospital. During 1917, 20,071 individual medical examinations were made; the number of children reported as suffering from physical defects being 5,078.

The staff of Dental Inspectors now consists of a Chief Inspector, two male and three female assistants. At present the principal work undertaken is the inspection of the teeth of pupils between the ages of 6 and 8 years, although special cases brought under notice by head teachers are attended to, and in the smaller schools the whole of the children are dealt with. It is proposed to follow, if possible, all children throughout the period of their school existence, and to take effective action to remove dental defects. The number of pupils dentally inspected during 1917 was 16,594.

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, even in the short time in which the scheme has been in existence, a marked improvement in the schools that were examined twelve months previously.

6. **South Australia.**—In 1909, at the desire of the Government, Dr. Rogers examined 1,000 school-going children in different parts of the State. Children under seven years and over fifteen years of age were not examined. Investigations were made with regard to personal appearance, cleanliness, height, weight, chest measurements, teeth, eyesight, hearing, nose and throat, etc., and the report was presented to the Minister for Education

in September, 1910, the results being, on the whole, satisfactory. A summary of this report, which contains statistical details exhibiting many interesting comparisons between various States in the Commonwealth and other parts of the world, was given in a previous issue of this book (see Official Year Book No. 5, pp. 1132 to 1138).

No State medical supervision of its school children was, however, undertaken in South Australia until 1913, when a medical officer, a fully trained nurse, and a health inspector were appointed for the work. Under the system adopted, the children are weighed and measured, their sight and hearing tested, and their chests, throats, and teeth examined. After examination, a notice is sent to the parents of any child who is found defective to an extent likely to interfere with its educational progress. No treatment is undertaken by the State. During the year 1917, 3,972 children were examined, showing a considerable percentage with defects of sight, hearing, nose and throat, sufficiently serious to interfere with their educational progress. In addition, the teeth of 3,000 children required attention, 853 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.

7. **Western Australia.**—Until the year 1911 no general scheme for school medical inspection existed in Western Australia, although examination in a few metropolitan schools had been intermittently carried on. During the latter part of 1906 and the first half of 1907, an extended examination of about 3,300 children was conducted by the Department of State Medicine and Public Health with the co-operation of the Education Department. Many physical defects among the children were detected, and the co-operation of the Inspector-General of Schools resulted in steps being taken, where possible, to provide better hygienic conditions. The system followed during 1909 was that, wherever possible, a visit was made to a school, the teacher bringing up all children who appeared to be suffering from any physical defects or bodily ailments. The exact condition of the child having been determined, a notice was sent to the parents calling attention to the necessity of obtaining treatment for the defect. Under the Health Act 1911, Medical Officers of Health become medical officers of schools and school children. During 1917, a medical officer for schools was appointed, and inspections were carried out in some of the large schools in the metropolitan district. The number of children examined was 6,072.

In the Metropolitan District the members of the Dental Society have carried out a regular system of examination of children's teeth. In connection with this, and also in connection with the general system of medical inspection, free treatment is provided for those children whose parents are unable to pay.

8. **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.

Medical inspection of school children as now existing in Tasmania is carried out by four medical officers, each controlling respectively one of four areas, which for medical inspection purposes are known as Hobart District, Launceston District, the Southern Country and Northern Country Districts of the State. Additional assistants in the persons of school nurses have been appointed to follow up the work of the Medical Inspectors. Reports on the physical condition of the children are furnished, and parents advised when medical attention is considered necessary, and in the case of parents unable to pay for such attention, orders are given for free treatment at the hospital. The system of medical inspection of school children was extended during 1916 to the pupils of private primary schools, where the teacher makes application for such inspection to be made. Under the scheme in operation, practically all of the primary school children of the State come under medical examination at least once in every two years. The examination in 1917 covered about 14,000 children. During 1916 school dental clinics were established in Hobart and Launceston. In that year 3,282 individual children were examined and 4,573 in 1917.