Cambridge Power Board (extensions). The number of route-miles of electric lines at the end of the year under review is approximately 3,200. With the constitution of the seven electric-power districts in connection with Mangahao, together with Ashburton, South Canterbury, and Southland, and other Power Board areas, all being reticulated in the near future, the volume of the work will necessarily be considerable for some time to come.

During the year steps were taken to inaugurate a "safety campaign" in connection with the general use of electricity, and advantage was taken of the columns of the *School Journal* to broadcast some information on the care and use of electrical appliances, and the dangers in unauthorized interference with same or in touching any broken wires lying on the ground, &c. It is anticipated that this avenue of giving publicity to the need for safety precautions will produce good results in educating the rising generation, concurrent with the increasing use and applications of electric power.

All local authorities throughout the Dominion were also circularized drawing attention to the prevalence of electrical accidents. A list of the electrical accidents which have occurred in New Zealand during the past twenty years was compiled from existing records on this Department's files, totalling sixty-seven accidents, of which thirty-three were fatal, and this was distributed to all concerned. The various electric-supply authorities are becoming alive to the necessity of constantly keeping before the public the risks which exist if proper precautions are not observed, and have adopted various methods of propaganda accordingly.

Licenses for the erection of electric lines were issued to seventeen public bodies during the year, each involving a detailed investigation of plans, and numerous inspections were made of the plans of proposed hydro-electric works submitted under the regulations.

Australian Works.

An opportunity was afforded to me during the year to visit Australia and to look into the construction and organization of the corresponding works there.

In Sydney the general features of the large electric-power plants at Ultimo, White Bay, and Pyrmont proved very useful. The White Bay plant of the Railway Commissioners consists of three 10,000 kw. steam turbines, and runs at an operating-cost below 0·2d. per unit, consuming less than 2 lb. of coal per unit, costing £1 5s. per ton in the power-house bunkers. The circulating-water system and boiler-room equipment of this station are of special interest. The control-room and oil-switch layout are also very carefully designed. The control-room is practically separated from the engine-room, having direct communication only by a bay-window so high up and remote from the generators that all communication must be by telephone and electrical signals. In Ultimo power-house the old high-tension switchboard, now situated on a gallery in the engine-room, is to be removed, and replaced by a remote-control switchboard located in a similar operating-room shut off by windows from the engine-room. At Newport (Victorian Electric Railway) power-station the operating-room containing the switch-panels is entirely removed from the engine-room, and, it is claimed, with advantage in operating. In New South Wales I also visited the Port Kembla steam station (3,600 kw.), which is being developed by the State Government to supply power for constructing the Cordeaux and Avon dams and for permanent power-supply in the district. The most interesting feature of this station is the fact that every circuit is metered with a printometer meter, giving a perfect automatic record of the station output and its distribution. At Port Kembla I took the opportunity of examining the processes of copper refining and manufacture into wire and cable, and the Cordeaux and Avon concrete gravity dams in course of construction. The Cordeaux dam will be 177 ft. high above foundation—about the same height as the Arapuni dam—but will be much longer (1,315 ft.) owing to the flatter nature of the valley. It is a gravity section containing about 220,000 cubic yards of concrete, estimated to cost £675,000 complete.

In Melbourne I got into touch with the development of the Victorian Electricity Commissioners at Morwell brown-coal fields, consisting of a 60,000 kw. steam plant and an eighty-mile transmission at 130,000 volts, and also the Newport power-house of the Melbourne Electric Railways. This station consists of six steam-turbine units, each of 10,000 kw. to 14,000 kw. capacity, and contained many details in the boiler-room, engine-room, and switch-chambers of great value. The details of the Melbourne Electric Railway overhead construction and rolling-stocks and workshops were also instructive. Although they have had about 200 motor-car equipments, each consisting of four 150 h.p. motors, in service for about two and a half years, only two armature breakdowns had occurred in that time and a few field breakdowns. The operation of the electric trains generally has proved efficient and economical, and has increased the passenger-carrying capacity and the comfort of the railways very much.

In Adelaide I examined the tramway and lighting power-stations, and the plans of the new power-station under construction at Port Adelaide, designed for 10,000 kw. units.

In Sydney and Adelaide I examined the working of the electric steel-smelting furnaces closely. These are both small single-phase furnaces, 7 cwt. and 15 cwt. capacity, taking 200 kw. to 300 kw., and are proving very successful indeed.

In Broken Hill and Port Pirie I got into touch with the mining concentrating and smelting industries, which give the raw material for the electrolytic zinc industry which forms the basis of the Tasmanian hydro-electric-power scheme. At Port Pirie the Government wharf-cranes for handling the coal for Broken Hill and the concentrates from Broken Hill were particularly interesting. Fifty men were employed, and it is a rare example of a large wharf worked entirely by permanent labour. By keeping general repair work in hand the men are all kept fully employed without lost time, and only twice in four years have men been laid off owing to shortage of work, and that due to stoppages of work at the mines.