ELECTRIC TRAMWAYS
OF NEW ZEALAND.

No. 2. - - - Dunedin.

A recent visitor, in commenting in an Australian newspaper on the benefits which New Zealand is deriving from the municipalisation of lighting plants and electric tramways, stated that in permanence of construction and high efficiency the Dunedin tram system has no superior in the Australasian colonies.

The following particulars of this service, gleaned by the courtesy of Messrs. Noyes Bros., the engineers, will be noted with interest by PROGRESS readers.

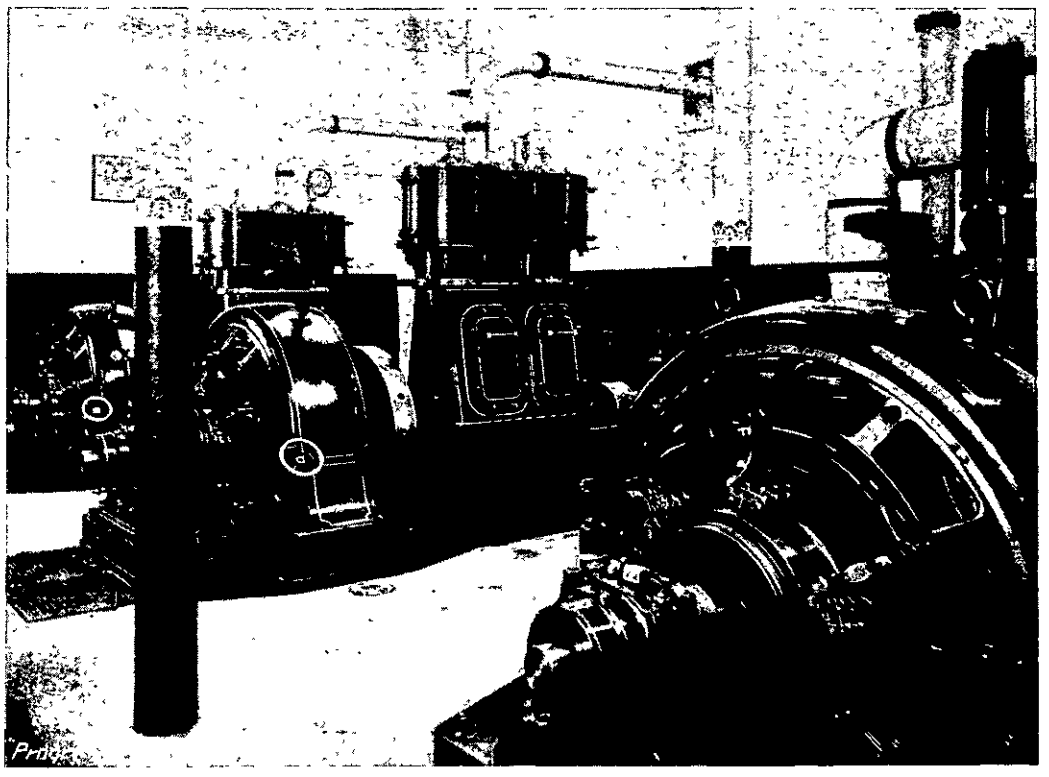
Turning first to the power house—which is of a temporary nature in view of the ultimate harnessing of Waipori—we find three Babcock and Wilcox water-tube boilers supplying steam to three of Belliss & Morcom's vertical compound engines, which are direct-coupled to three Westinghouse 6-pole generators supplying 500-550 voltage. The switchboard is of handsome Sicilian marble, and contains . three generator panels, with Westinghouse circuit breakers and instruments ; one summation panel, with wattmeter and main ammeter and voltmeter ; one battery and booster panel, with differentially wound ammeter to show charge and discharge of battery ; three feeder panels, with six Westinghouse circuit breakers, ammeters and switches ; two panels, with instruments and switches for controlling twelve circuits of six lamps in each circuit ; and one Board of Trade panel to comply with Board of Trade regulations. There are 260 Tudor accumulators capable of giving a discharge of 350 amperes for one hour. These cells take what is called the peaks of loads, and are connected to the mains through a reversible booster which causes the cells to charge when the loading falls below a certain predetermined limit, and to discharge when the loading rises above the limit. The use of this booster and battery has resulted in a saving of forty per cent. in fuel, as it enables a steady load to be kept on the engines and increases the load factor from thirty-six to thirty-seven per cent.

The car house is 165 feet square, and is lighted by a saw-toothed roof. In this house are thirteen tracks, and eight examination pits to enable ready inspection and repairs. A service of compressed air is laid to provide for the quick blowing of dust out of motors and cars. Along the sides of the car house are the revenue office, traffic staff's room—where each employee has his own locker for uniform, etc.—machine shop, armature room, stores and lavatories. The machine shop is equipped with an overhead crane, a 10-ton wheel press, planing machine, lathes and drilling machines. The revenue office is on the ground floor of the car house, and the rooms upstairs provide accommodation for the mechanical and traffic staffs.

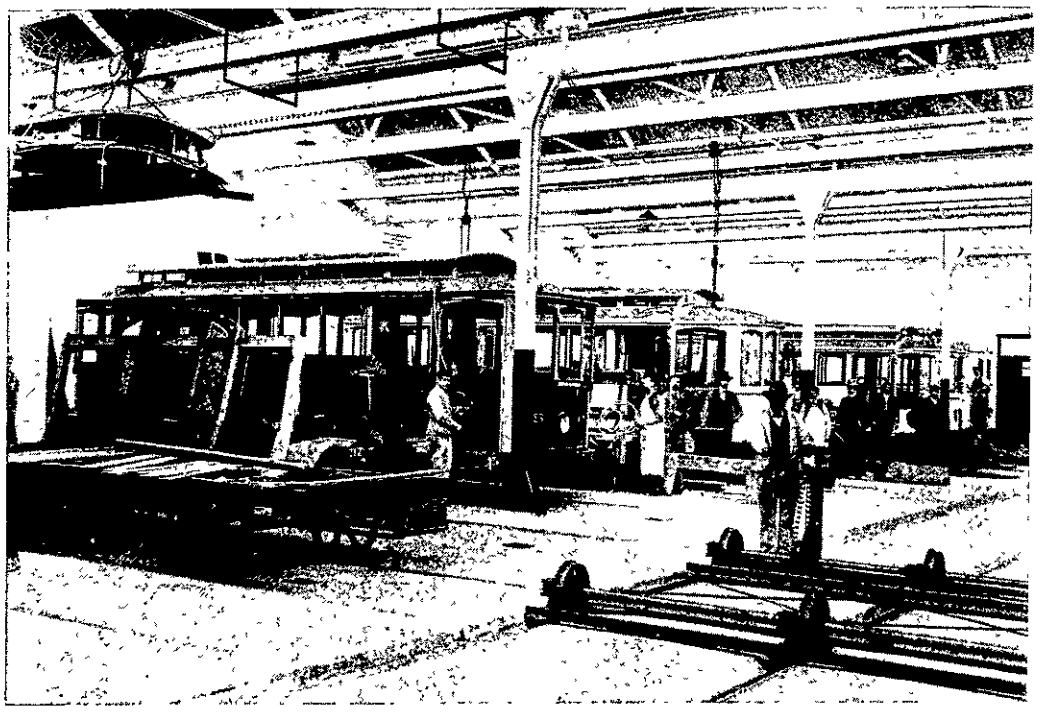
There are thirty-four cars now running on this system, all of which have been built by the J. G. Brill Co., of Philadelphia.

The box cars are quite enclosed, measure about 29 ft. overall, and have a seating capacity for thirty passengers These cars are commodious—there being plenty of room to walk down the centre when passengers are seated on either side. The combination cars have an enclosed saloon in the centre to carry passengers, and two seats at either end for five passengers each. Both box and combination cars have glass ends provided for the protection of the motormen. The open cars, of the type originally designed for Hong Kong, have seating accommodation for fifty passengers. Doors are provided on the box cars, and iron gates and rails on the combination cars to prevent the passengers getting on and off on the wrong side. These open cars have ten seats athwarts, and provide seating capacity for fifty passengers. Weather curtains, provided for protection against rain or dust, may be pulled down or rolled up as necessity arises. Reversible seats enable the passengers to face the way the car is going, and foot rails add to their comfort. The convex panels, dashers, etc., of the cars are in Indian red ; the concave panels, stiles, posts, etc., in canary yellow and gilt lettering. The interior woodwork is of quartered oak, while the ceilings are of three-ply veneer quartered oak, decorated with aluminium. The car seats and backs are covered with Wilton carpeting, and all sashes are of quartered oak, and the glass in the windows is set in felt to prevent noise of vibration. The undertrucks are Brill, 21 E type, and the wheels and axles are by Krupp of Essen ; the motor equipment consisting of two 40-h.p. motors. The controllers etc. were supplied by the British Westinghouse Co., of Trafford Park, Manchester.

Each car is provided with a hand-wheel ratchet brake and a Westinghouse magnetic brake.*



INTERIOR OF POWER HOUSE. [*Guy, Photo, Dunedin.*



THE CARS. [*Guy, Photo, Dunedin.*

There are six trailers which have been selected from the old horse cars, and which have been renovated and mounted on new Brill trucks. These are also provided with the magnetic brake, and when the trailer is coupled up to a motor car the brakes are connected so that the motorman operates the two sets of brakes simultaneously. Each car is provided with a life-guard at either end. Nine extra cars of the open type have been ordered, and are expected to be assembled in time for the summer traffic. All cars were imported "knocked down in the white" and were fitted together and painted locally.

An electric sprinkler, holding 2,500 gallons of water, completes the rolling stock. This sprinkler is provided with a Jerrard's patent track cleaner. This is suspended from the frame of the undertruck between the wheels, and besides scraping all the dirt out of the grooves of the rail, it is very useful during the winter for clearing snow and ice from the grooves.

Destination boxes are fitted on the canopy at each end of the car, where a sign and name of destination is shewn. These are lit up by electric light at night.

The centre, side, span, and anchor poles are seamless steel tubular poles made by the Mannesmann Steel Tube Co., The scroll work of the brackets was designed by Mr. W. G. T. Goodman, and is of local manufacture, as also are the bases of the poles and arc lamp cradles.

The trolley wire—00 B. & S. gauge—is suspended from the poles—about 125 ft. apart—in the usual way by insulated hangers. Special care has been shewn in designing the overhead work so as to make it as neat as possible, and there is no question that it has been very successfully carried out.

All the feeders in the city are laid underground. The cables are drawn through the draw boxes—about 240 ft. apart—into earthenware conduits made by Doulton. Where the feeder taps on to the trolley wire the cable is brought up neatly alongside the pole, and a section switch is placed on the pole in a neat iron box. In the suburbs

* A description of the magnetic brake appears on another page.