

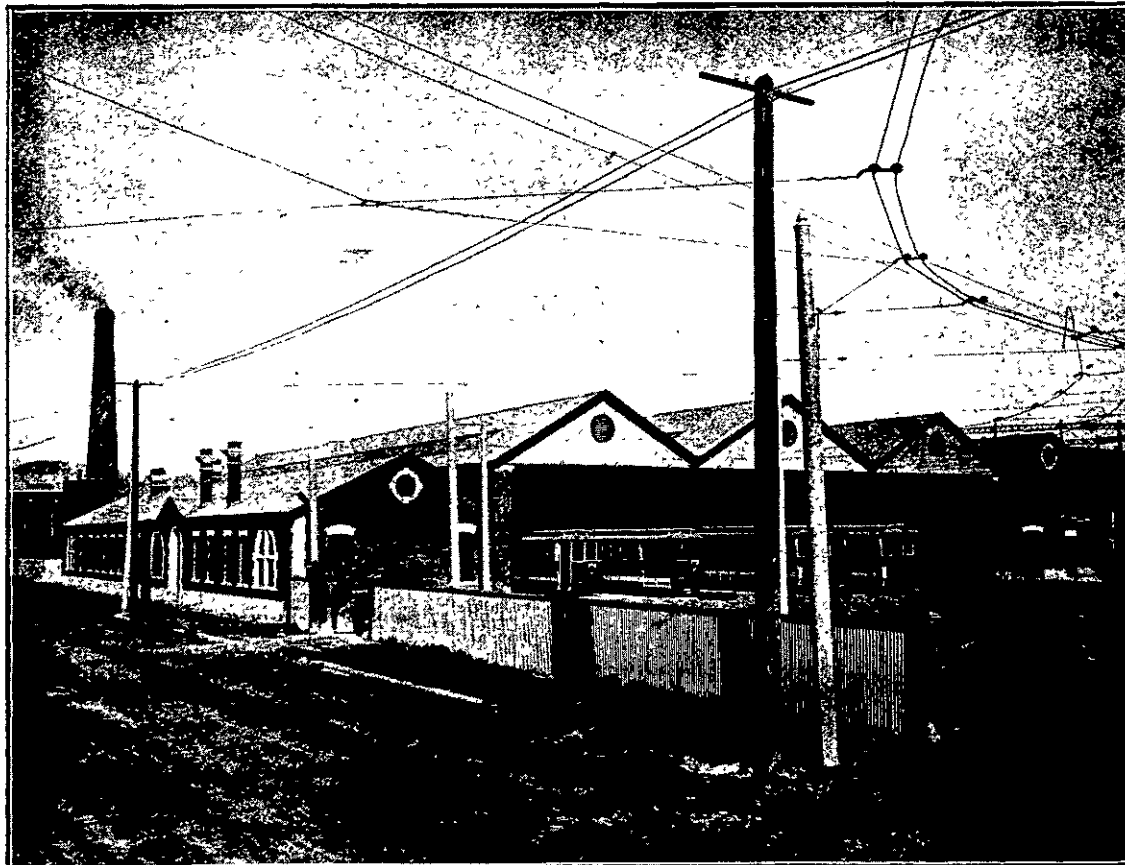
# ELECTRIC TRAMWAYS OF NEW ZEALAND.

No. 1. - - - Christchurch.

THE Christchurch electric tramway system, which was opened for traffic on 5th June last, has the distinction of being the only one having a 600-volt direct current south of the line; and experts affirm that the general equipment and rolling-stock need not take a single point of superiority from any other system in Australasia. The permanent way and overhead wiring are much the same as those in vogue at the other New Zealand centres, with the exception that the feeder wires are carried along the top of the street poles instead of through conduits. Chief interest, however, lies in the motive power at the central station, and this because of the introduction of the steam turbine.\* There are two two-stage, vertical Curtis turbines connected direct to two 600-volt, 500-kilowatt generators, and one set is capable of supplying the whole of the motive power for the service as it is at present—12 miles 21 chains. These turbines condense the exhaust steam in the ordinary way—the condensing outfit being supplied by the Alberger Condenser Co., of New York. The air pump and centrifugal pump in connection with the condenser are both driven by electric motors. The circulating water is cooled by an Alberger cooling-tower, which has sufficient capacity to cool enough water for the whole plant.

The auxiliaries in the engine room, excepting two 6 x 2 x 6 Worthington slow-speed pumps, are electrically driven—the air pump, centrifugal pump and water-cooling fan by motors of 15, 50 and 40-h.p. respectively. The air compressor in basement, which keeps all the electrical machinery clean, is also driven by electricity. A 20-kilowatt marine set, for lighting the station, completes the auxiliaries. In order to conform with Board of Trade regulations the plant is supplied with what are known as boosters—five negative and one positive—which are in reality supplementary dynamos installed for the purpose of re-inforcing the current on long-distance lines. The positive transmits the extra current to lines furthest from the central station, whilst the negatives are used to pull back the current through overhead return,

\* The Curtis turbine is described at length in this issue.



POWER HOUSE AND CAR SHED.

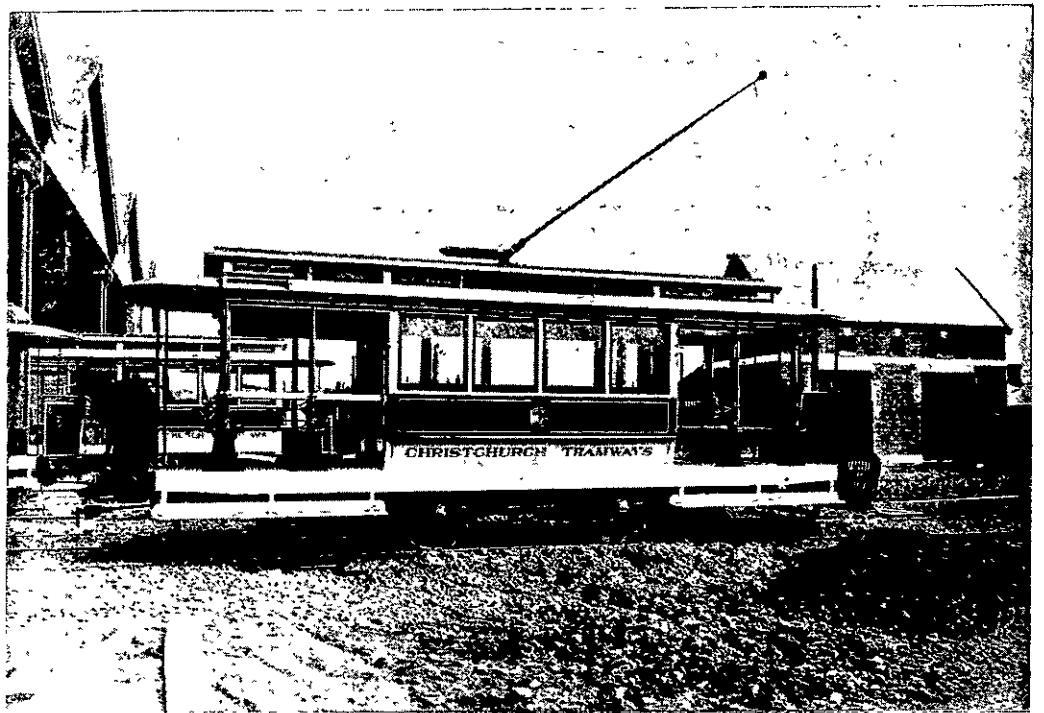
thus minimising against risk of electrolysis which is caused by the current coming back through ground return.

All cables supplied in this installation are lead-covered, in order to ensure perfect insulation and security against fire. The boiler room is replete with the most modern devices for the efficient and economical raising of steam. There are three Babcock and Wilcox water-tube boilers, each capable of evaporating 6000 lb. of water per hour, and working under a pressure of 150 lb. These fine steaming boilers are fitted with B. & W. chain-grate stokers—a contrivance which, slowly moved by

a 2-h.p. vertical steam engine, conveys the coal from overhead bins to the furnaces; and the outcome is a considerable lessening of the smoke nuisance on account of the instant consumption of gases before they have time to rise. The main flue passes through an economiser, thereby heating the feed water up to a high temperature. The boilers are fitted with B. & W. superheaters guaranteed to superheat boiler steam to 200°F. There is an injector to each boiler in case of breakdown to feed pumps. Two of Blake's feed pumps complete the boiler room outfit.

The main switchboard is considered to be the finest south of the line, it being of polished slate and surmounted by a clock and ornamental scroll bearing the names of the Christchurch Tramway Board. The panels of the board are thirty-one in number, made up as follows:— ten feeder, two positive booster feeder, four booster motor feeder, one summation, three machine, ten negative booster, and one lighting.

The rolling-stock consists of:— two-deck double-bogie cars\*—an improvement on the Wellington two-deckers, which have only four wheels; combination double-bogie cars—with nearly a foot clear space between knees of passengers and back of front seat; and the handy four-wheel box cars—similar to those of Dunedin, with vestibule at either end. There are twenty-seven new cars—



SINGLE-TRUCK COMBINATION CAR.

twenty-two having been constructed by the John Stevenson Co., of New York, and five by Messrs. Boon & Co., Christchurch; with these are used a dozen converted trailers. Two noticeable features of the new cars are:— (1) the introduction of air brakes, instead of the Westinghouse magnetic brake,† and (2), an American system of cleverly devised life-guards, which are said to be able to pick up any living object from the track, without harm, even though the car be travelling at the rate of twenty miles per hour. The cars are picked out in green and cream, and altogether present an exceedingly smart turnout.

The gauge is the national gauge of Great Britain as well as the common one in Europe and the most favoured one in America. It was used by the elder Stephenson for the Liverpool and Manchester Railway. It is 4ft 8½in wide, and was formerly known as the narrow gauge. The broad gauge, 7ft wide, which was once adopted on the Great Western Railway, has been discarded and is now almost forgotten. When the whole system has been completed, there will be twenty-nine miles thirty-three chains of single track and two miles thirty-one chains of double track, the latter being used within the city belts. The rails are of steel, and the best hematite ore has been used in their manufacture.

The 92lb. grooved rails will be used on the straight tracks over the whole system, with the exception of about four miles on the Sumner line, where the construction is what is known as the "live track." The exception has been made on account of the line there being laid next to an arm of the Estuary, and the

\* The earning capacity of an ordinary box car on short runs has proved to be twenty per cent. better than a two-decker.

† The Westinghouse magnetic brake will be fully described in next issue.