

ELECTRIC TRAMWAYS OF NEW ZEALAND.

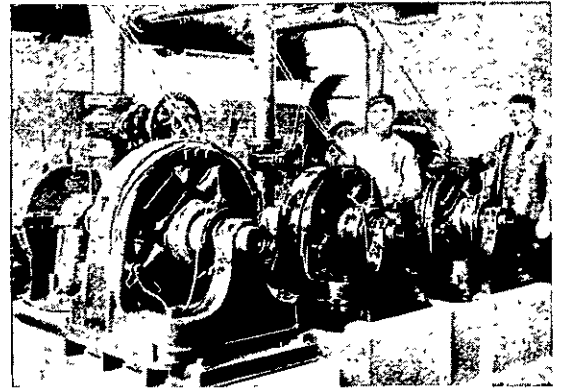
No. 3. - - - Wellington.

IN the forward movement of municipalisation of public works Wellington lays claim to her own fire brigade, drainage, water, and tramway systems, and lighting is to be added to the list in the near future. The electric tramways afford a good example of what may be attained in affairs having the direct control of the people. The system has now been in running order for close on eighteen months, and the detailed description which we are able to present to PROGRESS readers will be read with considerable interest.

The method of construction adopted is that of the now standardised system, viz.—the overhead trolley. There are over twenty-one miles of single and double track open for traffic. The whole of the city track has been laid on a solid concrete foundation, which provides a lasting bed. The rails are of the British standard section, 95 lb. per yard, 40' 0" long, and bonded with No. 0000 stranded copper bonds. The peculiar configuration of the city has necessitated quite a disproportionate number of sharp curves, points and crossings, with the result that the rolling stock is subjected to a much heavier wear than that of most other cities, since to maintain a fast service it becomes necessary to take the corners at what would otherwise be considered an excessive speed. The overhead wires are suspended from welded steel tubular poles, the latter being fitted with artistic bases and scroll work; and the trolley wire is No. 0000 gauge hard-drawn copper fixed with sweated ears and flexible suspension.

The rolling stock consists of 41 cars, and comprises box cars, double-deck cars, combination cars and the opensided Hong Kong type—all of which are painted in Indian red picked out with pale canary yellow. They all look well kept, and are in every way suitable for their particular class of work. All the cars, with the exception of the combination type, are mounted on the well-known Brill 21 E truck. The combination cars are provided with bogies by the same makers. The motor equipment, with the exception of the Hong Kong cars, consists of two 25-h.p. motors, the General Electric Co.'s type No. 54 being adopted. The Hong Kong cars are provided each with two 35-h.p. Dick Kerr motors. In addition to these cars five more are being built locally. The power station is situated on the reclaimed land within a stone's throw of the new coal wharf in course of erection for the Harbour Board—a site which will doubtless prove of great convenience. The boiler house fronting Victoria Street is a spacious room, 70 x 81, lofty and well lit and with ample window and skylight provision. There are at present three boilers of the Lancashire two-flue type, 8' x 30', working at a pressure of 160 lb. per sq. inch. Space has, however, been provided for four more boilers, two of which are now under order. The labour of stoking has been brought to the irreducible minimum because the coal, once tipped into the bunker, is fed by means of a series of motor-driven conveyors into the hoppers of the mechanical stokers, and thence to the furnaces. This mechanical stoker is of the well-known Erith make, and

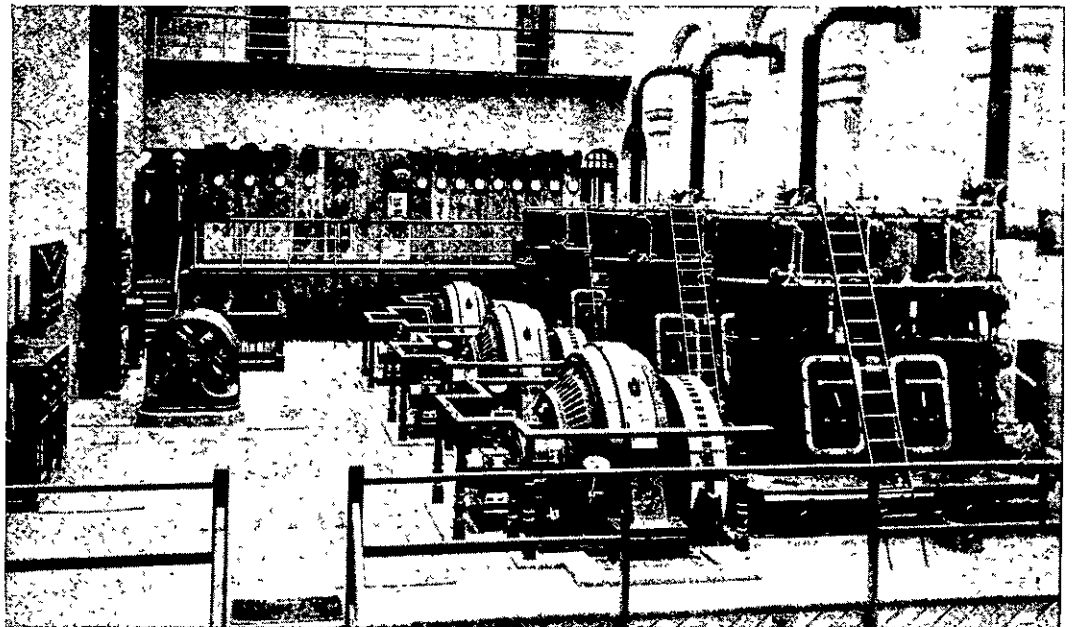
consists of an operating steam cylinder provided with automatic valve gear. The coal is forced with a simple ram action in below the fire line, and as the fresh coal rises it is brought to the coking stage at which the gases are liberated to pass upwards through the fire, thus ensuring the utilisation of the maximum amount of calorific value in the coal. Forced draught is provided by means of motor-driven rotary blower fans, which maintain a high furnace temperature. Two Weir gun-metal pumps represent the boiler feed plant, each with a capacity of 4000 gallons per hour. The feed water passes through a large Green economiser having 640 iron pipes set vertically in the flue; an auxiliary bypass flue is also provided as a standby during overhaul. The flues are 10' x 6'. There are two steam mains from each boiler, one leading direct to the 10" steam range, the other to a Bolton superheater set at the end of each boiler. Suitable valves are provided, thus admitting of the utmost flexibility



GWYNNE CENTRIFUGAL PUMPS DIRECT COUPLED TO E.C.C. MOTORS.

effected by motor reducers transferring the current from 550 volts to 220. The set, however, is also used from midnight to morning as a traction unit to keep the current on the lines for the ordinary work of cleaning and repairing the cars, etc. Of the three 500-h.p. sets, one is always standing by, while the other two take the traction load all day. Steam at a temperature of 460°F. is used, and, so far, has shown great economy. The speed of the small set is 500 r.p.m., and of the others 375 r.p.m. There are two motor reducers one of 60-k.w. and the other of 10-k.w.

The switchboard is effectively set on a raised



INTERIOR OF POWER HOUSE: BELLISS ENGINES, E.C.C. GENERATORS AND SWITCHBOARD.

of manipulation. The steam superheat is about 100°F. Geipel steam traps placed in suitable positions prevent any water, likely to condense in the pipes, from getting across to the engines. The type of engine used is the Belliss & Morcom triple-expansion, high-speed, self-lubricating machine, direct-coupled to E.C.C. six-pole direct-current generators. Four units are installed; one of 250-h.p. and three of 500-h.p. The foundations are in place, however, for two additional machines, one of which, of 1000-h.p., is under order.

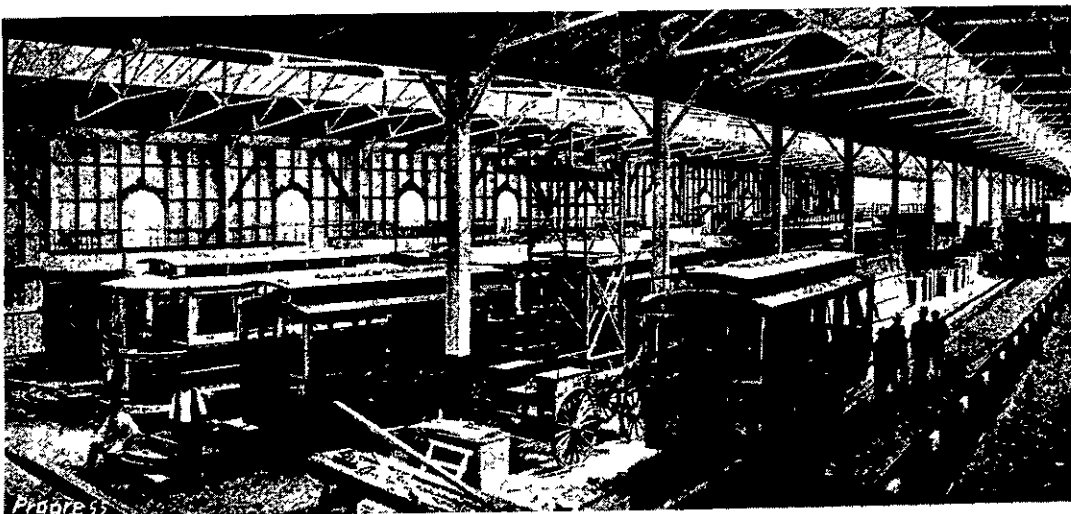
The 250-h.p. set is used for municipal lighting

parquetted platform at the end of the engine room, and is composed of handsome grey-blue marble. There are four machine panels, one Board of Trade, one summation, and nine feeder, all provided with the necessary indicating and integrating instruments, switches and circuit breakers.

The engine room is traversed by a three-motion motor-driven overhead crane capable of lifting 15 tons. The general appearance of the engine room, which is 85 x 35, is probably unequalled in New Zealand, the walls being sheathed with Wunderlich stamped steel facings and painted in green shades and cream, while the floor is suitably laid out with terra-cotta tiles.

The condensing plant is notable, in that it includes three motor-driven centrifugal pumps which pump the sea water through a culvert into the pump room, and thence into an overhead tank. The water then gravitates to jet condensers on the "Korting" ejector principle fixed to each individual engine. A first-class vacuum is maintained, the average being 27 inches. Engineers will appreciate this result since it is effected without the use of any form of air pump. Over the pump room are the offices of the chief engineer of the power station, the lines superintendent, and also the testing laboratory.

The engines are now working on a very small coal consumption. This fact, together with the economy of management of the works, results in the production of power at under three farthings per unit. The car shed, at the southern end of Newtown, is a fine building in picked brick, 384' long by 101' wide; the steel-trussed roof being divided into two bays provided with ample skylights. Forty feet of one end of the shed is used as work shops, paint shops and smithy. The work shops are provided with the most up-to-date motor-driven machine



CAR HOUSE: 384 FEET LONG BY 101 FEET WIDE.