

## Children's Ward, Invercargill Hospital.

This Children's Ward is to be formed in the present building by throwing five apartments into one, and thereby forming a ward 27ft. x 20ft., which will be used for some years as a Children's Ward, but will ultimately become an Isolation Ward when a future pavilion is erected for the use of children. The walls will be finished in Keen's Cement, and the ceiling with Wunderlich's plain stamped metal. A bathroom, lavatory, w.c. and duty room will all be provided for its sole use. They will have tiled floors, tiled dados 4ft. high and Keen's cemented finish above that. The usual up-to-date finish of a hospital will be followed throughout. The lavatory fittings will include an enamelled cast-iron bath, Doulton Hospital Sink for bed-pans, etc. This work, in conjunction with the new surgical block now building, comprises part of the general plan designed expressly for the future growth of this institution as a good working hospital on thoroughly modern lines.

## N.Z. Portland Cement in Australia.

### A Fair Test.

A large consignment of New Zealand Portland cement, sent over to Sydney recently, was found on testing to be far superior to the conditions required. The tests were, of time of setting, of the tensile strength, of compressive strength, and chemical.

The setting requirement was a minimum of 15 minutes for commencement, with for setting hard, a minimum of three hours and maximum of 12. The tested results were a commencement in two hours, completion to .975, 3 hours 45 minutes, and set hard in 6 hours. The maximum residues specified were for a mesh of 14,400 per square inch 15 per cent., and for a mesh of 32,400 30 per cent. The actual residues were 5.8 and 14.7.

For tensile strength the requirements were after 7 days in cold water a minimum of 583lbs. per square inch; after 7 days in Devil's hot bath 715lbs.; after 28 days in cold water, 715lbs. The tensile strengths on test proved to be respectively (under the above conditions), of 920, 1284, and 1047 lbs. This for neat cement with 15 per cent. of water.

For a mixture of one of cement to three of sand with 7.9 of water the requirements under the same conditions were 165, 250, and 250 lbs. The tests gave respectively 265, 362, and 400 lbs.

The compressive strength test specified for neat cement with 16.7 of water a minimum strength after 28 days in water of 5000lbs. per square inch, whereas the actual result gave 13,917. For a mixture of one of cement with 8.1 of water the requirement after the same specified period was 1750 lbs., and the result tested was 4186.

Under the chemical tests the specific gravity of the New Zealand article was 3.170 against the requirement minimum of 3.000; the residue insoluble in hydrochloric acid was 0.4 against a specified maximum of 2 per cent. Free lime in hydrated cement with 6 days of gauging the actual was 24 per cent., against maximum specified and minimum of 30 and 21. The sulphuric acid test gave 0.82 against specified maximum of 2 per cent.

## Bricks from Burned Garbage.

At Woolwich and at Nelson, England, garbage is incinerated in furnaces. The combustion gases, after heating boilers in which steam is produced for the generating of an electric lighting current, flow through tubes surrounded by air, which is thus heated to 300 deg. F. and is then blown through the furnaces. The operation leaves a large quantity of clinkers, composed of silica, alumina, lime, and iron, with a little magnesia, potash and soda, which is utilized in making sand-lime brick. The ground clinkers are mixed with quicklime and about ten per cent. of water, to form a soft mortar, which is stored in brick cisterns for a day or two to insure the complete slacking of the lime, and then goes to the brick-making machine. The fresh bricks are placed in closed vessels and subjected for eight or ten hours to the action of steam at eight atmospheres pressure. When taken out the bricks are sufficiently hard for immediate use.

The hardening is caused, as in the case of ordinary sand-lime brick, by the combination of the lime with the silica of the clinkers, at the high temperature of the steamer. The quality of the Nelson garbage brick is equal to that of good blue Staffordshire brick, except that it is rather more hygroscopic. Large building blocks and pavement tiles are made by similar processes.

## Reinforced Concrete Railway Sleepers.

From some information which has been furnished by the Italian State Railway authorities and the Gabellini Cement Company, it appears that the Italian Government has ordered 300,000 reinforced concrete railway sleepers of a new design, which are now in course of construction. The principal change is said to be in the increased number of the reinforcing bars, and a reduced diameter of the sleepers. The cost of the sleepers is estimated at about 5s. each, and it is believed that their endurance is from three to four times that of wood. The materials to be used in con-

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struction are Portland cement, sand in grains of two sizes, round iron bars, and braces of wood. The round reinforcing bars of the ties must support three bending tests at a temperature of 20 degrees of cold. The use of zinc iron is excluded. Braces must be of wood of strong fibre, and the wood must be well seasoned and thoroughly permeated with tar oil. In the construction of the sleepers a paste or admixture is employed which contains a cubic metre of sand and 0.75 tons of Portland cement, with the addition of water to give the mass a moist consistency. The sand should be washed with clean water, and so carefully and thoroughly that when fresh water is again applied it will be found to remain perfectly clear. The agents of the administration of State railways supervise the manufacture of the ties and are entitled to break open one tie for every thousand in order to ascertain whether the reinforcing has been done with iron bars of the prescribed diameter

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