Evan's Bridge, Otapiri (Vote, £150).—It is intended to erect a bridge of three spans of 20 ft. The work is in hand.

Eyre Creek Bridge (Vote, £300).—This work is completed. It consists of a light traffic bridge of fourteen spans of 20 ft. each. The vote was supplemented by a vote of £150 from the County Council. The erection of this bridge is a great boon to the travelling public as well as to settlers in the locality. All the streams between Invercargill and the Lakes are now bridged.

Garvie Burn Bridge, Hickey's Ford (Vote, £150).—A bridge consisting of three spans of 20 ft. each has been erected.

Hedgehope, Titipua, and Dunsdale Bridges (Vote, £500).—These bridges are in hand. They consist of 40 ft. spans (trussed) for the Titipua and Dunsdale, and 60 ft. for the Hedgehope. They are built almost entirely of 52 lb. steel railway-rails, the exception being the flooring and some bracing. They are a new departure in bridge-building, and the cost is cheaper than that of similar bridges built entirely of timber. They have been thoroughly tested as to their stability for carrying traction-engines, the test being thoroughly satisfactory.

The following bridges are also in hand and will be completed by the end of this year: Laura, Makarewa, Mimihau, Oreti, Otapiri, Forest Hill, and Winton Creek Bridges.

Waiau Bridge, Clifton.—This bridge was passed by me, and opened for traffic by the Hon. J. G. Ward on the 5th of April last. The work has been well carried out by Mr. William Baird, the contractor. The bridge had a thorough test as to its stability on the day of opening, it being fully loaded at one time with vehicles and pedestrians. The bridge has also been well tested as to wind-pressure, and, although not present, I am informed that there was no perceptible movement. The bridge is very stiff, and the movement, or wave, from a trotting horse is insignificant. The span is 366 ft., with roadway 12 ft. wide, sufficient for one line of traffic. The deflection of the cables is one-thirteenth of the span. The dead- and live-load capacity are respectively 147 and 137 tons, or a distributed load of 142 tons on each side of the bridge. The cables are galvanised steel, of which there are fourteen on each side. They are 5 in. in circumference, and have been tested by Kirkcaldy, of London, to stand a breaking-strain of 82 tons each. The total strength of the ropes works out at 2,296 tons, and, as the maximum possible strain at the towers equals 482 tons, a factor of safety of 5 is provided. As some engineers allow only 3½ to 4, this should be ample, and allows of considerable increase in the live load. The roadway timbers and ironwork is designed to carry traction-engines. The towers are of concrete, made of Millburn cement (Dunedin), which I consider superior to the imported article. The sand and cement found in the locality is of the very best for concrete purposes, and a thoroughly sound and satisfactory job has been made of this work. The ropes are anchored in the limestone in vertical shafts, which it was found necessary to fill with concrete to keep out the water. The timber has been carefully selected; the tranverse beams, blocks, and fillings are of ironbark; horizontal bracing of blue-gum; and chords, flooring, and joists of heart totara. The life of the totara may be estimated at twenty-five years; the ironbark, as far as is known, at forty to fifty years; and the ropes, ironwork, and concrete, which represent four-fifths of the cost, as permanent. The contract price for the bridge was £4,877 10s., which with extras amounting to £590 7s. made the total cost £5,468; but this does not include engineering and inspection. The scale of wages paid on the work was: Carpenters, 12s. per day; masons, 15s.; labourers, 8s. to 9s. A heavy item in the cost of the work was cartage of material from Otautau Railway-station, the distance being twenty-two miles.

D. Barron, Chief Surveyor.

APPENDIX No. 4.

EXTRACTS FROM REPORTS OF CHIEF AND ROAD SURVEYORS ON THE WORKING OF THE CO-OPERATIVE SYSTEM FOR THE TWELVE MONTHS ENDED 31st MARCH, 1899.

AUCKLAND NORTH.

During the past twelve months 354 contracts have been completed on the co-operative principle on roads in this district. The work in nearly all cases has been carried out by local settlers, and it has been generally fairly well done, the men working amicably together. Where work is to be done, after preparing the plan and specifications, I put up at the nearest post-office a notice calling offers for the work, and at the same time stating the price I intend giving for the jobs, and asking settlers anxious for the work to form themselves into gangs and to apply on a fixed date. If more gangs offer than I have work for I have a ballot taken before some Justice of the Peace or responsible person, so as far as possible to prevent the appearance even of favouring.

The average daily wage earned was 5s. 10¼d. per day of eight hours.

The total amount paid to co-operative contractors during the past year was £14,357.

Gerhard Mueller, Chief Surveyor.