Roman times drained the Alban lake. But it is unlikely that any drawings of the strata pierced are to be seen to-day. The contractors found some very hard rock on their way through the hill, and had great difficulty in getting steel hard enough for the boring. Shipment after shipment of tools proved useless, but in the end they succeeded in getting the tunnel through. Mr. Richardson, one of the firm, proceeded to London during these difficulties in search of better steel, taking with him blocks of rock, on which to try the steel, for the making of which he invited competition. Some of these samples were of rock that had absolutely defied the steel in use in the tunnel, and some had required the waste of three feet of steel for every foot of stone. When in London inviting the competition, Mr. Richardson found representatives of the Mont Cenis tunnel on the same quest. The rock of the Alps, a limestone, was softer than that met with in the Lyttelton tunnel, offering obstacles which were child's play in comparison, but it had brought the work to an absolute standstill, so inferior was the steel made for the European undertaking. W. Beardmore & Co., of Sheffield, were the successful competitors, with a special quality of steel which effectually disposed of the hard rock in the Lyttelton tunnel. That appeal direct to the manufacturers was a resourceful move worthy of the men who made New Zealand. The tunnel was a great triumph of engineering skill at the time—one that made its

THE PUNCH BOWL (BEALEY SIDE) NEAR EASTERN TUNNEL MOUTH.

mark in the history of the engineering construction of the period. To-day how different, with the hydraulic drills and the compressed air motors, the dynamite, guncotton, and diamond drills, which have made possible such works as the tunnels through the Simplon and the St. Gothard. The Lyttelton tunnel is 1 mile 55 chains long, and is large enough for a 5′ 3″ rail track, and cost about £200,000. The works proved a famous training school for engineers, and a large number of the staff of Messrs. Holmes and Richardson afterwards took a leading part in the railway works due to the Public Works policy of 1870.

The plans of the Lyttelton tunnel were drawn by the late E. Dobson, then Provincial Engineer, who was also designer of the famous West Coast road over the Arthur's Pass, one of the boldest works ever conceived in this country.

The construction and supervision were due to the Honourable E. Richardson, whose conspicuous abilities were then devoted for the first time to the service of this country, in which they have done royal work during the years that have passed since that eventful period of our history. It is to his experienced skill, prudent foresight, and organising energy that a great part of the success of the Public Works policy was due, in token of which fact Mr. Richardson is acknowledged by every man of capacity to have been the very best Minister of Public Works in our history. Trained as a civil engineer

THE APPROACH TO THE BRIDGE OVER THE ROLLESTON, WHICH LEADS DIRECT INTO THE MOUTH OF THE TUNNEL.