

this season. Papa for road-metal has been tried, and a careful record has been made of the exact cost per cubic yard of burnt metal. The result has not been entirely satisfactory. We can produce a hard metal suitable for roads out of a particular class of blue papa, but the cost at the kiln ready to load into drays is about 6s. 2d. per cubic yard. We find, in addition to the brown papa, which is unsuitable for burning, there are two kinds of blue papa, one of which is also unsuitable, as it apparently is full of lime, slacks down on exposure to the atmosphere, and burns light. The other contains more sand, retains its weight when burnt, and burns hard like a stone. We first tried an excavated kiln, building the papa blocks (of an average of about a cubic foot in size) as in a brick-kiln, and then fired it from below in the usual kiln manner. We found this would take less wood than laying papa and wood in alternate layers; but the cost of excavating the kiln and getting the burnt papa out added unnecessarily to the cost of production, and then we adopted a system that could be applied on any works while in progress. A kiln is built on an open road or other suitable place—say, 8 ft. wide, 8 ft. high, by any length, say 20 ft.—of blocks of papa not larger than 12 in. nor smaller than 6 in. cube, the side-walls being roughly built, so as to stand after burning, when the inner contents are removed. An archway about 3 ft. wide and high, by which to feed wood to fire the papa, is built in the kiln, and when the whole is completed the outside walls are plastered with papa-mud to control the draught and make the fire ascend. The kiln is fired by the archway, and when burnt and the contents removed another lot of papa may be burnt within the same walls. By this means no excavated kiln is required, a minimum of wood is used, and the material is easily got at for carting on to the road. But though we tried four experiments, we could not under any circumstances reduce the cost to less than the price I have named. We have metalled about 6 chains of road with the burnt material, which looks well, but for another year we cannot tell how it will stand the heavy winter traffic. It is very necessary that a further three miles of metalling should be done on this road next season—part near first Mangaotuku Bridge, part near Strathmore, and part near Mangaere—as the traffic is yearly becoming heavier, and these parts cut up very badly in winter.

*Ohura Road, Construction.*—In consequence of the wet autumn last year, and also the wet spring, we have not been able to push on road-formation as fast as was expected, in addition to which, our votes being expended, the formation-works were stopped about the middle of December. Believing the formation-work would be vigorously pushed on during last summer, we opened an 8 ft. bridle-road, on the permanent grades, over Pakaramu Ridge and to Waingarara Stream (about fifty-seven miles from Stratford), in order that parties could work on several miles of road, and obtain supplies by packhorse instead of swagging. In many cases we find this system of first opening up a good bridle-road, on the permanent grade, before the full dray-formation is cheaper than doing the full formation width at once, as in places such as deep narrow gullies we find an embankment will bind where from the angle of cross-section it should in theory slip away, and in afterwards widening the road a saving in the amount of cutting can be effected. The chief advantage, however, is that a large number of parties can work in advance of each other without in any way blocking the food-supplies. The bridle-road is now open to near Tangarakau Stream, about 57½ miles from Stratford. During the year 281 chains dray-road formation, 320 chains of 8 ft. bridle-road formation, 347 chains of felling, stumping, &c., 4,587 lineal feet of culverts from 1 ft. to 4 ft. internal diameter, and 137 lineal feet of bridges are the principal works effected. Between Whangamomona Township and the next three miles of road three large bridges had to be erected over Whangamomona Stream. One is completed (91 ft. 6 in. in length), and the other two (of a total length of 198 ft. 9 in.) are well in hand, the whole of the material being on the ground, and the erection of both bridges going on concurrently. The distance from Stratford to Kawakawa is about a hundred and twelve miles. Of this, about eighty miles is formed as a coach-road—viz., thirty-two miles on the north end and forty-eight miles on the south—leaving a gap of about thirty-two miles, out of which some five miles across the Pakaramu Ridge has been formed as an 8 ft. bridle-road, and would not be expensive to widen, being all on the permanent grade. It is very desirable that the whole of the bush left standing on Ohura Road—about fifteen miles along the Tangarakau, Paparata, and Heao Valleys—should be felled this season, in order that, if it be deemed necessary, the formation-works could be pushed on rapidly, and the road opened through to the northern end. The heaviest formation-works are now done, and rapid progress could be made with the remainder if desired. The maintenance of the road from former end of metal at nine miles and a half from Stratford to Waingara, a distance of about forty-seven miles, has been a large item in our expenditure. The traffic has been very heavy, and during the winter the slips were numerous. The road had to be kept open, or the settlers—of whom there are now a large number—would have been starved out.

*Pembroke.*—About 90 chains of upper end of Pembroke Road, next Mount Egmont Forest Reserve, will shortly be felled, stumped, and cleared out of this vote. The work should be completed early in May.

*Puniwhakau.*—This includes all the roads in Mangaehu Block. During the year we have felled, stumped, &c., 898 chains, formed a 5 ft. bridle-road 565 chains, including 1,304 lineal feet of culverts and 159 ft. of bridges, on Puniwhakau, Taihore, and Mangaehu Roads. There still remain several miles of roads to open to give proper access to this block, the loading-money being totally insufficient for the purpose. The country is very broken; the lands are in comparatively small areas (200 acres), necessitating many roads, and the roads, being generally on steep sidings, are expensive to make and keep clear of slips.

*Putikikituna.*—This road branches off Kohuratahi Road at 1 mile 43 chains from Ohura Road, and extends to Tangarakau River at a point it is expected steamers will connect with Wanganui. During the year 180 chains has been felled, stumped, &c.; 114 chains dray-formation made; 260 chains bridle-road; 111 lineal feet of tunnels for culverts, 6 ft. to 10 ft. in diameter, cut in hard papa rock; 169 lineal feet of ordinary culverts; and, in order to carry on the contracts in front of others,