

short, and local conditions making several bends in the rope unavoidable, wear-and-tear was found to be very considerable. Acting on my suggestion when visiting the mine in the early part of the year, the system was discarded, and a small pair of engines connected to the pumps by spur-gearing. This arrangement is giving very satisfactory results, and effecting considerable economy. At Allandale Colliery (Otago), where electrical power is used underground for hauling and pumping, a Mather and Platt patent high-lift centrifugal pump (for supplementary purposes) was decided upon during the year, and has recently been put to work. This, the first of its type to be used at any of the mines in this colony, is electrically driven; and the pump, although only a small one, has fully proved its suitability for mine-drainage. Its capacity is 5,000 gallons per hour against a vertical head of 210 ft., with an electrical energy of 200 volts and 37 amperes. The mine-manager informs me it is giving every satisfaction, and that a better pump could not be wished for. From the experience gained in the use of electricity for haulage and pumping it is probable that in the near future the Allandale Coal Company will considerably extend their electrical plant, and substitute an electrically driven high-lift centrifugal pump for the steam-pump now used for the main drainage of the mine. The class of pump under notice was described in the Mines Report (page 75, Goldfields division) presented to Parliament during the session of 1903.

In order to overcome the objectionable features of the exhaust from steam-pumps when discharged into the atmosphere of a mine or into the sump, advantage has been taken at a few mines of the simple condenser described and illustrated in my report (C.—3A) of two years ago. As a vacuum is obtained in addition to the advantage derived by the suppression of what would otherwise be a nuisance and also a source of danger by weakening the roof strata, the arrangement has proved of value in the economies of coal-mining; but, as pointed out in the description alluded to, the system has its limits, and is not applicable where the diameter of the steam-cylinder is more than double the diameter of the ram or water-piston, owing to the excessive proportion of steam to water detrimentally affecting the suction of the pump by the incomplete condensation of the exhaust-steam. To meet those cases where the relative diameters of steam and water cylinders are such as demand some other method of condensation, a very simple yet effective plan is to make the discharge-pipes for some distance from the pump of larger size than is necessary for discharge purposes alone, carrying the exhaust-steam pipe alongside the larger discharge-water pipe, then returning it *inside* the latter almost to the pump, and finally turning it into the suction-pipe. It is to be remembered that the enlarged pipe must be equal in area to the ordinary size of the discharge-pipe plus that of the exhaust-steam pipe. *Example*: Say (a) discharge-pipe 5 in. internal diameter, (b) exhaust-pipe 4 in. external diameter, then area of (a) 19.63 square inches + area of (b) 12.56 square inches = 32.19 square inches. The enlarged pipe would have an area of not less than 32.19 square inches, and the nearest size to this would be 6½ in. diameter, giving an area of 33.18 square inches.

In practice it has been found that good condensation has been effected with 120 ft. of exhaust-pipe submerged in the enlarged discharge-pipe in the manner described, and that an average vacuum of 7 lb. per square inch has been obtained. It is a wise precaution to have a check-valve on the exhaust-pipe near where the latter is turned into the pump suction-pipe, and also advisable to turn the end of the exhaust-pipe into the suction in the manner shown in the description of the simple condenser illustrated in the report already referred to.

Operations for the opening of a new colliery at Ngakawau, near Westport, have been commenced by the Westport-Stockton Coal Company (Limited) on the area referred to in my last report as having been taken up by Mr. G. L. Tacon. It is also understood that a Home company will open a colliery on land adjoining that held by the Westport Coal Company (Limited), formerly known as Cooke's lease. A colonial company, the Paparua Coal-mining Company (Limited), has also been floated to take over the lease of Messrs. Cutten and Neilsen at Paparua, near Greymouth, and active operations for the establishment of a large colliery are to be put in hand at an early date.

Matters in connection with the working of the New Zealand State Coal-mines form the subject of separate reports by the Managers.

EXAMINATIONS FOR MINE-MANAGERS' CERTIFICATES.

A copy of the papers set for the last examination of candidates desiring to qualify as mine-managers is appended.

SCHEDULES.

The list of persons to whom managers' certificates of service and of competency have been issued is appended, as are also the statistical tables showing the output of coal, &c., from, and the numbers of persons employed at, the several mines throughout the colony.

I have, &c.,

JOHN HAYES,

Inspecting Engineer.

The Under-Secretary for Mines, Wellington.