

additional outlet, but the assessors, Messrs. W. Leitch, manager of Blackball Colliery, and Robert McEwan, of Waikato, suggested to the company the construction of an underground embankment about 4 chains in width by hydraulic filling, to separate the under-lake workings from other parts of the mine; they also recommended stronger roof-supports at falls in the under-river workings. The use of hydraulic filling as a dam or stopping did not meet with the approval of the Mines Department, the mine-owners, or the workmen's inspectors, as it was realized that it was a mis-application, hydraulic filling being employed at mines as a support of rock, not as a dam. Material used in the construction of the latter must necessarily be impervious, whereas hydraulic filling is required to be porous to enable it to drain and become consolidated from floor to roof. At the Taupiri Extended Mine, to be effective, hydraulic filling would be required to support the roof throughout the shallow under-water workings: as a dam or stopping 4 chains wide, as suggested by the assessors, it would intensify the danger.

The danger owing to defective cover at the Taupiri Extended Collieries has been known for a number of years. In the Mines Department Annual Report for 1890 Mr. Henry A. Gordon, then Inspecting Engineer of Mines and now a director of the Taupiri Coal-mines (Limited), the owners of the Extended Mine, reported thereon as follows: "Some of the workings were not carried on with safety, and I had to give written notice to the manager that the men must be withdrawn from one portion of the mine, as they were working in a very dangerous place. On my next visit I learned that the men had only left this place a few hours before the ground came in from the surface."

In his annual report for 1900 Mr. James Coutts, the Inspector of Mines for the district, stated that "as the coal worked is either under the lakes or river, or in close proximity to them, large pillars have to be left in, more especially as the covering of the seam is mostly composed of running sand."

During March of this year the miners at the Extended Mine refused to continue working unless remedial measures were at once undertaken, and as the result of a conference subsequently held between their representatives and the mine-owners the latter agreed to isolate the shallow under-river and under-lake workings, by the construction of seventeen spherical dams constructed of timber (kauri) and concrete at sites shown upon the accompanying plan; also to construct an inclined stone drive connecting the main haulage-road with the upcast shaft as an additional outlet.

Waipa Colliery.—A considerable amount of work has been carried out by this new colliery, the output of which amounted to 100,568 tons. The thickness of the seam varies from 11 ft. to smaller dimensions; as the roof is of fireclay, about 2 ft. of coal is left for safety. Mining is carried on from two adit sections. In that section, situated to the westward, a fault has been encountered, at the other side of which boring operations have proved the coal-seam to be considerably reduced in thickness. To the southward, upon the freehold of Mr. W. R. Holmes, the seam rises to the surface and outcrops. In this small area pillar-extraction has been commenced. The future of this mine depends greatly upon the result of development to the northward in the direction of the Pukemiro Colliery, but between the present mine and that area there is about 100 acres of private property (Sections 5 and 6, Akatea Village Settlement), over which the Waipa company do not hold mineral rights.

Pukemiro Colliery.—This new colliery arrived at the productive stage in August. Two adit sections have been opened upon a brown-coal seam of excellent quality and thickness, the output being carried to the screens at the company's branch railway by a short electrically driven endless-rope tramway. In the northern section of the workings a 40 ft. fault temporarily caused a cessation of operations.

Grey Coalfield.

At the *Point Elizabeth State Colliery*, with the exception of a small area of solid working to the rise of No. 2 section, all operations are now confined to pillar-extraction, which will probably be completed within two years. The ventilation and timbering of the mine are excellent.

The *Liverpool State Colliery* is being developed by two mines—namely, the No. 1 Mine, situated at the top of the haulage inclines, and the No. 3 Mine, situated near the coal-bins at Rewanui; the last-named is divided into two sections—namely, No. 3 and No. 3A. At the No. 1 Mine two seams have been exposed—namely, the Upper seam and the Morgan seam—but only the former has been worked. In this seam, which averages 8 ft. in thickness, standing pillars now cover an area of about 40 acres, and an additional area of about 30 acres of solid coal may be considered available. Owing to folding of the coal-measures the coal is very friable, and makes about 70 per cent. of slack at the screens. The Morgan seam, having an average thickness of 17 ft., is situated about 170 ft. below the Upper seam, and is approached by a cross-measures drift therefrom. Of this seam an area of about 130 acres may be considered as proved, of which about 50 acres is to the rise of the mine-entrance. This seam where intersected is soft and friable. At the No. 3 Mine about 24 acres is standing on pillars, and an additional 68 acres may be considered as proved. The average thickness of the seam is 7 ft., and the coal generally is hard and of superior quality. In this mine Imperial permitted explosives are used. During the year two hundred Gray-Sussman Imperial permitted safety-lamps were installed, and after nine months' use have given every satisfaction. The miners have expressed pleasure at their introduction, owing to the superior light given. This is the only colliery in the Dominion where electric safety-lamps are in use. The ventilation at this mine is excellent. A large electrically driven single-inlet Sirocco fan is installed at the No. 1 section. There have been cases of omission by deputies to enter in their report-books the presence of fire-damp.

Paparoa Colliery.—During the year this colliery went into liquidation. Operations have since been on a reduced scale, and but few men are now employed. At this mine during 1915 over 67 per cent. of the output was slack.