

SECTION IV.—GENERAL REMARKS.

Ventilation.—The ventilation of mine-workings has been found generally to be excellent, and in no case has it been found necessary to remove men from a place by reason of the air containing less than the statutory quality standard of 19 per centum of oxygen or more than 1 per centum of carbon dioxide. No large accumulation of fire-damp has been reported at any mine, and no accident from gas-ignition occurred during the year. At the following mines fire-damp mixture has been reported most frequently by deputies during the year:—

	Number of Occasions.	Maximum Quantity Gaseous Mixture.
Taupiri Extended	24	500 cubic feet.
Kaitangata No. 1	51	500 „
Castle Hill	28	600 „
Point Elizabeth	26	20 „

At Castle Hill Colliery on the 26th September a blower was tapped in a bord in the rise workings of the Carson seam; on the 5th December I measured 600 cubic feet of gaseous mixture in the bord end, and bottled two samples therefrom, which upon analysis were proved to contain methane 53·80 per cent.; carbon dioxide, 0·40; oxygen, 8·82; nitrogen, 36·98. The fire-damp contents are the highest, and the oxygen-contents the lowest, of any sample of mine-air of which I have any record. At the time the samples were taken the gas was being properly removed by fixed brattice. I understand that the blower is now diminishing, but further influx of gas may be expected as work advances in the same locality.

Coaldust.—As a result of experiments conducted by Mr. Donovan, M.Sc., Mining Chemist, at the Dominion Laboratory, Wellington, it has been further proved that some of our bituminous and brown coal is exceedingly inflammable; and, in view of this and the impracticability in some cases of rendering harmless or removing accumulations of coaldust, the use of no explosive other than an Imperial-permitted explosive is now allowed at mines in which inflammable gas has been found within the previous three months, or at those which are not naturally wet throughout. The safe degree of wetness adopted by the Department as adequate is that recommended in the Sixth Report of the (British) Explosions in Mines Committee—viz., “The maintenance of at least 30 per cent. of water in a state of intimate mixture with the coaldust.”

At some mines, such as those at Kaitangata, it has often been found impracticable to maintain pillar-sides free from accumulations of coaldust, as such dust is constantly being produced by frittering, and to a certain extent when heaped against the pillar-side prevents greater decrepitation. At the Taupiri Extended Colliery fully fifty miles of old standing workings contain accumulations of coaldust from falls and frittering. Efficacious treatment by stone-dust or watering in such places is impracticable. In such cases as these safety can only be secured by the use of permitted explosives and safety-lamps, and general observance of the regulations pertaining to the use of explosives and lights.

On the 23rd May, 1917, at 11.20 a.m. a coaldust explosion, fortunately unattended by loss of life, occurred in the Deep Creek section of the Ironbridge Colliery, the property of the Westport Coal Company (Limited).

The Deep Creek section consists of a remnant of erosion containing about 10 acres of bituminous coal at an altitude exceeding 2,000 ft. above sea-level. The coal-seam is 14 ft. thick. The method of working is bord and pillar, the bords not exceeding 18 ft. in width, with an average height of about 9 ft.; the dimensions of the pillars are variable. The workings are lighted by naked lights, no inflammable gas having been seen in this colliery, the numerous outcrops and proximity to the surface having assisted in the liberation of occluded gas. Gunpowder was used for blasting. A plan of the mine-workings accompanies this report.

From the signed evidence of the colliery officials and some of the witnesses of the explosion, courteously supplied to me by Mr. Alexander Marshall, local manager for the company, and formerly Government Inspector of Mines for the district, the following account of the explosion has been prepared:—

A bord was being driven eastward at the point marked A on the plan, towards a place driven to split the pillar. Between the face of the bord and the side of the split there was only about 4 ft. 6 in. of solid coal. In the bord two miners were working, D. Crawford and E. Copper-smith; in the split no person was employed. Crawford drilled a shot-hole about 3 ft. 6 in. in length in a south-east direction at the face of the bord towards the split, inserted three plugs (1 lb.) of compressed gunpowder in the hole, and tamped the same with clay under the supervision of M. Connelly, deputy. None of these men knew that there was only about 1 ft. of solid coal between the charge and open place ahead of it. The shot was fired, and did not do its work, but blew through into that place; it made a report “like a cannon”; “the flame came as a ball of fire”; “the place was completely full of flame”; “the flame was steady”; the light from it was sufficient to enable the three men to retreat down the jig from the point B on the southern margin of the zone of explosion, where they had sheltered unhurt, although the shirt worn by Copper-smith was burned. Upon inspection of the zone of explosion it was found that the flame in every case had travelled towards the open goaf fallen to daylight, and to the holings to the surface, as shown by arrows on the plan. Along every drive marked by such arrows evidence of intense heating was noticeable, considerable charring of the coal and of the timber props being visible. The flame did not extend throughout the open workings, but propagation was confined to the area shown by the stippling of fine dots on the plan. No timber was knocked down or falls caused. Nine persons were employed in the Deep Creek section at that time; none, however, were in the zone of flame or received any injury.

On the 17th September I inspected the scene of the explosion. I found the sides of the pillars slightly damp, in degree insufficient, however, to moisten a postage-stamp. The floor was wet, although no pools were visible; coaldust could not be raised by kicking the floor or by blowing