EXPERIMENTAL MINE EXPLOSIONS.

Coal dust explosion tests in an experimental mine are dealt with in Bulletin No. 56 of the United States Bureau of Mines for the purpose of placing before mining men an account of the objects sought in the establishment of the experimental mine of the bureau. A description is given of the arrangement and equipment, and a detailed account of the first series of explosion tests, with explanatory notes concerning recording apparatus, etc.

Particularly interesting is the information which. the bulletin contains concerning the mine and its operation. The requirements considered in connection with the selection of the mine site were:—

It should be in a coal bed, the dust of which was inflammable; the mine should be naturally dry and self-draining; its openings should be drifts to avoid complications of shaft-wrecking; the mine should be practically free of explosive gas; a supply of natural gas should be available, so that tests with gas could be made if desirable; a good boiler-feed water supply should be available; and mine should be near a railroad, but at some distance from dwellings.

These requirements were met in the selection of the site at Bruceton, thirteen miles from Pittsburg. Development was begun in December, 1910. The mine at the time the first tests were made, which were considered to be preliminary tests, consisted of two main parallel entries a little over 700 feet long, nine feet wide, with a forty-one foot pillar between them. The entries were connected with cut-throughs every 200 feet. A diagonal heading 198 feet long connected the air-course at a point 117 feet from its mouth to a third opening. Ventilation was furnished by a small fan at the top of an air-shaft, which is offset six feet from the air course fifty-five feet from the opening.

The main entry was lined with reinforced concrete for the first 169 feet, and a strongly reinforced concrete portal constructed at the main opening. Five rows of shelves, three inches wide, were installed on each side of the main entry. The explosions in the first series were originated by blown-out shots of black powder from a cannon at the face of the entry or a pipe embedded in the coal. The shock wave from the shot would blow up the coal dust from a bench in front of the shot into a cloud and ignite it. Beyond this point the coal dust previously placed on shelves in like manner would be thrown into a cloud in advance of the flame and in turn be ignited.

At various points along the main entry instrument stations had been constructed in the coal rib, which were separated from the explosion gallery by heavy steel plates. Four types of instruments were used in recording the results of the explosions. Pressure manometers were used to give a record on a revolving smoked paper of the variation in pressure at the particular point. Pressure circuit breakers, installed in the stations, were connected to recording apparatus in an outside observatory by means of wires passing through a pipe embedded in concrete in a groove in the coal rib. When the circuit breakers were acted upon by a certain pressure the circuits were broken, the time of the breaks being recorded on a moving paper strip in the recording instrument at the surface. This permitted the determination of the velocities of the pressure wave between different stations. In like manner the velocity of the flame is obtained by a series of flame circuit breakers installed in the various stations. In addition, maximum pressure gauges measured, by the compression of copper cylinders, the maximum pressure exerted at various points.

The first series consisted of fifteen tests. Several of these were given before large numbers of spectators, that of December 30th, 1911, before about 500 persons. A large part of the value of this series was the educational work performed in convincing many persons who still doubted the explosibility of coal dust, that violent explosions could occur without the assistance of inflammable gas in the air. Apart from this result the tests were chiefly valuable in trying out the mine conditions and the various pieces of recording apparatus. Practically all of the tests were made for the purpose of obtaining information with respect to the phenomena accompanying the explosions. For this reason there was little opportunity for studying preventatives. The Taffenel barrier, with a load of shale dust, was not tried in the direct path of the explosion, but was installed a number of times in the air-course parallel to the main entry. The results were inconclusive as to its value.

Each of the explosions is described in detail in the bulletin as to origin of explosion, character of igniting shot, quality and quantity of coal dust used, nature of preventative, outside manifestations of the explosion, inside observations after the explosion, length of flame, and character of records obtained. Analyses of coal dust after the explosion, soot, coked dust, and mine air before and after the explosions are included in the description of the tests.

CHANGE OF NAME FOR NOVA SCOTIA FIRM.

The William P. McNeil and Company, Limited, of New Glasgow, N.S., have announced a change of name to that of the Maritime Bridge Company, Limited. The executive and directorate of the new firm is as follows:—Executive—Walter McNeil, president; Kenower W. Bash, vice-president and manager; Robert C. Grant, secretary. Directors—Francis C. McMath, president Canadian Bridge Company, Limited; Phelps Johnson, president Dominion Bridge Company, Limited; G. H. Duggan, general manager Dominion Bridge Company, Limited.

The old company was incorporated in 1908, although it existed for some time previous to that, in which time it has built up a considerable business. A good market for the products of the company was developed and in the spring of 1912 it was deemed advisable to place the plant and business in the most advantageous position possible for the handling of its requirements. This resulted in the joint purchase by the Canadian Bridge Company, Limited, of Walkerville and the Dominion Bridge Company, of the control of the organization.

In the fall of last year the plant was thoroughly overhauled and extensions made. Better facilities for fabrication work were introduced by more efficient routing of material, etc. The growth of the business in the eastern provinces and the development of the plant under the impetus of the changes made has been very marked.

DURABILITY OF TIES.

The average life of untreated ties as reported by the steam roads is as follows: Cedar, 9 years; tamarack, 8 years; hemlock, 7 years; Douglas fir, 7 years; jack pine, 6 years; spruce, 6 years. As recent statistics bear evidence, cedar is the species pincipally used, because of its durability, but the supply of cedar is rapidly becoming exhausted. Unless preservative treatment of ties is introduced, the short-lived species will have to be used untreated, which, on account of the necessary frequent renewal, will increase the cost of mileage maintenance. If treated ties were used, which would cost 30 cents extra per tie for creosoting and equipping with tie-plates, the inferior species, which are very plentiful and cheap in Canada, could be used with economy. With such a treatment, these woods would last at least fifteen years, and if protected from wear would probably last much longer, and would effect a very considerable saving.