

to the higher level. In this way the entire coal area is honey-combed from the shaft out towards the boundary. When the whole area has been worked in this way, part of the remaining 40 per cent. of coal may be recovered by robbing the pillars, that is removing the whole or part of the remaining coal, working from the boundary, allowing the surface to fall in if necessary.

The timbering of a pit worked on this principle is not extensive. The overlying strata is supported by the coal pillars; but the roof of the rooms must be further supported by one or two rows of timber, say 6 inches in diameter, and placed from 4 to 8 feet apart. Occasionally the roof of the haulage ways is supported by cross timbers set in the walls or resting on one or two props. The timbers used in the main airways are usually the best 8 inch props, for there the timber is more liable to rot, due to the large quantity of air that flows past having a very deteriorating effect on them. If the coal pillars at any part of the mine begin to crush on account of the weight of the overlying strata, then very heavy timbering must be resorted to, and a larger percentage of the coal left as pillars. On the traveling roads and haulage ways the old props are frequently replaced by new ones, for the average length of a prop is only from two to four years, and on main airways often not a year. Before the work of development has advanced very far it is necessary to put in some system of haulage. The mine cars here have a capacity of from 1½ to 2 tons, and run on a narrow gauge tramway. They are filled at the working face, and are drawn by horses to the main deeps and levels. The coal mined above the pit-bottom can be let down by gravity, the full cars going down pulling up the empties. When this is not possible some form of rope haulage is employed.

The two chief methods in use in Cape Breton are the tail-rope and endless cable systems. In the former the cars are drawn in trips, that is from eight to fifteen cars hitched together. In this system there is only one track and two ropes, one for hauling the loaded cars to the pit bottom, and the other of double the length of the road passing around a wheel at the end of the level or deep to pull the empties back to the working face. The engines are usually situated underground, near the pit bottom, and turn two drums of equal diameter, so that the one will be taking in the main rope, while the other is letting out the tail-rope, and vice versa. The main rope is a much heavier cable than the tail-rope, and will be as long as the road, the tail-rope will be twice this length. In the second system there is a double track and an endless cable kept moving at the rate of about two miles per hour along one track and back the other. The cars are attached to the cable by friction grips. The full cars are drawn to the pit bottom on one track and the empties taken back on the other. The advantages of this system are: 1. Less wear on cable and on roadbed due to slower speed. 2. The tubs arrive at the pit-bottom one at a time, and the strain on the cable is more equalized on account of the cars being fairly equally spaced. 3. The cable is only double the length of the road. 4. Only one engineer is required to manage three or four endless cables.

The disadvantages are: 1. A double track is required, therefore, the deeps and levels must be wider than in the single track system, and the initial cost of roadbeds and tracks more. 2. The initial cost of the power plant will be greater. 3. Cost of maintenance of roadbed more. 4. The cable will be damaged by the grips, and accidents are often caused in the deeps by the grips slipping. When the mine car is hauled to the pit-bottom it is run on to the hoist, where it is held by an automatic clutch; it is lifted to the bankhead, and dumped, and then lowered at the same time, as the next full car is being hoisted in the adjoining compartment. The lifts are run thus in balance, the weights of the cars and cages counter-balancing. The mine is usually kept dry by draining the deeps with compressed air pumps discharging into a sump or reservoir at the pit-bottom, and from there it is forced to the surface by a steam pump.

In all mines of this class some form of artificial ventilation must be employed. There are at least two openings to the mine, and it is so arranged by leaving walls of coal and walling up passages, that the air entering one shaft is divided so that some of it will pass through each part of the mine before finding its way up the second shaft. During the earlier stages of development, and in certain cases of deep shafts it may be economical to force this current of air by heating the air in the

upcast shaft by a fire at the foot, and so rarifying the air that it tends to rise and draw air through the mine from the other shaft. More often, however, some form of fan is used to exhaust or compress the air in one of the shafts.

#### GENERAL ENGINEERING COMPANY VS. THE DOMINION COTTON MILLS COMPANY AND AMERICAN STOKER COMPANY.

In a reference in our last issue to the litigation now going on between the General Engineering Company, of Toronto, and the American Stoker Company some errors occurred which we very much regret. In referring to the progress of the case it was stated that, "it was carried by the defendant companies from one court to another until it reached the Exchequer Court." The fact was that the action brought by the General Engineering Company was begun in the Exchequer Court, and all the proceedings have been in that Court. By a slip of the pen it was stated that an "injunction" had been granted instead of a "judgment" given. The substance of this judgment was given in our issue of October last, but it appears that formal judgment was not taken out, an application for a new trial having been made in the meantime by the defendants. This application first came up at Osgoode Hall on the 5th of July, and was enlarged at plaintiff's request until the 19th of September. Between these two dates the American Stoker Company applied for a writ of *scire facias* asking for the repeal of one of the Jones Stoker patents on the ground that it had expired. Judgment was given in this action in favor of the General Engineering Company on the ground that a writ of *scire facias* was not the proper remedy. The application for a new trial was then renewed by the defendants, and an order given by the Court to the following effect: That a new trial may be had on condition that the defendants pay plaintiff's costs to date, that the previous judgment be set aside, that at the new trial new evidence should be limited to the issues as to whether letters patent No. 40,700 in plaintiff's statement of claim had become void by expiry at the time of the infringements alleged, and prior to the institution of this action. It will be seen that there is no judgment now standing in the case, no damages were ever awarded, and no injunction was ever issued against the American Stoker Company. The Exchequer Court has as yet expressed no opinion, as to whether or not the patent in question is still in force, or has become void by expiry. The public are not restrained by injunction from putting in the stokers of the American Stoker Company, and the American Stoker Company is not prohibited from doing business in Canada.

#### NEW LAND SURVEYORS.

Commissions as Dominion Land Surveyors have been granted to C. W. MacPherson, O.L.S., Barrie, Ont.; R. Rinfret, B.A.Sc. (McGill), P.L.S., Montreal, Que.; F. J. Robinson, S.P.S., Toronto, O.L.S., Barrie, Ont.; J. N. Wallace, B.A. and B.C.E. (Dublin), O.L.S., Hamilton, Ont. The following candidates were admitted as pupils: R. H. Cautley, Ipswich, England; F. W. O. Werry, B.A. (Toronto), Ottawa, Ont.

At the recent meeting of the Board of Examiners for Ontario Land Surveyors the following candidates were admitted to practice: Wm. Walter Stull, Sudbury, Ont.; William Howard Fairchild, Simcoe, Ont.; John Henry Shaw, Pembroke, Ont., and Melville Bell Weekes, Brantford, Ont. Leonard Oswald Clarke, of London, passed the preliminary examination, and received a certificate admitting him to apprenticeship.

#### IT BENEFITS READERS.

Editor CANADIAN ENGINEER:

I am very much pleased with your paper, and although I have only received two numbers as yet I have derived a great deal of benefit from them. Yours sincerely,

Providence, R.I., Feb. 13th, 1900. G. A. HAMILTON.

Waring, Chapman & Farquhar, New York, have prepared plans for a system of sewerage for Ashly, a residential town now building by the Dominion Iron and Steel Co., near Sydney, C.B.