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Maritime Mining Record

Dr. R. Bell
Geol. survey dept.

Mar. 13 1912

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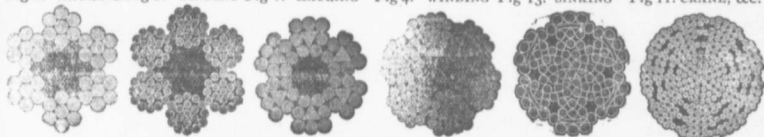
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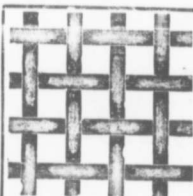
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(13-3-12)

MARITIME MINING RECORD

Vol. 14, No. 17. Stellarton N. S., March 13th. 1912. New Series

RESCUE APPARATUS.

(Continued from last issue.)

Paper read by Mr. Jas. McMahon, before Cape Breton Mining Society:

VISIT TO MARIANNA MINE.

Through the kindly efforts of Dr. Holmes and the courtesy of the Pittsburg Buffalo Co. a small party of 8 were able to visit the above mine and inspect the surface and underground workings.

The mine and its layout is considered by all to be the model mine of America; everything that human ingenuity could devise or money procure has been done to ensure safety, efficiency and comfort. The surface buildings are certainly good, though I think the layout bad—any way that is a matter of opinion. The comfort of the employees is seen to at the pit top, in that a fine concrete building houses them, till they descend the shaft to work, or leave the mine in clean warm clothes. This building is next the man shaft, and contains, on the ground floor a good hospital, described in the report on First Aid; and a large bath room provided with showers, and means of raising the clothes up into the warm air to dry. On the 1st Floor is the washing and changing room for the officials fitted with lavatory and bath; also the Rescue Apparatus Room similar to these in the report on Rescue Apparatus. Above, on the top floor, is the Lamproom, Storeroom and Time Office, and the exit to bank. On entering the lamproom one is faced with a board covered with brass checks; beneath each check in a receptacle is a printed card with a corresponding number. On taking his check the workman takes this card and inserts it in a time clock, pressing a knob which prints time into mine and similarly on leaving he prints the time of leaving. On every man leaving under 8 hrs. a written report has to be sent to the Manager for his inspection. No time is kept in the mine.

In the lamp room is an installation for charging 500 electric hand lamps of the chloride accumulator battery type but through the unsatisfactory behavior of the battery they had abandoned them and adopted the Wolf lamp, using gasolene instead.

The man shaft is rectangular with wood guides for the cage. The cage is fitted with Take-up recoil spring, over-wind hook and eccentric jaws to grip the guides should rope break. The shaft is fairly dry and used only by material and men. The porches at pit bottom are bricked and arched for a good distance, when the arching is replaced by steel girder work.

The weighing of boxes is done at surface. Boxes hold 6000 lbs. No mules are used anywhere in the mine. Small Porter Locos. gather all boxes directly from rooms to landings, where large compound Porter Locos. take the trips to the pit bottom in runs of 30

full, going twice with full to once back with empties.

The coal is worked single stall, the room being 27 ft. and ribs 6 ft. The roof is fairly strong, but a systematic timbering is insisted on, the maximum distance apart of props in the roadway being $3\frac{1}{2}$ ft. and next the rib 7 feet. Thus each room has 4 rows of props its whole length. This timbering is included in the tonnage. The coal is mined with punchers or chain under cutter of the Jeffrey type using air throughout. No shearing is done. Shooting with permitted explosives fired by detonator and battery in charge of Shot Firers. One man is allowed to work alone in rooms. The rates, of course, are fixed by the Pittsburg Wage schedule. The roads are extremely good and clean; the whole mine was a revelation in this respect.

Close to the pit bottom is a Station for housing the air locos, and repairs are carried on here. The room is about 120 ft. long by 27 ft. wide and spare locos. are always being overhauled. Adjacent to this is a series of work shops and stores containing pipe-cutting and threading machines, lathe drilling machine, vice and other tools and in the Store Chamber every part of material likely to be wanted is kept. The value of stock on that day was estimated at \$15,000. Each loco driver is expected to do minor repairs while out on duty, and to this end he is provided with a working kit in locked box, each box and every tool stamped with his number. He is held responsible for these and has to turn them in each night and make good any loss. The whole of these underground workshops and Loco. stables are brilliantly lighted so that working in them is comfortable.

The high pressure system is carried into each district so Locos. have no difficulty in re-charging at any time in its own district.

In the cabin in the pit, which, by the way, is a clean decent room 30 ft. x 15 ft. with proper furniture and brilliantly lighted, all the officials make their reports and keep their records. Round the walls of cabin is arranged a complete map of the mine, and adjacent, on blackboards, each district is drawn in chalk by the Surveyor or Manager; the scale used is a much enlarged one and serves to show the exact condition of each district at a glance. All rooms etc. are kept up to date, and any stopped or requiring attention are indicated on this chalked map by a series of colored thumb buttons, each color indicating as pre-arranged. In this way the Manager or other officials can see at a glance the conditions, and if ordered have been carried out and several other things that readily appear to the busy mine man. The Manager explained that he had adopted this idea as his mine was a very extensive one, such that it took considerable time to traverse all parts, and by the aid of these chalk maps he knew how his mine was running. This idea may appeal to some of our Managers or

Superintendents whose mines are extensive.

The mine is quite flat, 60 lb. rails are used throughout the main tracks.

The Main Hoist lifts two tubs at a time, raising 3000 tons per day. There is a fine steel tippie, but as I had only time to casually visit it I cannot describe it in detail. So also the washer which I am told is a Lulrig. The Fan House and buildings is a fine pile of brick and concrete. The Fan 36 ft. x 8 ft. used as a forcing fan in winter and exhaust in summer, there being suitable doors in the fan drift race to quickly effect the change.

The engines are in duplicate and at the time of our visit were running 60 strokes, with 3.3 W. G. and 180,000 cu. ft. of air.

The village of Marianna is built on the sloping hillside above the mine yard. The houses rise tier on tier each with its lot for garden purposes. They are built in 5, 6 or 8, roomed size each has natural gas, heat and light, sanitation and water and all repairs for the sum of \$2.00 per room per month.

There is an Institute and Library with a theatre for concerts and plays, good stores, churches and hotel. The population is largely Slavic, who are taught the English language at the Institute classes. The village is under the control of a Board of Health mainly officials of the Company but co-operating with others of the better end of the citizens. They have scattered broadcast a set of rules in the form of an appeal, a First Aid.

The time occupied in visiting a big mine such as this could be well extended. I have tried to set down here the points that seem to offer suggestions. The information is not as complete as it might be, but I have the any thing required in detail he will gladly furnish it. Mr. Ferguson of the Pittsburgh office that to Marianna, spent the whole day working hard for our instruction and brought us back at night—the whole trip taking up a day of 12 hours.

The Mines Bureau, after running the gamut in artificial coal dust experiments, both in the laboratory and surface galleries, resolved to open the above mine for the purpose of further experimenting with coal dust and gas under exact mining conditions.

The mine is situated near Bruneton on the Wheeling section of the B. & O. R. R. about 20 miles from Pittsburgh. A point was selected on a hillside where the Pittsburgh seam crops, about 100 ft. above the railway level.

The mine surface plant already erected consists of an incline hoist for hauling material from Station, 100 ft. below; a grinding house for reducing coal to dust, etc.; engine fitters, and smiths shop; Sirroco fan and engine driven by natural gas; store house, office and observatory where all important instruments are housed.

The mine has two main entries with a slant from the back entry running out to the fan. An extension gallery built of boiler tubes 100 ft. x 6 ft. Dia. x $\frac{1}{2}$ inch plate with single riveted lap joints. There are three movable sections each 35 ft. long. From one section an angle tube is taken and a wooden housing to connect with the fan, which acts as a blowing fan.

All entries are protected with heavy reinforced concrete, built downwards and upwards in every direction and bedded well into the adjacent earth. This reinforced concrete lining is carried into the three tunnels for a distance of about 150 ft. The walls are 14 in. thick and the crown rather flattened and the whole is

reinforced by $\frac{1}{2}$ in. square iron hoops, two feet apart, extending the whole section of tunnel and bedded into the earth below the foundation walls. At the point where the steel boiler tube enters the gallery mouth, it was well rammed with concrete. Particular attention was given to the structure of this tunnel to find if in like manner the crown. We were informed that the best endeavor had been made to have this as solid as possible. The reason for this enquiry will be shown later when I tell of the results of the explosion.

At 40 feet from main entry mouth the first instrument chamber is located, built solidly of concrete, the small entrance being protected by a strongly ribbed steel door. One hundred feet from this and inside is a second instrument chamber, built exactly as the other. Both these chambers contain the instruments for recording pressure and velocity, etc., these being electrically connected with the Observatory on the hill outside the mine. At 240 feet inside, the first cross-cut is met. This is a curved cut, the crown of curve being inwards towards the headings. No other cross-cut is met till within 70 feet of the headings, which are now 750 feet from mouth of tunnel. The tunnel is 8 ft. wide by 6 ft. high inside the concrete lining. Beyond this the width varies from 9 to 10 ft., 6 ft. high and clear except for an occasional prop or timber. The coal is a clean section about five and a half ft. high with a roof of fairly strong shale (slate). There is plentiful evidence of joints and slips. The mine foreman states they have never found evidence of gas, and though we searched diligently we could not find any.

On Tuesday, the 24th. of October, to make sure that conditions existing in the mine would produce an explosion, a test shot was fired and answered in every way the expectations. In order to imitate in some measure the accumulation of dust in an ordinary dry the main tunnel is provided with shelving up to wide, are laid on railway dogs let into the concrete or timbers, about one pound of dust per running foot was distributed evenly on these shelves, making about 680 pounds of dust in all. The dust was ground to pass a 100 mesh screen. The shot was placed in a hole drilled horizontally and following the tunnel bearing in the centre of heading. This hole was four and a half feet deep, dia. 2 in., the charge two and a half pounds of F. F. F. black blasting powder, tamped with 2 pounds of dry fire-clay, and fired by electric detonator (No. 7). Two attempts to fire this shot failed through defects in the cable caused by people walking on it. On changing the cable and passing an extra strong current it fired and a most violent explosion resulted.

CONDITION OF MINE BEFORE EXPLOSION.—On entering the mine I carried a Wolf Lamp with magnifying lens and Mr. Strachan of Hosmer took his Hygrometer. On testing he got dry bulb 62°, wet bulb 61.5°. The day was a very wet one and the condition of the shelves when touched left a wet smearable mark. The intake by the Steel Tube and Slant were decidedly wet and the condition of the mine was such as to lead me to believe that the dust would not explode. I carefully searched for the dust would not explode. I carefully searched the constant interruption of the ventilation through the opening and shutting of trap door at intake end to allow the passing of 1100 visitors.

To control the course of the current, two stoppings of sand bags, 8 feet deep, and covered with brattice, (Continued on Page 18.)

MARITIME MINING RECORD.

THE MARITIME MINING RECORD is published the second and fourth Wednesday in each month.

THE RECORD is devoted to the Mining—particularly Coal Mining—Industries of the Maritime Provinces.

Advertising Rates, which are moderate, may be had on application.

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R. DRUMMOND, PUBLISHER.

STELLARTON, N. S.

Mar. 13 1912

CHECKING COAL DUST EXPLOSIONS.

The experiments being carried out under the auspices or superintendence of the United States Bureau of Mines are taking a wide range and all in a practical direction. If it is not possible, at all times and under all circumstances to prevent explosions of coal dust which many now claim to be more destructive of life and property, more deadly in their general effects than explosions of gas, then the next best thing is to confine their effects to as small an area as possible. A Frenchman named Taffanet claims to have originated a scheme, whereby explosions of coal dust can be confined within narrow limits, and prevented from rampaging wildly throughout the entire works. In order to give the scheme a test, along the main entry of the experimental mine at Bruce-ton, for a distance of 750 feet, a very large quantity of coal dust was distributed. This dust was scattered along the floor and spread upon artificial shelves. Everything was done to induce similar conditions as might be expected to prevail when a mine dust explosion took place. Three pounds of black powder were employed to give effect to the explosion. The Frenchman's scheme runs on the same lines as the dictum of the homeopaths, namely, 'Like cures like', not on precisely similar lines however. Not coal dust against coal dust, but rock dust against coal dust. In the air course, the only place to rush in place of danger, was placed, what is called, a rock dust barrier. The barrier is a somewhat simple affair consisting of shelves hung from the roof in the air course, and which are laden with finely ground rock dust. The powder was set off by a battery placed several hundred feet from the mouth of the mine. The explosion travelled, it is claimed, at the rate of 2,000 feet a second and forced its way into every nook and cranny of the mine and made, of course, a dash for the air course. But here it was checked with an un-reckoned obstacle to his further progress. It was now the Frenchman's innings. The force of the explosion over-turned or demolished the shelves and set the rock dust whirling in dense masses in all directions, and in opposition to the attacking devouring dust flames. Through this cloud of rock dust, through this hitherto unheard of barrier, the raging flames and the poisonous black smoke could not penetrate. The test was considered by all the experts call-

ed to witness it, a great success. After the explosion samples of the gas in the mine were taken for analysis, the rescue crew stationed at the mine entering the smoke-filled course equipped with the newly-perfected oxygen helmets, Canary birds taken into the mine immediately after the explosion dropped from their perches before they had been exposed a minute, showing that the after-effects of the test were exactly similar to those which invariably follow a coal dust ignition. The fumes were so low a coal dust explosion that the crowd was forced to keep away from the entry, and the experts said a typical blackdamp had ensued.

ROYALTY.—ON SALES OR PRODUCTION.

Sometime ago when the Mines Department was troubling the coal mine operators for figures showing the quantity of coal on bank and the balance carried forward from the previous year, and also explain discrepancies between outputs and sales, the RECORD suggested that possibly the easiest plan to avoid these questions, vexatious, and impossible at times of correct answers, would be to make royalty payable on a—to be ascertained by conference between the government and the operators,—certain quantity sold. In his review of the Report of the Department of Mines in the House of Assembly the Hon. Commissioner of Mines incidentally remarked, "... approximately 90 per cent. of the total coal output has paid royalty, that is, is sold. Perhaps it would be better if the law could be so amended as to have a definite understanding with the companies which would make the royalty payable on the output or a percentage of the output instead of the alternative of coal sold or removed."

There is much to be said in favor of the royalty being based on production and not on sales. The clerical staff in the Mines Department and at the collieries would be freed from putting and answering, what appears at times, trivial, and at other times, vexatious questions. And the government, if it ever has even entertained such, would be freed of all suspicions as to the genuineness of the statements made as to sales. At present the sales can only be gathered from one source, namely, the operators, whereas in the case of production they have a check in the workmens weigher. It is not to be assumed that the change can be made without a great deal of thought and consideration. At least one difficulty presents itself as we write. The percentage of slack made at some collieries is much greater than at others. That would be a matter easy of solution did it not happen that some companies can dispose of all the slack made, while others experience difficulties, and still others are unable to dispose of it at all and are forced to throw it on the dump. To ask them to pay on the production and not on the sales, would, at first blush, seem not only a handicap but an injustice. One great argument in favor of royalty on production possibly will be that it will tend to economy, and to improved methods of work. Less coal may be wasted at the fire-doors, and it might also have the tendency toward the production of larger and better coal. The change in our opinion cannot be made without the consent of the operators. At any rate it cannot be

made in the case of the Dominion Coal Co. without its consent, as both in the charter and the lease a specific royalty on sales for a specified number of years is mentioned.

- Rubs by Rambler.

More questions have been put to the Local Government by His Majesty's loyal opposition during the past ten days than in any similar period for a quarter of a century. And it looks as if there were to be a succession of crops. Many of the questions are of much interest to the coal mining fraternity. There may be a few frivolous ones, but, as a whole, the questions relating to coal mining with their answers should prove of much practical value. Mr. Butts has put the following questions relative to submarine areas:

- "That an order of this house do issue for copies of
1. All correspondence between the Nova Scotia Steel and Dominion Coal Company, Limited, and the government relative to or in any way connected with any or all the submarine coal areas held by the Dominion Coal Company between the northern side of Sydney Harbor and Point Aconi, and pertaining to or in any way connected with any or to all submarine coal areas held by the Nova Scotia Steel Company, Limited, between Flat Point and Mira Bay in the county of Cape Breton.
 2. All correspondence between the above named companies and the government relative to any submarine areas in the county of Cape Breton.
 3. Plans showing the extent and relative location of all submarine land and coal areas in the county of Cape Breton leased by said companies with particulars of applications for same.
 4. Plans showing locations and extent of submarine coal areas held by others than the companies named with particulars and dates of application.
 5. Copies of leases and plans of all land and submarine coal areas held by Sir Robert L. Weatherlie in the county of Cape Breton."

As our readers are aware the Dominion Coal Co. owns areas immediately in front of the submarine areas at Sydney No. 1, or Cranberry Head, and the Nova Scotia Steel & Coal Co. own areas in front of the Dominion Coal Co.'s areas at Dominion No. 2, also submarine. The Nova Scotia Steel and Coal Co. are now near the boundary of their submarine area at Cranberry and cannot proceed further unless some arrangement is made with the Dominion Coal Co. for the acquisition of, say, a couple of square miles of that company's holdings which lie between the inshore areas of the Scotia company and their areas out to sea. Presumably Mr. Butts' queries have reference to these areas. It is greatly to be desired that some amicable arrangement be speedily arrived at between the two companies.

Mr. Tamer submitted the following question:
 "That an order of the house do issue for a return including copies of all correspondence between the deputy inspector of mines for Pictou county and the government or any department or member of the government, and all other documents and papers relating to the areas of the Acadia Coal Company at Westville, county of Pictou, since 1907."

This question presumably has reference to the lower workings in the Acadia colliery. Owing to the depth of the workings, the length of the haul, and the tender nature of the strata, the Acadia Coal Co. do not intend, on economical grounds, to work out the coal at the part nearest to the Drummond colliery boundary. The Intercolonial Coal Co., owners of the Drummond, say they can advantageously win out this coal which the Acadia intends to leave and are willing to pay a fair price for the privilege. It is understood the Deputy Inspector has called the attention of the government to the Acadia's plan of operations, and Mr. Tamer's question evidently is put for the purpose of learning the government's mind on the matter. The point, so far as can be learned, is a most important one, and with it, the future of Westville is, to some extent, bound up.

A large number of questions were asked as to the mode and manner of granting certificates to candidates for the several positions in coal mines, of the questions put to candidates, and of the methods of examination, also as to the composition of the Boards for granting certificates to workmen as well as officials. These questions, coupled with the government's intimation of a reconstructed and reconstituted board, convey the impression that at long last we are going to have Boards above reproach.

Though the Hon. Commissioner of Mines made an elaborate and comprehensive review of the Annual Report of his department, it will never do to take him at all points seriously. His intentions undoubtedly were of the best, and yet that did not prevent him getting at an odd time a little, or a much, mixed up, and perhaps on that account his well prepared comments do not command the success they deserve. Perhaps the blame of a few discrepancies may be chargeable to the reporters or the newspapers, and not to the commissioner. For instance the commissioner said:

"It is also interesting to follow the figures to show, whilst I am calling attention to the exports to the United States, that we have largely increased the importation of coal from that country. The total imports of coal, anthracite, bituminous, and bituminous dust for the year 1911 amounted to 1,730,218 tons, an increase over the year before of nearly 200,000 tons. This coal, bituminous particularly, goes to the St. Lawrence markets and there comes into competition with our own coal. Two tons of anthracite slack mixed with our own slack produces, so it is alleged, a very fine steam coal."

Now I would be inclined to hesitate before accepting the figures in the quoted paragraph. My! would there not be rejoicing and cause for congratulation among Nova Scotians if the importations of the three classes of coal mentioned amounted to only 1,730,218 tons. Why, the importations of Anthracite alone double that quantity. The total importations of U.S. coal into Canada, as has already been shown RECORD readers, is over twelve million tons. More than nine millions of bituminous coal alone was imported. The increase in imports of U.S. bituminous coal is alarming. Presumably the Hon. Commissioner means his figures 1,730,218

tons to apply to the importations of anthracite and dust, bituminous screened and dust, into Montreal and points east alone. The American are steadily gaining a foothold in the Montreal market, and displacing a large amount of tonnage hitherto supplied by Nova Scotia, and the pity of it is that there seems to be no present help for it. We are being told daily in the press that Nova Scotia is waking up. That is excellent news, but if it takes her as long to jump up out of her bed as it has taken her to open her eyes, she will not be able to shout Eureka for some time yet. She cannot say "I have found it", until she has better found herself.

COAL,
IN DETACHED PIECES.

PAPER BY MR. DRUMMOND.

(By request of Canadian Mining Institute.)

A little over a hundred and twenty-five years ago, in spite of British cruisers and revenue cutters, the smuggling of coal was actively carried on at several points along the Cape Breton coast line, extending from Cow Bay along past Cranberry head. Very many coal seams were exposed along the sea board, and to quarry and sail away with a boat load was an easy matter. Mining was not actively prosecuted in Nova Scotia till the advent of the General Mining Association, a British concern, which had acquired known coal lands in several of the counties. The Cape Breton county seams do not lie at so high angles as those of the mainland, and, perhaps, on that account, coal mining has not been attended with so many incidents there, as on the mainland. I may repeat what I wrote at a former time, namely: that in connection with the discovery and development of coal mining in Pictou County, there are more incidents interesting, remarkable and thrilling than in connection with the opening up and carrying on of coal mining in any part of the American continent.

Possibly more pits have been lost in Pictou County through fires than in all of the remaining coal producing sections on the continent.

For a period of sixty years, from say, 1830 to 1888, pit after pit was lost by fire or explosion, and the wonder is that in view of the numerous mishaps, the mining of coal was not abandoned as a profitless business. There must have been giant optimists in these days, who bereft of property laid hold on hope as a remaining and magnificent asset. In the early days Nova Scotias best coal market was the U. S. Sydney Mines coal was exported there mainly for domestic purposes, and continued to be sent in fairly large quantities until displaced by Anthracite, which rapidly grew in favor.

Between 1850 and 1865 considerable quantities of Nova Scotia coal were sent to the U. S. for gas making, but at this time the only coal being sent is slack coal for the gas works at Everett.

Nova Scotia produces neither anthracite or lignite, only good old bituminous. Her coals are excellent for steam, gas or domestic purposes. For this latter purpose, in my opinion, though many customers hold to the contrary, it is to be preferred to the more stately and more aristocratic anthracite. Bituminous is not

oriously a democratic coal. In burning, anthracite behaves in a staid and dignified manner, maintains for a time an even glow, and then in a calm and impassive way resolves itself into ash. Bituminous, on the other hand, scouts all formality. It cackles and crackles and prances and dances. Stare at it, it chatters to you, and therefore it is that some kinds go by the name of parrot coal.

Those who have never burned Nova Scotia bituminous in an open grate have not yet realized the satisfying contentment of a cheery fire. Who ever drew inspiration from the prosaic glow of anthracite? Had the "bonnie bonnie bairn" of the song been gazing into an anthracite fire there would have been no "fuffing lowes" to laugh at; there would have been no varying shaped and colored flames, which suggested to his awakening mind castles towering to the moon; nor sparks suggesting little soldiers, bent on bringing the castle to the ground.

There is gross ignorance in many quarters as to the merits of bituminous coal for domestic purposes. A Brooklyn coal dealer asked the writer if it was possible that bituminous was burned in his home and the house not spotted all over with soot. A few weeks ago two gentlemen from Toronto stayed over night during the January zero weather. On coming down in the early morning there was a cheery blazing fire. They gazed at it in wonder, were so delighted that they went into east of transportation to Toronto. Of course there are coals and coals. For domestic purposes use the Nova Scotia kind. True it may gather a little soot in the chimneys. That can be got rid of by the handful of zinc chips process. Select a windy day when you throw the chips in the fire so that the loosened soot may be carried clear of your own and deposited in your neighbors back yard. In thirty-two years I have not had my furnace fire swept thrice. Bituminous also smuts the hands, but that can be avoided by investing a few cents in a fire shovel.

As has been said of the British Empire, so may it, in the opinion of some, be said of Nova Scotia—and it is said with all due respect to those who persist in declaring that farming is the one, and only basis of a country's prosperity—"The province rests on trade, and trade rests on coal."

Loudly these days it is being dinned in our ears, shouted over vale and dale, from hill-sides and mountain tops "Back to the Land" Yes, "back to the land," as a cure for the squalor of the towns, a panacea for the prevailing poverty in crowded communities, and as a potent factor in arresting the human slaughter in the "shambles" of overcrowded cities, due to the alleged grinding of the wage earners under the cruel heel of the heartless tyrants, the much talked of capitalists.

The cry "back to the land" carries with it the inference that those now responsible, in part, for the crowding of the cities were once dwellers on the land, and tillers of the soil. If the ideal life, as we are insistently and persistently told, can only be attained 'on the land,' the question arises, how has it come about that deserted farms dot the county side, vacated by those now dwellers in the cities. The short answer, void of sentiment, is, that charming and ideal as the business of farming may be, at some times, in some places, and in some portions of a country, it does not pay. Are not all hearts thrilled, as at most regularly recurring intervals of time, they read, not of thousands, but of millions starving for lack of food in the extensively tilled east. Famine at too short in-

tervals slays its millions of souls in China, and yet if there is any country in the world seeking its life in farming that country is China. The curse of China has been the lack of a prophet to stand on the hill tops and on the plains and cry aloud "Away from the land;" away to the undeveloped minerals, and to the trades that follow in the wake of mineral development. Here it may be asked why select China, why not Denmark? Why? Because the Britisher engaged in trade, supplies the Dane with an adequate and profitable market. Without industrial population farming is not a lucrative occupation, and because of this lack, the farmers in Nova Scotia and in many of the states of the Union have left their farms and hied them to the towns, and if there is now reason for the cry, "Back to the land," it is found in the fact that industrial centres afford now the farmer with a market at once profitable and easy of access. The farmer cannot thrive without a ready market, and such markets can only be found in centres of industry. I have said it before and been assailed for so doing, yet, I say it again with emphases "the prosperity of the province rests on coal.

If honor is due to age then much is due the Nova Scotia Coal trade. Before Gunder, in 1791, discovered anthracite coal in Pennsylvania, yes, several years prior to that year, coal was being mined and sold in Nova Scotia. There are official records of shipments forty five years before the first official figures are available for the United States. On account of the vast quantities of wood, both in C. B., N. S. and the United States, very little progress was made, in either country, in the mining of coal until, it may be said, the year 1850. In 1785 C. B. shipped between 3 and 4 thousand tons of coal, and in 1850 the total sales of N. S. coal were only 27,000 tons. The growth of the N. S. coal trade has been, one is forced to say, slow, while the increase in the production of coal in the U. S. since, say, 1860, is the worlds wonder. For sake of comparison of the difference in increase of sales in N. S. and the U. S., I submit the following figures:—

1830	N. S. sold	27 000 and the U. S.	100 000	or say 4 times
1840	"	100 000	" 1 112 000	" 10 "
1850	"	150 000	" 2 820 000	" 20 "
1860	"	322 000	" 6 494 000	" 30 "
1870	"	568 000	" 17 371 000	" 30 "
1910	"	5 000 000	" 320 000 000	" 75 "

I refer only to bituminous coal and use Canadian long, instead of American short, tons.

These figures show that the coal trade of Nova Scotia is a very small affair in comparison with that of the U. S., and yet, her coal trade means as much to Nova Scotia, every whit, as does the trade of the U. S. to that great country. Small, as is her tonnage, and slow the yearly increase, N. S. can still raise a cackle and point to the fact that while her coal sales equal 10 tons per head of population, those of the U. S. amount to only a trifle over 5 tons per head of population. The coal trade of Nova Scotia and the United States though, as our American friends would say, very different propositions, have, all the same, some things in common. First as to their differing aspects: To mine coal in Nova Scotia is much more difficult, dangerous and expensive than in the United States. Coal is sold in the United States at a figure less than its mere production in Nova Scotia, and this is accounted for in several ways. The mines in N. S. are of a much higher angle, are much deeper, have tenderer roofs, give off more gases, and let in—from the strata—more water. Not for a moment must it be

said that higher cost in Nova Scotia, is chargeable to more primitive modes of working. Indeed in the matter of precautionary mining laws and regulations Nova Scotia lags not behind the most progressive coal producing country. At and in her mines are installed the most modern machinery, and approved appliances for the economical and safe production of coal. Security of life and limb, and the comfort of the workers, has the first place in her system of operations. Nova Scotia had installed the Draegar Rescue apparatus, ready for use, before the United States Bureau of Mines had begun experimenting with such apparatus.

The high cost of coal in Nova Scotia, as hinted at, is due to the heavy angle of the seams, demanding close and frequent inspection of the workings; the forest of timbers required for the support of the roof owing to the great weight of the superincumbent strata, and the expensive and many pumps, necessary to cope with the steady and continuous inflow of water. These all militate against cheap coal production in Nova Scotia, and they are not offset by the fact that a majority of the mines being on, or near, the seaboard, have short rail haulages in comparison with those of the United States. I have mentioned but a few of the differences in conditions in the two countries, but these must suffice for the present.

The one thing common to the coal trade of the U. States and Nova Scotia, is, in a majority of cases, the high invisible profits of the coal mine operators. They lay no claim to be philanthropists or single eyed benefactors, and yet it almost looks, though unknown to them, that really they are. There are no businesses carried on in a large scale in either country and conducted with so utter disregard of profits, or fair returns on investments as the coal industry, and there is no industry, all the risks and anxieties taken into consideration, which should command a more than ordinary margin of profit. The profits are low in Nova Scotia, and less in the United States, if there is, taken as a whole, any profit at all. As an instance—in a certain district in the United States with mines producing about two million tons annually, the profit for a year reached an average of half a cent a ton. That means that some mines must have been conducted at a heavy loss. When the tremendous risks are considered, with the fact that a coal mine is not reproductive the profit on a ton of coal in Nova Scotia should be thirty to forty cents per ton, and in the United States to 20 cents.

It may be asked, why allow so much more profit to the Nova Scotia than the United States operator. For the simple reason that the capitalization necessary to successfully operate a coal property in Nova Scotia is about five times greater than in the United States. In Great Britain it is estimated that two and a half dollars per ton of output is a necessary capitalization. In Nova Scotia the required capital exceeds the British estimate, while in the United States a mine can be equipped for about a forth of the British estimated cost.

Notwithstanding that in Nova Scotia there is no adequate profit in the coal trade. Certain of the people and a portion of the press, every little while, make a bitter outcry against the high price of coal and the huge greed of the coal barons. These have called upon the government at various times and in divers manners, to seize the coal lands and work them in the interests of the people. The provincial government is urged to enter upon mining so that fuel may be obtained at what they deem reasonable figures. These clamorous ones are surely not posted in the history of

their own country. Government ownership and operation of mines is not a new thing in the most easterly province of the Dominion. At the end of the eighteenth, and in the early days of the nineteenth centuries the government on two separate occasions went into the coal mining business, and on each occasion they came out of it with burnt fingers. Instead of a success with coal for the people at popular prices, the attempts were failures, and the price of coal only a few cents less than it is sold to-day; and in these days it should not be forgotten, labor was cheap, and there was no necessity for costly hoisting and pumping machinery, and no elaborate appliances for cleaning and screening the coal. The coal, it is supposed, cost the government two dollars a ton to produce, and was sold it is alleged, at over three and a quarter dollars per ton. Governments are no more disposed than individuals to carry on operations of any kind without a show of profits, as witness the efforts of the government to show a surplus, the bigger the better, on the operation of the I. C. R., the so called people's railway, and the howls of the Ontario members of the opposition if they cannot. At a meeting of the Nova Scotia Press Association, a member urged that the assembled brethren should demand that the provincial government operate the coal mines as was done in Germany, so that the people might have cheap coal. Great Scott! how unwisely knowing some cranky folk are. It is perhaps well, in view of past provincial and German experience, that the gov't. have turned a deaf ear to all such clamorings. It is an utter folly to assume that the German government worked some coal mines solely in the interests of the people. It had an eye, and its best eye, to profit, and this is apparent since the announcement that the Westphalian syndicate will assume the business of disposing of the product of the government mines in Westphalia. As is known the government collieries in Westphalia were purchased several years ago in response to an outcry raised against the high price of coal charged by the syndicate. It was imagined that the operation of these mines by the State would at one and the same time check excessive prices, on the part of the syndicate, and yield a fair profit to the government. Failure is written largely in both instances. The underselling of the syndicate has turned out so unprofitable a business for the government that an agreement has been arrived at between the syndicate and the State Mining Department, and approved by the Minister of Commerce, whereby in future, state mined coal will be sold by the syndicate at the prices fixed by it. Whether the agreement will be of long continuance is of small moment; the point that I wish to make is that government operation is no less expensive than that by individuals or corporations. What I hold as necessary, to the satisfactory operation of the mines in the United States as well as in Nova Scotia, is not government operation, as they have it in Germany, but a selling syndicate as they have it there, which will take charge of sales and give to each member of the syndicate a fair and reasonable profit on his operations. To some, it appears, such a procedure is absolutely necessary if the coal trade is to be conducted as business and not purely philanthropic lines. The idea here set forth may not be received at first with acclaim, yet I think, the members of mining societies might come round to the opinion, after discussion and deliberation, that the experiment may, at least, be worthy of a trial. Failing a selling syndicate, organized by the operators, it might not be a bad idea to suggest that the government appoint a 'fair price' commission, whose duty it would

be to set a price that would not be an imposition on the consumer, while leaving a reasonable profit to the producers. Some means must be arrived at whereby cut-throat competition may no longer be a culpable characteristic of the coal trade, on this side of the Atlantic. There are, let it be admitted, big obstacles in the way in any attempt to carry out either suggestion. Though an attempt was made to show that there is a coal combine in Nova Scotia, the fact is there is sad lack of unanimity and cohesion in the ranks of the operators. That is the chief obstacle to the formation of a selling syndicate; and a big objection to a fair price commission is that it costs some operators, owing to adverse conditions, all the way from twenty to sixty cents more to produce coal than others. A fair profit to the cheap producer would mean a dead loss to his less favorably situated competitor, and yet if a minimum wage can be accepted as a principle, there being poor workers as well as capable, may not a minimum profit, by some process be also demanded and arrived at.

U. S. MINE FATALITIES IN 1911.

The number of fatalities in or about coal mines within the States and territories are shown in the annual report of Senator William Green, of Coshocton, Ohio, as statistician of the U. M. W., submitted to the international convention of that body at its last session.

In 1911 2,838 miners were killed and the year before the number was 3,200. The figures are becoming more astounding when it is made known that since 1900, during a period of eleven years, 24,037 lives have been sacrificed in and around coal mines. This does not include the number of employees injured which is far in excess of the number killed.

More than 1,000 miners are killed every year in Pennsylvania. West Virginia was second in 1910 with 328 killed. Colorado was a close third with 323. Ohio came next with 161, followed by Illinois with 143. The death rate in the United States in 1910 was 3.91 to the 1,000, twice as high as in most European countries.

THE HUMAN ELEMENT

(George S. Hodgins.)

In the intelligent operation of machinery there is always a more or less clearly defined human factor or personal element, and the expression 'personal equation' is often used to indicate the liability of the human machine, or the human mind, to failure or to some form of aberration without previous warning. It is really borrowed from astronomy, and is used, in connection with accurate time observations, of the interval there is found to be between the occurrence of an event, such as the passage of a star across one of the spider lines of a transit instrument, and the perception or record of its occurrence by the observer. The existence of this personal error in the case of specialists and highly trained observers suggests that among the majority of men employed on our transportation system, perhaps a more marked form of personal peculiarity may exist which may manifest itself in various ways, and in an emergency might render the man temporarily inefficient.

AROUND THE COLLIERIES.

Mr. James Cunningham, shipping clerk with the Acadia Coal Co'y has been promoted to the position of assistant accountant.

During January last there was imported into Quebec, and points east, of American coal as follows:—
Anthracite 61,895 tons; Bituminous 11,613; Bituminous dust 5,034, a total of 78,642 tons.

The Canada Iron Corporation are to install at their new ore mines at Bathurst, N. B., a 300 h. p. Robb-Armstrong Horizontal Corliss Engine and a Return Tubular boiler 72-ins. in diameter by 16-ft. long, also made by the Robb Engineering Co. Ltd.

Halifax burners of anthracite coal are alarmed lest there should be a strike of the anthracite mines followed by higher prices for that article. Well what of it. There is still some bituminous coal left in Nova Scotia; and it might be well that patriotic householders should acquire the bituminous habit.

Having a plentiful supply of electric power, it is the intention of the Maritime Coal & Railway Co. to drive all the machinery at their mines, new and old, by electricity. Great improvements involving large expenditures are contemplated. For purposes of development it is said that the company has no less a sum than a million dollars at its disposal.

A great boom is predicted for Cumberland County within the next four or five years. The boom will exist as soon as there is assurance that legitimate operations will not be interfered with by the illegitimate methods of foreign trades unions who have no interest in the progress of Nova Scotia further than to draw per capita tax and assist in electing officers.

It looks as if the coal trade was at 'long last' to receive due recognition. The Commissioner of Mines, a western man, in his remarks on presentation of the Mines Report, admitted more than once that coal mining was one of the chief industries of the province. It will be a comparatively easy matter to take a further forward step, and gratefully announce or gracefully admit that coal mining is the chief industry of the province. It is that now, for what other industry contributes so largely to the revenue, to the trade of the merchants, and to the circulation of money generally, in the province.

The C. P. R. have created a new department to be known as the Department of Natural Resources. In charge of this department will be placed the company's unsold land grants in the several provinces, also the townsite grants. The Company's coal mines at Leith-bridge, Bankhead and Hosmer will all come under the purview of this department, and the best of it is that so capable a man as P. L. Naismith, formerly transportation Superintendent of the Dominion Coal Co., is at its head. Mr. Naismith's headquarters are at Calgary, as he entered upon his new duties on the 1st. of Feby.

Supt. T. J. Brown of the Nova Scotia Steel & Coal Co. came back a while ago from Britain, hale and hearty. His stay was rather on the short side but he applied himself to seeing and learning things in connection with mining in that country and returns with a large fund of information which will be useful to him in his work.

Matters are proceeding nicely at the Joggins Mines. Some rumors were current that impediments to a large output had been encountered, but these must have been largely, if not wholly, imaginable, as the output for some time has been remarkably steady. The average output for some time back has been 600 tons per day, which is most gratifying in view of the size of the seam and the intervening fire-clay.

It seems the RECORD has many more life time subscribers than it thought of. Mr. A. J. Scott, writing from Old Bridgeport says: "I have been a subscriber from the first issue in Springhill (Jan'y, 1880) The since the first issue in Springhill (Jan'y, 1880) The news contained in the RECORD is by far the most reliable. I need scarcely say, the RECORD is the best authority on all coal mining matters affecting the province. May your circulation be doubled in 1912."

When the strike of anthracite miners occurred in the U. S. a few years ago, Nova Scotia was unable to take full advantage of the opportunity presented of sending coal into the U. S. and owing to the crippling of a half a dozen of collieries, she will be in no better position should another strike follow the present agitation. The strike of British miners is giving the opportunity to supply a fair amount of bunkier coal at reasonable prices.

From Springhill to Amherst by tram is within the not distant possibilities. A line by way of Maccan might possibly be run with profit. In a direct line from Springhill to Chignecto the distance it is said is less than four miles, or about a third less than by the Springhill Junction route. In these days tram lines can be operated at long distances from the source of power supply, and there is nothing preposterous in a tram line from Amherst to Springhill with the source of power supply situated about midway between the two termini.

The Maritime Coal Company must, evidently, be pleased with the progress of operations, as it is the intention of the company to immediately extend operations. The company will open and operate what is known as the "Diamond" Area. The mine will be known as the "Diamond" Area. The mine will be a comparatively short distance from Maccan, and as between the two points there is a grade of two percent it is the intention to use gravity in transporting the coal from the mine to Maccan. This will be the cheapest of all kinds of transportation. The seam on the Diamond area is not more than three feet thick and will presumably be worked on the long wall system.

AROUND THE COLIERIES.

Hector McLeod, Overman at Dominion No. 3, has been transferred to Dominion No. 10.

John C. Nicholson has been appointed Assistant Manager to W. D. Matthews of No. 3 slope, Springhill, and is now occupying that position.

A new record for hauling ropes has been made on the French slope, Reserve Colliery, where the rope now in use has hauled over 500,000 tons. It is about 23,000 ft. long.

Star Lodge P. W. A. of Inverness sprang into activity after a quietness of many months. On representation by their committee the travelling road was put in splendid shape and other matters adjusted.

Over two hundred thousand tons of coal are now in the coal heap at Dominion No. 2 Colliery. The heap is still growing and will likely reach the 300,000 ton mark before the shipping season commences.

The ventilating fan, Dominion No. 3 colliery, will in future be driven by electricity. The motor has been set in position. This will dispense with the two Mumford boilers heretofore used for this purpose.

A tail rope has been installed in No. 11 level, north of the Angle Deep, Dominion No. 1. This will greatly facilitate the handling of the coal on this level, which supplies a large amount of the coal from the angle deep.

Bridgeport colliery, which was declared dead 10 years ago, is doing splendidly. Before navigation opens, about 50,000 tons of coal will have been banked, and sufficient places will be ready to provide employment for its usual force of men, which this season should be equal to the last.

Inverness Colliery has been busy all winter and will continue to be busy during the summer. The Company are looking with greedy eyes towards the St. Rose coal areas and it appears that it is only a matter of time when a railroad will be run in to that district, and the coal seams opened up.

General regret is expressed at the announcement that Mr. J. K. Fraser, second accountant in the Acadia Coal Co.'s office Stellarton, has tendered his resignation, to become effective in a few days. Mr. Fraser leaves toward the end of the month to assume a much more lucrative position in Winnipeg. Mr. Fraser was a favorite with all classes, as his disposition was urbane and kindly, or to put it simply and shortly he had a 'taking way with him', a 'sunny' way an irresistible power of attraction. The RECORD wishes him every success in the new sphere which he is soon to occupy, at the same time regretting that another Pictonian is lured by the call of the west.

The annual meeting of the Dom. Coal Co.'s Employees' Benefit Society was held on Feb. 20. The following were elected officers for the ensuing year: President, M. J. Butler; 1st Vice Pres. Michael McNeil; 2nd Vice Pres., F. W. Gray; 3rd Vice Pres. John McEish. These, together with Alex. McDonald, M. A. McInnis, and Fergus Bryne, were appointed as Board of Directors. A committee consisting of C. S. Cameron, John Moffatt, and F. W. Armstrong, Treasurer, were appointed for the purpose, of from time to time, investing the surplus funds of the Society. The interest of the funds now invested amounts to nearly \$7,000 per year.

It was rather interesting to read the question put by John C. Douglas to the Government as to whether the P. W. A. or the U. M. W. made recommendations to the Government regarding members of the board for granting certificates. John is one of those chaps of the "Good Lord", "Good Devil" order, who desires to keep on the good side of everybody. It might be information of special interest were he told that in the Dominion Collieries there are now less than ten members of the U. M. W., and these few are rapidly diminishing to the vanishing point.

That grand friend of the discontented of all countries, J. B. McLaughlin, has a new idea. He is writing letters to a number of workmen, soliciting their membership and dues for the formation of ONE local of the U. M. W., with headquarters at Glace Bay. McLaughlin has reached the end of his rope, and we are very much mistaken, if miners will allow him to dupe them again. Getting down to one local seems almost like the fall of Lucifer. But better to reign in H. than serve in Heaven is the motto of the humble preacher of the 'church of man' Glace Bay.

The P. W. A. lodges of the Glace Bay district, especially those within the limits of Glace Bay proper, after discussing the resolution passed by the Town Council to have the Dominion Coal Company collect the taxes of the workmen through the office, agreed to make representation to the Local Government against legislation of this nature. They feel that a Council that would pass such resolutions is incapable of handling the financial end of their work, and consider it an insult to the workmen to refer to the matter of collecting taxes through the office of the Coal Co. They believe that there are now enough matters of an irritating kind between the Company and its employees, without adding others that are altogether unnecessary. The resolution of the Council, if it did nothing else, showed up Councillor Danie MacDougall, ex-President of the U. M. W. of A., in his true colors, and the workmen have not been slow to observe his part of the business in introducing the tax-collecting resolution into Council.

(AROUND THE COLLIERIES)

A short time ago some of the P. W. A. lodges received letters, purporting to come from District No. 26 of the U. M. W. They were letters of a begging kind asking money for certain purposes. Needless to say that they were all turned down, and motions of a spicy nature were made to consign them to the flames. How have the mighty fallen.

These are busy days in the Emery seam at Reserve. Mr. Boch, the new manager, with his capable assistants, are extending 8 inch and 6 inch air lines, through different parts of the mine, building brick stoppings and blasting two air crossings, etc. This mine should show considerable improvement in output, over previous years.

All the development of Dominion No. 1 colliery is now subterranean. Last year, 5 miles of headways, deeps, and levels were driven to provide working places for 1912, thereby placing the colliery in a splendid position to provide ample work for its large force and to maintain its usual output.

(Continued from Page 10)

were placed, one at the junction of the back tunnel and slant to prevent the air short circuiting by the back tunnel mouth, the other at the intake end of the circular cross cut.

The recording instruments in the main entry tunnel were out of order from the previous test, so no data is available as to speed, pressure, etc.

AFTER THE EXPLOSION.—There was no chance to examine the mine that night as the hour was late and ventilation was cut off owing to the wrecking of the fan housing, so we took notice of exterior damage only. The steel tube at the Slant mouth was bodily shifted forward from its setting in the concrete about 4 in., and the fan housing blown completely away. All the windows in the offices were completely blown out, two mine cars standing on track 150 feet from the mouth of main entry were blown clean across a gully; 150 to 200 ft., timber props from inside the mine were blown 300 feet up a rise of 150 feet on opposite side of samgully. The massive concrete abutments at entrance were lifted and broken and large pieces dislodged, rails twisted and bent and wreckage in all directions was sufficient evidence for that night.

Next day the housing connecting the fan was replaced, ventilation restored, and the interior examination began. For the full distance of the main tunnel no piece of moveable material was left in its original place, but lying broken and twisted in every direction. Many of the dogs holding the shelves in place were bent completely at right angles with their original position, due, no doubt, to being hit by flying timbers. At the sand bag stopping in the Circular cross-cut, the curious effect was noted of the stopping being driven in both directions, inward and outward. As we examined it, the generally accepted opinion was that the same blast had cleared out the obstruction at the same time creating a vacuum behind its path, the air force, would catch up some of the bags and whirl them back again past their original position. Another idea advanced was that of a secondary explosion following with extreme rapidity on the original blast, but working back instead of outwards would do the same thing. This, however, does not seem as reasonable as the Vacuum theory.

Inside the main heading and just past the last cross cut we found the first evidence of coking, very distinct but more in the nature of isolated coke grains than masses. Pendent from the roof were myriad stalactite

forms of coke crystals, reminding one of the needle like shape of the stalactite in the lead mines of Derbyshire, England. Turning by the cross-cut, to the back heading, we found the evidence of coking more and more decided, until just round the corner from the cross-cut, in the direction of the back tunnel heading, we came on patches of coke as large as a man's hand. Back along both tunnels to the entry we noticed the surface of the coal had assumed the dull tint of lamp black or soot. On trying we could easily lift a thin layer of coal about thick. This gave the impression that the burning blast has been too rapid in its passage to more than sear it. Two small falls from distinct slips in the back tunnel was the only damage to the roof. At the junction of Black Tunnel and Slant and onward through the Slant, to many, the most convincing evidence of the power of the blast, was found. About three and a half feet from the floor of the tunnel and following an irregular wavy line to the exit at the steel gallery, the whole of the side walls of the concrete lining were fractured and had been lifted for a distance of 14 to 15 inches and then dropped back in place. In proof of this the reinforcing iron hoops were dragged bodily out of the foundations and as the crown of tunnel settled back they had buckled, and were ripped in the fracture, and pieces of wood and brattice cloth were caught and ripped in similar manner at various points. As there is close on thirty feet of cover at the junction, and we were standing almost immediately above it, the sensation we felt of the earth being lifted bodily under our feet may have had some foundation in fact. All the windows in the steel gallery measuring 6 x 4 ft. were broken, and the gallery itself lifted bodily forward out of its concrete setting for about four inches.

The explosion above outlined was intended as a spectacular display to bring home to the American mine officials, miners and the public, the evils likely to result from the continued use of black blasting powder in bituminous mines. No serious attempt was therefore made to collect any data as to speed, pressure, heat developed or composition of gases, etc. These will come later.

The total amount of roadway opened out at present is only a little over 2,000 ft. It is intended to keep on driving out and to open up a district, all the time experimenting on gas and dust problems and other matters such as the effects on explosive wave of stone dust and other deadening agents, water sprays, steam, etc. Later, other problems met with are to be investigated if the funds at their disposal will allow. The cost of the above display at the Experimental Mine was estimated to have cost over \$6,000, without taking into account some of the items that will later appear in the repair account. At this mine a fifteen ton gasoline locomotive is used for hauling around the mine. Enquiries of the Engineer elicited a very satisfactory report as to its behaviour. Its capacity has never been severely taxed, so he did not commit himself.

All the instruments installed in the Observatory and chambers in the mine, are of the same kind as those used in the (Eng.) Experimental Station, but in ordering, some, like the pressure recorder, were not sufficiently strong for the work, and were quickly damaged.

TESTING MINE GAS FOR CO WITH BIRDS.

This was a convincing test of the value of birds for indicating the presence of dangerous gas in the mine air, more especially the Carbon Dioxide, which causes a large percentage of the fatalities in After Damp from explosion.

To make the test a large air-tight box, with glass sides and roof, was used, and the Chemist at the Gas Testing Laboratory, Mr. G. A.

Burrell, caused the air to be fouled with $\frac{1}{2}$ lb. (0.25 p.c.) of Carbon Monoxide, CO. When the gas was thoroughly mixed in the air of the box, he stepped in and three birds were passed in the air of the first two dropped in about three minutes each, the last, not being given such a severe test as the other two, as he was a good singing miner. Mr. Burrell did not want to lose him. At the end of eight minutes Mr. Burrell stepped out again, with his third bird, both a bit of the gas, but the test was too much for them, they were dead. I saw Mr. Burrell the next day, and he confessed he had nearly gone too far, described the feeling after the test as consisting of complete indifference and grogginess, though probably he was not in a condition to properly analyze them.

COMBUSTION OF FUEL.

I paid some attention to the experiments the Bureau are conducting on the complete combustion of fuel, and found that at the Arsenal they are able to take the worst of coal, with the highest proportion of moisture and volatile matter, fire it under a boiler by hand or mechanism, and yet there will be no evidence of smoke at all. I found it was done in one case by completely burning the coal on a travelling chain grate, in an external combustion chamber, before the hot gases reached the boiler tubes, thus ensuring complete combustion of the solids and allowing only the cooled gases to pass off through a long flue.

Similar conditions prevailed at the boilers using Underfeed Stokers (Jones Type) and the combustion seemed nearly perfect.

Attached to the back of the boiler range is a long combustion chamber running at right angles to them. In this chamber are observed all the phenomena connected with combustion. The gases are drawn off and analysed constantly, under all conditions, to tell what is passing through the flue. The amount of CO₂, CO and Oxygen giving an indication of the perfection or otherwise of combustion. Along the length of the flue are portholes for taking the temperature, either by Pyrometers or a telescope indicator, which measures heat to within 1° based on optical refraction and electrical measurements. In this chamber was worked out the laws governing the transmission of heat through furnace walls, wherein it was proved, that the idea of an air chamber, to isolate the interior wall from the exterior, was entirely wrong, and that walls filled in with loose material, such as sand, give far better results. I spent about four hours with the Chemist at this boiler plant, learning how to use the gas testing apparatus, and I think I have sufficient acquaintance with its construction and use, to be able to pass the knowledge on to any of our Engineers who would care for it.

The type of apparatus for testing used by the Arsenal is the Ostran Lunge, which pipettes for extracting CO₂, CO, O. The cost of one is about \$35.00 for a Pittsburg, though it is likely that the Chemist at the Steel plant uses the same apparatus and may be able to advise as to better terms of purchase. By a slight modification of this same apparatus, Mr. Burrell, the Chemist in the Laboratory testing mine gases, isolates all the constituents of mine air and determines to 0.01 per cent. of methane.

In the same house with this boiler plant, is a Gas Producer plant, for producing gas from low grade fuels, extracting the whole of the CO₂, CO, and passing the slag out through the bottom. Exactly what goes on in this producer the engineer in charge confesses he does not know, but states he is getting producer gas as high as 33 per cent. CO, and that from low grade lignites. He hopes to keep working on the problem till he has solved it, when the result of his investigations will be published by the Bureau.

EXPERIMENTAL GALLERY AT PITTSBURG.

The Explosion Gallery at Forbes Field, Pittsburg, in which the exhibition tests were made is a cylindrical steel tube of boiler plate, 6 ft. 4 in. inside diameter and 133 ft. long. Coal dust averaging 1

lb. per running foot is scattered throughout its length and on a wooden platform in front of and 9 ft. below the axial line of the cannon bore, other 20 lbs. are placed to copy somewhat the condition met with in a working face, where a heap of dust covered coal, or dust is left in the path of a shot.

On Saturday, October 25th, I went with Mr. Clarence Hall, J. G. Hudson and a few other gentlemen to witness the preliminary tests to make sure that I was right for the day of the Demonstration. As these were tests I was able to intimately observe and get data from, I give all particulars.

Four shots were fired into this Gallery,—the 1st and 2nd each with a charge of 275 grains of Monobel, a permitted explosive of the nitrate of ammonium class. This charge is supposed to be equivalent to one of a half pound of 40 per cent Nitro Glycerine in disruptive force. The charge was tamped with a little more than 1 lb. of dry fire clay and fired with detonator. No effect was produced although the 2nd shot was fired into the agitated coal dust. The 3rd shot was a charge two and a half lbs. of F. F. P. black powder tamped with 2 lbs. of dry fire clay and was equal in disruptive force to one-half pound of 40 per cent Nitro Glycerine. This was fired by Detonator (No. 7) and a violent explosion followed, the flames rushing for nearly 150 feet beyond the mouth. One peculiar feature I observed was the intrusion of the outside air round the edge of the tube mouth, at the same time the flames and the smoke were ejected from the centre. The Tube plates were distinctly heated, more especially in the middle zone. To test the possibility of another explosion with the dust still left in the Gallery, another charge of Black Powder of same weight and tamping was fired into the midst of the now quiet Gallery and an explosion of equal if not greater violence was produced. This was taken by the Engineers present, to indicate the necessity for prosecuting researches into the ability of the same charge of coal dust to produce secondary explosions. As this extra test was not on the programme of events held was carried out at our request. I thought it sufficiently interesting to call your attention to it.

Several films were run off whilst these tests were being made, and it is not at all unlikely that these events will be shown to the Public at Ulster Bay and Sydney in the near future.



TENDERS FOR DREDGING. 7

SEALED TENDERS addressed to the undersigned, and endorsed "Tender for Dredging, Cheticamp, N. S." will be received until 4.00 P. M. on Wednesday, March 21, 1912, for dredging required at Cheticamp, N. S. Tenders will not be considered unless made on the forms supplied, and signed with the actual signatures of the tenderers.

Combined specification and form of tender can be obtained on application to the Secretary, Department of Public Works, Ottawa. Tenderers must include the layout of the plant to be and from the work. Only dredges can be employed which are registered in Canada at the time of the filing of tender. Contractors must be ready to begin work within thirty days after the date they have been notified of the acceptance of their tender.

Each tender must be accompanied by an accepted cheque on a chartered bank, made payable to the order of the Honourable the Minister of Public Works, for fifteen hundred dollars (\$1,500) which will be forfeited if the person tendering declines to enter into a contract when called upon to do so, or fail to complete the work contracted for. If the tender is not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender; By order,
R. U. DENBOCHERS, Secretary.

Department of Public Works, Ottawa, February 23, 1912.
Newspapers will not be paid for this advertisement if they insert it without authority from the Department.

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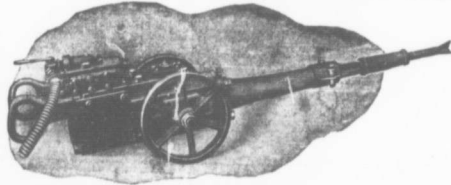
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3 30	10 45	P. TUPPER JUNCTION	3 45	11 30
4 15	11 30	INVERNESS JCT	3 50	11 05
5 15	10 12	PORT HASTINGS	3 55	11 11
	10 07	PORT HASTINGS	4 08	11 30
	9 57	TROY	4 25	A. M.
	9 44	CREGINISH	4 36	
	9 37	CRAIGMORE	4 50	
	9 18	JUDICER	5 05	
	9 25	CATHERINE'S FOND	5 16	
	8 44	PORT HOOD	5 28	
	8 35	GLESCOPE	5 38	
	8 25	HABOT	5 53	
	7 50	BLACK RIVER	6 10	
	7 40	STATHLOSER	6 28	
	7 35	INVERNESS	6 45	
	7 42		7 00	
	6 55		7 10	
	A. M.		P. M.	

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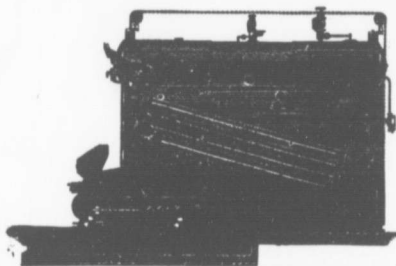
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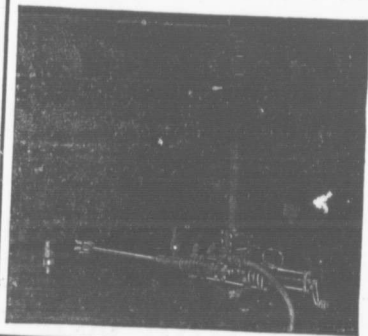
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Duties—Six months' residence upon and cultivation of the land in each of three years. A homesteader may live within nine miles of his homestead on a farm of at least 80 acres solely owned and occupied by him or by his father, mother, son, daughter, brother or sister.

In certain districts a homesteader in good standing may pre-empt a quarter section alongside his homestead. Price \$2.00 per acre. Duties—Must reside on the homestead or pre-emption six months in each of six years from date of homestead entry including the time required to earn homestead patent, and cultivate fifty acres extra.

A homesteader who has exhausted his homestead right and cannot obtain a pre-emption may enter for a purchased homestead in certain districts. Price \$5.00 per acre. Duties—Must reside six months in each of three years, cultivate fifty acres and erect a house worth \$500.

W. W. CORY,

Deputy of the Minister of the Interior.

N. B.—Unauthorized publication of this advertisement will not be paid for.

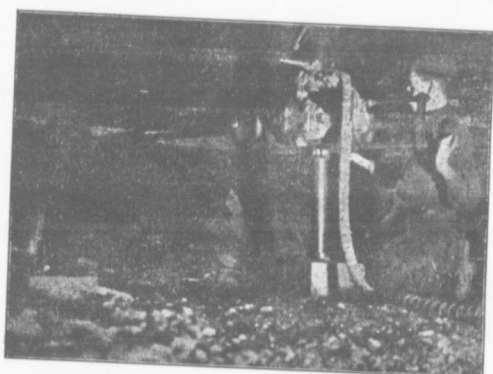
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