

down the face more than was necessary to the machine to pass, as it saved labour, and made less small when allowed to remain for next fall.

At Garrieth Colliery, near Airdrie, in Scotland, where machines had worked successfully for many years, in a 30 inch seam, with good roof and strong floor, they made the gates 14 yards apart. The corves were filled in the gate at about 83d. per ton, and the filler had to throw the coal when it got out of his reach, filling 6 yards at each side of the gate. The cutting was done by one contractor at 44d. per ton, and the filling was done by another. In Yorkshire the system was to take the corves into and along the face, necessitating the use of small corves in thin seams, but allowing the gates to be made at any desired distance apart, and accordingly they were made at from 12 to 50 yards apart, to suit the ideas of those adopting them, and it often took from two shifts upwards to fill out the coal. This necessitated irregular working of the machine, without any regular quantity of work being laid out for them per shift, and it was not nearly so methodical a system as the Scotch. It also compelled the filler to take up the spavin instead of continuing his energy to the filling out the coal, which could not very well be done, but while the filler was drawing, and the spavin could be removed at any time. In some cases the machines were made to cut all in one direction, having to be taken back through the gateways, every time it cut through the length of the face, but almost all the recent installations were made to cut back and forward. His (the writer's) opinion was that money spent in taking them through the gates, except for repairs, was simply wasted. The best mode of working seemed to be to subdivide the labour into something like the following divisions—Holers, blowers, and timberers, and fillers, packers and rippers. The holers would include a man to drive the machine, one man to lay the way in front of the machine, and a youth to clear away the debris from the cut; the fillers, to devote the whole of their time in filling out the coal. The blowers would include men to bore the holes, timber up the face and blow down the coal. The packers to take up the spavin and rip and pack the gates. The whole of those about the machine should be under the control of a capable man (more especially at the commencement) who understood machinery and mining in a general way. He might have him on contract, so it could be left to the section under him, but he should have complete control of the men, without interference of subordinate officials, whose prejudices and jealousies would only hamper and impede the work. Energy, perseverance, and system would work machines in any mines, with a fairly good top, but, of course, their proper place was in thin seams, where holding forms the greatest part of the labour, and where properly worked they should benefit both the miner and the mine owner; the former, in doing the most laborious part of the work, and the latter by increasing the output, reducing cost of getting and in reducing the proportions of slack made in getting. Mr. G. B. Walker gives the saving effected in the reduction of cost of getting, at from 3d. per ton in a 3 feet seam to 10d. in an 18 inch seam, and that effected by the value of the yield of coal as compared with hand labour, at from 0.7d. in the 3 feet, to 10d. in the seam 18 inches thick, per ton, making together a total saving of from 9.7d. in the 3 feet, to 15.9d. per ton in the 18 inches seams. In concluding his paper, Mr. Sutcliffe said that the boring type of machine had obtained a strong footing in America, but compressed air was the motive power in both countries, with few exceptions, and in the mining districts of the United States, machine mining was steadily increasing, there being scarcely any corner of the territory of the Union where machines were not being, or had not been, used with more or less success.

Buckingham and Lieve Railway Company's Bill.

(Proceedings in the Senate.)

HON. MR. DICKEY, from the Committee on Railways, Telegraphs and Harbours, reported Bill (H) "An Act to incorporate the Buckingham and Lieve Railway Company," with certain amendments. He said: "The first amendment to this bill is in the clause which states the direction which this road is to run. By the Bill, as it came to us, it was required to pass along the River Lieve, and as the railway projectors did not desire to make it quite so crooked as that river, they asked to amend the Bill by putting in the words 'along or near the river.' To such an amendment, I presume there will be no objection. The next amendment is that which introduced the provision that this work shall be declared a work for the general advantage of Canada. The next amendment is to introduce the word 'connects' in the clause which gives authority to make agreements with other lines. These are the amendments, with the exception of the concluding clause of the report which is my duty also to explain to the House. This charter, as applied for, is for the construction of a line of railway from Buckingham up the Lieve River to its source, and also to continue that undertaking south from Buckingham to the River Ottawa, and to cross the River Ottawa by a bridge, and then to connect with other lines through the Province of Ontario. The House is probably aware that by our 66th rule, it becomes the duty of the committee to whom a private Bill is referred to report whether there is any difference between the Bill as it was brought before them, and the Bill which was originally applied for by petition and notice given. In this case all the provisions which give authority by this Bill to con-

struct a line from Buckingham to the River Ottawa, and a bridge across the Ottawa, and the connecting lines from that bridge to other railway lines in Ontario, were left out of the notice. No notice was given of them, and it became our duty to report that fact to the House, so that the House might deal with it as they chose. In connection with that a question was asked by the hon. gentleman from Sarnia as to whether the notices were regular in other respects, as to time, and I felt it my duty to look into that, and I have now in my hand the report of the Committee on Standing Orders and Private Bills, to which committee this Bill had been referred, in which they state that the notices were short in point of time, but recommending the suspension of the rule, and the rule was accordingly suspended. But the fact that the notice was short I felt bound to state to the House. It is for the House to determine whether they will pass this Bill now, or take it into consideration at a future day. My duty is discharged when I state the nature of the amendments.

HON. MR. CLEMON moved that the amendments be concurred in. He said: The chairman has given a fair explanation of all the changes that have been made and I do not think they interfere with the Bill in any respect. It is true what he says, that there was no notice given of this bridge and connection, but it does not affect anyone. It is rather an improvement in the Bill as it was originally introduced. The motion was agreed to and the amendments were concurred in.

HON. MR. CLEMON moved the third reading of the Bill as amended.

The motion was agreed to and the Bill was read the third time and passed.

Alberta Railway and Coal Company's Bill.

(Proceedings in the Senate.)

HON. MR. GIRARD moved the second reading of Bill (39), "An Act respecting the Alberta Railway and Coal Company." He said: The company asked for power to further extend their railway through the Crow's Nest Pass to a point where a connection may be conveniently made with the Canadian Pacific Railway. They also ask for authority to construct, maintain and operate irrigation ditches in the District of Alberta. Of course they ask for power to impose certain charges for the use of these irrigation ditches, but these charges must be submitted to and approved by the Governor-in-Council. The work referred to must be commenced within three years and completed in six years, and in the case of irrigation works the limit is seven years.

The motion was agreed to and the Bill was read the second time.

MINING NOTES.

(FROM OUR OWN CORRESPONDENTS.)

Nova Scotia.

Cumberland County.

The coal sales of the county were 462,267 tons, for 1891, against 438,608 tons in 1890.

The production of the collieries of the Cumberland Railway and Coal Company was 459,395 against 419,012 tons in 1890, in spite of the delay caused by the explosion. Since that date the enlargement and completion of the air-way has been finished. New pumps, screens, etc., have been put in, and the colliery generally placed in excellent order. Safety lamps alone are used underground, and no explosives.

There has been quite a lot of work done in the air-ways and the volume of air considerably increased. The new lift which was sunk last year in the east slope has been opened up this year, and levels driven east and west. During the year the west slope has been sunk down 1,200 feet. There is also a new lift in the north slope and one in the east slope, 600 feet each, and 1,200 feet in the west. Properly speaking, we do not know the extent this lift may be driven westward, as every year further developments are made of this seam westerly, until now they are proven for some miles with slight variations southerly, caused by up-throw dikes or faults. Easterly the No. 5 slope is proved to some extent a distance of one mile, roughly speaking.

There are somewhere about 1,400 men and boys employed in these mines, and when we take into consideration the hazardous nature of their employment the casualties that do occur are comparatively few. During the year there has been placed in the north slope a new duplex pump—high and low pressure, water barrel 10 inches, stroke 36 inches, water column 10½ inches; the pipes are lined inside with wood.

The Chignecto mine has remained closed, and no returns of a satisfactory character have been received of the results of the prospecting carried on for other seams.

The output from the Joggins mines was 60,056 tons.

Pictou County.

The coal sales in 1891 amounted to 405,096 tons, as compared with 450,509 tons in 1890. The home sales were 265,095 tons against 277,753 tons in 1890.

Gay's River.

"The gold district of Gay's River," writes Mr. Faribault, "was re-opened last spring by the Coldstream Gold Mining Company, who put up an extensive 50 stamp steam mill and other large buildings. They sank a shaft, immediately north of Daniel McDonald's old works, which gave the following section of the Lower Carboniferous:

Surface drift.....	20
Conglomerate containing gypsum, non-aufiferous.....	35
Coarse sandstone.....	3
Aufiferous, irregular conglomerate.....	8

"This lower aufiferous conglomerate is wholly composed of debris of the adjacent Lower Cambrian rocks, apparently in an old river bed, and rests on the lower graphitic ferruginous slate group. Beds of conglomerate similarly situated along the northern boundary of the gold-bearing rocks may prove sufficiently rich to be worked, but the great excitement caused two years ago by exaggerated reports of discoveries of gold in various places, remote from the gold-bearing rocks, have led a great many to take up valueless ground."

Oldham.

Mr. E. Faribault, in his preliminary report of the operations of the Geological Survey in this district, writes as follows:

"Special attention was given to the gold district of Oldham, it being a typical district, worked to a great extent and exposing to great advantage the quartz leads, all of which were prospected by means of surface trenches on account of the small extent of the drift. A detailed geological map of this district on a scale of 120 feet to one inch, with sections, was compiled on the ground. It shows the elliptical structure of the anticlinal fold, with all the known quartz veins, both interbedded and transverse; and also the numerous faults affecting them, and proves clearly that the richness of a lead depends altogether on its position and relation to the structure of the elliptical dome of the fold to which it owes its origin. In this work I am specially indebted to Mr. J. E. Hardman, B.Sc., M.E., manager of gold-mining properties in Oldham and Waverley, for such valuable information which his great experience in gold-mining enabled him to give.

"Some facts which have an important bearing upon the question of deep mining may here be introduced in view of the great interest taken at present by the mining community in the subject. From a study of the districts east of Halifax, and especially of that of Oldham, it is plain that whenever an interbedded lead is followed some distance on the surface or to great depths, its relation to the axis of the anticlinal, and consequently to the stratigraphy of the fold, is constantly changing, and its size and workable value must consequently be affected; so that it is improbable that a lead found richly and of good size on the surface can be followed profitably to great depths. The limit of depth may vary from a few feet to 400 or 500 feet, according to the structure of the anticlinal fold. In most of the districts the zone of rich leads has the anticlinal axis for its centre, and it is probably the centre of the aufiferous zone to a depth practically unlimited. Such is the case in the eastern part of the province, at Seal Harbour, Isaac's Harbour, Goldenville, Harrigan Cove, Salmon River, Fifteen Mile Stream, Killam, Mosselton, Moose River, Caribou, Gold River, Lawrencetown, Waverley and Oldham. In a few other districts where the aufiferous zone is worked only on the north or south side of the anticlinal, the zone would, for the same reason, be parallel to the axis of the anticlinal to an inaccessible depth, as in Isaac's Harbour, Wine Harbour, Beaver Dam, Tangier and Lake Catcha.

"I would, therefore, strongly recommend that deep, perpendicular shafts be sunk on the anticlinals, and the cross-cuts be driven on both sides at various depths to test leads which do not crop out to the surface, many of which would probably prove very rich, as they would be cut in their most favourable stratigraphical position and could easily be worked by means of levels and overhead stoping from cross-cuts and the one perpendicular shaft. This system might be adopted with advantage at the North Star property of Isaac's Harbour, at Goldenville, where both sides of the anticlinal have been worked from 500 to 600 feet deep and abandoned, but the middle of the aufiferous zone has never been tried; at Fifteen Mile Stream, in the vicinity of the Serpent lead; at Moose River, where Mr. D. Touquoy has his main shaft; at Waverley, on the east and west side; and at Oldham, west of the Black Brook. No such systematic workings have, however, yet been undertaken in Nova Scotia that I know of, except in Oldham, where Mr. J. E. Hardman began last summer to sink a perpendicular shaft on the anticlinal dome. The result of his undertaking is awaited with great interest.

"The pay streak of the leads in different districts is also of great importance; but, unfortunately, the data necessary to draw conclusions are very meagre, as in most of the mines, especially in old workings, no systematic records of the yields of different parts of the leads have been kept. I hope, however, to be able to throw some light on the subject from the notes I have gathered this summer."