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Established 1882

Vol. XX—No. IX.

OTTAWA, SEPTEMBER 30th, 1901.

Vol. XX—No. IX.

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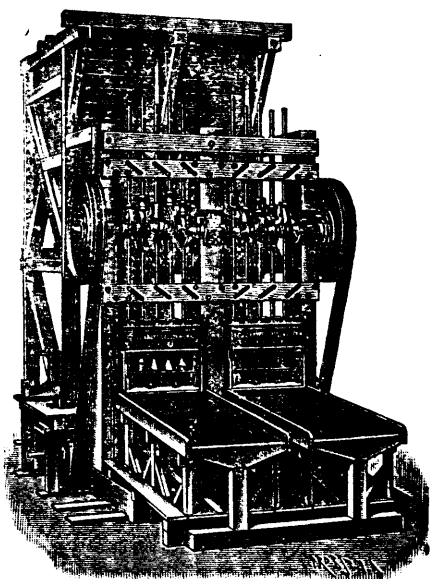
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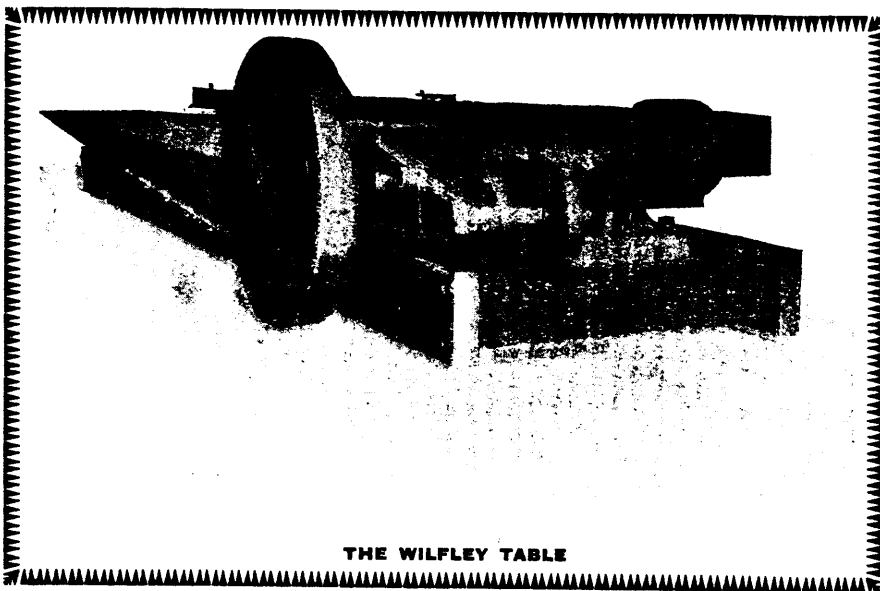
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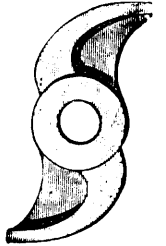
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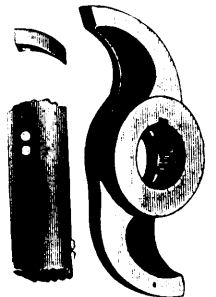
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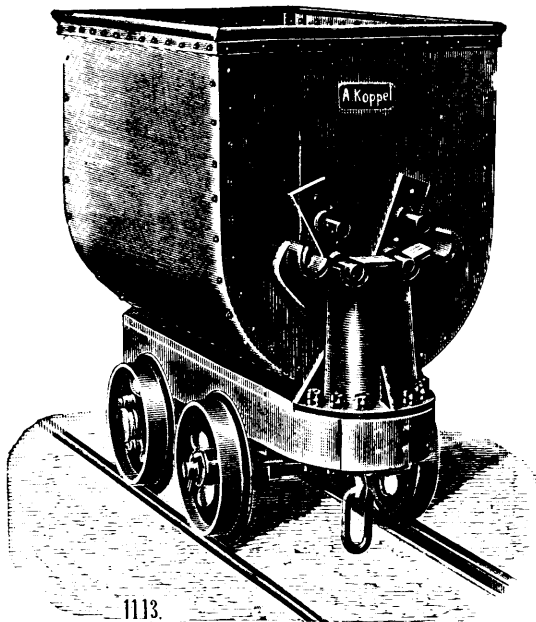
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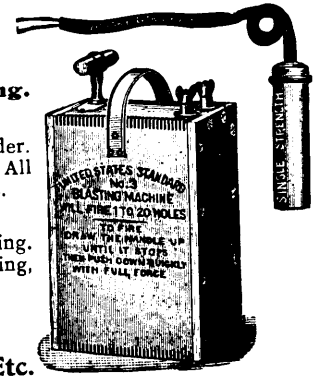
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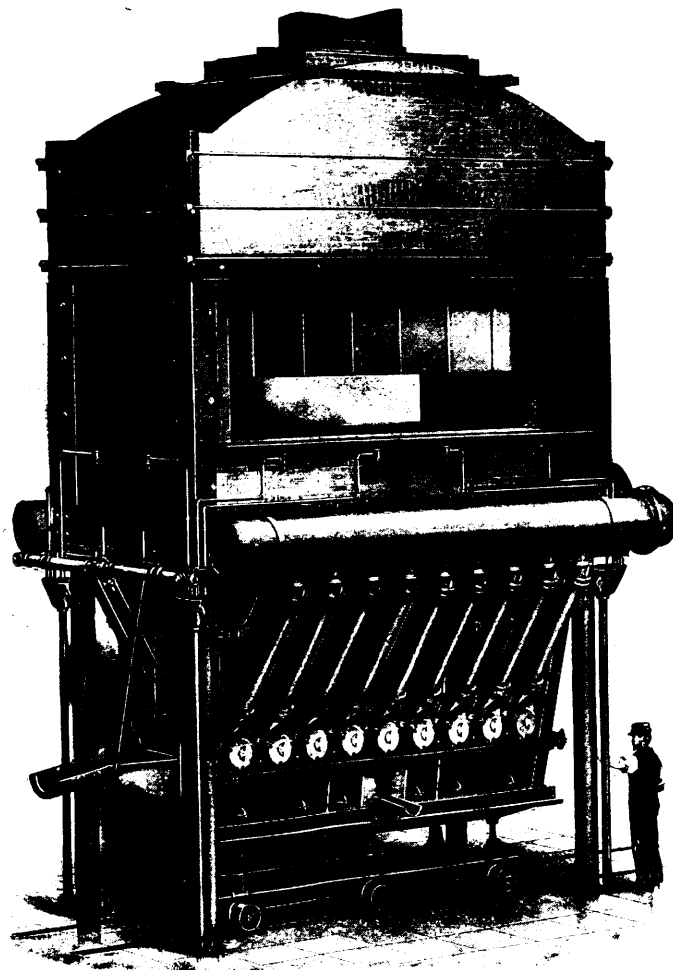
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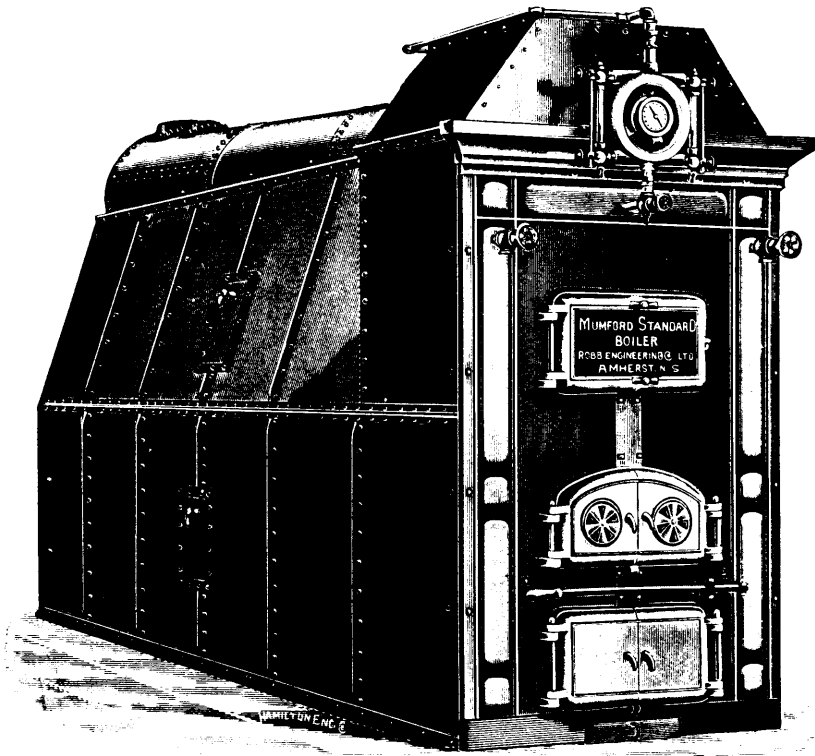
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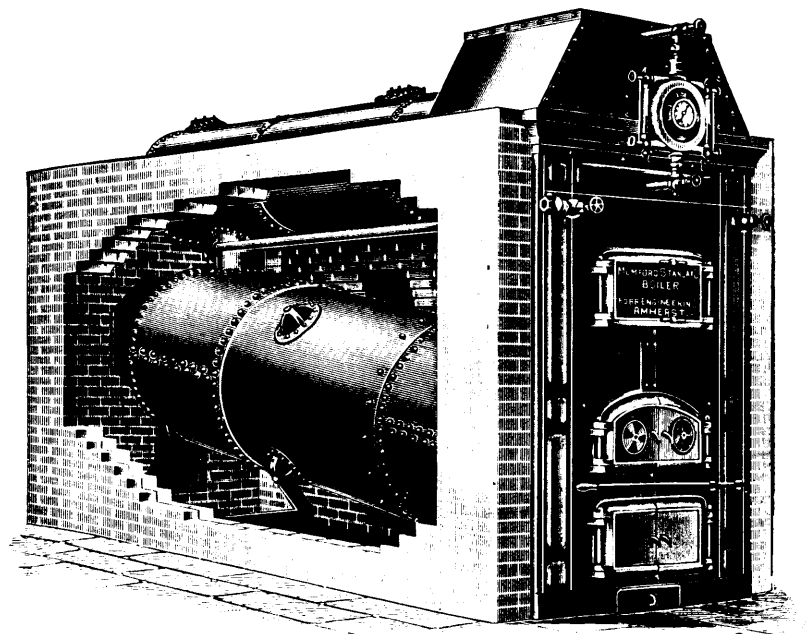
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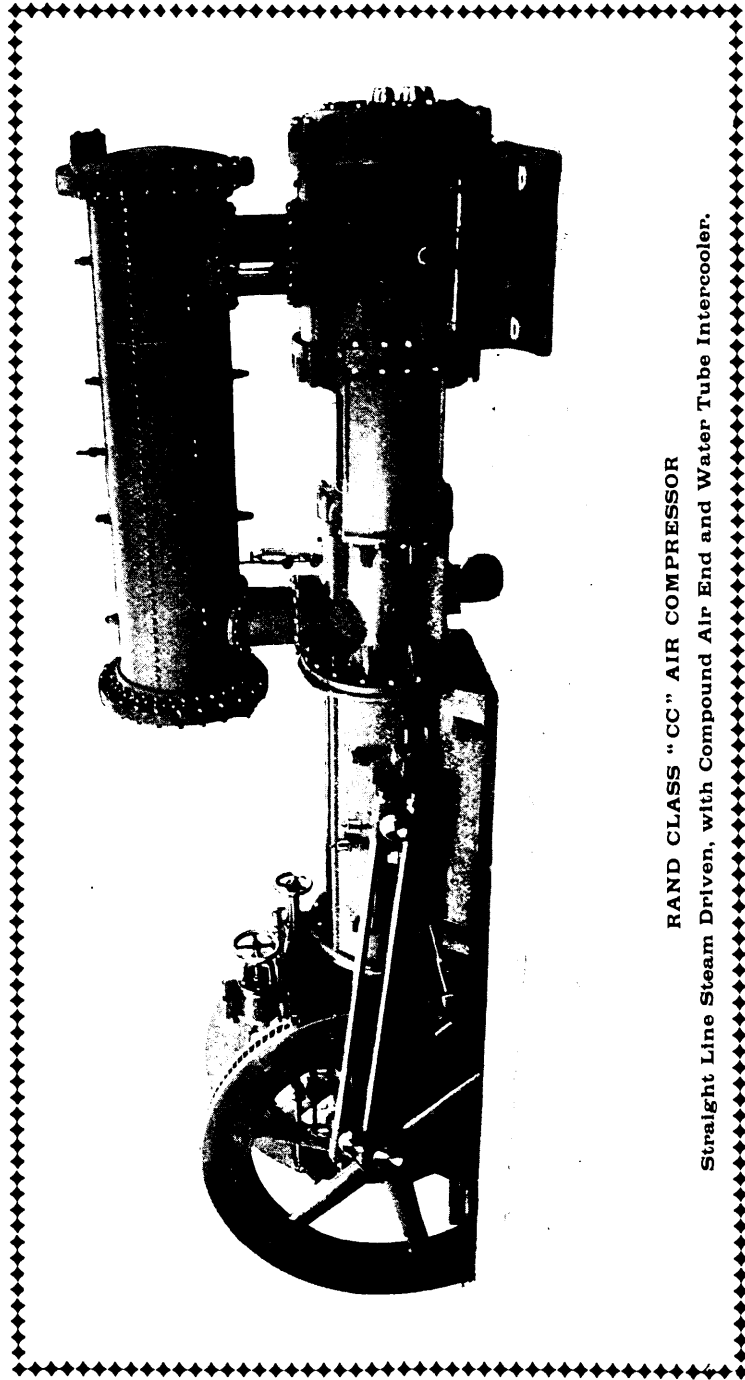
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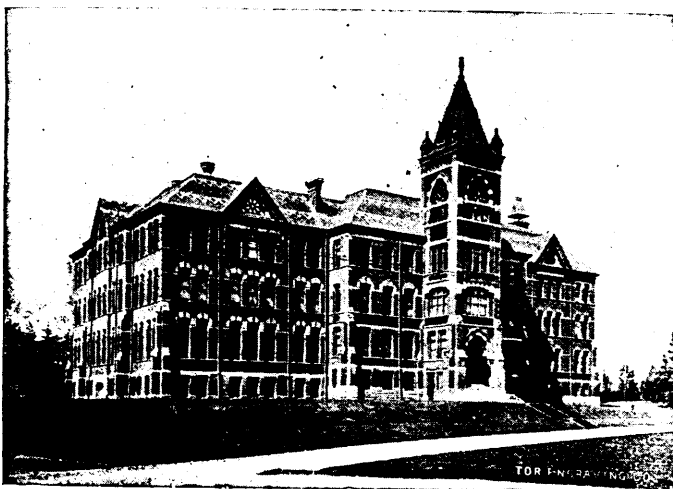
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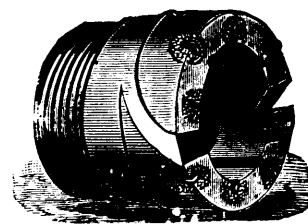
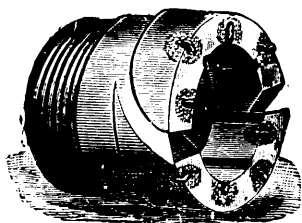
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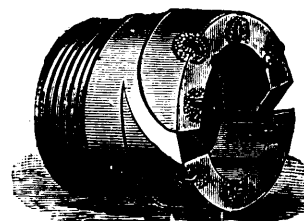
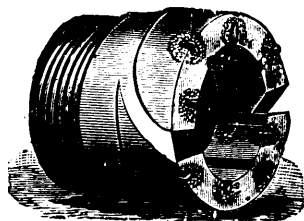
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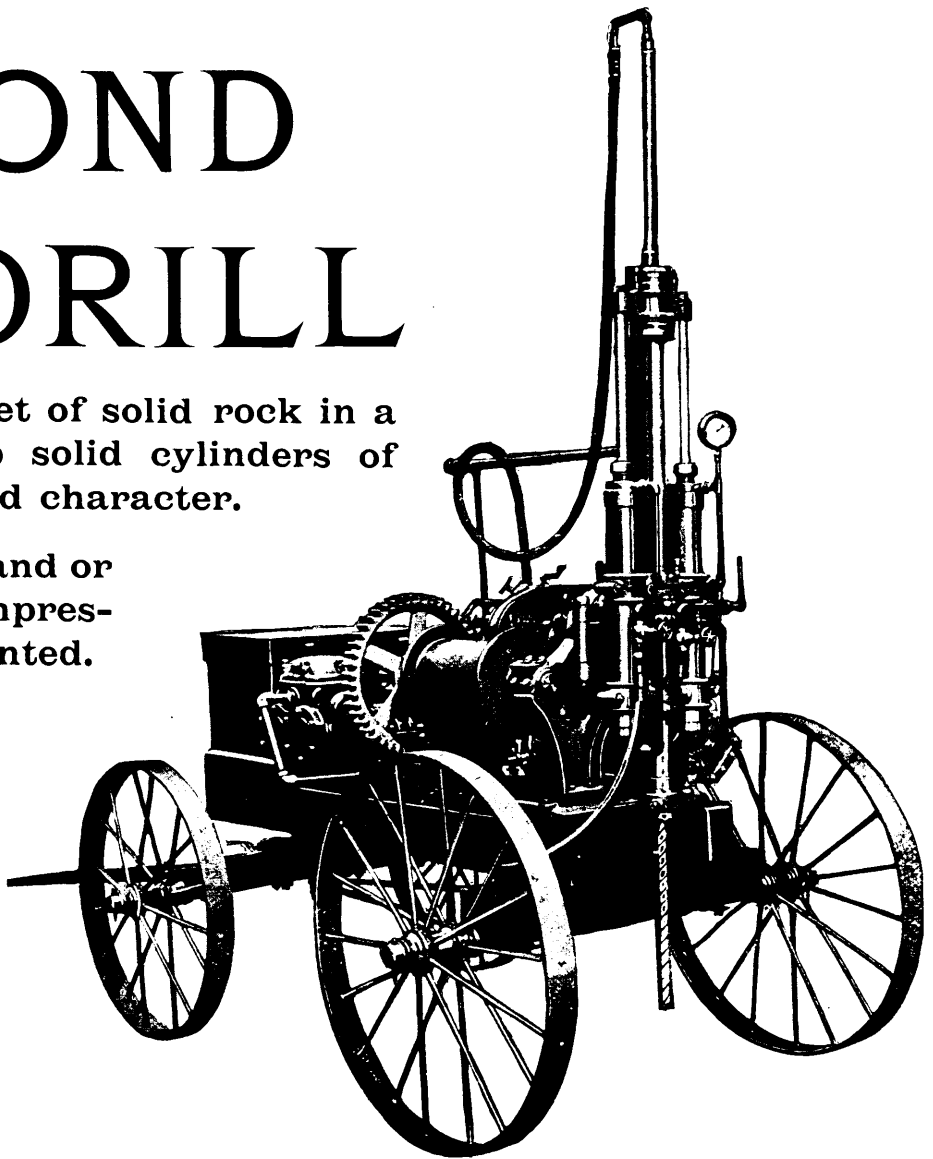
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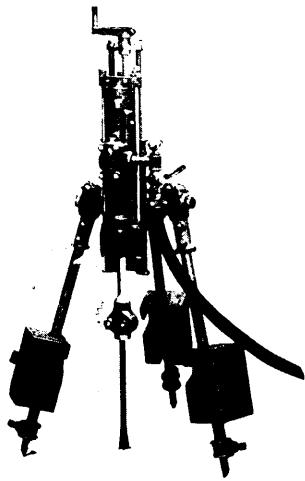
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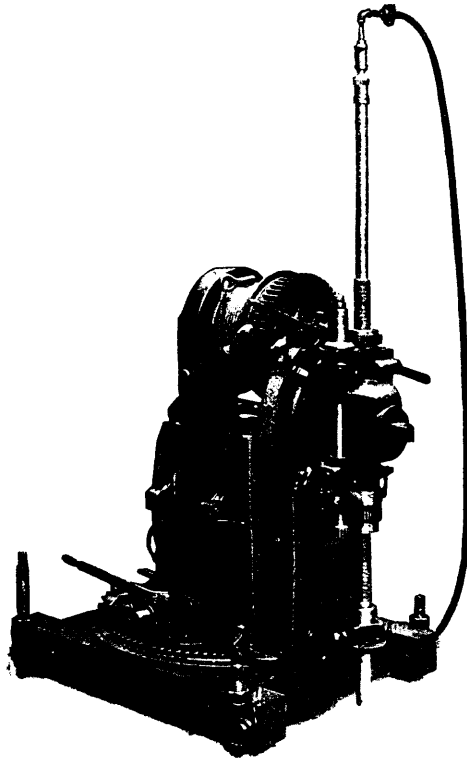
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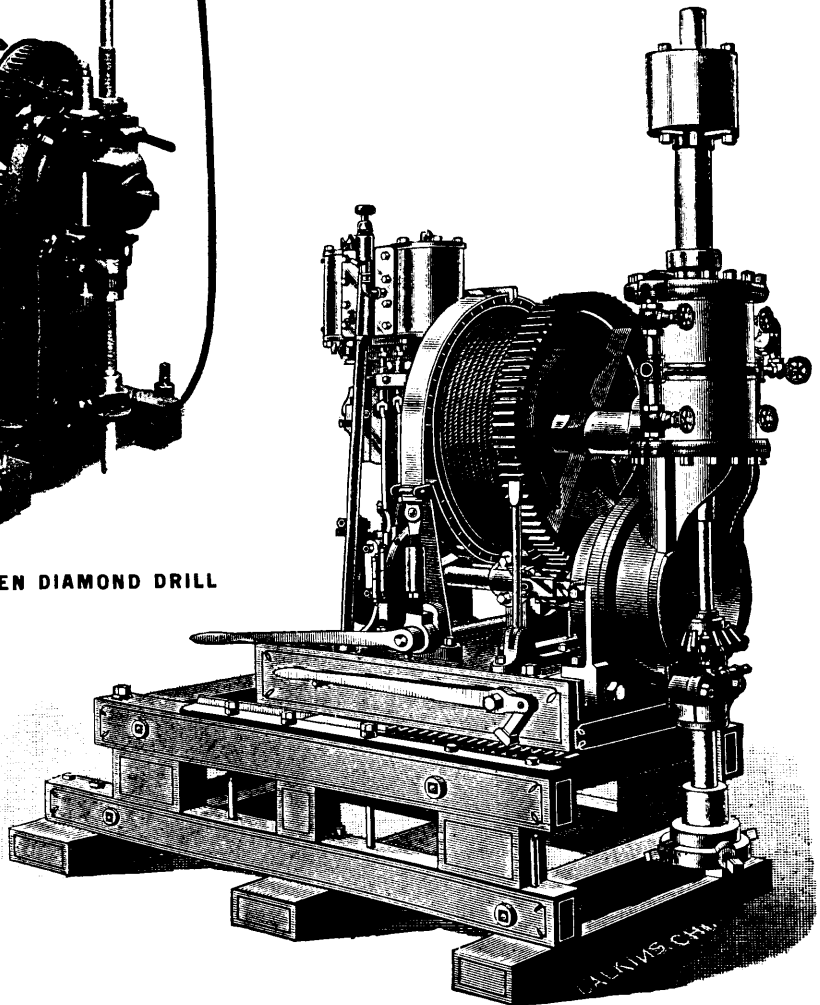
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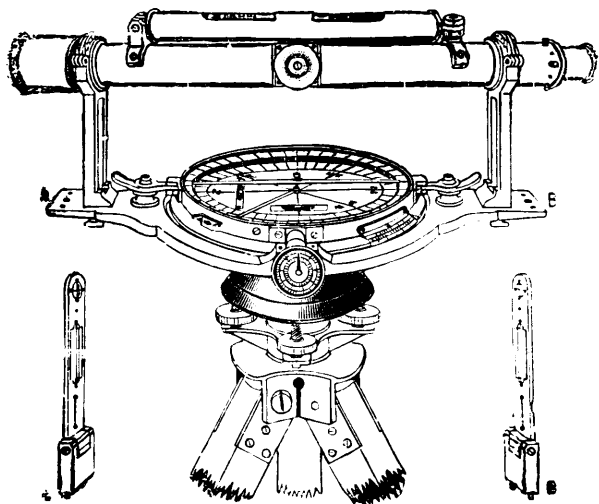
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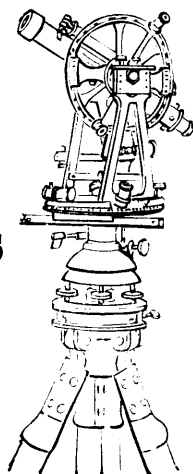
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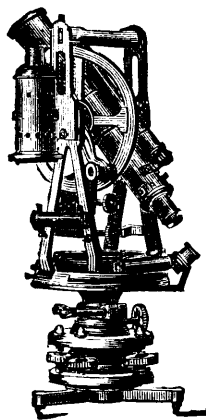
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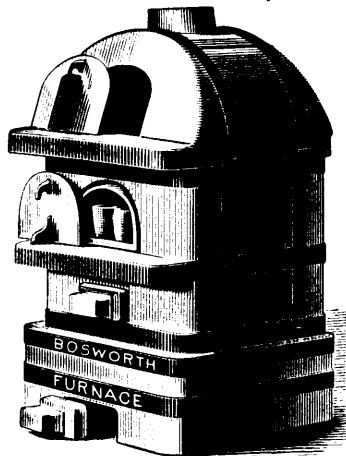
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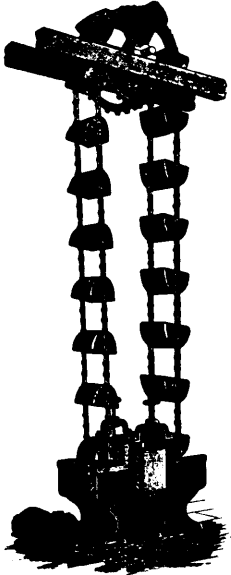
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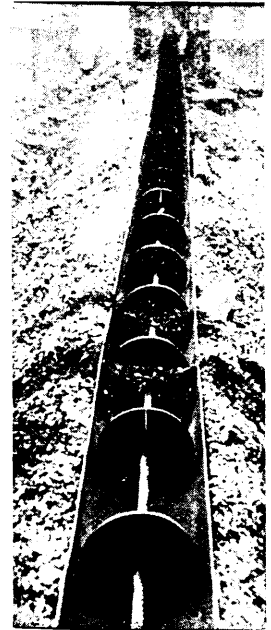


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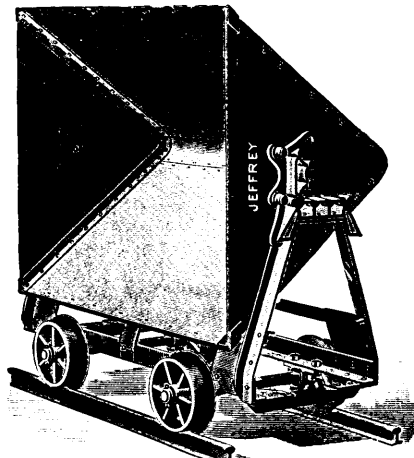
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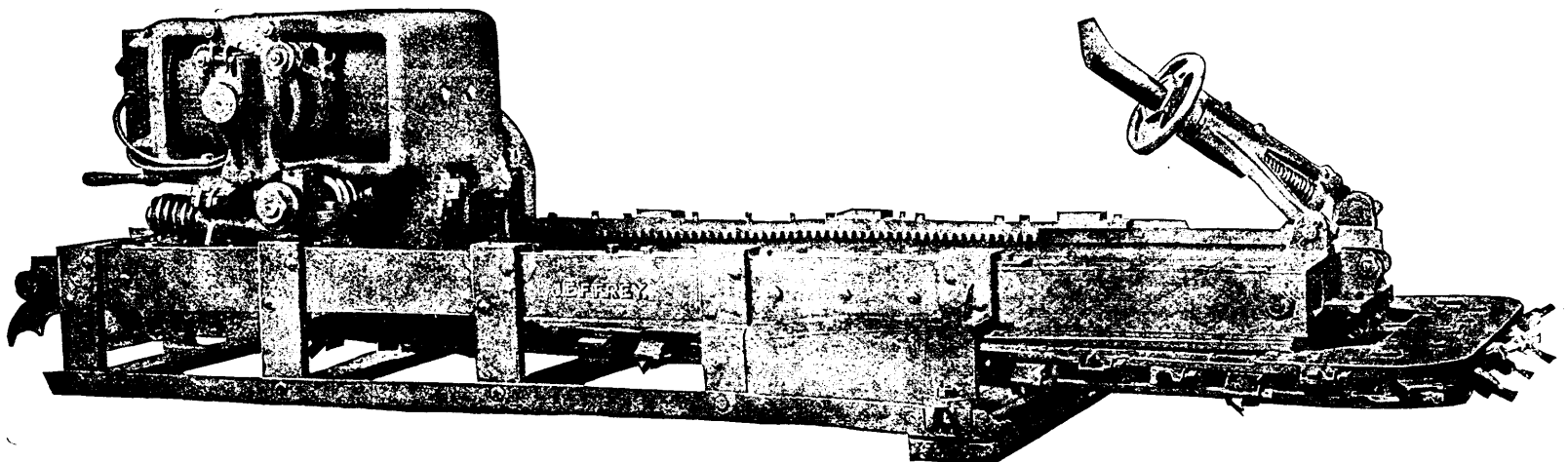


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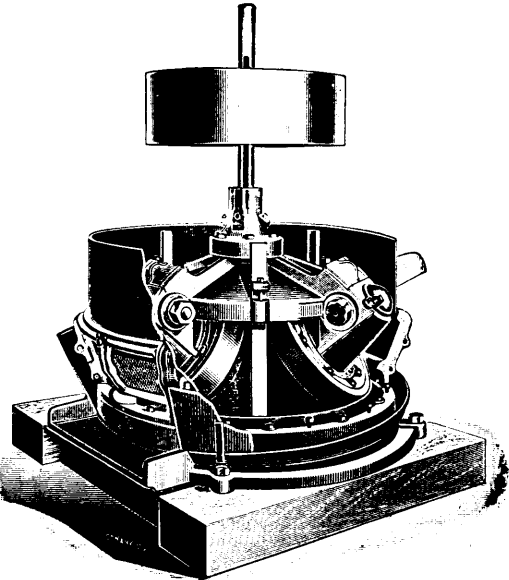
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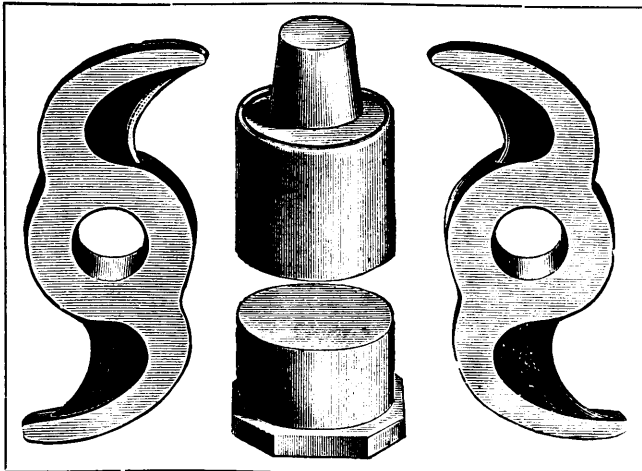
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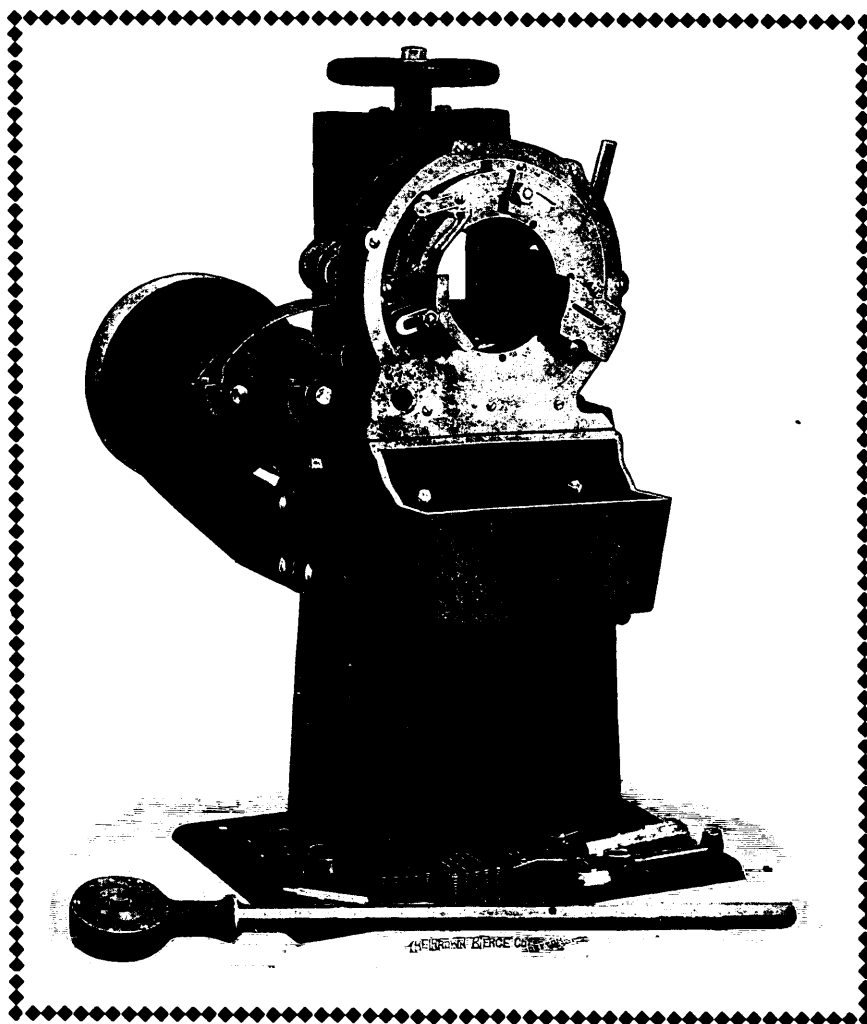


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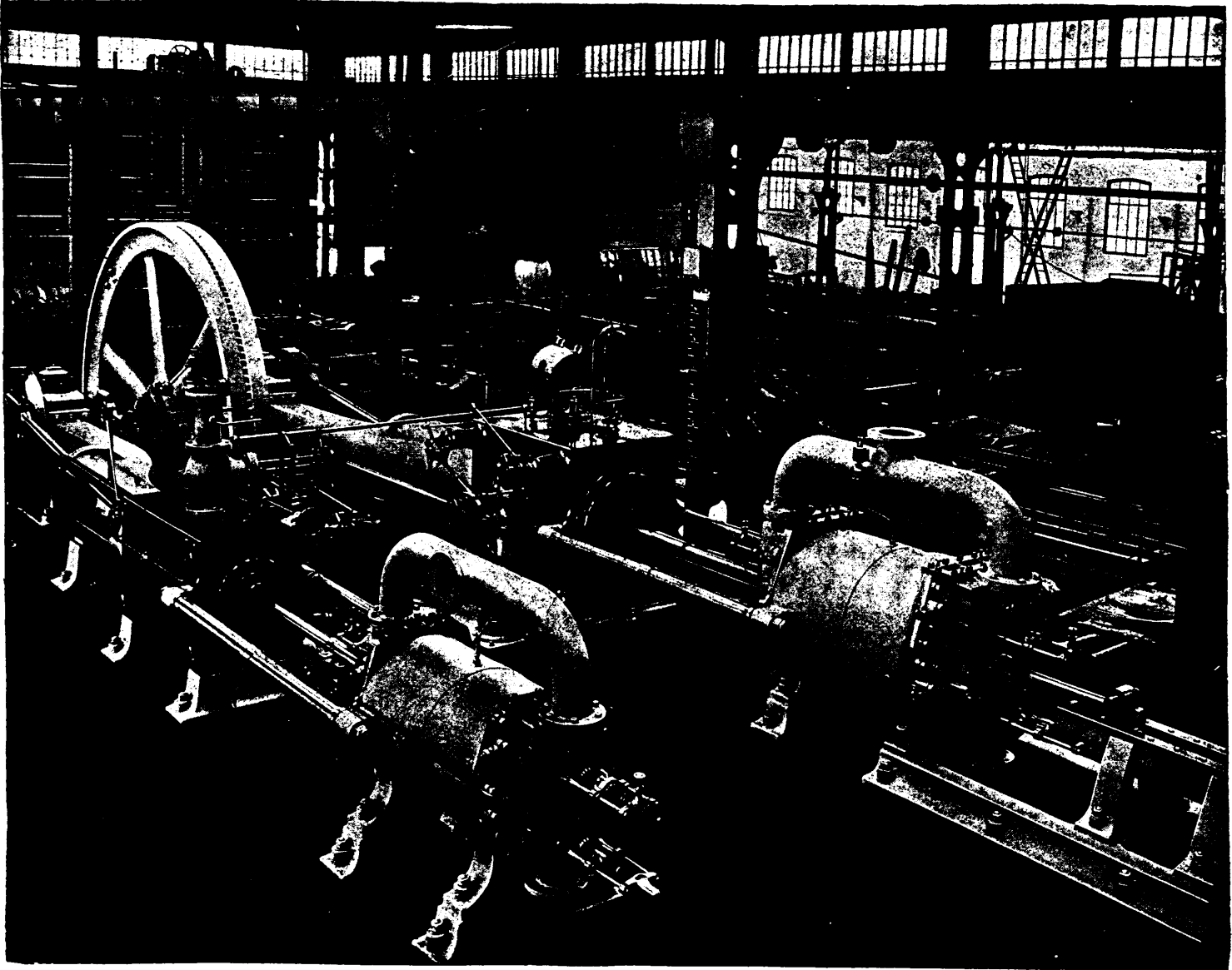
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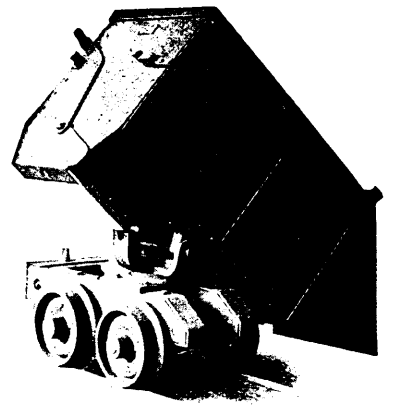
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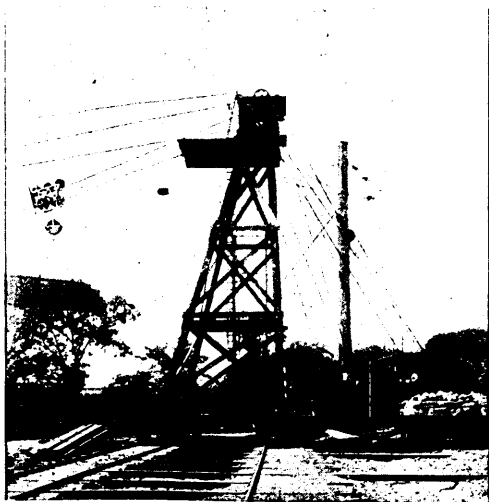
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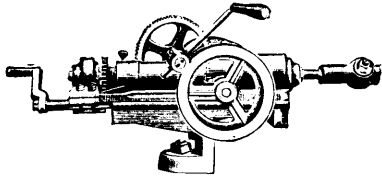
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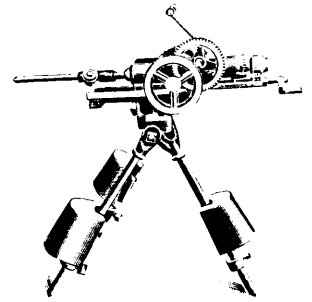
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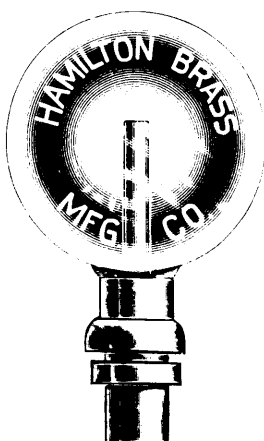
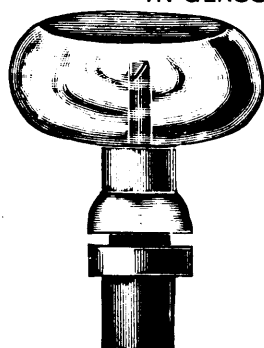
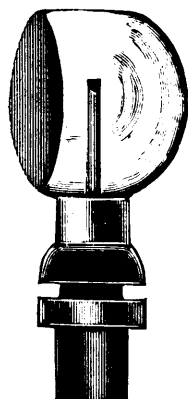
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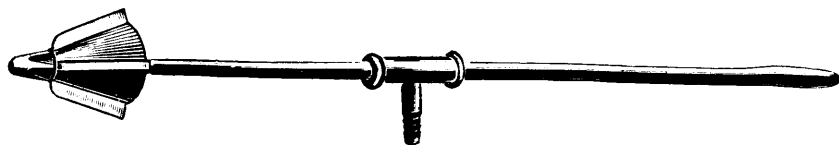
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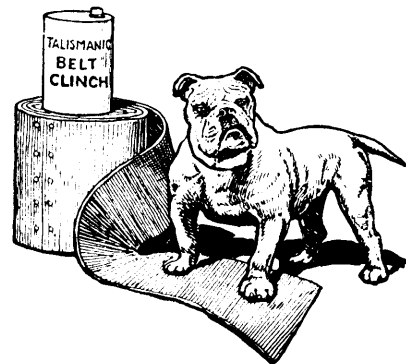
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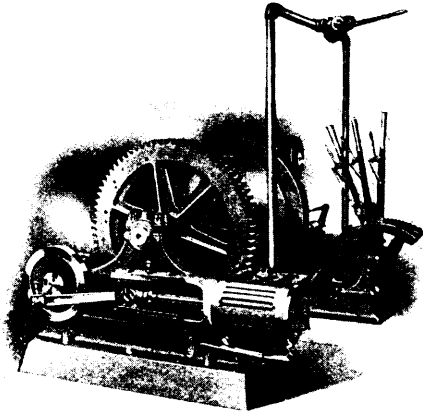
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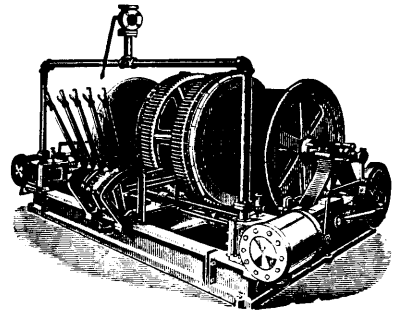
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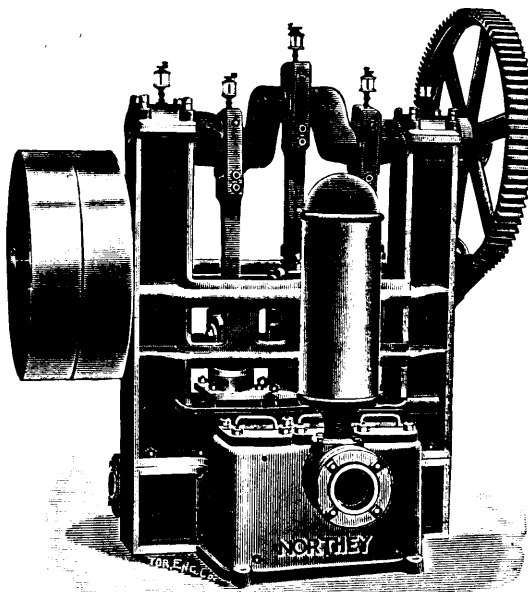
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Choice Methods of Finance.

The report of the official receiver of the winding up of the British America Corporation furnishes some remarkable disclosures of the methods of financing the affairs of this enterprise, the Le Roi, and its other subsidiary undertakings in Canada.

The British America Corporation was floated in December, 1897, by the London and Globe Finance Corporation, and was to acquire from the parent concern certain "options, concessions and properties," for which £500,000 in shares was to be paid. The London and Globe interest in these properties, however, consisted only of options to purchase, "and," to quote Mr. Barnes, "no concession or property was in fact sold to the British America Corporation, as suggested by the prospectus" On the deal the London and Globe made a large profit; but beyond the statement in the prospectus that shareholders subscribing to the British America Corporation issue would, in addition to such dividends as might be earned, also receive "their share of the profits accruing to the London and Globe by means of this issue," no mention was made of this essential fact. The issue was a success, and the company started business with a cash capital of about a million sterling. Mr Barnes groups the operations of the corporation under the following heads:— (1) The acquisition of mining claims and properties in British Columbia; (2) the acquisition of mining claims and properties in Yukon and the conduct of trading operations in that district; and (3) the purchase and sale of shares on the London Stock Exchange and the conduct of financial transactions with the London and Globe Finance Corporation and kindred companies. For the detailed accounts of how these various branches were carried on we must refer the reader to Mr. Barnes's report, paragraph 14 *et seq.*

The Le Roi deal, however, is of more than passing interest to readers. The directors of the British America Corporation authorized the resident director in Canada, Mr. C. H. Mackintosh, to purchase a controlling interest in the company owning the Le Roi mine at a price not exceeding £250,000. After some negotiations 270,676 shares (out of a total 500,000) were eventually purchased at \$6 per share. The minority shareholders managed to make a better deal with the British America Corporation directors, obtaining \$8.50 for their holdings. This caused trouble, and the matter is still *sub judice* in the Canadian Courts. But the result of this purchase of Le Roi shares was the discovery on the part of the British America Corporation directors that they had bitten off more than they could chew. Accordingly, the London and Globe was invited to co-operate in the Canadian business and to share on equal terms any profits which might accrue. The London and Globe, being controlled by practically the same board, naturally

agreed, and half the cost of the Le Roi shares was charged to this company. The Le Roi mine, which had been bought for £725,000, was sold to the English company for £950,000, the profit on the transaction, after meeting all expenses, being £164,315. The next move was to create three additional British Columbia companies—namely, the East Le Roi Mining Company, the West Le Roi Mining Company, and the Columbia Kootenay Mining Company, each with a capital of half-a-million sterling, and each paying for the various properties acquired from the British America Corporation £400,000 in fully paid shares. These companies were never publicly issued, but the outcome of this juggle was the inflation of the British America Corporation assets from £294,665 (representing the moneys paid out in connection with these mines and claims) to £1,200,000, being the face value of the shares in the above-mentioned companies accepted as payment for the transferred properties.

Later on the West Le Roi transferred all its interests, less claims valued at \$38,117, to the Le Roi No. 2, Limited, receiving for claims, valued originally at \$437,000, £550,000 in cash and shares. The East Le Roi subsequently transferred in cash and shares. The East Le Roi subsequently transferred claims valued at \$320,000 to the Rossland Great Western Mines, Limited, for £450,000 in cash and shares, retaining only one claim, originally valued at \$16,000. The Columbia Kootenay sold claims originally valued at \$250,000 to the Kootenay Mining Company, Limited, for £350,000 in cash and shares, retaining one claim valued at \$10,000. The properties not included in the transfers to the new companies were withheld, Mr. Barnes learns from the secretary of the British America Corporation, "because little (if any) development work had been carried out by the corporation upon them." Yet we find the directors of the British America Corporation, in their statement of the corporation's assets, putting down 432,000 shares in the Columbia Kootenay as "estimated to produce" £229,312, 433,000 shares in the East Le Roi as "estimated to produce" £49,163, and 437,000 shares in the West Le Roi as "estimated to produce" £181,491—or in every case to realize exactly what they cost the corporation! And this, let it be noted, after what we may assume to be the cream of the assets had been transferred to other companies!

That the financial operations of the corporation were peculiar will surprise no one after the above-mentioned disclosures. One sample of the juggling which was practised will be sufficient—others can be discovered by the curious in Mr. Barnes' report. Between September, 1897, and September, 1898, the British America Corporation had lent the London and Globe £629,699, of which £442,223 was repaid in cash, leaving £187,475 due from the London and Globe. This indebtedness, however, was changed into a debt of £82,524 due from the

British America Corporation, to the Globe, by transferring to the British America Corporation, at a price of £270,000, 100,000 Standard Exploration shares, 100,000 Victorian Gold Estate shares, and 70,000 International Nickel Corporation debentures. The Globe subsequently repurchased the Nickel debentures at par. The London and Globe, indeed, seldom allowed the British America Corporation to scoop the pool in any of these deals. The latter did manage to make a profit of 2s. per share on a block of Nickel Corporation shares, but the result, according to Mr. Barnes, "was a gift without consideration of £26,411 by the London and Globe to the British America Corporation." Then it was determined to balance the British America Corporation's books on November 28, 1899, and on that date the London and Globe paid to the British America Corporation £264,110 for shares repurchased. This transaction increased the balance of cash at the corporation's bankers on the date of the balance sheet from £2,697, to £266,807, and the corporation's profit by £26,411. The directors on this balance-sheet—which showed a total profit of £601,501, consisting of £148,833 realized profit and £452,667 unrealized paper profit—declared a cash dividend of 10 per cent., absorbing £150,000. We know the value of some of these paper profits, and we are not surprised to notice Mr. Barnes's remark that "in the circumstances the legality of the dividend of £150,000 will have to be carefully considered."

The Lead Situation.

A most undesirable condition of affairs exists at the present time in connection with the Canadian lead industry. Boiled down to few words the situation is that circumstances have combined to make the production of lead ores so unremunerative that the greatest producers in the Slocan and East Kootenay districts of British Columbia are either shut down completely or devoting their attention exclusively to development work pending a turn in the market that will restore prices to a basis that will leave a reasonable working profit for the mines.

The question of making lead mining profitable in British Columbia is one of the greatest problems that the country has to face, and it is a fact, unfortunate too, that the legislature of the province has manifested little or no insight into the question, otherwise matters might have taken a turn earlier in the year.

From the time the Canadian lead first figured in the world's output, practically in the early '90's, up to January last, prices fluctuated from time to time, but lead ores could always be mined at profits that offered a strong inducement to operators, and the production increased rapidly. The purchasers were the Canadian smelters at Nelson, B.C., and Trail, B.C., the Everett, Wash., smelter and the American Smelter Trust. The bulk of the ore went to the latter institution. The Canadian Pacific railroad held the lead industry in the hollow of its hand by reason of controlling the transportation throughout the producing districts and when the big road fell out with the Smelter Trust, the miners were ground between two stones and came out of the ordeal decidedly the worse for wear.

The American Smelting Trust's contracts with British Columbia lead producers expired at the first of this year and when it came to a question of renewals, the Trust demanded from the Canadian Pacific some concessions in the matter of rates. There can be no argument as to the justice of the demand in many instances. The case of the St. Eugene mine, the biggest producer in the country, may be quoted as an example. The property is located on the Crow's Nest road, a section of the Canadian Pacific system, and over this section the ore from the St. Eugene was hauled for a distance under 50 miles to the junction of the Kootenay Valley road, a link in the Great Northern system. The Canadian Pacific railroad people charged for this haul

more than half as much as the Great Northern road charged the Trust for transporting ores from the Cœur d'Alenes in Idaho to the Missouri river, a haul of over 1,000 miles. Other instances of a similar nature might be quoted, but the sample is sufficient to demonstrate what the Trust described as a system of "hold ups" under which they could not do business. The result of the rate jangle was that the American Smelting Trust, which had stood ready to contract for more than half the entire output of the country, retired from the field and refused to do business with the mines of British Columbia.

Thus robbed of its principal market for lead ores, the British Columbia lead trade turned to the home smelters for a market. With the big American company out of the field, the Canadian smelters lost no time in raising rates a few dollars, thereby putting another twist in the suffering lead producer. Moreover, the Canadian smelters did not have the capacity to handle half the output of the country, and had the Everett smelter not come to the rescue, the situation would have been worse than it actually is. The net result was ultimately to close down the producers of high grade lead ores. The St. Eugene, with immense bodies of ore and a shipping capacity of 3,400 tons of 66 per cent. concentrates per month, sent the product of several months' work to the Guggenheims in South America, and then worked for several months on a large order for concentrates to be shipped to Antwerp, Belgium, but these artificial helps soon "petered out" and the biggest lead properties on the continent are now idle save for the employment of 100 men on development work. The same thing applies to other high grade lead properties. In the Slocan most of the ores carry a high percentage of silver and many of the mines under this head continue to ship to the smelters, satisfied to make the lead values pay for the cost of production and accepting the returns from the silver values on which to figure out a profit.

The slump in lead on the London market hit British Columbia lead producers hard. At present quotations on the London market, where all Canadian lead is marketed, the product nets British Columbia operators \$1.50 per hundred, at which the margin of profit is infinitesimal because of the cost of producing under working conditions appertaining in the province.

The question of a remedy for the trouble has vexed British Columbians for many months. It was believed that the establishment of a Canadian refinery would solve the problem, inasmuch as the enterprise would place the Canadian product on an independent basis in the matter of securing a market. Finally the agitation of a refinery took active form in the shape of a strong delegation from the Kootenay country which visited Ottawa and induced the Federal Government to grant a subsidy on refined lead. The bonus is made to cover a period of five years, with the proviso that it should not exceed \$200,000 in any one twelve-month. For the first year the subsidy is to be \$5 per ton, second year \$4 per ton, third year \$3 per ton, fourth year \$2, and fifth year \$1. The bonus is, presumably, to cover the charges of interest account to accrue on refinery stock while a market is being secured for the product. Up to the present time nothing has eventuated in the shape of a definite proposition to construct a refinery, and it is now agreed that the Canadian Pacific railroad must go ahead with the refinery if it is to be realized in the near future. The general impression is that the Canadian Pacific railroad has the proposition in hand and that a move will be made at an early date, but nothing definite has been announced.

In the meantime the lead industry is suffering severely. It was estimated during the closing months of 1900 that the production of lead for the present year would aggregate 120,000 tons, instead of which the aggregate output for the first six months of 1901 is slightly under 30,000 tons, or at the rate of less than one half of what was regarded as a reasonable estimate. The St. Eugene mine alone contributed

9,000 tons and as that property is closed down with several other considerable shippers, it is regarded as extremely likely that the total tonnage for the year will be considerably under last year's total of 66,450 tons. An increase in the London quotations would substantially stimulate the industry, but as this is not in sight at the present time, mine-owners are fain to look forward to the promise of a refinery with the attendant reductions in charges, which it is claimed would net the producer not less than \$3 per ton more than he receives at the present time on lead in ore.

The History of Mining in Newfoundland.

Mining in this ancient colony has had almost as checkered a history as that of the island generally. Truly as Lord Salisbury said that "Newfoundland has been the sport of historic misfortune."

Scarcely half a century has elapsed since the first bold adventurers dared attempt to prove that the country really possessed some mineral wealth, but their efforts were not successful for a long time, and they themselves were looked upon as persons having decided tendencies to lunacy. It is indeed related that about this period an old Scotch miner who was seen prospecting around Notre Dame Bay, was reported to the authorities at St. John's as "a poor demented creature going about hammering at the cliffs but otherwise he appeared to be harmless."

It is true that long prior to this date, indeed from the very earliest records of the island, there would appear to have been a vague suspicion that it might possibly possess some minerals of value, for we learn that Sir Humphrey Gilbert, who took possession of it in the name of Queen Elizabeth, in 1583, had with him a mining expert whom he despatched on a prospecting tour along the coast. This expert is reported to have gathered many specimens of ore supposed to be rich in copper, iron, lead, and silver. To quote from the narrative of the voyage, "One Daniel, a native of Saxony, a very expert miner and assayer, brought to the General a piece of ore of which he said he would stake his life that it contained a considerable quantity of silver."

Sir Humphrey was greatly elated at the prospect of rich mineral wealth in his newly-acquired possession, but fearing lest the numerous Basque and Portugese fishermen, then on the coast, might get wind of the find he ordered all the specimens to be concealed on board ship till they were again at sea when he would cause assays to be made.

So confident was he of the value of this ore that he boasted to his friends, that on the credit of the mine, he did not doubt of obtaining from Queen Elizabeth the loan of ten thousand pounds (£10,000), to defray the expense of another similar enterprise. Alas! for the uncertainty of human designs, the poor mining expert with most of the crew, and all the precious ores, was lost on Sable Island in the "Delight," one of the ships of the squadron, and no more came of the brilliant prospects of Sir Humphrey's mining venture.

But the riches of the teeming waters laving the shores of Newfoundland, which were pronounced by Sir Francis Bacon in 1610, to contain more valuable treasure than all the mines of Mexico and Peru, and whose inexhaustible stores of wealth continue to this day as productive as ever, soon eclipsed all other enterprises, and obliterated for centuries even the very recollection of the island's more problematical mineral resources.

A few attempts at mining were however made later on, where indications of various minerals presented themselves in the sea-cliffs. The most noted of these was at a place called Shoal Bay, about twelve miles south of the Harbor of St. John's on the eastern Atlantic sea-board. Here, an opening was made upon some small veins of

quartz about the year 1778, which revealed rich sulphurets of grey and yellow copper ore. The mine was abandoned after a short time, but reopened in 1837 by Captain Sir James Pearl, R.N., with no better result. What the outcome of these ventures was, it is impossible now to ascertain.

Strange as it may seem, people still have faith in this property, and others have taken hold of it from time to time; even as I write, a new local company just formed, is about giving it a further trial.

Desultory attempts at mining, chiefly for copper and galena continued to be indulged in thereafter, by the very few who had any faith in the country. Such persons were looked upon as cranks of the most advanced character. How could a country composed only of barren rocks and bogs be expected to produce minerals. It was the extreme of folly to entertain such an idea for a moment. Not at all, there was no getting over the fact that the all-wise Architect of the universe had but one object in creating this desolate rock, viz., as a place to dry fish upon. Such were the arguments used, at the time by the pessimists of the country.

One enterprising gentleman, who is justly deserving of credit as being the pioneer of the mining industry in the island, the late Hon. Chas. Fox Bennett, at length took up the search for minerals in downright earnest. About the middle of the last century Mr. Bennett obtained extensive concessions from the Imperial Government to search for and mine such ores as he might find on certain portions of the southern districts of the island, paying the usual royalty to the Crown, and he was able to interest capitalists in England to furnish the necessary funds to exploit his properties. Many rich deposits, especially of copper, were located by him on the shores of Conception, Placentia and Fortune bays. Beautiful samples of grey and yellow sulphurets, erubescite, and even native or metallic copper were obtained. Galena, accompanied by native and ruby silver, was also found at Laun in Placentia Bay, and for a time Mr. Bennett's prospects of amassing a rapid fortune looked bright indeed. But his capital gradually dwindled away, and the rich prospects failed to turn out according to promise. In fact, like most very rich ores of the kind, they did not seem to occur in any appreciable quantities anywhere, and Mr. Bennett eventually became a poor man. But with characteristic John Bull stubbornness (for he was a west-country man), he continued his search, to be crowned in the end with complete success. Having associated with him the late Mr. Smith McKay, a hardy and intrepid prospector from Nova Scotia, their efforts were rewarded in 1864 by the discovery of the Tilt Cove Copper Mine, in Notre Dame Bay, which to-day, after thirty-six years of continuous and successful development, holds first place amongst our copper mines. The shipment of ore from this property for the last calendar year reached 69,744½ long tons, while the gross profit of the company now operating it (the Cape Copper Co.), amounted, according to their last fiscal report, August 1900, to £66,349.12.5 sterling.

Though Bennett and McKay have long passed beyond that bourne whence none return, the Union Mine at Tilt Cove continues as prolific as ever, and with the high price now ruling for copper, this year will probably witness the greatest output in its history.

Needless to say, that during most of the above period the pessimistic views of the great majority still held sway, and actual pleasure followed each unsuccessful attempt to establish a mine.

When the success of Tilt Cove became assured it was no uncommon thing to hear it said, "Oh, well there may be one mine in the country, but there is not, likely, to be another Tilt Cove discovered." The more knowing ones, however, began to change their views, and after a while, prospecting, chiefly for copper, became general. Many

new discoveries of more or less promise were made in the course of a few years, and the copper craze reached fever heat about 1870.

Coincident with the opening of the Tilt Cove Mine, in 1864, was the establishment of the Geological Survey of the Island, under the late Alexander Murray, C.M.G., F.G.S. This gentleman was detached from the Survey of Canada, whereon he held second rank under Sir William Logan, and deputed to take up this new field of exploration. For twenty years Mr. Murray labored assiduously at his work. It was a labor of love with him, and in a short time he became convinced that the country's mineral resources gave promise of great future development.

At the time he took up the investigation, the island was literally a "*terra incognita*." Not a feature of its topography had ever been mapped out, beyond the mere fringe of coast, partly surveyed by the Imperial Government for navigation purposes. Many portions of the country, more especially the western and northern regions, were less known to the inhabitants of the more populated eastern and southern sea-board, and in reality actually more remote, than most parts of Canada or the United States.

Mr. Murray's first surveys of the interior were, indeed, a revelation. His description of the splendid rivers, large and beautiful lakes, extensive forests, and agricultural lands, but above all of its interesting geological and mineralogical features, were received by most people with the utmost incredulity, for old prejudices were hard to remove. Even up to the time of his retirement from the Survey in 1882, he failed to entirely dispel the immense mass of doubt and unbelief which surrounded the subject on all sides. It was a long and hard fight, and he was frequently tempted to give it up in despair. He left the country almost broken-hearted at finding his labors so little appreciated.

Slowly but gradually, however, a better feeling began to manifest itself, engendered by the actual opening and development of new mines, patent facts, which could not be set aside, and people came to look more favorably on the importance of the mineral wealth of the country.

Tilt Cove was followed in 1875 by the discovery of the Bett's Head Mine and in 1878 by that of Little Bay, two copper properties which for a time completely eclipsed it. Between the years 1875-85 Bett's Head Mine shipped to market 130,682 tons copper ore and 2,450 tons iron pyrites, and from the Little Bay Mine there were over 200,000 tons of 2,240 lbs. mined and shipped. This was chiefly of low grade, and when in the later eighties copper became so depreciated in value, both the latter mines ceased operations, and were allowed to get into such a state of disuse as to frighten capitalists from attempting to work them. The recent high price to which copper has attained, however, has had the effect of inducing new mining companies to again take hold of both properties, as well as several other smaller ones, upon the shores of the same great bay.

Numerous attempts at mining copper ores in a small way are being made in various other sections of the island to-day, and some, at least, are destined to develop into paying properties. Hitherto most of these attempts were confined to the district of Notre Dame Bay, but within the last few years other sections of the island are being exploited for copper.

A new mine has been opened at York Harbor, Bay of Islands, by an English company and at the present date is showing up most favorably. It is deep seated but probably all the more lasting.

The old Huronian series on the south eastern portion of the island in which the very first attempts at mining were made, is again, after the lapse of nearly a century, attracting attention on account of

the numerous small deposits of high grade copper ores it is known to contain. Recent discoveries of native copper in amygdaloidal trap rocks, interbedded with metamorphosed strata in parts of Placentia Bay, have been made within the past twelve months. The similarity of the rock masses, and possible coincidence in geological horizon with your Lake Superior cuperiferous amygdaloids are points worthy of consideration. One of these is situated on an island called O'Derin, having a fine harbor open at all seasons to navigation. Although the average percentage of metal in these rocks is low, yet the exceptionally favorable position and surrounding circumstances generally, seem to point to a property capitalists might well take into favorable consideration. The metal is apparently disseminated in fine particles through the greater part of the Trappean rock, which is the prevailing material forming the southern half of the island, but in some instances it is concentrated in mass form.

The following is a list of the copper mines that are, or have been working within the past twenty-five (25) years.

Union Mine.....	Tilt Cove, Notre Dame Bay.
Bett's Head.....	Bett's Cove, " " "
Burton's Pond	" " "
Rouge Harbor.....	" " "
Stocking Harbor.....	" " "
Colchester.....	S. W. Arm, Green Bay, " " "
Naked Man.....	" " " " " " "
Little Bay.....	" " "
Hall's Bay.....	" " "
Lady Pond.....	" " "
Sunday Cove Island.....	" " "
Rabbit's Arm.....	" " "
Thimble Tickle.....	Seal Bay, " " "
Leading Tickle.....	" " "
Batt's Hill Mine	Conception Bay.
Presque Mine.....	Placentia Bay.
O'Derin Mine.....	" "
Blomidon Mine.....	York Harbor, Bay of Islands.

It is true the copper boom of some years ago has subsided, and many of the smaller properties remain undeveloped, but the industry has settled down to sober earnest, and all the best properties are now taken up, even those abandoned some years back, and to-day we have a steady growing copper development which adds much to the mineral output of the country.

While there are many small copper properties in the island not perhaps sufficiently extensive in themselves to warrant the establishment of mines on an expensive scale, there is every reason to believe, were a smelting plant established in their midst, such as you have at Trail Creek, B.C., where small lots of ore could be treated on the spot, many of those might be wrought successfully; especially were our native coal brought into requisition in reducing the ores.

This is a subject I have frequently adverted to before and in a paper published in the English Mining Journal, for August 1897, entitled "Opening for mining investment in Newfoundland" I endeavored to draw attention to what I conceived would be a very paying investment in that direction.

Galena is a mineral distributed through many rock series in Newfoundland, but the best and most promising finds yet recorded were in the Pre-Cambrian or Huronian series of the Avalon peninsula. At least three localities in Placentia Bay have been fairly tested, two of which, the La Manche Lead Mine, and the Silver Cliff Mine, gave every indication of becoming successful ventures. Both are, however, closed down at the present time.

I never could ascertain whether it was the scarcity of ore, low price of lead, or mismanagement of the operations which caused this closing down, but I think the latter had most to do with it. When last seen by myself, both properties bore evidence of being rich in ore and I cannot believe there was sufficient work accomplished since that date to exhaust the mines.

The La Manche Mine was vigorously worked for a time by three different companies in succession. Between the dates 1859 and 1878 some 2,375 tons of galena were extracted from about 1,000 cubic fathoms of vein-rock, excavated, equalling an average of 2.26 tons of ore per fathom.

The galena occurs in a lode of calcspar mixed with fluor and barytes, which averages about three feet in width, but frequently widens out to six or seven feet. The vein follows a nearly vertical fissure with well defined hanging and foot-walls. It has been traced on the surface fully a mile. While the ore is irregularly distributed through the matrix, there appeared to be a nearly continuous string of prill ore in the middle from one to five inches in thickness. Many pockets or vughs filled with lumps of ore were met with throughout the workings.

The Silver Cliff galena was rich in silver, assaying in some cases as high as 400 ozs. per ton. But there was considerable blende and pyrites mixed with it in some parts. The Laun Mine was a fluor spar vein cutting porphyritic rock, and though not rich in galena contained pockets in which native silver, ruby silver, and chloride of silver were found in considerable quantity. It is stated that the miners, unacquainted with the character of the ores, especially the latter, shovelled it out over the cliffs into the sea, believing it to be some useless material.

I conceive that none of these properties received that careful or scientific treatment their contents warranted, hence the failure to make paying ventures of them.

Pyrites in deposits of more or less value, are of common occurrence in this country, and it is safe to say that it is more profusely distributed than any other known mineral substance. Though generally low in sulphur and iron, there are some few which would, under careful selection, prove valuable properties. Fully two-thirds of the ore from the East Mine at Tilt Cove is of this character, and much of it is used by the Cape Copper Co., at their sulphuric acid works, Breton Ferry, for the purpose of manufacturing this useful article of commerce. The old Terra Nova mine at Bay Verte, which was worked for copper even before the discovery of Tilt Cove, is also of this class. It only averaged about $1\frac{1}{4}$ per cent. copper, and as in those days pyrites was considered valueless, and its copper contents were too low to make it worth working for that substance alone, the mine was abandoned. Mr. Murray, writing of it in 1865, describes it as "an enormous mass of pyrites." The property was taken over last year by the Newfoundland Exploration Company, an American concern, who have unwatered the mine, and were so satisfied with its appearance that they are now about to begin operations upon it. But the most celebrated pyrites deposit yet discovered was at Pilley's Island, in Notre Dame Bay. An immense body of ore averaging over 50 per cent. in sulphur, was mined here for several years. The output from this mine between the years 1888 and 1899 reached 325,606 tons, valued at \$1,685,338 in its crude state, as it left the country. In the latter year it closed down, but is being re-opened this season by the Newfoundland Exploration Company. Another large deposit of pyrites on Newfoundland Labrador is also being operated the present season.

Arsenical pyrites and pyrrhotite have been worked to a small extent, the former containing gold and the latter nickel, but in each

case not sufficient to warrant much outlay. As, however, both minerals are pretty abundant, and no systematic attempt to test their value has been entered upon, it is quite possible that other deposits may exist showing a higher percentage of the more valuable metals.

Amongst other mineral resources, one that is destined to give prominence to this country, is the possession of large deposits of iron ores. The two hematite mines now working at Bell Island, in Conception Bay, are taking the lead as the most easily handled and cheapest ore mined in British America. The deposits, owing to their unique character and situation, have become world-famed. As your readers have been made familiar with them through your own and Mr. R. E. Chambers admirable articles on these properties, it would be superfluous for me to enter into a detailed description of them here. The output of both mines last year, notwithstanding the prolonged strike, reached 317,216 tons, which amount will, in all probability, be doubled this season. The completion of the great iron and steel works at Sydney, C.B., must call for an increased output on the part of the Dominion Iron and Steel Company, which is dependent to a great extent on this source of supply of the raw material.

To the enterprise of the Nova Scotia Steel Company, in exploiting this property, is due its present prominence, and had it not been for them, the valuable deposit would remain unutilized for years to come. Its existence was known for a long period, and mention is made of it by the historian, Anspach, as far back as 1818. None of our people took any heed of it, such is the absence of knowledge and enterprise here, yet, now that it has been made a success, and become such a valuable asset, it is a common thing to have a fling at the poor geologist, who did not long ago find it out and give the information to some friend, &c. Now, the facts are that ten years ago or less, any person who believed Newfoundland iron ores would ever be of value was considered a mad enthusiast. Had any of our people secured it, in all probability the property would have been locked up for generations, as many other valuable properties are, because the owners are unable or unwilling either to work them, or to make reasonable terms with those who would.

The Bell Island iron deposit was opened in 1895, when the first small cargo of 750 tons was shipped to the Ferrona works at New Glasgow. Since that date up to the end of last year, 824,236 tons have been raised and shipped. The future of this great deposit is assured, as the quality of the ore is excellent, and there is enough in sight to last for generations. The western half of the island also has ore deposits which must sooner or later come into use. Though the bands are not nearly so large, and appear to be somewhat inferior in quality, yet I can speak from personal observation when I state that there are millions of tons available.

New finds of iron ore are constantly being made, yet so far none have developed into mines. Whenever the day comes for the utilizing of the titaniferous magnetites, as come it must, Newfoundland possesses many deposits, one of which, at least, is known to be of immense extent, and is within a short distance of the sea-coast and railway. This is situated in the district of Bay St. George, and in close proximity to our most extensive coal field. With regard to coal the same skepticism still exists, and the failure of the Messrs. Reids' attempt to work the coal area surrounding the head of the Grand Lake, has unfortunately given color to this belief. Their non-success was not, however, due so much to the absence of material as to the methods adopted. All the same, their failure has tended to throw a damper upon coal mining, and has given to the pessimists a grand argument to support their utter disbelief in the existence of workable coal deposits in the island. Facts and figures, geological structure, discovery and measurement of existing coal seams, all count for nothing; the "I-told-you-so" prin-

ciple rules over all, and sets at naught all scientific data. Sooner or later our coal must be developed, and the high prices now ruling for that important item of fuel in our local markets, must inevitably hasten the opening up of the coal seams. While I do not pretend to say that we can compete with Cape Breton or Nova Scotia, in foreign markets, there is sufficient local demand to make it imperative ere long for some steps to be taken in this direction.

The extent of the petroliferous formation along the western and northern portions of the island is enormous, and should the boring operations now being conducted at one or two points prove the oil to exist in paying quantities, a boom in oil will certainly follow. Our pyroschists are situated at a lower geological horizon than any at present producing oil in America, and in that respect are a new feature in the history of petroleum deposits; all the same, the evidence obtained points to very favorable conditions, and the oil produced from the few borings so far made is of a high grade, especially in lubricating qualities.

The chromite mine, at Bluff Head, Port a Port Bay, ceased working last year, from what cause I am unable to ascertain exactly. It certainly, for a time, looked a most promising mine. The ore was excellent, and realized a splendid figure. While most of it exceeded 50 per cent. in chromic oxide, the concentrates were also easily brought up to that standard. Between the years 1895 and 1899, 4,737 long tons were raised from the mine. An English company now have it in hands, and, I understand, will soon recommence work upon it. In the meantime, two new discoveries of chromite have been made, one in the same neighborhood, and the other in the interior, at the head of the Bay d'Est River. Both are represented as extensive deposits, and are at present being examined by experts. Chromite is an ore which may be expected to occur at many points, where large bodies of serpentine and allied rocks are known to exist, and indications of the ore are frequently met with.

During the present summer, quite an excitement was created here by the Dominion Iron and Steel Company taking options upon some manganese deposits on the south side of Conception Bay, and for a time a great boom was expected. Manganese ore of low grade was known to exist in this locality for a number of years, but all attempts to secure a sale for the properties had proved unsuccessful. The ore was considered of too low a grade, though some of it yielded over 50 per cent. oxide of manganese. That the deposit is an extensive one has been clearly proven, as it has now been traced almost continuously for several miles along the coast, where the Lower Cambrian series rests unconformably upon the Older Huronian. The ore is confined to the Cambrian strip, and is a stratified deposit, somewhat similar in character to the Bell Island iron deposit, which is only a few miles distant, and in the same series of rocks, though at a higher horizon. It would seem as if so extensive and easily wrought a deposit, so admirably situated for shipment to market, can scarcely fail ere long to attract capital to its development. Manganese is known to occur elsewhere in the same series, but so far no high-grade ores have been met with.

Antimony and zinc ores occur in several localities, and one deposit of the former has been mined to a certain extent, at a place called Morton's Harbor, on an island in Notre Dame Bay. A special examination of this property was made by myself in 1858, which convinced me that here a most promising mine was awaiting development. In 1890-91, ore to the value of \$2,200 00 was sent to market, but owing, I presume, to want of capital, the proprietors of the mine ceased working it. The ore was chiefly high-grade, ranging as high as 80 per cent. metallic antimony, and the situation of the mine is an ideal one in every respect.

Though gold is known to exist both in the free state and in combination with the baser metals, so far, Newfoundland cannot be said to have a paying gold mine in operation. This may be accounted for by the fact that but little actual prospecting for gold, by experienced persons, has as yet taken place, and also from the usual unbelief in its existence that prevails. Yet most of the low grade copper ores contain traces of the precious metal, and in the case of the Tilt Cove ores, an appreciable amount is annually recovered at the smelting works of the Cape Copper Co., in England. The returns given in the Mineral Statistics reports show an amount of 13,783 ozs. fine gold recovered during the past five years, or an average of 2,756 ozs. 12 dwts. per year. At Brigus in Conception Bay, some years ago, several handsome nuggets were obtained in small gash veins of quartz, cutting Huronian strata, and at Ming's Bight north of Cape John, on the N.E. coast, free gold was struck in sinking on a copper lode. It has been met with sparingly in the neighborhood of St. John's and near Cape Broyle on the Eastern sea-board, also in Huronian series. What, however, appears to hold out most promise is a recent discovery on the southern part of the island, near Rose Blanche and Garia Bays, amongst mica-schists and granites of Laurentian age (?). Immense bodies of quartz, or quartzose rock, sometimes over one hundred feet wide, and situated on the shoreline, have given mill tests of varying richness, though as a rule low, not averaging more than about 3 to 4 dwts. per ton. The ore is reported to be free milling, not mixed with pyrites, and can be easily and cheaply mined, with ample water power for crushing, while labour in the locality is cheap. The properties are looked upon by some of your Nova Scotian gold miners as offering exceptionally favorable prospects. One of those properties has recently been sold for \$30,000, and other proprietors are awaiting favorable offers to dispose of theirs.

Another large body of quartz and ferruginous gossan occurs in White Bay, carrying galena and iron pyrites, which has also yielded an average of about 4 dwts. gold per ton.

While I recognize the fact that gold in sight and in paying quantities is the best and surest indication of auriferous deposits, I cannot conceive otherwise than in view of the above facts, and of the geological conditions pertaining to a great portion of this island, that a very few years will witness gold mining as an established industry here. It will, indeed, be remarkable should such not prove to be the case.

Amongst the non-metallic substances which have as yet attained any prominence in our mining industries, slate stands first. Roofing slate of the very best quality occurs amongst the lower Cambrian series, in Trinity and Placentia Bays, on the East Coast, and in Humber Sound, Bay of Islands, on the West. For many years a quarry was worked in a small way in Smith's Sound, Trinity Bay, but only on a scale sufficient to supply the very limited local demand. Two years ago, Professor Walcott, of the U.S. Geological Survey, while on a fossil hunt, in which I accompanied him, visited the quarry, and was so impressed with the quality of the material and favorable conditions for working it, that upon his return home, he interested some American slate men in the matter, with the result that they sent an expert to examine the quarry, and purchased it out from the original owners. Last year the new company commenced operations, and shipped one small cargo of 600 tons to the English market, where it found ready sale, and was pronounced fully equal, if not superior, to the best Welsh slate. It is of a dark purple colour, and cleaves with ease into any thickness desired. There is also, in the same quarry, a smaller proportion of an unfading light green colour, which is much prized. One of the employees of the company informed me a short time since, that there is nothing in the way of roofing slate surpassing this quarry in

North America. It forms a cliff immediately on the seashore, rising some 500 or 600 feet above sea level. It strikes back into the land an unknown distance, and there is sufficient material in sight to last for generations. Nothing could surpass the facilities for shipping: the Sound is a long, deep, narrow, smooth water inlet, and any sized vessel can lay alongside the wharf, within a stone's throw of the quarry. Under the new management, with ample capital, experience and enterprise, this slate is destined to cut a figure in the English markets ere long. Great preparations have been made during the past winter for extensive work, and a large output may be looked for.

Though the country possesses an immense amount of building and ornamental material, most of which is on the immediate coastline, either at or in close proximity to the finest harbors in the world, nothing has been done with these as yet, except in a very small way. Beautiful granites, syenite, &c., exist in abundance and in great variety of color and texture, at most convenient points for shipment. During the construction of the Railway, a considerable amount of such rock was quarried and used for bridge abutments, and other structures calling for stone work. At the present time, a small quarry of pinkish syenite is being operated at a place called Petites, and the material is used in the construction of a new court house at St. John's. The rock is admirably adapted for structural purposes, and will present a most imposing appearance. The quarry is right at the water's edge, and the natural cleavage of the rock is such as to afford every facility for working and dressing into slabs or blocks of any desired dimensions or thickness.

There are immense deposits of marble along the western and northern parts of the island, but beyond obtaining specimens for exhibition or ornament no attempt to establish marble quarries has been made.

Serpentines of great beauty are quite common to the localities where these metamorphosed deposits occur, and many varieties of porphyries, jaspers or other ornamental stones are abundant.

Specimens of most of the above, cut and polished, are in our local museum, and are much admired by visitors.

So far, we have not been successful in exploiting our asbestos or gypsum deposits, though both exist in abundance. The former is usually of short fibre, yet some has been obtained four to five inches long, but no systematic attempt has been made to develop this material, and it will have to be better known and advertised before we can expect such. The gypsum occurs in vast bodies amongst the lower carboniferous series in Bay St. George district, and much of it is of the snowy white variety, well adapted for paper filling, &c. This, also, is awaiting capital to develop it.

Many useful substances, which have not been mentioned, are known to occur, but the time is not yet ripe for exploiting them. New finds are constantly being made, and minerals heretofore regarded as worthless are coming to light, such as molybdenite, rutile, barite, graphite, salt or saline springs, steatite, soapstone, agalmatolite, asphaltum, anthraxolite, garnet, feldspar, kaolin and brick clays, fire clays, terra cotta clays, moulding sand, fluor spar, quartz and rock crystal, amethyst, tourmaline, lithographic stone, limestone, mica, especially on the Labrador coast, red and yellow ochres, &c.

Though neither apatite nor corundum have as yet been met with, there is reason to believe they both exist in the country, and for that matter, there are few mineral substances common to the older rock formations of the earth's crust, which may not reasonably be looked for.

In this review of the history of mining industry in the colony, I have endeavored to show the slow but steady growth of the industry, and the tremendous up hill work it had to contend with all through.

Less than half a century ago Newfoundland was a thoroughly unknown and unexplored country, with no resource but one—the fishery. Her population consisted of fishermen, merchants, a few mechanics and professional men: her whole existence depended upon the precarious and fluctuating sea-harvest. In times of failure of the latter, the bulk of her population were thrown into poverty and abject misery. The opening up of the country by railways and coastal steam service has given an impetus to lumbering, agriculture and mining industries, which are rapidly forging ahead, and another decade or two will witness an extraordinary advance in these directions. I anticipate that the periods of depression, consequent upon her single industry, though not yet removed from the realms of possibility, will soon become at least minimized to a great degree. With wise government and advanced ideas, these periods of wholesale depression should not have such far reaching effects in the future. For, I do not hesitate in saying that judging from all the circumstances, the country's mineral wealth alone is capable of sustaining many times her present population, and the day will arrive when the fishery, grand resource as it is, will have to take second place in her economic and industrial pursuits.

Within the past five years the value of the mineral products has increased from one to four millions of dollars, while that of the fisheries remains almost stationary, at about eight millions of dollars.

Some one has described Newfoundland as "a country of grand possibilities." Your readers will, no doubt, be inclined to the same opinion after a perusal of this paper, yet there is more truth than poetry in that saying, and optimist as I am termed, yet I have seen many of my predictions fulfilled, and hope still to see many more.

Should the development of our coal areas be brought about, in the near future, it will result in a boom for the Ancient Colony such as few dream of at present.

JAMES P. HOWLEY.

The Operation of the "Hole-Contract" System in the Center Star and War Eagle Mines, Rossland, B.C.

By CARL R. DAVIS, E.M., Rossland, B.C.*

I. GENERAL REMARKS.

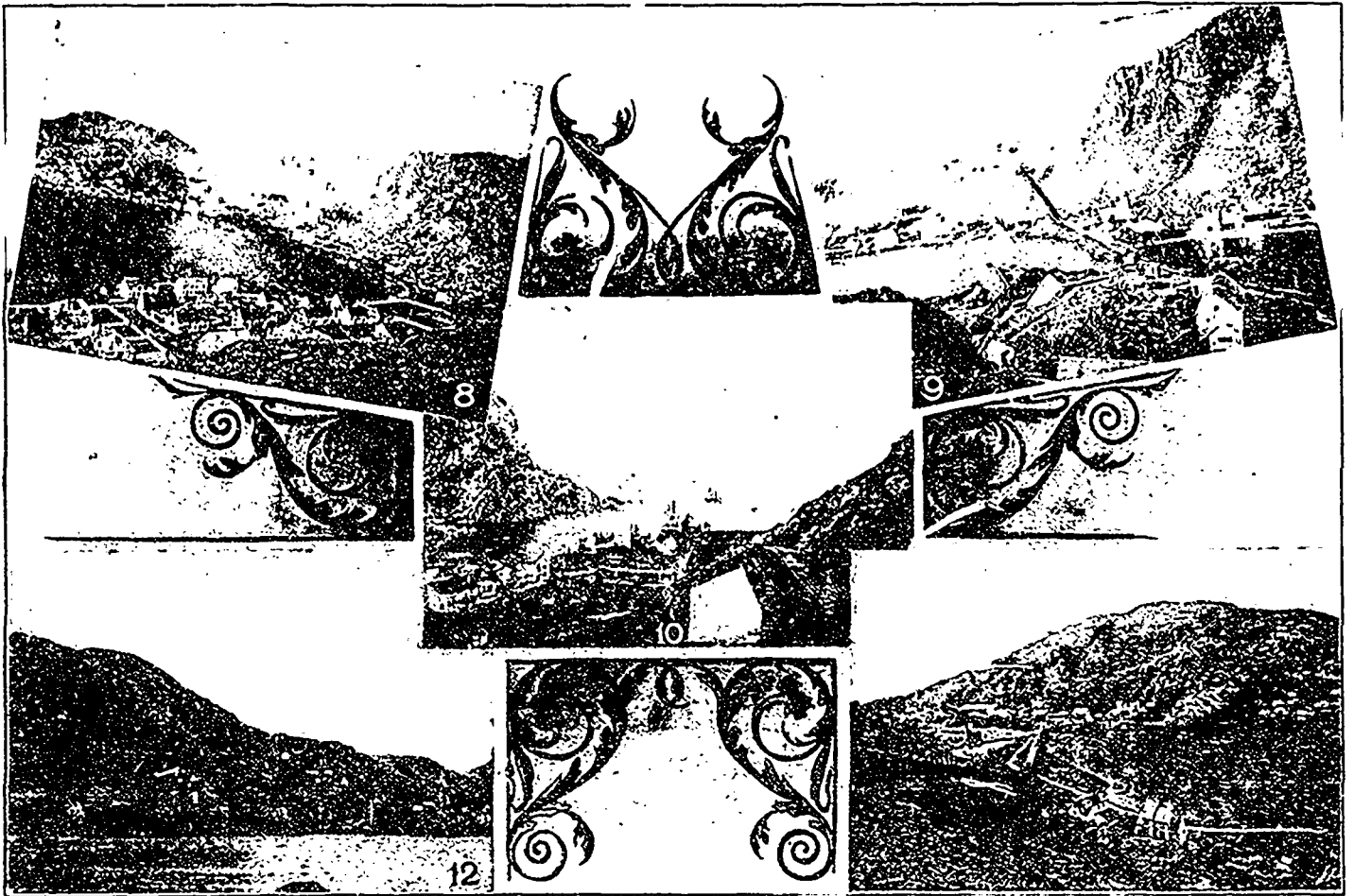
The cost of mining during the past history of these mines has been excessive, principally by reason of the inefficiency of labor under the wage-system. The amount of labor performed per man was unsatisfactory; and Mr Edmund B. Kirby, the general manager, decided to adopt the contract system as a remedy. For this purpose the method now in use was devised by the writer (then and now the superintendent), as best adapted to the local conditions. On March 12, 1900, this system was presented to the miners of the War Eagle and the Center Star. The issue remained unsettled for several weeks, during which the mines were closed. On April 5 an amicable understanding was reached, and the miners resumed work on the new terms. The system was introduced by degrees; and the results of a year's trial have shown it to be an unqualified success.

The veins of this district have been formed by replacement in fissures of the shear-zone type, ranging in width from several feet to 100 feet, or more, and fairly regular in strike and dip, through the main mass of Red Mountain, which consists of augite-diorite, a dark, tough, basic, eruptive rock.

Between the limiting walls, the vein material ranges from a hard silicified mass, with only scattering mineralization, to an almost solid sulphide, mainly pyrrhotite, with a relatively small amount of chalcopyrite and pyrite. Consequently the rate at which drilling proceeds varies considerably within short distances; but the *monthly* average of the

*Paper read before the American Institute of Mining Engineers.

MINING IN NEWFOUNDLAND.



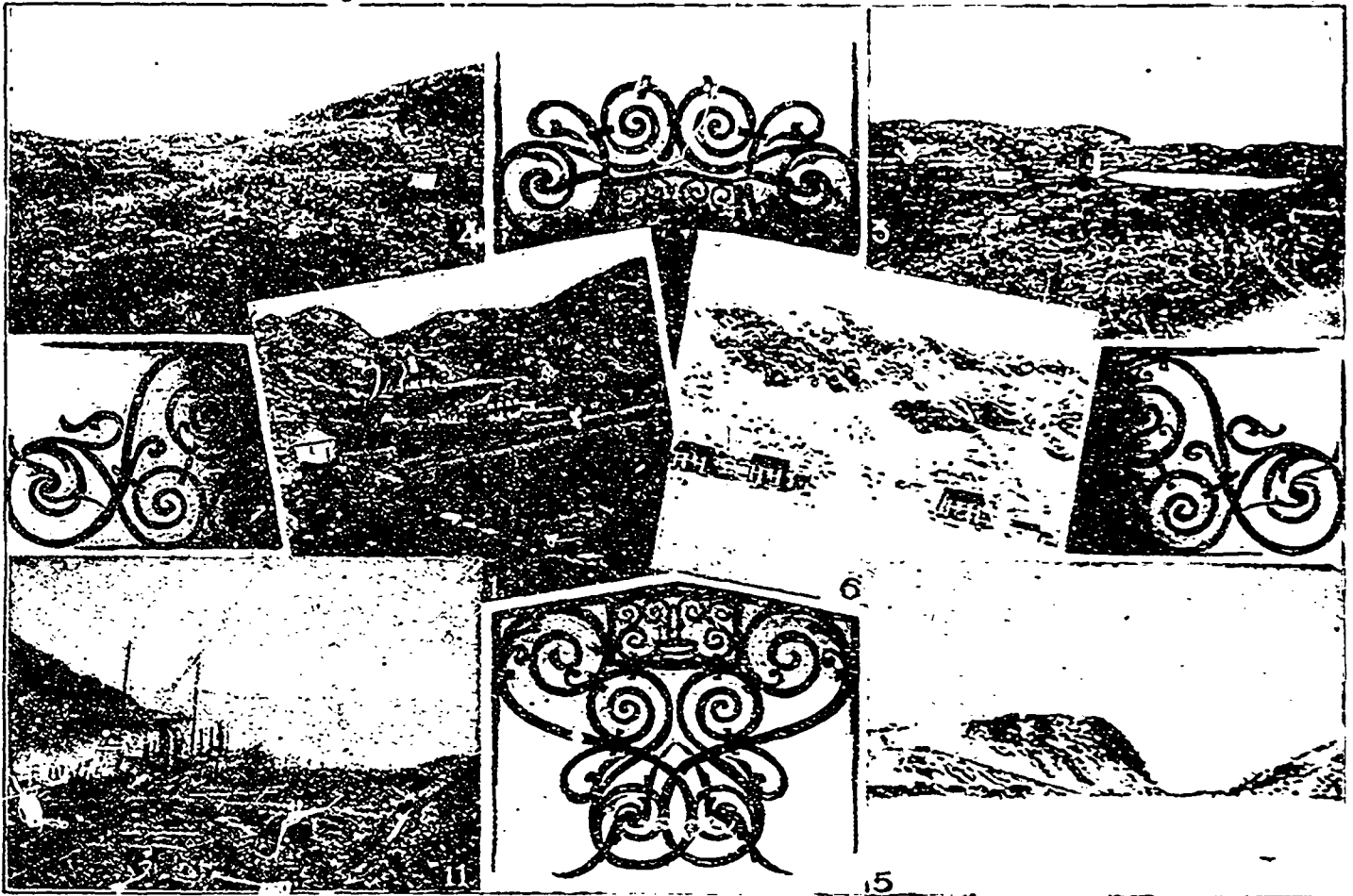
PYRITES MINING AT TILT COVE.

7—View from East Side Incline. West Mine in centre. Offices, stores, etc., to the left. 8—View from East Side Incline, North end of Pond showing miners' houses, etc. 9—View from West Mine Bluff, towards East Side Incline. 10—West Mine Bluff, showing Cove and Wharfs. 12—Cove from outer point. S.S. "Annandale" loading.



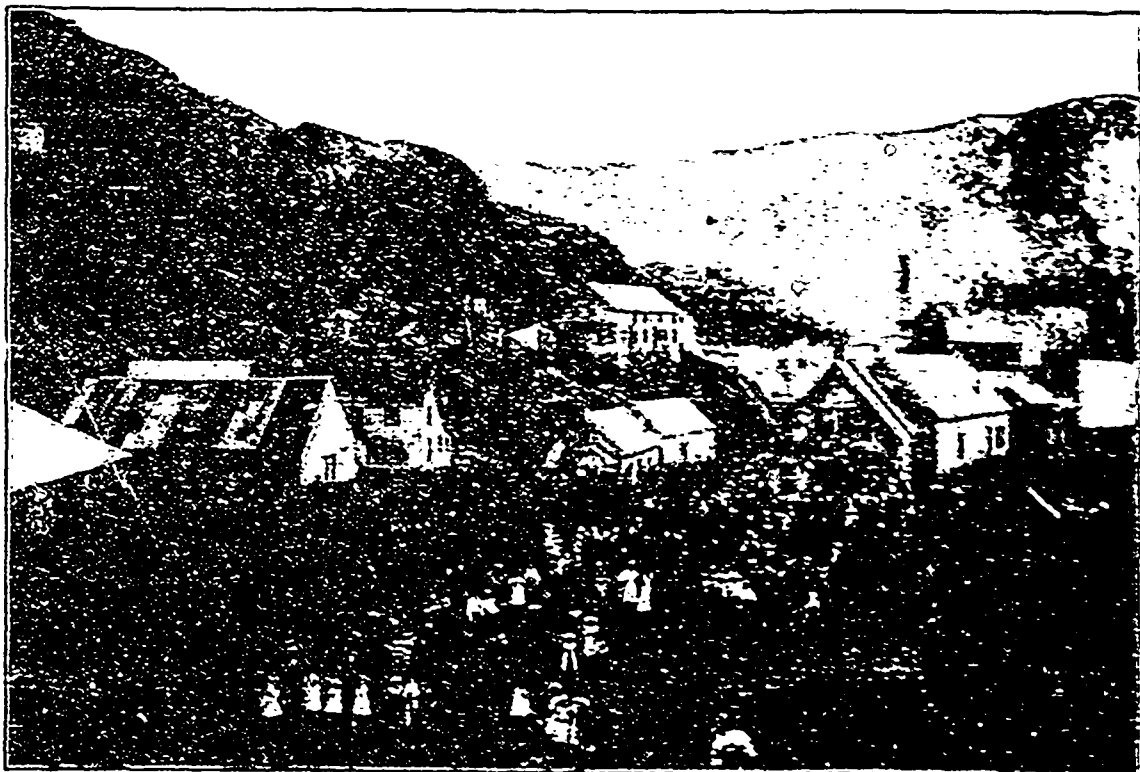
Open Cast Workings in the famous Red Hematite deposits of Bell Island, Newfoundland.

MINING IN NEWFOUNDLAND.



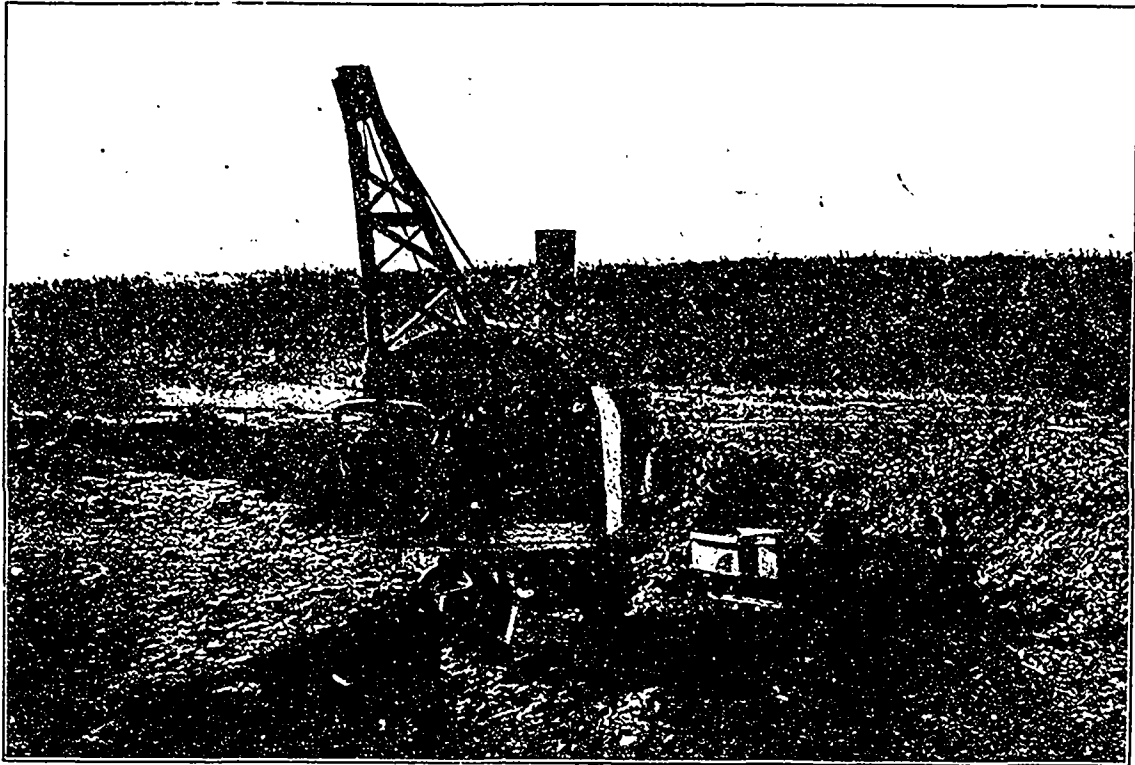
PYRITES MINING AT TILT COVE.

- 1—Looking toward East Mine from the pond.
- 2—East Mine Pumping Station.
- 3—Showing surface over East Mine.
- 4—View showing entrance of Cove from head of pond.
- 5—View showing head of Winsor Pond.
- 6—S.S. "Para" loading ore.



Tilt Cove Copper Co., Tilt Cove, Newfoundland.

MINING IN NEWFOUNDLAND.

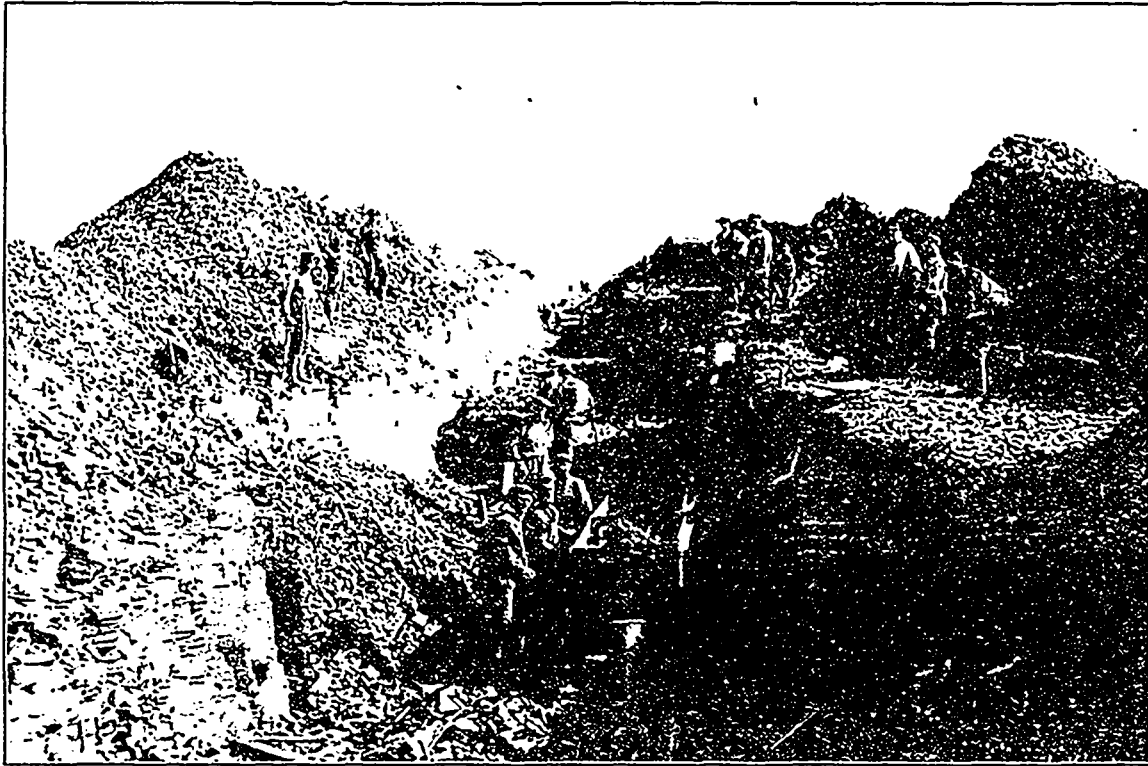


Steam Shovel at work on the Wabana Iron Mine, Bell Island, Newfoundland.



Mining Red Hematite at Bell Island.

MINING IN NEWFOUNDLAND.

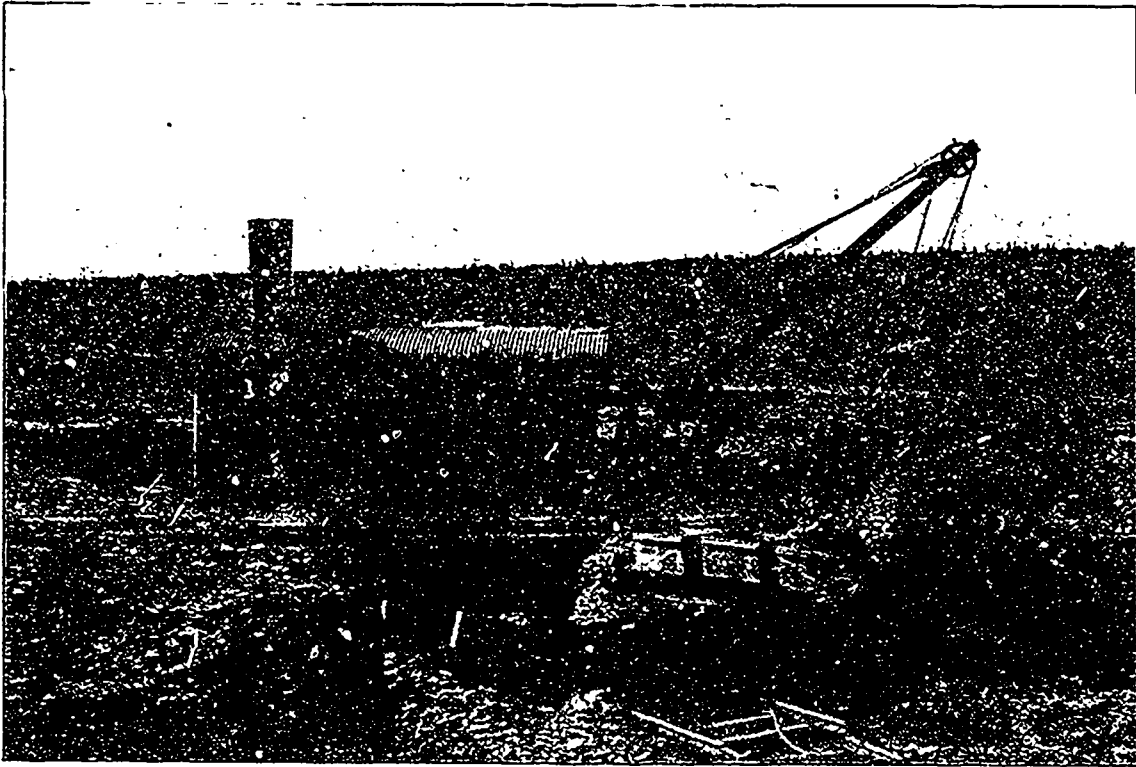


Open Cut on seam about 18 feet thick worked by Dominion Iron and Steel Co. at Bell Island, Newfoundland.

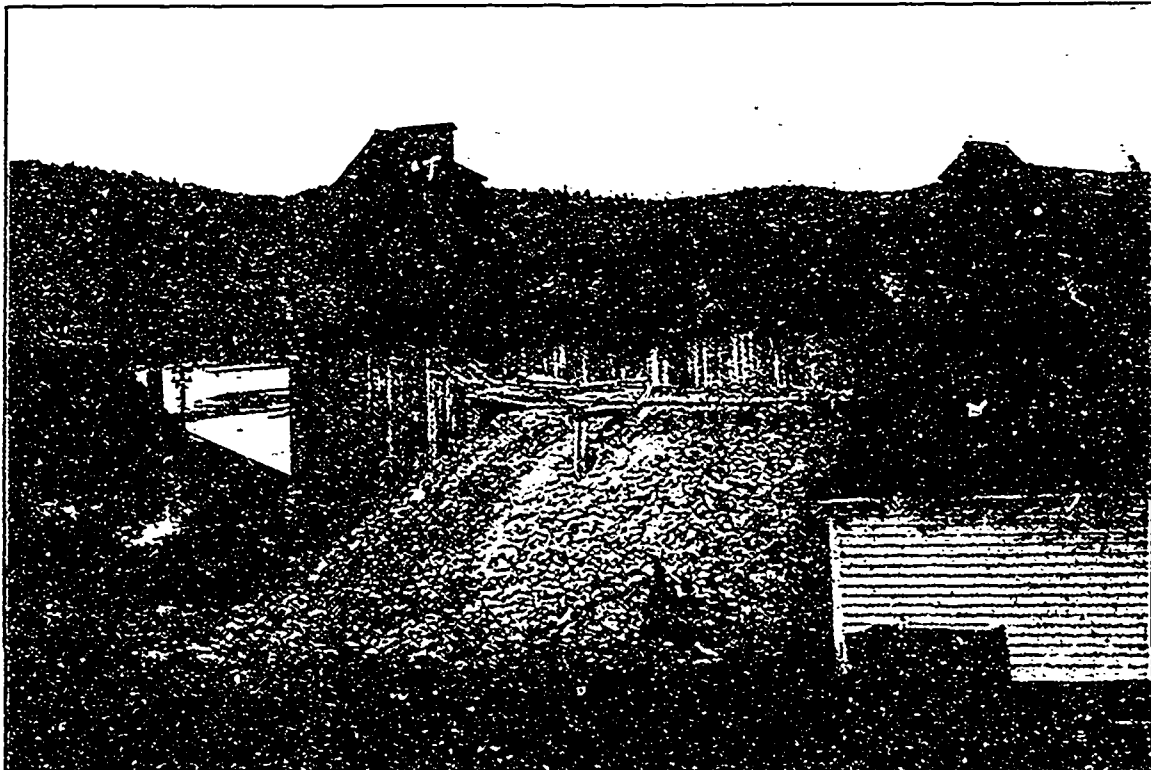


Drills at work on the Red Hematite deposits of Bell Island, Newfoundland.

MINING IN NEWFOUNDLAND.

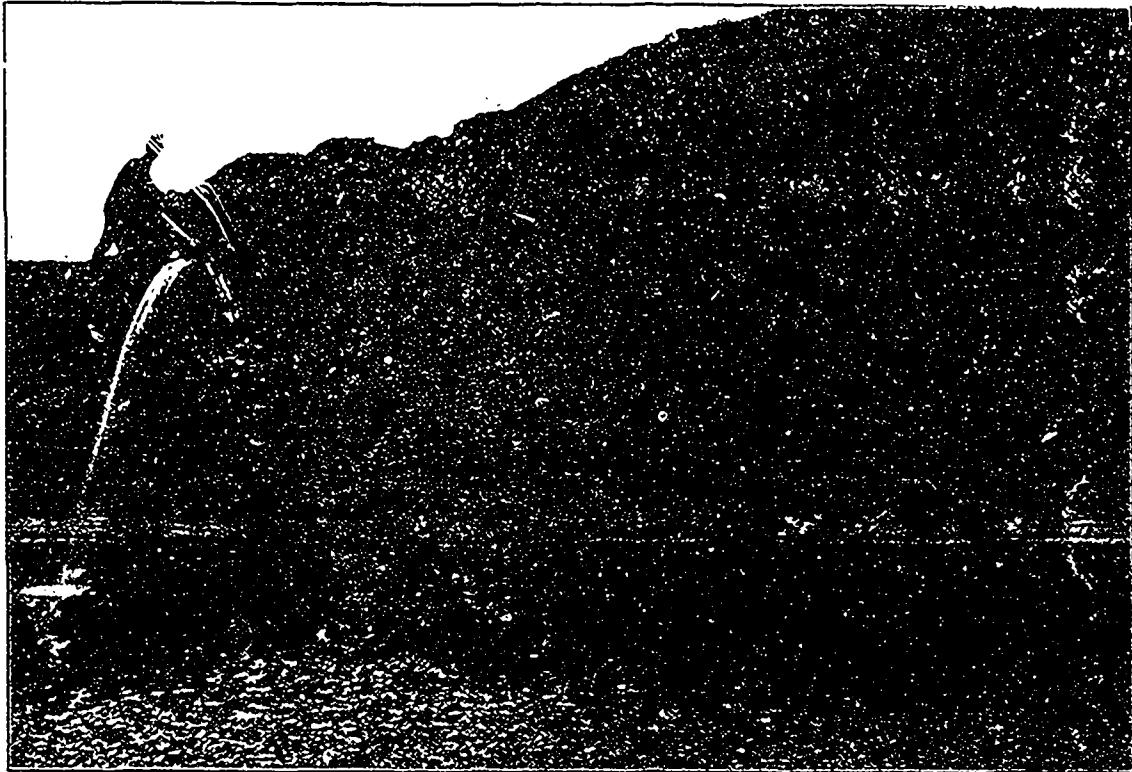


Steam Shovel at work on the Wabana iron mines of the Nova Scotia Steel and Coal Co.

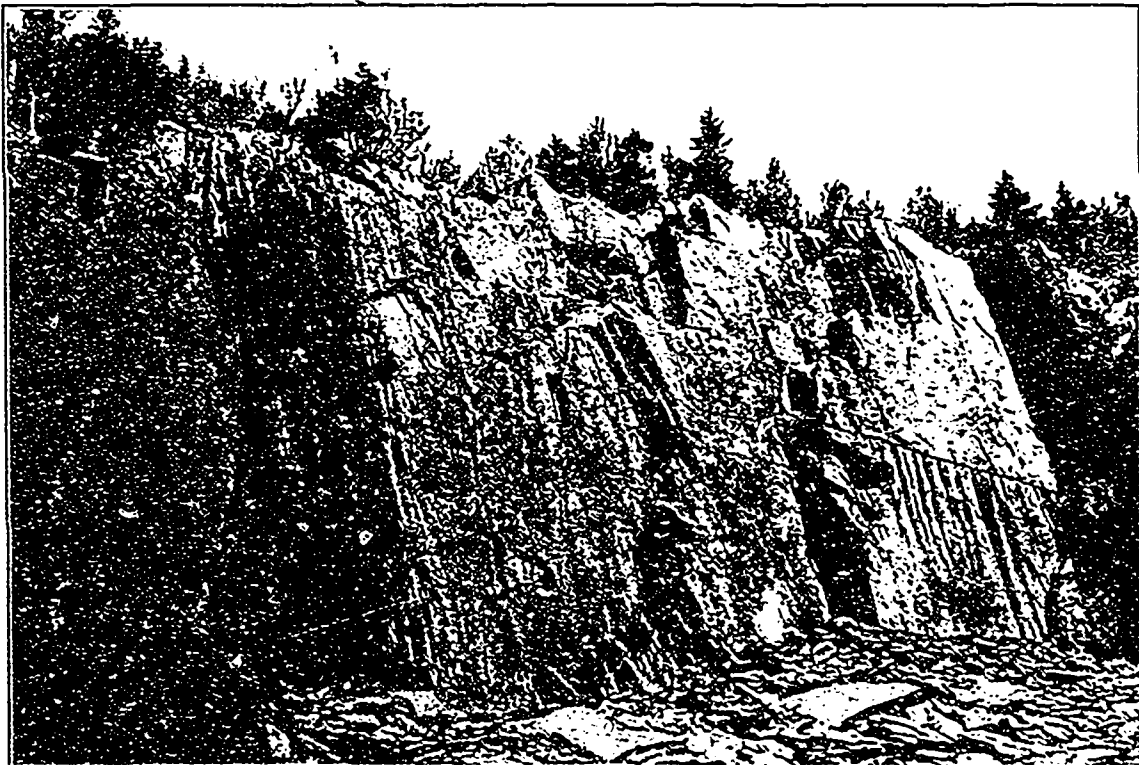


Pilley's Island Pyrites Mine, Nôtre Dame Bay, Newfoundland.

MINING IN NEWFOUNDLAND.



Outcrop of Iron Ore band, Bell I-land.

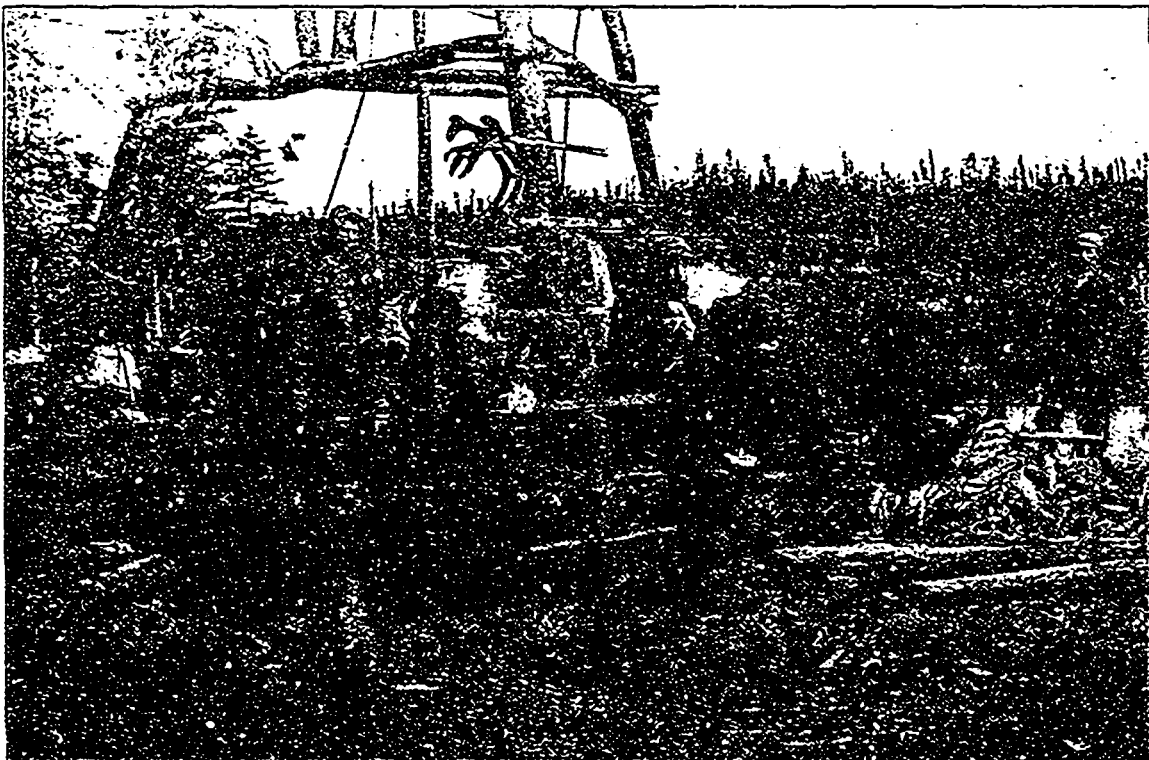


Wilton Grove Slate Quarry, Snider Sound, Trinity Bay, Newfoundland.

MINING IN NEWFOUNDLAND.

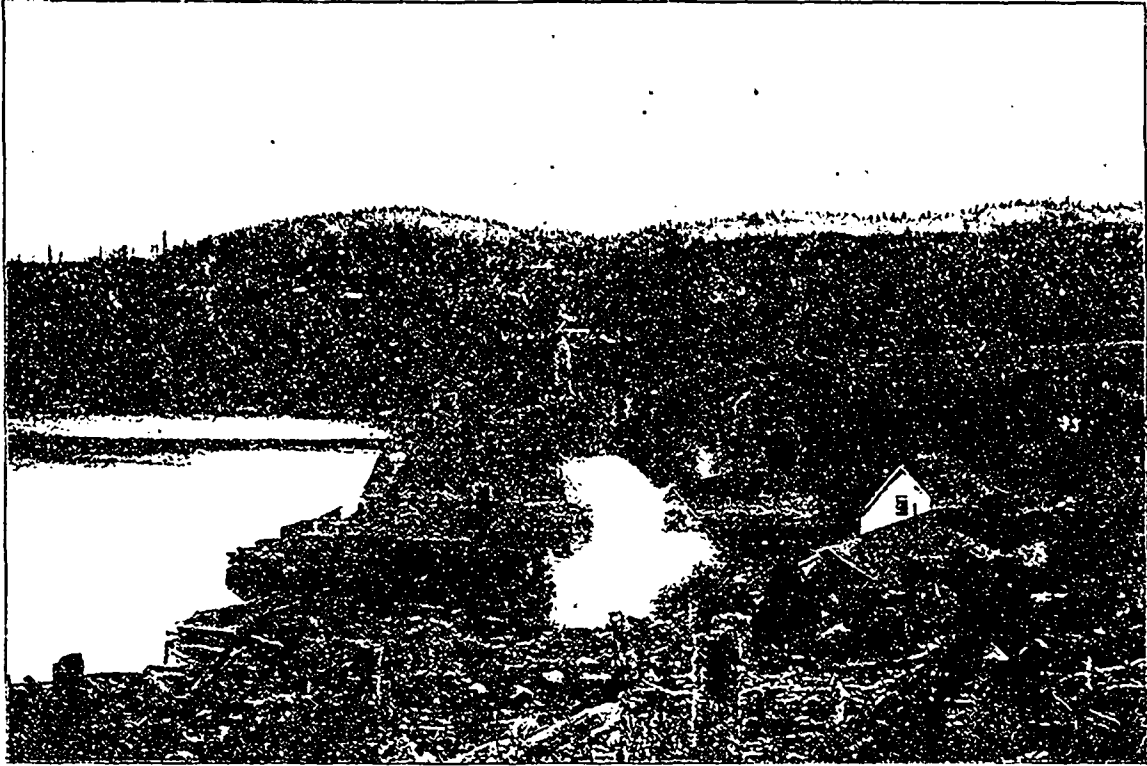


Granite Quarry, Benton, near Gander Lake, Newfoundland.

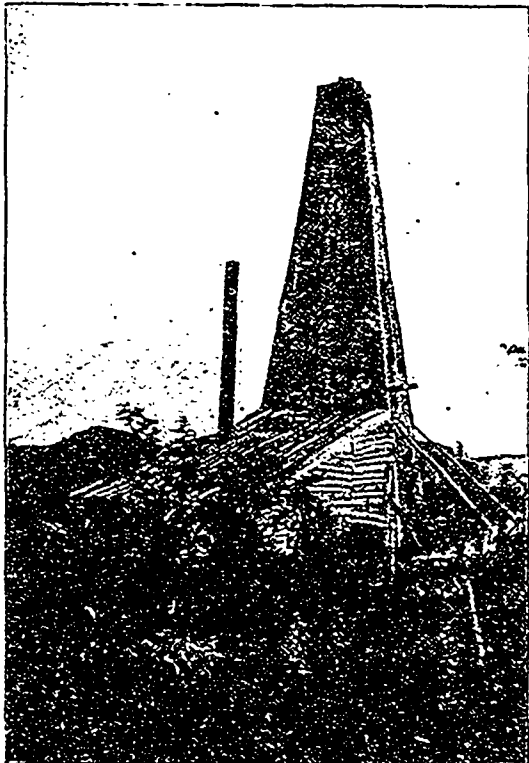


Diamond drilling for Coal near Grand Lake, Newfoundland.

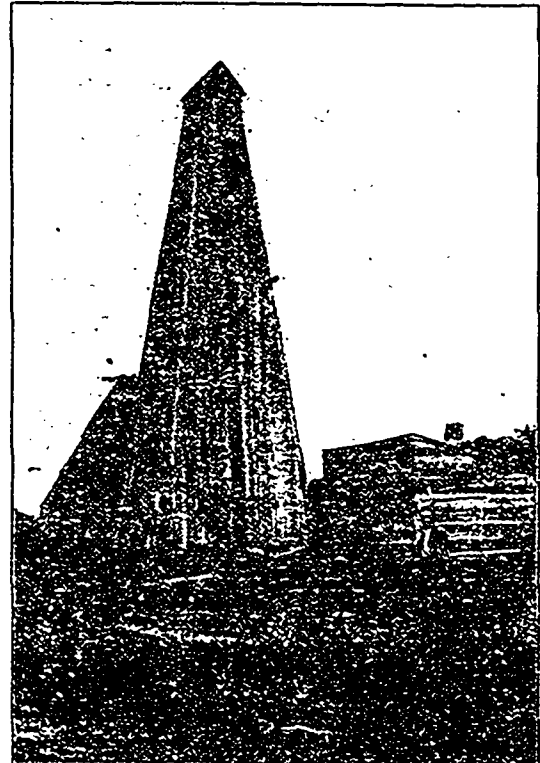
MINING IN NEWFOUNDLAND.



Pilley's Island Pyrites Mine, Notre Dame Bay, Newfoundland.

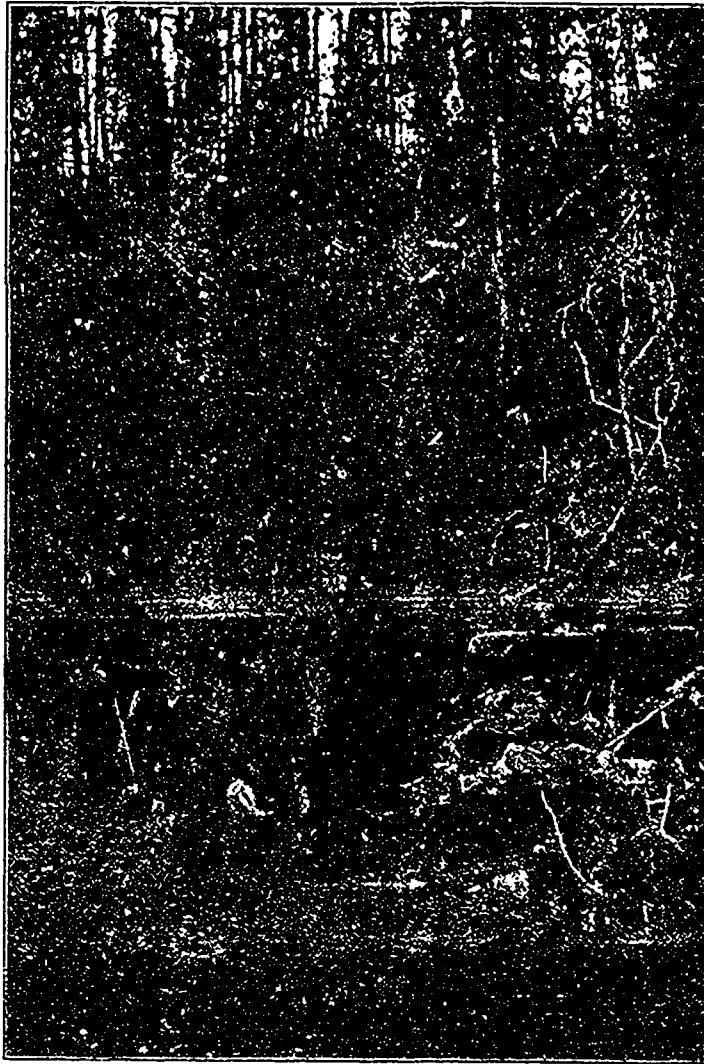


Drilling Rig for Petroleum at Parson's Pond,
West Coast Newfoundland.

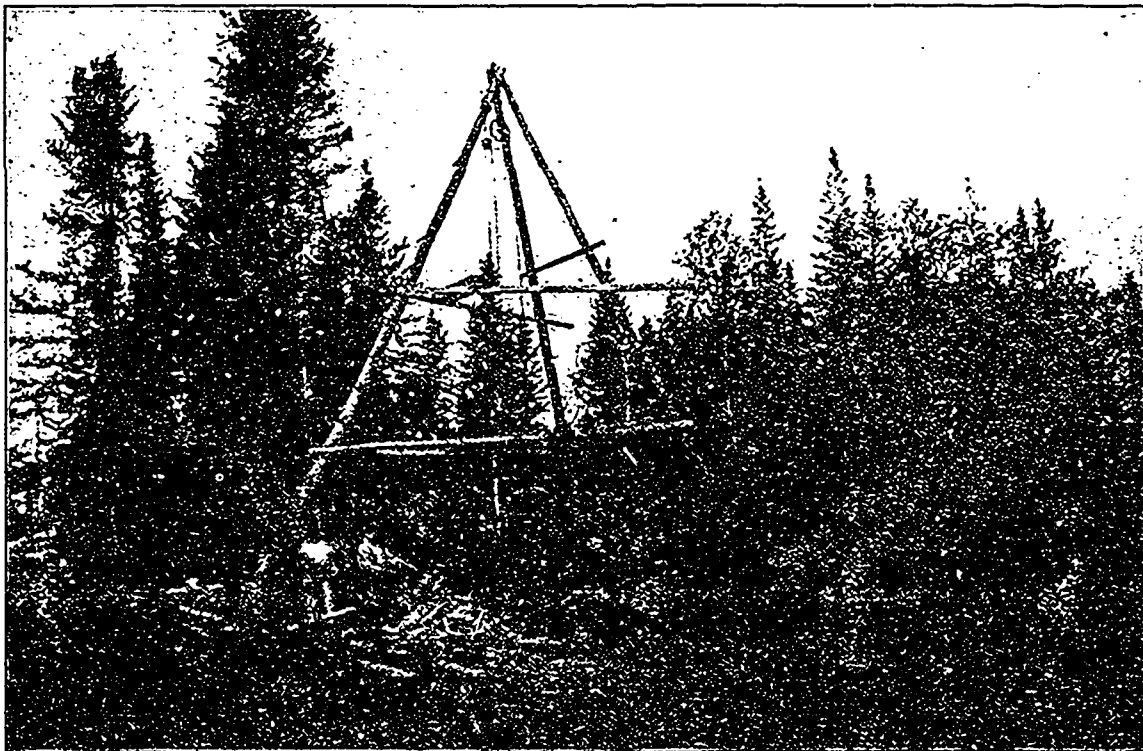


Derrick Drilling for Petroleum at St. Paul's,
West Coast Newfoundland.

MINING IN NEWFOUNDLAND.



Outcrop of Coal Seam, Aldery Brook, Grand Lake, Newfoundland.



Drilling for Coal near Grand Lake, Newfoundland.

MINING IN NEWFOUNDLAND.



Mining Iron Ore on the property of the Nova Scotia Steel and Coal Co., Bell Island, Newfoundland.

number of feet drilled per machine per shift does not vary more than 5 per cent.; thus allowing an accurate determination of the price to be paid per foot of drilling.

Generally speaking, the vein-material and the surrounding country-rock are very hard and tough, making it unnecessary to timber the headings. In fact, stopes up to 50 ft. in width can be made without timbering. Another feature bearing upon this problem is the complication of the geological structure by numerous dykes and faults. The pay-shoots are very irregular in outline, so much so that the payment of contractors in the stopes by the fathom or any other unit would be impossible, by reason of the difficulty of measuring exactly the volume of rock broken during a given period. The determination of the amount of ore stoped by making a mine-car the unit of measurement for either weight or volume was considered, but had to be abandoned on account of the impracticability of keeping the ore broken by each set of contractors separate, since, at times, the ore broken by several sets of contractors is drawn off through the same loading-chute in the mine.

II. CONTRACT SYSTEMS.

Two methods are employed in measuring the amount of work performed:

1. Measurement of the number of linear feet of advance. This method, commonly employed in all parts of the world, is applicable to headings only, such as drifts, cross-cut., raises, winzes, and shaft sinking. In these mines, where payment is made per running foot, the contractors are charged for the explosives, which are furnished to them by the company at cost. This results in greater economy in the use of explosives than is secured by the practice, followed in some western mines, of supplying powder, etc., free. Under such an arrangement the men are not as careful as they would otherwise be to put their holes

in the most advantageous positions; and, substituting powder (which costs them nothing) for labor, they make the total cost of the work unnecessarily large. In raises and winzes, the necessary timbering is performed by the company; but in shaft sinking the contractors place the sets in position, subject to the approval of the mine-foreman. Blasting is done by the contractors at any time.

2. Measurement of the number of feet of holes drilled. This system, first adopted for use in the stopes, has been shown by experience to possess several advantages over the one above described; so that, in many cases, it is now used even in drifting and cross-cutting, and deserves to be here more fully described.

III. DETAILS OF THE HOLE SYSTEM.

The underground work is carried on by two 8-hour shifts, arranged as follows: morning shift, 7 a.m. to 4 p.m., with an interval of one hour for dinner; afternoon shift, 4 p.m. to 1 a.m., with one hour for supper. The men are raised from and lowered into the mine on their own time, (*i.e.*, before and after the terminal times given), making eight hours the actual working time. In shaft-sinking and in occasional headings, three shifts are employed, and the work is carried on continuously during the 24 hours. With the exception of the main shaft, in which the contract includes 12 men, contracts are generally let to four men, working in pairs for two 8-hour shifts daily. Contracts are verbal, not written. No sub contracting is permitted, and the men share equally in the profits of each contract. In case of sickness a contractor must provide a substitute. If any contractor wishes to leave before the expiration of the contract, he is paid his share of the net earnings according to his proportion of the total number of shifts worked. Prices are fixed and contracts are let at the beginning of each month.

On beginning work, each set of contractors is supplied with a tool-chest, provided with lock and key, containing all necessary tools and

supplies for machines, for which a receipt is taken. At the expiration of the contract the tools are inventoried, and those missing are charged to the contractors. On the other hand there is no charge for breakage, if the broken tools are turned in, and new ones are issued. Machine-drill repairs are made by the company, but it is understood that breakage through neglect or carelessness is sufficient cause for discharge. When desired, a box for steel drills is placed at some convenient point on the level. This box has two compartments: one for sharp steel, placed therein by the tool-packer, the other for dull steel, which the tool packer collects while replenishing the "sharps"

The first duty of the miners on the morning shift is to pick down the loose ground left from the blasting. When the "back" has been made secure, the machines are set up, and drilling proceeds continuously during the two 8-hour shifts. The location of the holes to be drilled is marked, and their approximate depth and direction are indicated by the foreman. Misplaced holes, or those drilled too deep, are not accepted by the foreman as entitled to be paid for, and an occasional check of this kind is all that is necessary to insure good work. Drilling proceeds without interruption during working hours, and is only stopped on the night-shift in time to allow the contractors to take down the machines, clean out the holes, and leave them in shape for the blasting crew, before leaving the working-faces at 1 a.m. The number of feet of holes drilled is measured at the end of the shift, at which time a record of the measurement is furnished to the contractors, and a duplicate is delivered at the office.

The blasting-crew works between the hours of 1 a.m. and 7 a.m., and its work consists in loading and blasting the holes drilled by the miners. This effects a considerable saving in the consumption of explosives, since these are handled by a few picked men only. Another advantage of this method is that it involves no loss of time by miners and muckers (shovelers) in waiting for the working faces to become clear of smoke.

In headings, the details of the work are, in all essentials, the same as previously explained with respect to the stopes. The number, direction and depth of the holes are outlined by the foreman or shift-boss, but when contractors have become familiar with the ground, little direction of this kind is needed, the work being practically the same each day. The working hours are the same as in the stopes. On entering the heading in the morning, the miners pick down the roof, put up the horizontal bar supporting the machine-drill, and proceed with the drilling of the holes in the upper part of the face. While drilling is carried on, the shovelers are removing the broken rock from the previous blast. By the time this has been cleared away, the machine men are ready to take down the bar, set it again in a horizontal position near the floor of the drift, and drill bottom-holes or "lifters." These being finished, the machine is taken down; the holes are cleaned out and a floor is laid for the shovelers. Everything is then ready for the blasting, which, as in other parts of the mine, is performed between 1 and 7 a.m. by a special crew.

In headings where a certain number of holes have to be drilled before the whole set or "round" can be blasted, the difficulty with the "hole system" (*i.e.*, the system of payment according to linear feet of aggregate drilling) is in making sure that the contractors finish this work before blasting-time, in order that they may not have to lose working-time during the blasting, and thus that they may be kept continuously employed. This difficulty is met, either (*a*) by increasing or decreasing the depth of the holes to be drilled, or (*b*) by having one or two spare headings or stopping breasts in which contractors can utilize their extra time. The latter expedient is to be preferred, for the reason that, to secure the best effect, the depth of drill holes ought to be determined on other grounds than that of the time required to drill them.

Advantages of the Hole System.

1. Its applicability in stopping, where the ore-shoots are irregular in

outline, and measurement by weight or volume of the ore broken cannot be easily made.

2. Within certain limits, the number of machines in any one stope can be varied at will; and there is no difficulty such as would arise from the necessity of keeping separate the work done by each set of contractors.

3. The system is extremely elastic; that is, the same set of contractors can be employed in different headings or stopes, without any resultant confusion in measuring the work performed.

4. Blasting is done only in the interval between 1 a.m. and 7 a.m., and the miners and shovelers are not kept idle, waiting for the smoke and gas to be cleared away from the working-faces

Disadvantages of the Hole System.

As above shown, this system has been perfectly satisfactory in stopes. In headings, the disadvantages, as compared with the linear system of payment per running foot, are as follows

1. Two 8-hour shifts only are employed under the hole system; while by the system of paying according to the linear progress of the heading, three shifts may be employed daily, and blasting done at any time, thus often increasing the rate of advance, which may be a matter of supreme importance in opening new ground, etc

2. The difficulty, already discussed, of so laying out the work that the round of holes may be completed in the two daily shifts, without an undue loss of time to the contractors.

IV. ECONOMIC RESULTS OF THE HOLE-CONTRACT SYSTEM.

The following tables show the saving effected by the substitution of the contract for the wage-system. In this connection I may add that the advantage thus gained by the employer is not lost to the workmen. The miner now receives daily from \$4 to \$4.25, as against \$3.50 under the wage-system.

Table I.—Comparative Cost of Stopping.

	Contract (Hole) System. Per ton.*	Wage System. Per ton.†
Drilling.....	\$0.356	} \$0.750
Blasting	0.021	
Explosives	0.100	
Total.....	\$0.477	\$0.865

Table II.—Comparative Cost of Development-Work.

	Contract (Hole)-System. Per foot.‡	Wage-System- Per foot.§
Drilling	\$5.36	} \$8.36
Blasting	0.68	
Explosives.....	2.75	
Total.....	\$8.79	\$11.14

Equally important with the saving, per foot or ton, shown in Tables I. and II. is the increased speed with which shafts have been sunk, and headings have been driven. For it is clear that, other conditions remaining the same, the output of the mines is governed by the time required to open new ground in depth by sinking and driving levels, etc. In drifting and cross-cutting, the average rate of advance per month has been increased from 50.8 feet under the wage-system to 97.5 feet under the contract system; this comparison being made on the basis of two shifts (4 men) per day, and a 30 day month. In shaft sinking, calculating on a basis of three shifts (12 men) per day, and a 30 day month, 555.5 feet of work done under the contract system, compared with the last 200 feet done under the wage system, show the rate of advance per month to have increased from 27.2 feet to the present average of 58 feet.

* Calculated from 49,849 tons of ore stoped.

† Calculated from 13,818 tons of ore stoped.

‡ Calculated from 1,244 feet of headings driven.

§ Calculated from 1,377.5 feet of headings driven.

COMPANY NOTES.

Nova Scotia Steel and Coal.—In a letter from Mr. R. E. Chambers, M.E., Engineer in charge of the Company's iron mines in Newfoundland, he reports as follows.—This season we have mined 212,000 tons and shipped 45 steamer loads amounting to 201,000 tons. Our biggest month was July with 66,000 and the biggest days run 3,708 tons. There have however been loaded on steamers from bins three cargoes amounting to 16,000 tons in a day. The underground work is fairly commenced and analysis of core from borehole at extreme limit of the property shows the ore to be of first rate quality.

Consolidated Cariboo.—Reports from this mine indicate a likelihood that the wash-ups for the present season will probably fall short of anticipation, work having been greatly hindered by a heavy fall of rock. The output will probably be between \$250,000 and \$300,000.

Forty-Third M. & M. Co.—In a circular to the shareholders under date of 4th September, Mr. N. C. Sparks, President of the company reports:—"With Mr. G. C. Martin, of Tweed, one of our largest shareholders, I left Ottawa June 22nd and arrived at Manson Creek July 20th. We spent four weeks there, leaving August 18th for home. The company's property was found to be in excellent condition; the additions made last year to the plant being fully up to the standard of that previously reported upon. During our stay actual mining was not in progress, nearly the whole force of men being engaged in the work of changing the elevator plant to Slate Creek and in the erection of the new pipe line on Manson Creek. Colonel Wright turned the water on to the elevator in Kildare Gulch as soon as the snow and frost were out of the pit. For some time the ground proved favorable and the greatly increased capacity of the elevator, due to the larger throat and improved method of feeding, gave hopes of a large clean up there. Unfortunately the run of gold thinned out and after some attempts to re-locate the heavy run, the change to Slate Creek was decided upon. The run is known to exist farther up the Gulch, but as Slate Creek has always been the objective point of the Company's work, it was decided to move there at once. After the penstock was built, the elevator was temporarily set, and with the aid of its suction pipes, test pits (one 163 feet distant) were sunk in order to obtain some knowledge of the creek bottom and to find the best position in which to place the elevator permanently. It may be as well to explain that while much work has been done on the sides of this creek by old timers, who went as deep as they could, it has never been before bottomed. The gravel is deep and there is very little fall to the creek, so that they could only follow the bed rock down a short distance on either side. The existence of a great number of shafts gave an indication of the high values found. Before we left four pits were sunk and gravel 16 feet deep disclosed on one side of the creek. Sixty yards gave a return of fifty dollars, one-third being picked up by hand by the men shovelling in the pit, the balance being caught rather unexpectedly in a short line (3 lengths) of sluice boxes put up mainly to dispose of the water and gravel tailing from the elevator. The amount saved cannot be over 50 per cent. of the gold contents, and some estimates make it 25 per cent. The gravel in the last three pits was large and tight, and progress in their confined limits was slow until the derrick was put to work to handle the boulders. The last pit was being enlarged and more sluice boxes were added before we left, so that with more room to work greater progress would be made and at the same time the gold values would be saved. If there was no decided change in the position of bed rock the elevator would be put down into this pit as soon as it was sufficiently opened. The benches just along side and about 100 yards up stream have given big prospects, one yielding one four and one six ounce nugget. While the pits were being sunk the Chinese miners were employed clearing the brush from the creek bottom as far up as Poverty Bar, and the old workings can be more clearly seen. Several miners who worked on the creek in early days gave the names of owners and details of gold recovered from various claims. They were unanimous in their opinions as to the great richness of this part of your property. There is a mile or more where every claim was partly worked and each returned an ounce or more per man per day. Some photographs taken of this part of the creek will give a slight idea of the work done there. A penstock was erected on the front of claim 22, Manson Creek, and a pipe line and No. 2 Monitor installed to work the bench of the Arctic Slope Co., as per contract. The pipe for this plant did not arrive until rather late, but no time was lost in riveting and laying it. The ground to be worked is just opposite Discovery Bar and prospects well. It is expected that 1,000 yards per 24 hours will be turned over by 10 men. This plant would begin opening up the face of the bench August 19th. Mr. M. W. Loveridge being on the ground, a full report on the property was obtained from him and is presented herewith. Colonel Wright is indefatigable in laboring in the interests of the Company and maintains his staff in a high state of efficiency, but the work has now reached a stage where he requires the assistance of an hydraulic engineer, and one should be secured for next season. The change to Slate Creek would have been begun sooner but Col. Wright expected I would arrive at the mine at an earlier date than I found possible, and he wished to consult as to the point to be worked there. It is to be regretted that owing to the difficulties which have delayed the completion of the last few miles of the Yukon telegraph main line, the branch into Manson may not be begun this year. Supplies have been at Stuarts Lake all summer, and the appropriation voted, but the men are all engaged on the main line. A railroad from Kitmat Arm to Hazelton is being surveyed, which, if constructed, will reduce our freight rates and transportation difficulties very greatly. There was a good supply of water in the creek, and it is probable that both plants are working full time now. I am more fully convinced of the great value of your property, and believe that when it is opened up it will be one of the big producers of British Columbia."

Ymir Gold.—A Rossland correspondent writes: The news that a bonanza ore-body has been discovered in the Ymir mine will be a crumb of comfort to the ill-starred participants in the British Columbia market.

The average value of the ore milled by the Ymir is \$3.88 per ton, and satisfactory profits are earned on that. What a chute of ore 26 ft. wide and containing nearly five times the value means to the dividend-earning capacity of the mine may be imagined. In discussing the strike, the manager, Mr. Robertson said that in running the No. 4 level the ore body carrying the values indicated had been encountered to the west of the dyke. No. 4 drift is the lowest level so far worked, but the shaft is down some 600 ft., and in ore. Mr. Robertson explained that this dyke had been met regularly on all the upper levels, and before being met on the No. 4 the ledge carried good values, and when the dyke was cut the ore-body widened out to the 26 ft. above mentioned. The ore-body continues to appear well as the work on it progresses. To sample it mine-car samples were taken across 15 ft. of the ledge at a time when the entire width had not been ascertained, and these gave values of \$35.00 in gold and \$5.00 in silver to the short ton of 2,000 lb. Mr. Robertson said he was naturally pleased with the find, and if the favorable appearance of the ore chute continued it would naturally mean a very considerable increase in the earnings of the Ymir Company, as the average value of the Ymir ore milled last year was returned at \$8.88. Viewed in this light the find was sensational, and it gave him great satisfaction to report it to his directors, as there was every indication that the new body contained greater average values than any previously encountered in the Ymir mine. Naturally he would like to see the ore-body in the No. 4 level reach the expectations of the most sanguine; anyhow there is no occasion for uneasiness so far as the Ymir property is concerned. The company's mill is now grinding out 200 tons of rock per day, and there is ore enough blocked out in the mine to keep the mill running at this rate for over two years. Mr. Robertson said he was confident that the reserves above the No. 4 level at the present moment represented a two year's supply, and he had not the least doubt but that there was ore enough in sight to keep the mill going for three years; but two years' reserve in sight was not bad, and before it was used up something might be heard from the long tunnel which is now being run in to catch the Ymir lead at a depth of 1,000 ft., and in view of the large amount of other development work which was being steadily pushed along. To get the ledge at this depth it will be necessary to run almost 2 ft. for one, which means a pretty long tunnel. It is now in about half the distance, and rapid progress is being made upon it.

Bosun Mines, Limited.—The Secretary, under date of 3rd instant, reports:—"The following telegram has just been received from the mine manager, Mr. W. H. Sandiford: 'Shipment for August amounts to 20 tons galena. Mine looking up all round, in the bottom of winze (from) level No. 2 the width of the pay-streak is 2 ft. 6 in. Level No. 3, 10 in.' The above shipment of 20 tons is ore that has been obtained during development and without stoping. The directors consider that the above advices indicate that the development operations have been of a satisfactory nature. It is now under consideration as to shortly recommending shipments."

Baltimore Nova Scotia Mining Co.—This company, operating the Lake Lode gold property at Caribou, N.S., is receiving bids on a 40-stamp battery.

Vindicator Gold Mining Co.—This company has been formed in Nova Scotia to acquire and work the Drysdale gold areas at Goldenville, N.S. The capital stock is \$50,000, in 50,000 shares of a par value of \$1 each. Among the directors are C. D. Pickles, of Annapolis, N.S.; George A. Pickles, M.D., of Mahone Bay, N.S.; F. W. Green, Halifax; and Chas. A. McClair, of the Blackhouse Gold Mining Co.

Dolliver Mountain M. & M. Co.—This Nova Scotia company has called for tenders for the construction of a 50-stamp battery on their gold property at Isaac's Harbor.

Athabasca Gold Mine, Ltd.—At an extraordinary general meeting of this company held in London on 14th ultimo, the following resolution was proposed:—"That the company be wound up voluntarily, it having been proved to the shareholders' satisfaction that the company cannot, by reason of its liabilities, continue its business, and that it is advisable to wind up the same, and Mr. John A. R. Clark be and is hereby appointed liquidator for the purpose of such winding up, at a fee of 50 guineas." The Secretary of the company remarks that the shareholders are probably aware that lack of water in the early part of the year, and the consequent inability to work the air-compressor plant and rock drills, caused the development of the mine to fall greatly into arrears, to such an extent that it was necessary from lack of ore to close down the mill and simply keep a small force of men on development work and the cyanide process. The cyanide plant works with great success, and, as the mill was closed, the \$5,872 yield of gold for June was obtained entirely from the cyanide. Unfortunately the amount of tailings on hand cannot keep the cyanide plant supplied for more than a few weeks. Under the circumstances it was deemed best by the directors to confer with the manager. He came to England in May and explained the position of affairs, and that a considerable overdraft had been necessary from our bankers at Nelson to meet the losses on working during the past five months. The directors then decided that before proposing anything to the English shareholders, it would be well to get the opinion of the Canadian shareholders, who hold more than half the shares in the company. The manager has now been in Toronto for some days discussing a plan whereby the company may be greatly strengthened by amalgamating with an adjacent property which is in a highly developed state, with large bodies of ore ready for stoping and practically ready to commence shipping to the Athabasca mill. The Canadian shareholders have entire confidence in the mine. The following letter from a Canadian firm in Toronto, representing the Canadian shareholders, dated July 12, gives the latest information in the possession of the board: "We had been waiting to answer your letter of the 14th of June until we had seen Nelson Fell, who arrived here last Monday, the 8th July, and since then we have been in close communication with him and other parties interested in the Athabasca and the Venus as to some way of getting out of the present difficulty, and we are very hopeful that in the course of the next week or ten days we will be able to forward you a scheme of reconstruction that will meet with your approval and that will be of great advantage to the property. Just as soon as we can get things in shape and can make some definite proposal we will at once communicate with you, either

by cable or letter." In the last paragraph of his circular the secretary of the Athabasca company says the directors hope to lay the scheme referred to before their shareholders very shortly; but in the meantime consider it best for the interests of all concerned, to put the company into voluntary liquidation.

Rambler-Cariboo Mines, Ltd.—At the annual general meeting of the Rambler-Cariboo Mines, Limited, held in Kaslo, a dividend of one per cent. was declared. The dividend was payable on Aug. 30th, and will be the first of a series of bi-monthly dividends which are to be distributed until further notice. The election of officers resulted in the return of last year's officers and board as follows.—A. F. McClaine, Tacoma, president, J. J. Humphrey, Colfax, vice-president, William Hastie Adams, secretary-treasurer and general manager, directors, Jas. D. Chaplin, St. Catharines, Ont.; A. F. McClaine, Tacoma, Alfred Coolidge, Colfax, Wash., Chas. J. Kapps, Kaslo, B. C., J. J. Humphrey, Spokane, Wash., Bernard MacDonald, Wm. Hastie Adams, Kaslo. The following circular has been sent out to the stockholders with the notice of dividend No. 5. "Your directors concluded this day a thorough examination of the properties of the company, and feel amply assured in congratulating the stockholders upon the present conditions of 'mines and treasury.' The improvements in the ore chutes, both in quantity and grade, have been marked from level No. 1 to Nos. 2, 3, and 4, respectively, and in the case of the lowest level, No. 5, the gain has been nothing short of phenomenal. The monthly products and profits permit us to enclose notice of dividend No. 5, and we anticipate similar distributions to shareholders every 60 days, notwithstanding that at this time we are installing additional mine equipment to the extent of \$35,000 to \$40,000, consisting of 2,500 ft. flume and pipe line, 400 light electric plant, 60-ton concentrating mill, belt-driven air compressor and 4-ton hoist. These improvements should be in operation Nov. 15th, and will double the earnings of the property. The policy of generous mine development and equipment will be diligently followed the coming year."

Tyee Copper.—The ordinary general meeting of this company took place last month. Mr. T. H. Wilson (the chairman), in moving the adoption of the report, gave some particulars regarding his visit to the mine in May last. At present work was only being carried on upon the Tyee claim, out of the 90½ acres owned by the company. The miners were a carefully selected body of men, and impressed him favorably. Water rights had been acquired, and a dam constructed. He took several samples from the workings which had been assayed by Mr. F. Claudet, with the following results.—Copper, 23.60 per cent.; silver, 7 ozs. 18 dwts.; and gold 2½ dwts. per ton of 2,240 lbs. He supported the scheme for increasing the area of the property, as he was of opinion that the valuable lodes possessed by the company passed through the claims proposed to be acquired at a low price. They would also be able to erect electric machinery, deriving the necessary power from the Chemainus river, flowing through one of these claims, by which much of the work could be carried out more economically, and the low-grade schists concentrated on the spot. He congratulated the shareholders on possessing such a valuable property, and felt sure that when supplied with the capital required, they might look forward to a prosperous career, having arrived at the stage when more capital would produce early dividends. The report was seconded by Mr. E. B. Livingston, and unanimously agreed to. A resolution was also passed, increasing the capital of the company to £180,000, by the creation of 60,000 new shares of £1 each. The chairman added that the capital now proposed was small compared with that of most companies at the present time, bearing in mind the large area, which would be 240 acres, the whole of which they believed to be ore-bearing. Out of the £180,000 no less than £80,000 would be actual working capital.

Dominion Iron and Steel.—A. J. Moxham, general manager Dominion Iron and Steel Co., in a recent interview, said the company's two furnaces are now turning out 450 to 500 tons of pig iron, all of which, except a low phosphorous iron needed for a special trade, is made entirely of Wabana ore. He added, "We will continue using foreign ore so long as we cater to this special trade, but it will be a very small portion of the whole. If we marketed all our product as pig iron the phosphorous iron would be 40,000 tons a year, against 400,000 of straight Wabana iron. The English trade is exclusively Wabana ore. We have had to curtail sales pending the blowing-in of numbers three and four blast furnaces, and these will probably be blown in within the next thirty to sixty days. Canada is taking now one-third and England two-thirds of the mill's products. We will be making steel somewhere between October and January. The rail mill will be probably finished in the summer or early fall of next year."

Westmoreland Copper Company.—This company is about ready to begin turning out copper at its works, 3 miles from Dorchester. Some difficulty has been experienced in getting deliveries of the necessary machinery, but at present the reduction plant, including steam apparatus, dynamos, furnaces and crushers, is nearly complete. Work is being pushed on the construction of the precipitating tanks, of which there will be about 80. The mine is opened up by three shafts—No. 1, on the northern side, being 135 ft. deep, and Nos. 2 and 3, on the southern side, 40 and 60 ft. respectively. The horizontal workings aggregate about 7,000 ft. in length. Since the present company took hold of the concern, somewhat over two years ago, they have spent about \$240,000 at the works and mines.

British Columbia Copper Company.—This company's Mother Lode mine shipped during August to its smelter at Greenwood 724½ tons of ore. The blast furnace needed repairs after a continuous run of 6 months, necessitating a shut-down of 8 days, and no ore was shipped from the mine for 10 or 12 days. The mine is now worked on the pillar and stope system. Much deadwork is completed and stopes are open at both the 200 and 300 levels—in all, a dozen. The output will increase as soon as the second furnace, already ordered from the Allis-Chalmers Company, is ready. The big quarry is producing from 150 to 200 tons of ore daily.

Granby Consolidated Mining, Smelting and Power Company. The Old Ironsides, Knob Hill and Victoria, during August sent to the Granby Smelter 20,218 tons of ore. The output will be larger from now on. Work on the foundations, buildings and other preliminary work preparatory to

putting in two more furnaces, two copper converters and other additional plant is well advanced. The quantity of ore hitherto sent down from the mines will be required to keep the smelter going.

Dominion Copper Company.—After doing a lot of development work on its Brooklyn, Idaho and Rawhide claims, the company has reduced its working force and operations were suspended on the Idaho and Rawhide. More machinery is being installed on the Brooklyn, where more men have been put on.

Granite Gold Mines, Limited.—This company's properties were sold under an order of the Court recently, and were bought in by the liquidator of the Duncan Mines for about \$134,000—the amount of the indebtedness of the Granite Company to the Duncan Mines. It is stated that the reconstruction of the Duncan Mines has been arranged in London, the new company to be known as the Duncan United Mines, Limited, with a capital of £300,000 in £1 shares. The new company, it is said, will first develop the Poorman mine, sinking 300 ft. below the present workings and doubling the output. E. R. Woakes is engineer in charge.

Molly Gibson.—Men are at work on this claim near Nelson, at the head Kookanee Creek, driving a cross-cut tunnel from the end of the tramway to tap the main lead below the present workings. The total distance will be 250 ft. The ore is galena carrying silver.

Montreal & Boston Copper Company.—This company during August shipped about 300 tons of ore to the Hall Mines Smelter at Nelson. A 14 x 20 double-cylinder double-drum hoist has been ordered from the Jenckes Machine Company, of Shebrooke, Que., for delivery in November. An electric light plant has also been ordered. Besides extending development underground in the Sunset Mine, the company is opening a quarry in ore on its adjoining Crown Silver claim. The managing director has announced the company's intention to build its own smelter. A short spur now connects the Sunset with the railway, and ore-bins are to be erected shortly.

Hall Mining and Smelting.—Sept. 13. Output of smelting ore from the Silver King for four-weekly period ending August 26th, 2,586 tons, averaging 21.62 ounces silver and 4.75 per cent. copper.

Tyee Copper.—September 9. Still cross-cutting splendid body of ore. At the present time we have 20 feet. Average assay of ore is, gold 4½ dwts. per ton, 4 ounces of silver per ton (of 2,000 lbs.), copper, 8 per cent. Selected ore assays, gold, 15 dwts. per ton; 7 ounces of silver per ton (of 2,000 lbs.); copper, 20 per cent.—Livingston.

Velvet (Rossland) Mine.—With reference to the recent rich strike in the main shaft, general manager cables September 10:—An average sample from 3 tons assays 1 ounce gold, 8 ounces silver, and 9½ per cent. copper (wet assay). Approximate value £10 per ton.

New Goldfields of British Columbia.—The following is excerpted from the fourth annual report, which has been issued to the shareholders this month:—The profit and loss account shows a gross profit of £7,604 8s. 6d., expenditure £6,111 10s. 1d., leaving a net profit for the year of £1,492 18s. 5d. This balance, together with the amount brought forward from last account, viz., £5,590 13s. 8d., gives a total credit balance of £10,083 12s. 1d., from which has been paid dividends as declared, special remuneration to directors and income tax amounting to £7,842 13s. 10d., leaving a net credit balance at date of £2,240 18s. 3d. The unfavourable condition of the mining market referred to in last year's report has continued, and it has specially affected mining interests in British Columbia. Although your directors believe the depression to be only temporary, they have thought it prudent to considerably write down the value of all its mining securities, and, under the circumstances, do not propose the payment of a further dividend, beyond the interim dividend of 5 per cent. already paid, leaving the reserve of £5,000 shown in last year's balance-sheet and the balance of this year's profit, together amounting to £7,240 18s. 3d., to be carried forward.

VELVET (ROSSLAND) MINE, LIMITED.—It was thought desirable by the Directors of that company, in consequence of unsatisfactory progress at the mine and loss of confidence in the manager, to make a change in the management. Mr. Stanley Sorensen, a highly competent engineer, was appointed to take charge, and his report upon the property was issued to the shareholders of that company a few weeks since. Although the estimates given by Mr. James Morrish, late consulting engineer of that company, as to the quality and value of the ore in sight have not been confirmed by Mr. Sorensen in their entirety, the developments being now carried out under the direction of the new manager appear to be identical with those recommended by Mr. Morrish, and have, especially during the last month, given most reassuring results, thereby warranting, in the opinion of your directors, continued confidence in the value of this property.

PORTLAND (ROSSLAND) MINE, LIMITED.—Mr. Sorensen's latest report states that the result of the developments at the No. 1 Shaft give "evidence that this part of your property is in the region of ore deposits of a payable, I might almost say, highly payable nature," and that this part of the mine should be equipped with suitable hoisting gear. At the same time he points out that the developments of the Velvet Mine are such that they are exploring the ground in juxtaposition to this part of the property.

Le Roi No. 2.—Shipments last week approximately 650 tons. Expect to have mine supplied with full force men within the next week, when shipments will soon rise normal.

Le Roi.—The manager cables:—"Smelter treated 10,500 tons of ore during month of August. Estimated value \$150,000, matte shipped \$130,000. We are now shipping 80 tons per day dump ore to the smelting works at Trail. Expect to have plenty of men within two weeks from this date to commence shipments from the mine."

Ymir.—The following cablegram has been received from the company's representative at Nelson, British Columbia:—"During last month 80 stamps ran 706 hours (29 days 10 hours). Estimated profit on operating is \$26,600 (£5,480)."

MINING IN NEW BRUNSWICK.

Considerable interest along the mining route is noticeable—but we lack capital and judicious advertising of our mining chances, so the work goes on slowly but nevertheless surely.

The recent development by the N.B. Petroleum Company has resulted in oil being discovered in the Memramcook district, Westmoreland Co. near St. Joseph's Catholic College. Evidences of existence of oil has been long known in this vicinity. On the strength of reports by Prof. Shaler of Harvard the Government of N.B. passed legislative enactments that were framed to develop this industry—though their action is a questionable transaction as they conferred on the N.B. Petroleum Co. monopolistic powers giving them exclusive rights to have first choice on 10,000 square miles of territory in the province—before any other company can invest—the reason being given that capital could not be otherwise induced to go in. However this company have been exploring and working for past two years with result that the oil sands have been struck and two wells at no very great depth have shown oil in fair quantity and of a quality that is of the very highest grade. Other wells are now being put down and the hopes of the shareholders are very much above par at present time.

Within 4 miles, or so, operations have been quietly but vigorously going on on what is known as the Intercolonial Copper Co. The chief promoters of which are Providence, R.I. capitalists. A large force of men have driven tunnels, sunk shafts and are now mining and storing ore for crushing and smelting. A splendid outfit of machinery, engines, boilers, crushers, roasting plant, and smelters have been placed on the property and it is probable the expenditure has not been less than a quarter of a million dollars. The work of smelting will soon be commenced. Of this more full and explicit details at a later day.

Near St. Stephen, N.B. work of exploiting the large and well known deposits of pyrrhotite or nickel ore is being quietly pursued. The Government diamond drill I understand is in use at present. I have a number of times before referred to this deposit in the columns of the REVIEW. To many persons it looks as if some day it might be a respectable rival to the Sudbury nickel deposits as its proximity to the Atlantic sea board would be much in its favor.

Within 16 miles or so of Sussex, N.B. some capitalists from Nebraska have been exploiting a copper, gold and silver vein at a point known as Hillsdale, and the evidences are very favorable for a valuable mine at this point. The vein is well defined, large, and the ore certainly is very prepossessing.

At a point in Kent County a short distance above Moncton, known as Mt. Carlyle, some New York capitalists under the direction of a Mr. Polley's, M.E. are sinking a shaft, erecting buildings and propose to develop and mine coal which it is claimed exist in good working quantity there. Also to develop manganese claims controlled by same parties. The result will be anxiously looked for as there are many unbelievers. Nevertheless this company purpose seeing it through.

The sketch in the REVIEW of late issue of a New Brunswick coal mine—motive power a horse—is good. The feeling is however that coal exists in workable quantity and Mr. Poole's ideas may wake up some of the dormant ideas of our Government and home capital. The first step has been taken and the construction of the N.B. Coal & Ry. Company's road from Chipman, Queen Co. to Fredericton will determine matters as this Co. will be bound to open up certain coal measures and mine not less than 150,000 tons of coal per year in order to avail themselves of the Government grant voted for the purpose. The first section of the road, 15 miles, is now under contract—the remaining 30 will be built next summer.

Much prospecting is going on in a quiet way for copper, pyrites, manganese, graphite, baryta, iron, and last but not least gold which beyond doubt exists in N.B. The former metals are numerous and good showings can be pointed out easily if we only had the capital to develop them. Mispickel, galena and other sources of wealth are well known but it seems impossible to get capital to invest. Perhaps however our day will come.

Since writing the foregoing, re the Dorchester Copper Mine, a chance visit brought me to the locality and I took the trouble to look around a little. In company with a friend we met Mr. A. W. Chapman, the resident manager, and by him were shown over the works and buildings, and were astonished to see so much development. Two shafts, and the tunnel some 1,500 ft. into the hillside, are being worked regularly, and the ore piled up awaiting the starting up of the mill and copper producing processes. The electrolytic process is the principle settled on, the ore being broken up in a powerful rock breaker, conveyed to rolls and there crushed to necessary fineness; from thence to the long row of furnaces, and then roasted so as to free the ore from arsenical sulphurets; from there conveyed to huge tanks, where the ore is extracted by solution and from thence conveyed to the boxes or tanks wherein are placed sheets of lead in the liquid holding the copper, and the electric process collects the copper, which, after being all collected, is then stripped off in sheets from the anodes as stated. We found that the work has been going on continuously for over two years, and a very great amount of development work has been done. There is now probably some 50,000 tons of ore on the dumps which will be crushed and treated as soon as the electrical part of plant is finished, the work having been delayed for weeks in consequence of inability of electrical works to fill order given them. This ore, it is claimed, will yield from 2 per cent. copper upwards, and from numerous tests made and assays at various points the management confi-

dently believe they can rely on an average value of 5 per cent. copper in all their ore, and as it is worth about—as I understand it—\$3.00 per cwt. the values of this ore will average about \$15.00 per ton. The management affirm that, with their plant and process, they can mine, mill and treat this ore for \$2.50 per ton, hence it can be seen that very good values are to be looked for, and from explorations made over the company's property, which controls a very large area, it can simply be said there are millions of tons of ore in sight. The men who have promoted this company have full faith in their venture, and from the time of starting up to the present some \$250,000 has been expended on development work—making roads, building houses and stables, shaft-houses, engine-houses, mills, and installing therein first-class and up-to-date boilers, engines, rock-breakers, furnaces, tanks, dynamos, and other plant, all built in the most substantial manner, so that one cannot help being impressed with the importance of what is seen. And all this has been done in a quiet and unostentatious manner, the outside world rarely hearing anything about it. The capital of the company is \$2,000,000, headquarters at Providence, R. I., and, without any waste of words, they deserve every credit for the thorough and systematic manner they have adopted in exploiting this mine, and it is to be sincerely hoped their fullest expectations may be realized. If they are, New Brunswick bids fair to have one of the greatest copper producing mines in Canada. I hope to give you more information on the mine at a later date for the columns of the REVIEW.

MINING IN NOVA SCOTIA.

The Egerton Syndicate who have taken over the New Egerton mine at Fifteen Mile Stream, Halifax Co. have sunk their main shaft to a depth of 165 feet, and cut the three belts worked by the old company. It is proposed to continue the shaft to a depth of 240 feet when cross-cuts will be driven out to and levels along the belts. The shaft, which is a double cage one with pump and ladder way, is being sunk at the rate of about 10 feet per week and it is expected that the mill will be started about the end of October. The mine is under the management of Mr. W. Borlase.

The National Mining Company have struck rich ore in the continuation of the old incline in their mine at Mount Uniacke. The mine is under the management of Mr. John Rentz, and Mr. F. H. Mason, of Halifax, is consulting engineer to the company.

The Great Belt Mining Company have nearly completed their thirty stamp mill at Mount Uniacke. The open cut is being pumped out and it is expected that milling will be started in October.

The East Lake Mine at Mount Uniacke have a lot of ore ready for crushing. All the mills in this district are closed down on account of the scarcity of water.

The Harrigan Cove Mine produced 230 ounces last month from 231 tons of ore.

The Truro Foundry Company have received the contract for the new mill being erected by the Baltimore & Nova Scotia Mining Co. The company are putting in 20 new stamps and remodelling the present 10 stamp mill. The plant will be equipped with Wilfley tables. A large new vein has been opened about 500 feet from the present one.

The Cheticamp Gold Mining Company's tunnel is now in 130 feet and an excellent body of argentiferous galena is reported.

Messrs. W. L. Libbey and B. F. Pearson, both well known in mining circles, are in the field of local politics, the former in the Tory interests in Queens Co. and the latter in the Grit interests in Colchester Co. The appointment of Mr. Arthur Drysdale, K.C., as Commissioner of Mines for Nova Scotia meets with universal approval.

MINING IN ONTARIO.

The quantity of natural gas exported to Detroit from the Essex oil wells averages one and a-half billion cubic feet per annum, or one-half of the Essex County field.

During 1900, 12 iron mines gave an output of 90,302 tons, valued at the pit's mouth at \$111,805, being an increase over the previous year of 73,391 tons. A large part of this marked increase is due to the opening of the great Helen mine, in the Michipicoten mining division, a deposit whose importance and bearing upon the development of the iron industry of the Province is so great that it may be said to have wrought an entire change in the situation since its discovery. Of the total quantity of ore mined, 16,850 tons were magnetite and 73,452 tons hematite.

In 1895 some energetic and far-sighted men recognizing that a progressive community like Ontario furnished a home market for iron such as was hardly found elsewhere, established a blast furnace in the city of Hamilton having a capacity of 200 tons of pig iron per day. The furnace was a success from the start, and the company controlling it during 1900 added a plant for the manufacture of steel by the open hearth process, capable of making 30 to 90 tons a day.

The Hamilton Blast Furnace Company's example was followed in 1899 by the Deseronto Iron Company, which preferred to make charcoal iron, and whose decision to build a furnace in Ontario was in part due to a provision of the United States tariff that certainly was not intended to encourage the growth of manufactures in Canada. Large quantities of charcoal made at Deseronto were exported to Detroit for use in iron furnaces in that city, and with the desire of affording protection to the charcoal burners of the United States and of checking the imports of charcoal into that country, the tariff was amended to bear more heavily on that article. The somewhat unexpected result was to plant the charcoal iron business in Ontario, where unlimited supplies of wood were available, and where other conditions were almost as favorable as in Michigan. The charcoal business of Deseronto was not destroyed, but continued to flourish, and found its complement in the new industry for the making of charcoal iron of a superior quality.

Both these furnaces had the advantage of being blown in before the remarkable expansion of the iron industry began in 1899, accompanied as it was by an almost unprecedented increase in the price of pig iron, which doubled itself within a year. The Canada Iron Furnace Company, Limited, already carrying on a long-established and successful business at Radnor Forges in the Province of Quebec, next entered the field and erected a smelter at the town of Midland on the Georgian Bay.

The production of nickel in 1900 was much greater both in quantity and value than in 1899, being 3,540 tons worth \$756,626 in the matte as against 2,872 tons worth \$526,104, an increase in quantity of 668 tons and in value of \$230,522. The same thing is true of copper, the output last year being 3,364 tons worth \$319,681 as compared with 2,834 tons in 1899 worth \$176,236, an increase of 530 tons in amount and \$143,445 in value. It must be borne in mind that the figures of value given here are those for the metals in the form of matte before being exported for refining. If the price of the fine metals were made the basis of computation, the values would be many times increased.

Producers of nickel and copper had the advantage of an active demand throughout last year, and the average price realized for both metals was higher than for a number of years previous. Especially was this true of nickel, the selling price of which in the New York market advanced from about 35 cents per pound in January to 55 or 60 cents per pound in December. The average value of the nickel contents of matte at the Sudbury works as returned to the Bureau of Mines was \$213.73 per ton or 10.686 cents per pound, and of copper \$95.03 per ton or 4.756 cents per pound. These figures compare with \$183.18 per ton or 9.159 cents per pound for nickel and \$62.18 per ton or 3.109 cents per pound for copper in 1899.

The returns as to labor showed 1,444 employees at work in the nickel and copper mines of the Province, of whom 348 men and 2 boys were underground workers and 1,029 men and 23 boys were engaged above ground.

The Canadian Copper Company continues to be the chief producer of both copper and nickel, and its operations at Copper Cliff are on a larger scale than ever.

In purely copper ores, the old Bruce mines are undergoing complete renovation at the hands of The Bruce Copper Mines, Limited, an English company. Extensive works for the treatment of ore are in process of erection.

At Rock Lake also the Rock Lake Mining Company, Limited, are placing in producing condition a large and promising copper vein, the ore from which will be treated in the large concentrating plant now being put up. The railway from Bruce Mines on the shore of Lake Huron to Rock Lake, which was granted aid by the Legislature at its recent session, will be of material assistance to this company in greatly cheapening the transportation of machinery and supplies.

The Ontario Smelting Company is exploiting a copper vein near Massey Station, and is also building a refinery or rather a matte-concentrating plant at Copper Cliff for the purpose of smelting the copper ores from the Massey Station mine and of increasing the metallic contents of the Canadian Copper Company's mattes.

In eastern Ontario, the McGown and Wilcox mines near Parry Sound shut down about 1st December, after running in a fairly steady way for a considerable time. It is understood that work will be begun again in the spring. The Helena mine in the township of Barrie, Frontenac county, was in operation for the whole of the year and is said to promise well. It is not yet in the producing stage.

MINING IN EASTERN ONTARIO.

By PROF. DEKALB, Inspector of Mines.

(Continued from August issue.)

ORFORD COPPER COMPANY'S SMELTER.

The Orford Copper Company is erecting a smelting plant for the further refining of the matte from the furnaces of the Canadian Copper Company, the location of these works being 400 feet southwest of the old McArthur No. 1 rock house at Copper Cliff. The plant will consist of a crusher house for breaking up the matte, a roast shed, and a furnace house. The equipment comprises a Blake crusher, a Krupp ball mill, a Brown straight line roasting furnace, 165 feet long, with hearth 15 feet wide; a 70-foot stack, a series of dust chambers, and two cupola furnaces. Power is supplied from two 125-h.p. boilers, and a 75-h.p. Atlas engine. There will also be a Cameron pump, a dynamo, and much additional apparatus, some of which is practically new in its application to smelting plants. The maximum capacity

of the plant is calculated at 6,832 lbs. of high grade matte per hour. The resident manager of the works is Mr. S. C. Lake.

In addition to handling the Canadian Copper Co's. matte, it is intended to reduce here also the ores from the Massey copper mine, previously mentioned.

IRON MINES.

The iron industry of the Province is assuming a more satisfactory aspect than ever before. The Helen Mine at Michipicoton yields an ore of very superior quality and the quantity in sight is so large as to insure permanent operations for a long period. The Eastern mines have also been producing more steadily than for many years past, and the outlook for an increased production is very favorable. It is encouraging to note also that more systematic development work is being prosecuted, resulting in establishing the mines, where this has been done, upon a surer footing for the future.

THE HELEN MINE

The Company controlled by Mr. F. H. Clergue, of Sault Ste. Marie, Ont., has developed the Helen iron mine beyond the experimental stage to that of large and steady production. The ore-body has been proved to have a longitudinal extension of 1,100 feet and a height above the level of Boyer lake, (on the east shore of which the mine has been opened), of 97 feet; and by diamond drilling it has been shown to extend at least 188 feet below the lake level. The only underground work conducted so far has been some drifting at the eastern end of the deposit. The main tunnel is 260 feet long with two branches. The southwest drift begins 31 feet from the mouth of the tunnel, and extends 85 feet; and the northeast drift starts 50 feet from the tunnel entrance, and has a length of 35 feet. These workings are entirely in ore. The ore consists mainly of limonite and other hydrous oxides of iron, with an admixture of hematite. Its physical structure is admirable for smelting, being sufficiently hard to produce but little dust, and yet soft enough to admit of ready and rapid reduction in the furnace. The iron content averages about 58 per cent., the sulphur from 0.08 to 0.20 per cent., and the phosphorus from 0.011 to 0.067 per cent.

The actual mining is being conducted under contract by Messrs Powell and Mitchell, of Marquette, Mich., who employ about 400 men. At the time of my visit the ore was being hauled to the crusher above the railroad track, in tramcars drawn by horses, but a cableway was about to be put in operation, the towers being already in place. The span of this aerial cableway was to be 703 feet. The tower at the power station was 35 feet high, standing on a hill giving it an elevation above the railroad of 125 feet. The tower on the opposite side of the deposit was 70 feet high, with an elevation above the railroad of 115 feet. The crusher house stood 65 feet high, rising from the side of the track. At a height of 50 feet was located a Gates crusher, through which all ore passes to the loading bins below. The miners' camp consisted of a collection of buildings on a plateau above the railroad, behind the power station of the cableway. From here an inclined tramway for elevating freight extended 370 feet from the railroad to the plateau, which has an elevation of 150 feet above the lake shore. This is operated by a hoisting engine at the top. No Dynamite magazine had yet been built at the mine, the explosive supply being kept in two open sheds at the western end of Boyer lake. The main supply of dynamite was kept in a magazine several miles distant, along the line of the railroad.

Ore from the mine is hauled to the docks at Michipicoton Harbor 11 1/4 miles distant over a section of the Algoma Central Railway. In addition to the permanent way, there are 1 1/4 miles of siding. In the construction of this line the earth excavation amounted to 143,000 cubic yards, hard pan and frozen earth 12,000 cubic yards, clay 11,000 cubic yards, rock cutting 48,000 cubic yards. The total of all fills amounted to 180,000 cubic yards, and other fills are yet to be made. The track is laid with 85-lb. steel rails with a ballast of sand and gravel. A trestle at present spans the Magpie river, which is to be replaced by a bridge now under contract, consisting of three 80 foot spans. The maximum grade is 2.7 per cent., and the summit level at the mine is 653 feet above Lake Superior. The rolling stock consists of 3 Mogul locomotives of 52 tons each, 100 steel ore cars of 100,000 lbs. capacity, 1 combination car, and additional box, dump, and flat cars. The engineer in charge is Mr. Henry F. Shipley.

At Michipicoton Harbor there is a wooden ore dock 275 feet long, owned by the Algoma Central Railway Company, containing 12 bins having a capacity of 50 tons each. The approach to the docks consists of a trestle 750 feet long, on a 12 degree curve. The track is 40 feet above the lake level. The depth of water alongside the dock is 24 feet. Ore will be stored during the closed season on the sand plain, 4 miles from the harbor.

Four hundred feet east of the docks is a pier 600 feet long by 60 feet wide, on which is a warehouse 180 feet in length. The basin between the pier and the dock has been dredged out to a depth of 24 feet.

Nine hundred feet east of the dock is a sawmill having a capacity of 12,000 feet per diem. At the head of the pier is the company's office, and near by are a hotel and a company's store, owned by the Algoma Commercial Company. The operations of the company have resulted in the growth of a town of considerable dimensions around the harbor.

THE WILBUR MINE.

This property, located about two miles south of Lavant, on the Kingston and Pembroke Railway, has been in process of development throughout the year. The owner, Mr. William Caldwell of Toronto, has been carrying forward a plan of development, blocking out ore reserves, but doing no stoping. The exploratory workings however are wholly in the deposit of magnetite, which averages about 28 feet in thickness, and the output of ore from the shafts and drifts has amounted to somewhat more than 6,000 tons, which is corded up along the siding from the railroad, no shipments having as yet been made. The stock pile has been sampled at frequent intervals, and is said to show an iron content of more than 60 per cent. with only a trace of sulphur and no phosphorus.

The new shaft, called No. 2, which was only being started at the time of my previous visit, is now 226 feet deep, on an incline of 27 degrees. At the bottom is a drift 40 feet long to the north, connecting with the bottom of the old workings, known as No. 1 mine. On the south side is a sump 20 by 12 feet and 8 feet deep, over which is located a Williams duplex direct acting pump, with a 2-inch discharge pipe. From No. 3 shaft, which is connected at two points with No. 2, as explained in my report for 1899, a new incline has been driven part way through to No. 2 shaft, serving as a sump for the drainage from this part of the mine. There are two levels started in No. 2 shaft, one at a depth of 100 feet, and another at 150 feet. The existence of ore in advance of the workings for a distance of 300 feet has been demonstrated by diamond drill borings.

The old No. 1 mine has been drained, revealing one long gallery at the bottom, with large stopes above, extending nearly to the surface. Pillars have been left, and walls of waste rock have also been built supporting the roof. The workings are secure in the lower part, but are somewhat treacherous near the surface. This mine, however, is not used for any purpose other than to afford further ventilation for the new workings, so that absolute security of the roof under the circumstances is unimportant. A roof fall here would not endanger any part of the new mine. The dynamite thawing house is now heated by steam, and is kept in good condition, but was left unlocked, to which objection was strongly made. The handling of all explosives is entrusted solely to the mine foreman. There is no ladderway in shaft No. 2, but there is a good manway in No. 3, which is the easier route for entering the mine. The surface plant remains unchanged. Attention was called to the absence of any brake on the hoisting drum, and it was urged to make good this deficiency at once.

THE ROBERTSVILLE MINE.

The Robertsville mine, also known as the Lizzie mine, has made excellent progress under the management of the lessees, Messrs. F. W. Schwendiman and Thomas Barnes. No new plant has been erected, but the mine has been brought into a better condition, rendering it both safe and easier to operate. The old floor-arch forming the floor of the first level has been removed, throwing the upper and lower stopes into one. The hanging wall has been scaled, and the skipway has been extended to the bottom of the mine, making a total length on the incline of 194 feet. For a distance of 84 feet, the inclination of the skipway is 45 degrees, at which point it changes to a slope of 79 degrees. A ladderway follows the skipway to the bottom. The stopping chamber at the bottom measures 30 by 88 feet. Its widest point is 110 feet from the mine mouth, where it measures 57 by 108 feet. At the mouth it is 26 by 36 feet. As will appear from these dimensions the mine is only a deep open pit. There is still magnetite ore in considerable quantities on the foot wall of the stope, but the hanging wall is clean, sound country rock. Day and night shifts are being worked, using steam drills. The output of ore for a considerable period has averaged 40 tons per diem. At present the shipments amount to 50 tons a day, and the stock pile is estimated to contain 2,000 tons. Dynamite is stored in an old frame house half a mile distant from the mine, and a small supply of about 300 lbs. is kept in a locked magazine 450 feet east southeast from the pit. Thawing is done in a proper manner with a hot-water thawer. The address of the lessees is Clarendon P. O.

THE ST. CHARLES MINE.

This is a newly developed mine on lot 19, concession XI, Tudor township, Hastings County. The owners are The Anglo-American Iron Company, whose principal office is in Cleveland, Ohio. The operators are the Catarqui Mining and Development Company of Ontario, with offices in Madoc. The general manager is Mr. Chas. L. Meyer; consulting engineer, Mr. Leopold Meyer; and superintendent, Mr. Freeman J. Daniels of Millbridge. The directors are Hon. P. McLaren, Hon. J. McMillan and Mr. E. S. Leetham. The mine lies 5 miles north of Millbridge and 1 mile south-west of McDonald siding on the Central Ontario Railway.

The ore is magnetite, with more or less calcite, occurring in an apparently well defined vein having a strike north 45 degrees west, lying between dioritic wall rocks. The vein evidently occupies a position along a fault plane, with which is associated an intrusion of a dark, fine-grained basic volcanic rock. There has been movement of the walls subsequent to the original ore filling, followed by deposition of calcite. This was shown by the crushed and broken hornblende crystals, healed by calcite. So much of the geology of the deposit was easily observable on a very superficial examination. A careful examination of the geology of this vein should prove highly instructive.

The workings consist of an open cut, with three pits, having a total length of 500 feet. The length of the outcrop as shown by a number of test pits is 1,000 feet, with a width varying from 20 to 40 feet. During the season there have been shipped 3,000 tons of ore from this mine to the Hamilton blast furnace, which gave an iron tenor of from 57 per cent. to 60 per cent., with some as high as 64 per cent. The ore contains no phosphorus, but shows from 0.5 to 1 per cent. of sulphur. There are at present 1,500 tons of ore on the stock pile awaiting shipment. The high grade of the deposit is evidenced by the fact that in extracting the aforesaid 4,500 tons only 200 tons of waste were culled. Hoisting is by derrick, and drilling is done with steam drills. Five hundred feet east of the mine is a boarding camp for 40 men, a blacksmith shop and a foreman's house. Dynamite is stored in a temporary magazine 500 feet north of the mine.

THE DUFFERIN MINE.

This property lying just south-east of the station of Malone on the Central Ontario Railway has been working during the season, under the direction of Chas. Bulpit for Thomas Barnes of Hamilton. A tunnel 100 feet long has been driven, connecting with a shaft. The mine was producing 3 carloads a week until the Hamilton blast furnace was closed.

THE WALLBRIDGE MINE.

This mine, on the east half of lot 12, concession V, Madoc, is still in operation, with some promise of continuing to be a steady producer. The ore is a soft red hematite. Operations have been carried on for four months, yielding from 15 to 20 tons of ore per diem. The old shaft extending 35 feet below the present working, is now filled with debris, but will be cleaned out as mining proceeds. The depth from the edge of the pit to the working place is 60 feet. The side wall of the pit was apparently insecure, and instructions were left to set a row of stulls, and lag them closely so as to protect the miners below. Hoisting is done by derrick. Dynamite was kept in a small building on the edge of the pit. The erection of a suitable magazine at a proper distance from the mine was required. The mine manager is Mr. Campbell Wallbridge.

THE SEYMOUR MINE.

The Seymour iron mine was one of the earliest producers of iron ore in Ontario, and had been abandoned for many years. It is now being pumped out preparatory to active operation by Mr. Stephen Wellington of Madoc, who has obtained a lease of the property from the owner, Mr. Fred E. Seymour of Madoc. It is located on the west half of lot 11, concession V, Madoc township, 4 miles north of the town of that name. The old shaft is said to be 125 feet deep. The water had only been lowered to a depth of 40 feet at the time of my visit, revealing an old open stope 200 feet long east and west, varying from 18 to 22 feet wide, and dipping 60 degrees toward the south. The stope had once been well timbered up, but these timbers have mostly rotted and fallen. As was pointed out to the lessee, it will be necessary to set a row of stulls above the old level to insure safety. A 10-h.p. boiler now furnishes steam to the pump, and a horse whim is being set up for hoisting. The attention of the owner of the property was called to the regulation requiring the fencing of open workings.

This old open stope has remained unfenced for many years, and while no serious accident has resulted, the remains of cattle and sheep were found

in the pit on pumping it out. It appears that practically no attention has been paid to the law on this subject, so far as old abandoned mines are concerned, throughout the Province. Nearly all such workings which I have visited have been found in the same condition as the Seymour mine, in this regard.

CALABOGIE MINES.

These mines, controlled by the Hamilton Steel and Iron Company, have been shipping on an average about 125 tons a day during the season. The pit has been but slightly deepened, the ore being extracted by enlarging its diameter.

The Calabogie Mining Company has also pumped out its pit which lies on an extension of the same deposit, and development has been progressing during a considerable part of the summer.

KATHERINE LEAD AND ZINC MINE.

This property is located on lot 7, concession XI, of Lake township, Hastings county, 3 miles northwest from Millbridge, embracing 300 acres. The owners and operators are The British Colonial Mining and Development Company of Ontario, Limited, with offices in Millbridge. The manager is Mr. Charles L. Meyer, with Mr. Freeman J. Daniels as superintendent. The directors are Messrs. Charles L. and Leopold Meyer, Col. Charles E. Turner and Mr. E. S. Leetham of Ottawa, and Hon. J. McMillan.

The vein carries argentiferous galena and zinblende in calcite, the average of the ore showing 10 ounces of silver. It lies wholly between walls of diorite, with a width varying from 1 to 4 feet, and a known longitudinal extension of half a mile. Explorations have been carried on by diamond drill borings to a depth of 292 feet, and by a shaft 125 feet, consisting of two compartments. For a depth of 50 feet it is vertical, and then inclines east 60 degrees. At 100 feet is a drift, 100 feet to the north, with a stope 30 feet high and 50 feet long, beginning 10 feet from the shaft. Hoisting is done with a 25-h p. hoisting engine, taking steam from a 40-h.p. boiler. The shaft house is 22 feet square on the base, 12 feet square at the top, and 50 feet high. Adjacent is the boiler house, 60 feet by 25 feet. There is also a blacksmith shop, a boarding camp for 30 men, an office, and stables.

Half a mile south of the former shaft is the south shaft, 9 x 18 feet in cross-section, and 18 feet deep. The vein here is less highly mineralized, having, however, a width of 9 feet, with six ore-bearing streaks, containing galena, but no zinc. The mines are at present idle, but work will soon be resumed.

HENDERSON TALC MINE.

A very interesting and important discovery of talc has been made at a distance of a mile and a half from Madoc on the north shore of Moira lake, by Mr. James E. Harrison of that place, by whom the property is being worked under lease. The location is on lot 14, concession XIV, of Huntingdon township, Hastings county. The talc vein averages 36 feet in width, and has a strike north 40 degrees west, cutting across the strike of the tilted dolomite in which it occurs, the latter bearing north 10 degrees west.

The talc is of exceptionally fine quality, entirely free from grit, and being practically uniform across the full width of the deposit. Eight hundred tons of the material have been shipped to New York during the summer, representing nearly the total of all rock raised, the culls from this amount being only 5 tons. The shaft is now 43 feet deep, with a cross section of 18 x 20 feet. A pit-head frame, closed in, has been erected over the shaft with horse-whim shed adjacent. Hoisting is done by bucket. Preparations were being made at the time of my visit to put in timbering, owing to the tendency to slips which were becoming dangerous. Dynamite was stored in a magazine 900 feet distant.

CANADA CORUNDUM COMPANY, LIMITED.

Regular work has begun at the corundum mine seven miles south of Combermere, by the Canada Corundum Company, Limited. The head offices of the company are in Toronto, with a branch office in Bridgeport, Connecticut. The officers are: President, Clark Edwards, Bridgeport, Conn.; vice-president, J. H. Shenstone, Toronto; and manager, B. A. C. Craig, Toronto. The superintendent of the mines and works is Leverett S. Ropes.

The properties being worked are in the 18th concession of Raglan, Renfrew county, known as the Robillard property. The company has also located 1,200 acres out of the 2,000 acres allowed by the Government. The mines are on lots 3 and 4, Concession XVIII of Raglan, and the mill is half a mile southwest on lot 2. No underground development has so far been

done, and in this case it will be unnecessary for a long period, the width of the deposit and the length of the outcrop over a high hill revealing a sufficient supply for many years, which may be cheaply obtained by quarrying. The rock extracted yields from 12 to 15 per cent. of corundum. It has been found that the rock containing the mineral fairly well disseminated in the form of relatively small crystals produces the finer grade of material, and the operations are being confined chiefly to that portion of the deposit where this character predominates.

The mill is situated on lot 2, consisting of the old W. E. James' sawmill remodelled for the purpose. The plant contains a No. 2 Gates crusher, a pair of 14 x 24-inch Gates rolls, 2 double-compartment Hartz jigs, a Wilfley table, and a Bartlett concentrator. With this equipment the capacity of the mill is 20 tons of rock per diem. Additions are being made, the new equipment consisting of 3 Hartz jigs, 1 pair of Sturtevant centrifugal rolls, 16 x 6 inches, with a crushing capacity of 40 tons a day, and a magnetic separator for removing magnetite. The mill is driven by a 40-h.p. 5-nozzle Leffel water-wheel of the hurdy-gurdy type, located 315 feet south of the plant and 420 feet from the dam. The power is transmitted by a wire rope driver. The present mill is regarded only as experimental, and plans are under consideration for reconstruction at a point just below the mines, where ample dumping ground for tailings is available. This plan would involve the fluming of water from Echo lake, which would afford a large supply under a higher head than can be had at the present mill-site. Other buildings on the property are an office and blacksmith shop near the mill, and a boarding-camp midway between the mill and the mine. The dynamite magazine is located on the south-west corner of lot 4, five-eighths of a mile east from the mill. It is built of logs, well-ventilated, but needed chinking and cleaning. It contained one ton of dynamite. The force of workmen employed numbered 45. A short road is being built from the mine 3 miles to François' landing on the York river, distant 4 miles from Combermere.

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Canboro Natural Gas Co., Ltd.—Incorporated 23rd Aug., 1901. Authorized capital, \$12,000, in shares of \$10.00 each. Head office: Canboro, Ont.

Cartier Mining Co., Ltd.—Incorporated 23rd Aug., 1901. Authorized capital, \$100,000, in shares of \$1.00 each. Head office: Toronto, Ont.

Consolidated Mines Co. of Lake Superior, Ltd.—Incorporated 23rd Aug., 1901. Authorized capital, \$1,000,000, in shares of \$1.00 each. Head office: Port Arthur, Ont.

Gopher Mining Co., Ltd.—Incorporated 23rd Aug., 1901. Authorized capital, \$1,000,000, in shares of \$1.00 each. Head office: Fort Frances, Ont.

Czarina Gold Mines Co. of Ontario, Ltd.—Incorporated 28th Aug., 1901. Authorized capital, \$40,000, in shares of \$1.00 each. Head office: Fort William, Ont.

Canfield Natural Gas Co., Ltd.—Incorporated 28th Aug., 1901. Authorized capital, \$40,000, in shares of \$25.00 each. Head office: Canfield, Ont.

Superior Copper Co., Ltd.—Incorporated 6th Sept., 1901. Authorized capital, \$1,500,000, in shares of \$10.00 each. Head office: Sault Ste. Marie, Ont.

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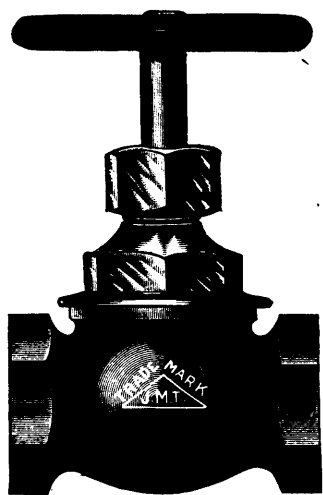
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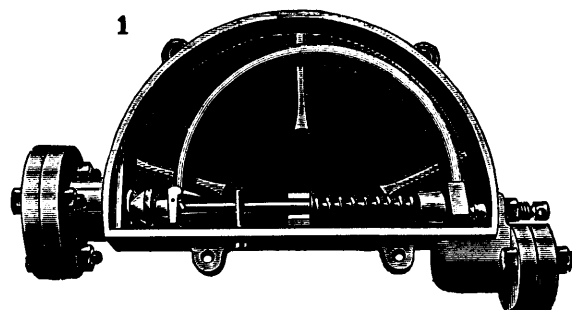
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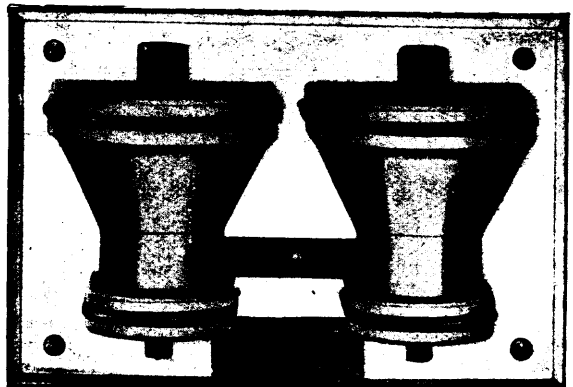
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In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. Recent discoveries of corundum in Eastern Ontario are believed to be the most extensive in existence.

The output of iron, copper and nickel in 1900 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province salt, petroleum and natural gas are important products.

The mining laws of Ontario are liberal, and the prices of mineral lands low. Title by freehold or lease, on working conditions for seven years. There are no royalties.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe. The Canadian Pacific Railway runs through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc , apply to

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Mining concessions are divided into three classes:—

1. In unsurveyed territory (*a*) the first class contains 400 acres, (*b*) the second, 200 acres, and (*c*) the third, 100 acres.

2. In surveyed townships the three classes respectively comprise one, two and four lots.

All lands supposed to contain mines or ores belonging to the Crown may be acquired from the Commissioner of Colonization and Mines (*a*) as a mining concession by purchase, or (*b*) be occupied and worked under a mining license.

No sale of mining concessions containing more than 400 acres in superficies can be made by the Commissioner to the same person. The Governor-in-Council may, however, grant a larger extent of territory up to 1,000 acres under special circumstances.

The rates charged and to be paid in full at the time of the purchase are \$5 and \$10 per acre for mining lands containing the superior metals* ; the first named price being for lands situated more than 12 miles and the last named for lands situated less than 12 miles from the railway.

If containing the inferior metal, \$2 and \$4 according to distance from railway.

Unless stipulated to the contrary in the letters patent in concessions for the mining of superior metals, the purchaser has the right to mine for all metals found therein ; in concessions for the mining of the inferior metals, those only may be mined for.

*The superior metals include the ores of gold, silver, lead, copper, nickel, graphite, asbestos, mica, and phosphate of lime. The words inferior metals include all other minerals and ores.

Mining lands are sold on the express condition that the purchaser shall commence *bona fide* to mine within two years from the date of purchase, and shall not spend less than \$500 if mining for the superior metals ; and not less than \$200 if for inferior metals. In default, cancellation of sale of mining lands.

(*b*) Licenses may be obtained from the Commissioner on the following terms:—Application for an exploration and prospecting license, if the mine is on private land, \$2 for every 100 acres or fraction of 100 ; if the mine is on Crown lands (1) in unsurveyed territory, \$5 for every 100 acres, and (2) in unsurveyed territory, \$5 for each square mile, the license to be valid for three months and renewable. The holder of such license may afterwards purchase the mine, paying the prices mentioned.

Licenses for mining are of two kinds : Private lands licenses where the mining rights belong to the Crown, and public lands licenses. These licenses are granted on payment of a fee of \$5 and an annual rental of \$1 per acre. Each license is granted for 200 acres or less, but not for more ; is valid for one year, and is renewable on the same terms as those on which it was originally granted. The Governor-in-Council may at any time require the payment of the royalty in lieu of fees for a mining license and the annual rental—such royalties, unless otherwise determined by letters patent or other title from the Crown, being fixed at a rate not to exceed three per cent. of the value at the mine of the mineral extracted after deducting the cost of mining it.

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Under the provisions of Chap. 1, Acts of 1892, of Mines and Minerals, Licenses are issued for prospecting Gold and Silver for a term of twelve months. Mines of Gold and Silver are laid off in areas of 150 by 250 feet, any number of which up to one hundred can be included in one License, provided that the length of the block does not exceed twice its width. The cost is 50 cents per area. Leases of any number of areas are granted for a term of 40 years at \$2.00 per area. These leases are forfeitable if not worked, but advantage can be taken of a recent Act by which on payment of 50 cents annually for each area contained in the lease it becomes non forfeitable if the labor be not performed.

Licenses are issued to owners of quartz crushing mills who are required

to pay Royalty on all the Gold they extract at the rate of two per cent. on smelted Gold valued at \$19 an ounce, and on smelted Gold valued at \$18 an ounce.

Applications for Licenses or Leases are receivable at the office of the Commissioner of Public Works and Mines each week day from 10 a.m. to 4 p.m., except Saturday, when the hours are from 10 to 1. Licenses are issued in the order of application according to priority. If a person discovers Gold in any part of the Province, he may stake out the boundaries of the areas he desires to obtain, and this gives him one week and twenty-four hours for every 15 miles from Halifax in which to make application at the Department for his ground.

MINES OTHER THAN GOLD AND SILVER.

Licenses to search for eighteen months are issued, at a cost of thirty dollars, for minerals other than Gold and Silver, out of which areas can be selected for mining under lease. These leases are for four renewable terms of twenty years each. The cost for the first year is fifty dollars, and an annual rental of thirty dollars secures each lease from liability to forfeiture for non-working.

All rentals are refunded if afterwards the areas are worked and pay royalties. All titles, transfers, etc., of minerals are registered by the Mines Department for a nominal fee, and provision is made for lessees and licensees whereby they can acquire promptly either by arrangement with the owner or by arbitration all land required for their mining works.

The Government as a security for the payment of royalties, makes the royalties first lien on the plant and fixtures of the mine.

The unusually generous conditions under which the Government of Nova Scotia grants its minerals have introduced many outside capitalists, who have always stated that the Mining laws of the Province were the best they had had experience of.

The royalties on the remaining minerals are: Copper, four cents on every unit; Lead, two cents upon every unit; Iron, five cents on every ton; Tin and Precious Stones, five per cent.; Coal, 10 cents on every ton sold.

The Gold district of the Province extends along its entire Atlantic coast, and varies in width from 10 to 40 miles, and embraces an area of over three thousand miles, and is traversed by good roads and accessible at all points by water. Coal is known in the Counties of Cumberland, Colchester, Pictou and Antigonish, and at numerous points in the Island of Cape Breton. The ores of Iron, Copper, etc., are met at numerous points, and are being rapidly secured by miners and investors.

Copies of the Mining Law and any information can be had on application to

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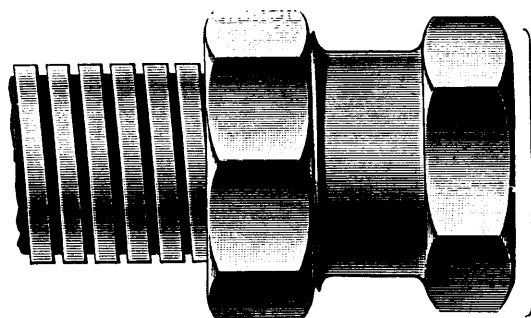
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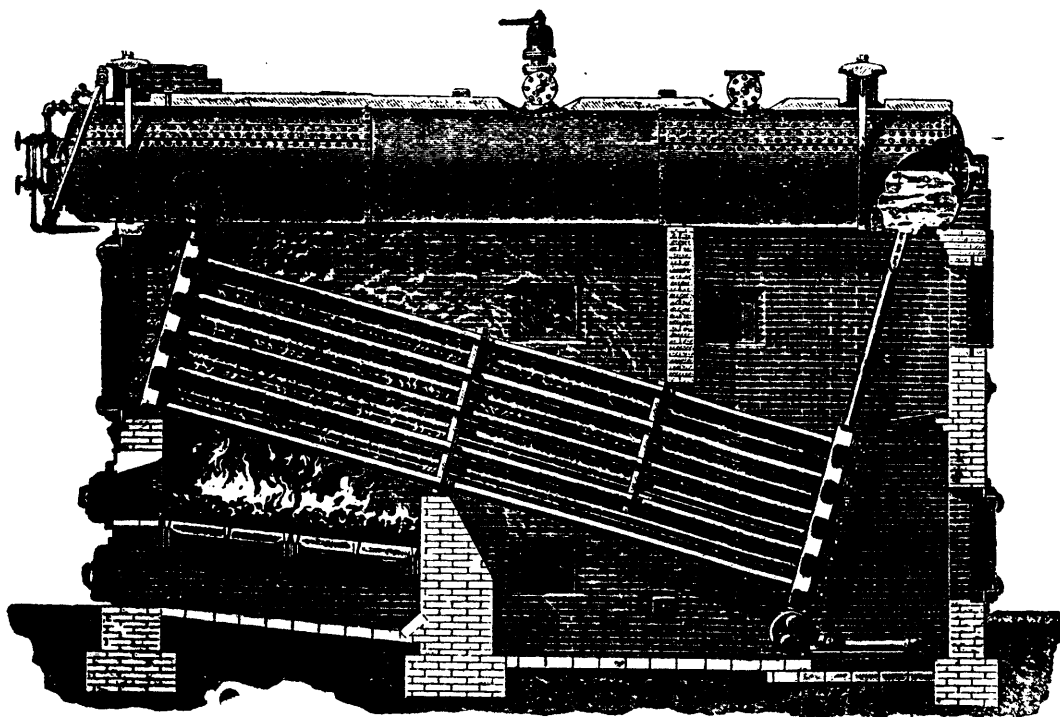
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