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*See article by
Prof. Mudd*

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Established 1882

Vol. XXII—No. XII.

OTTAWA, DECEMBER 31st, 1903.

Vol. XXII—No. XII.

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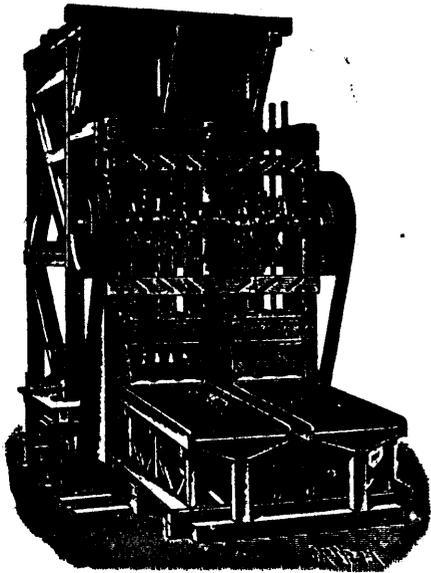
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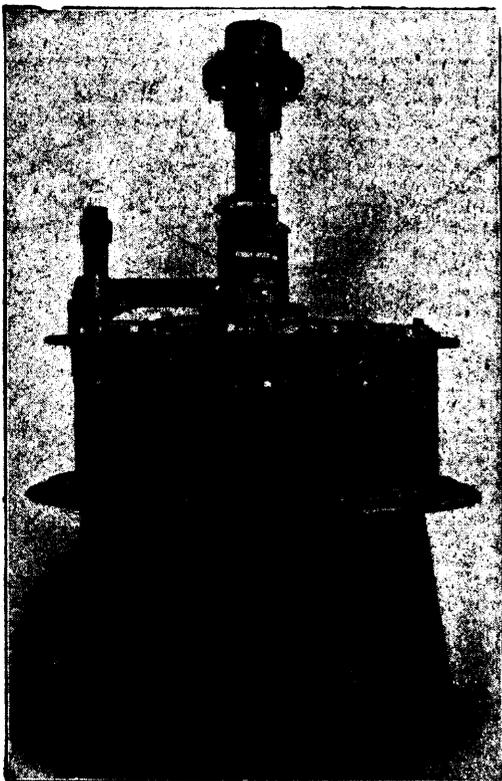
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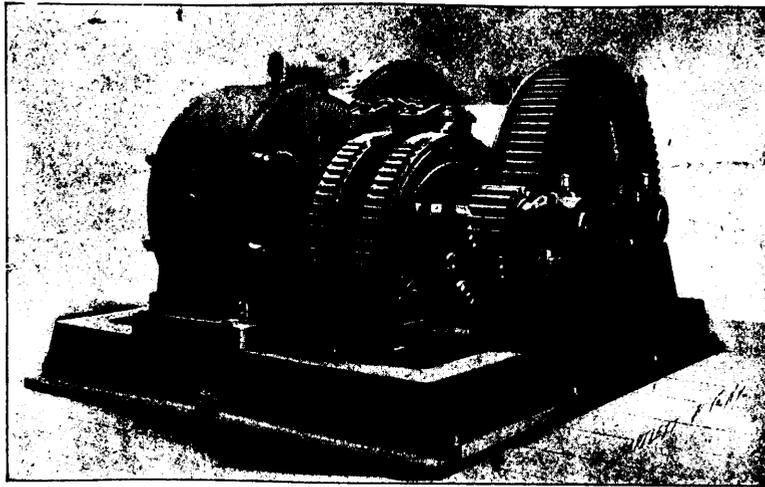
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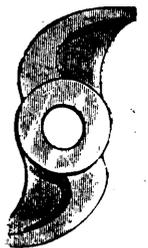
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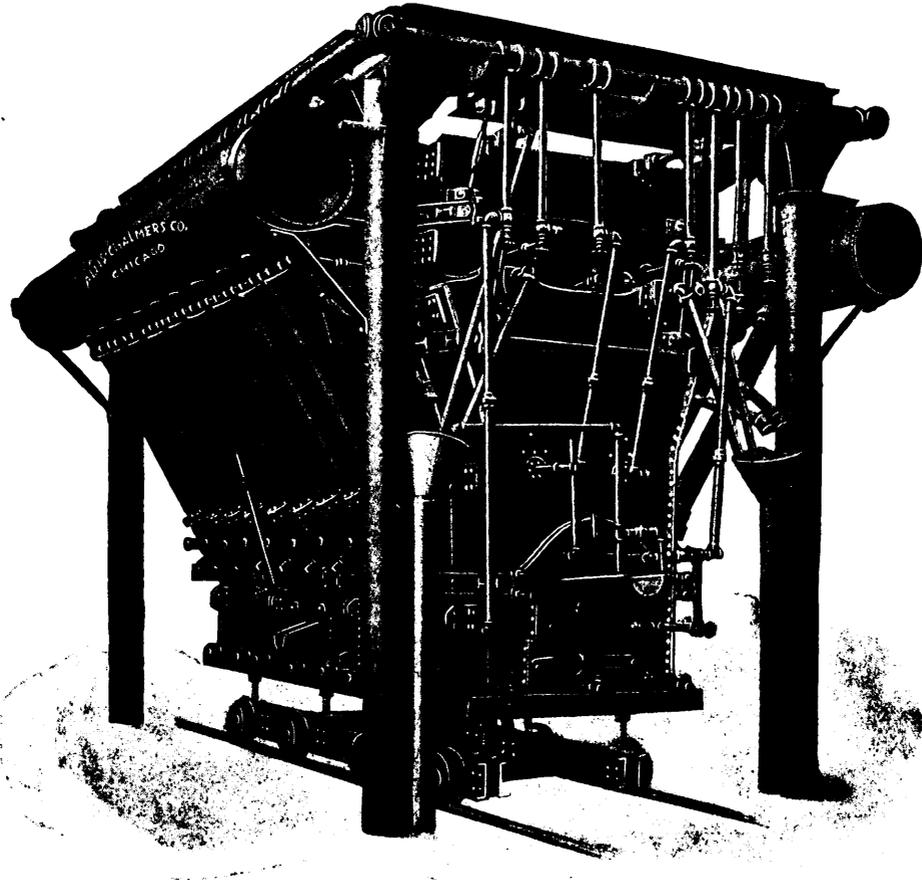
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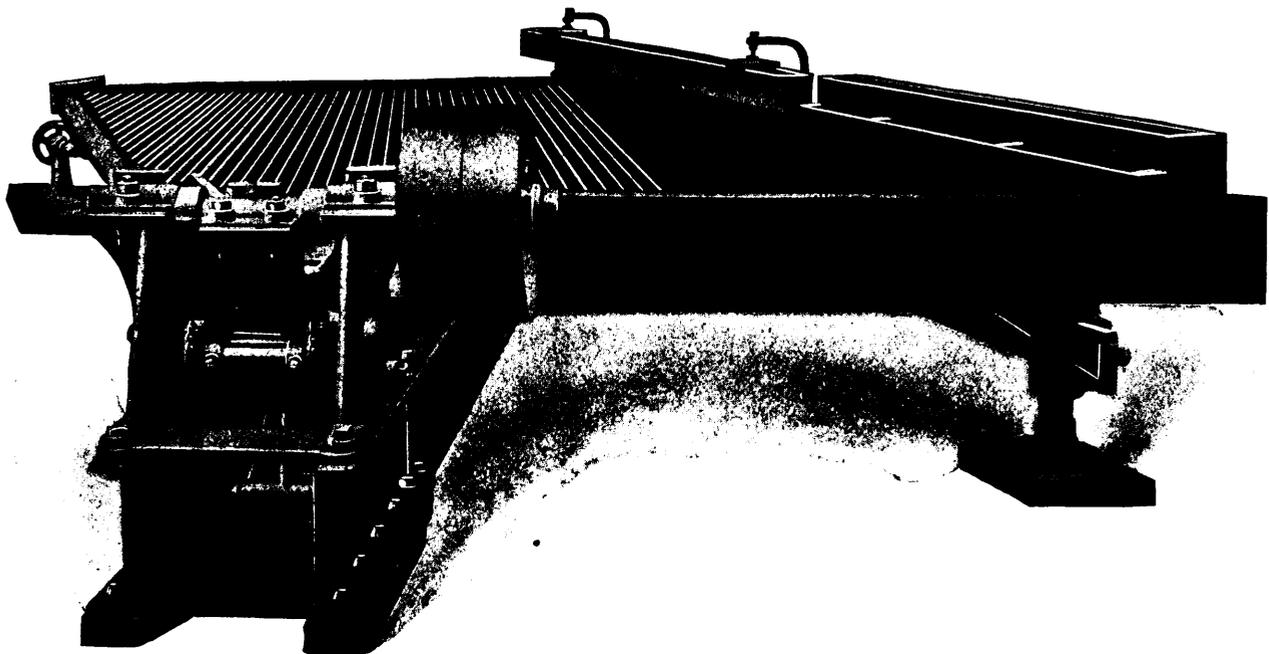
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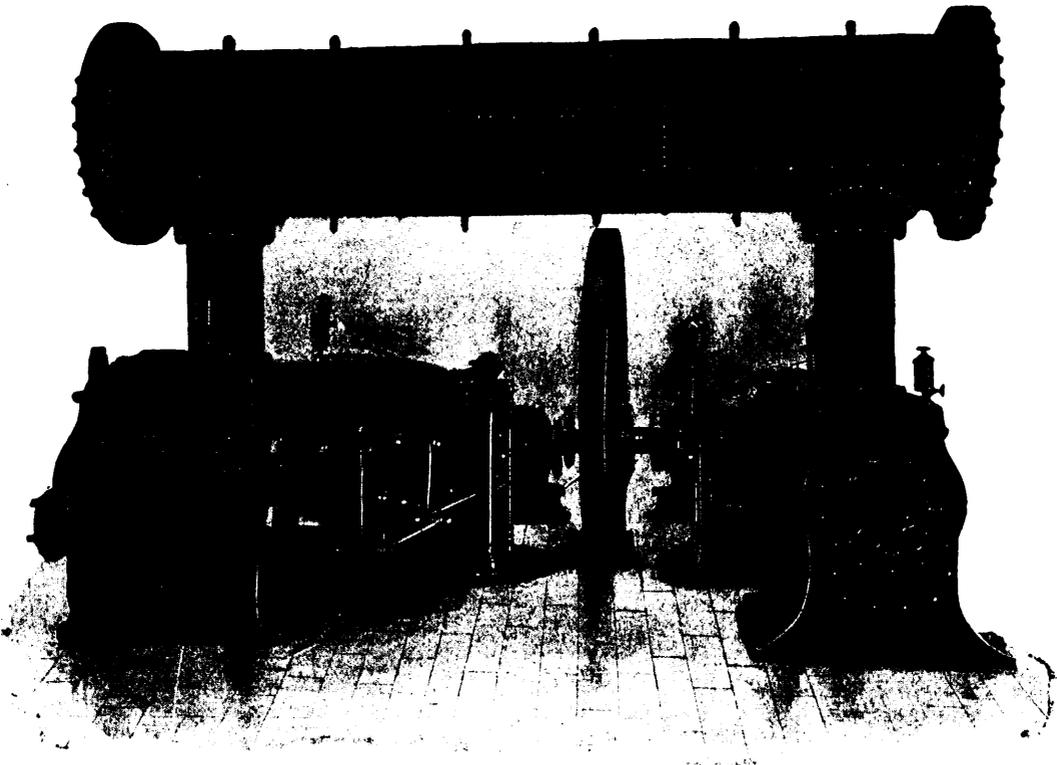
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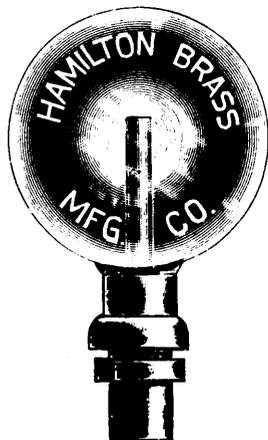
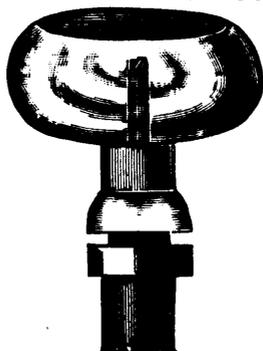
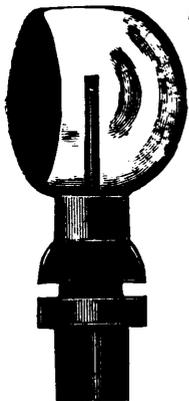
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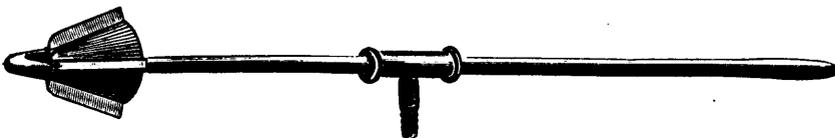
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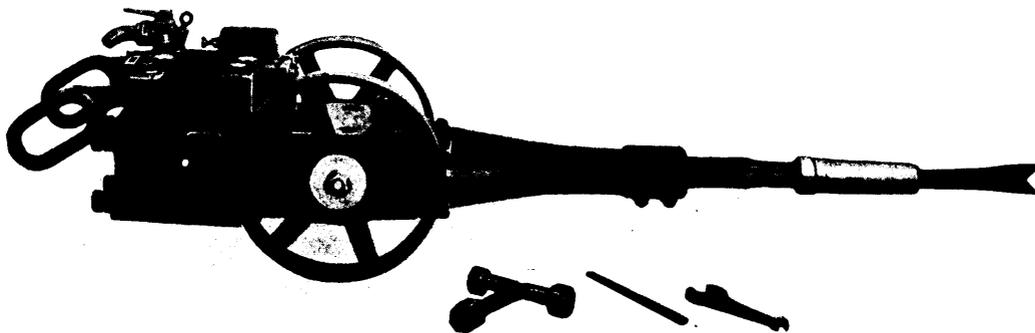
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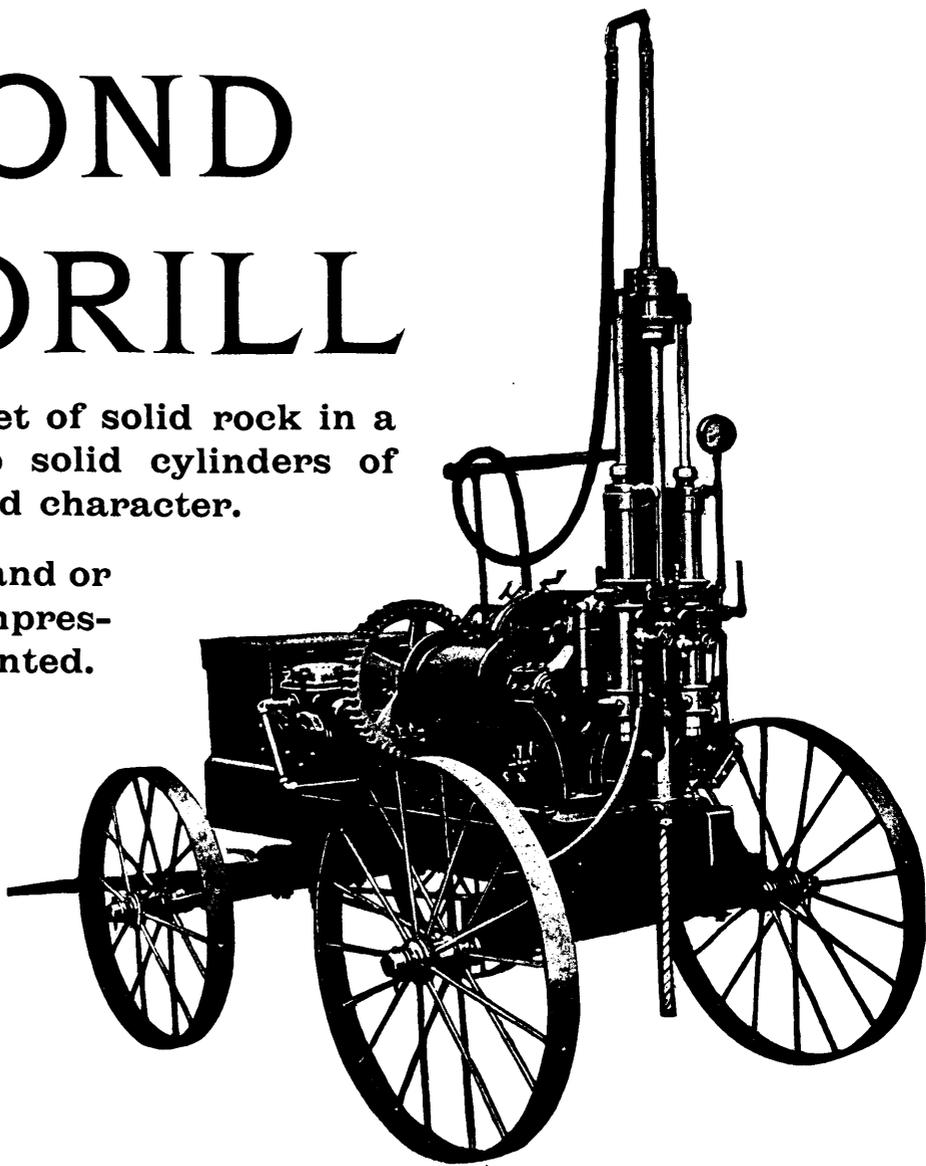
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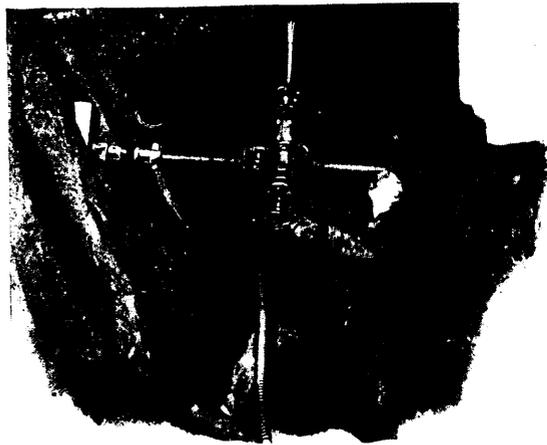
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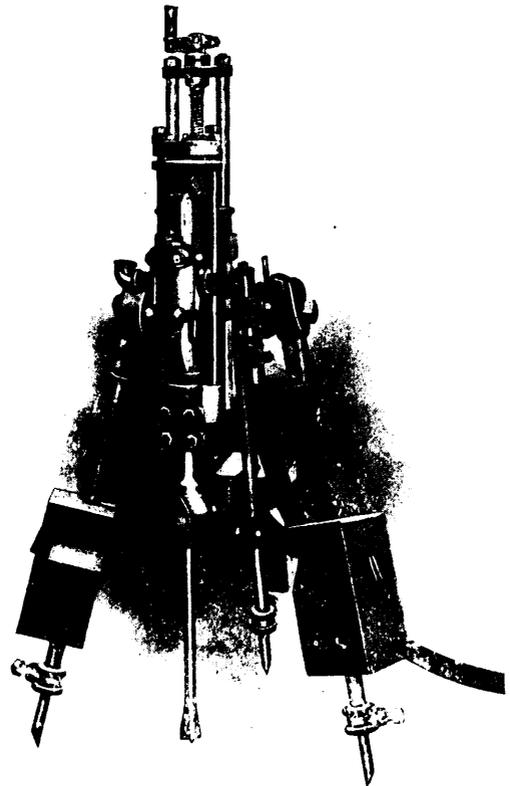
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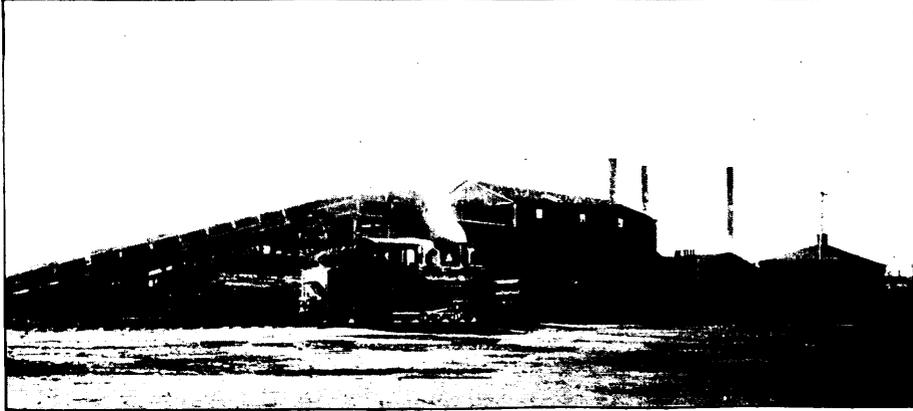


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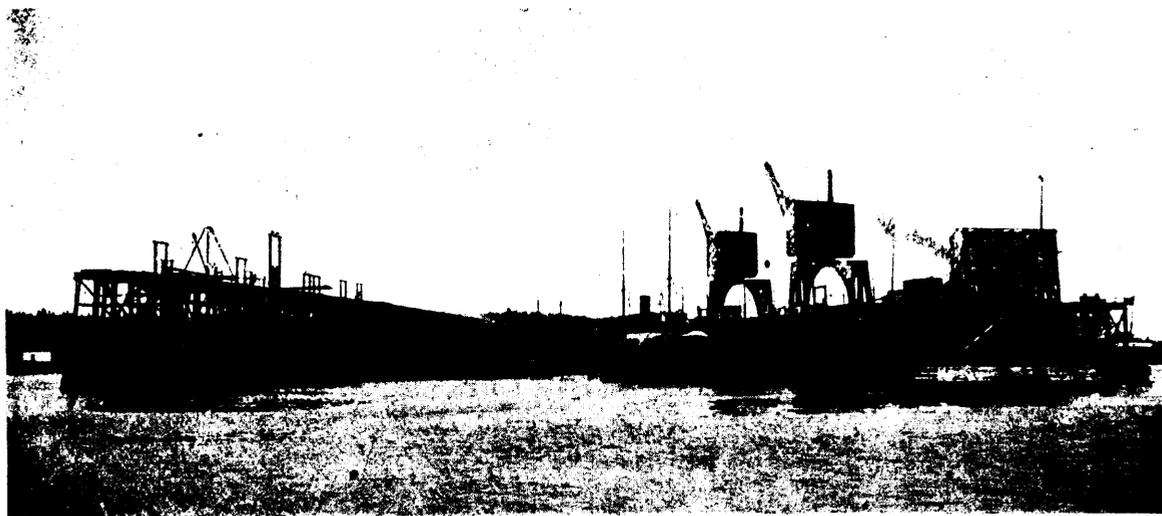
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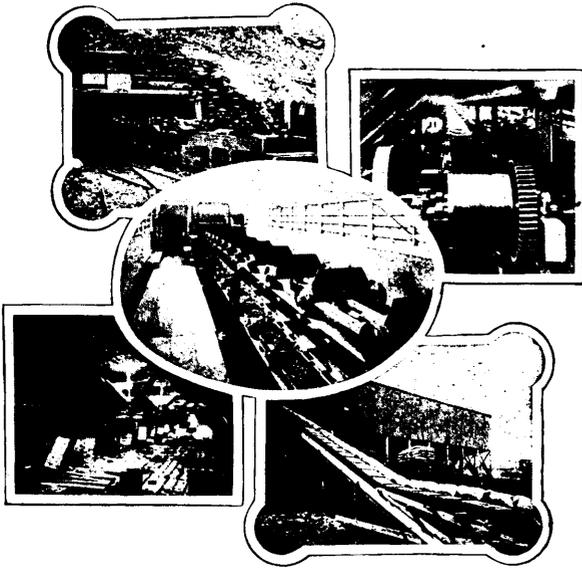
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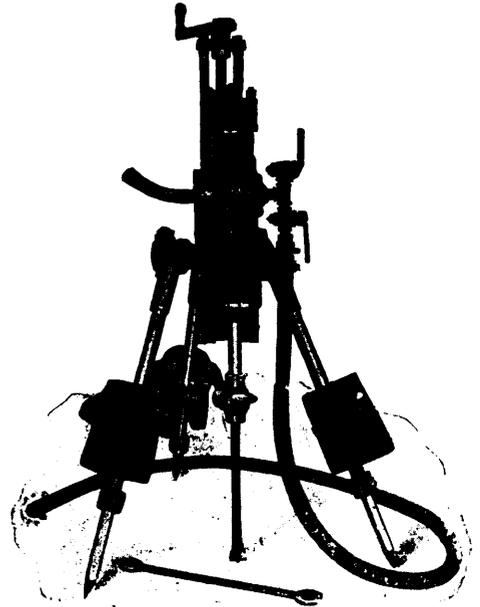
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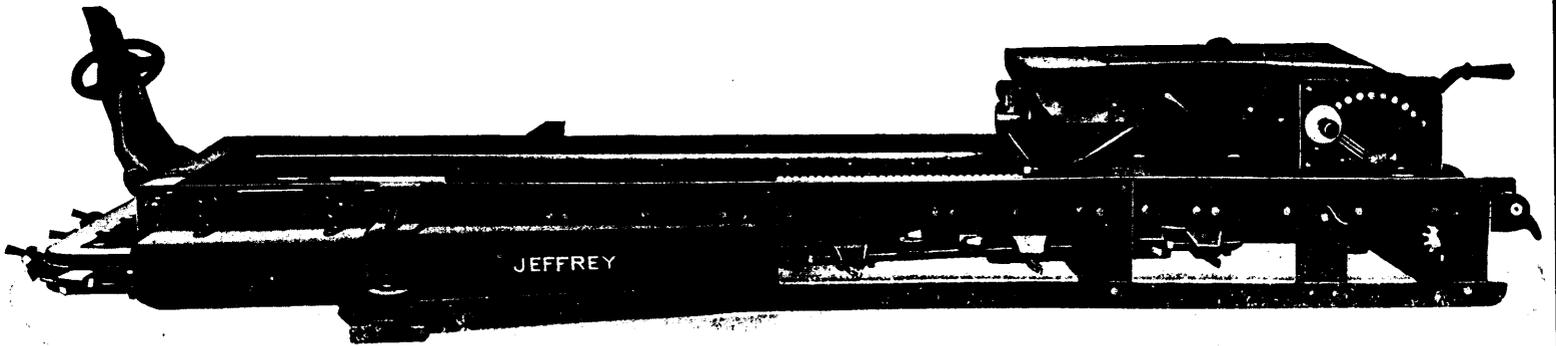
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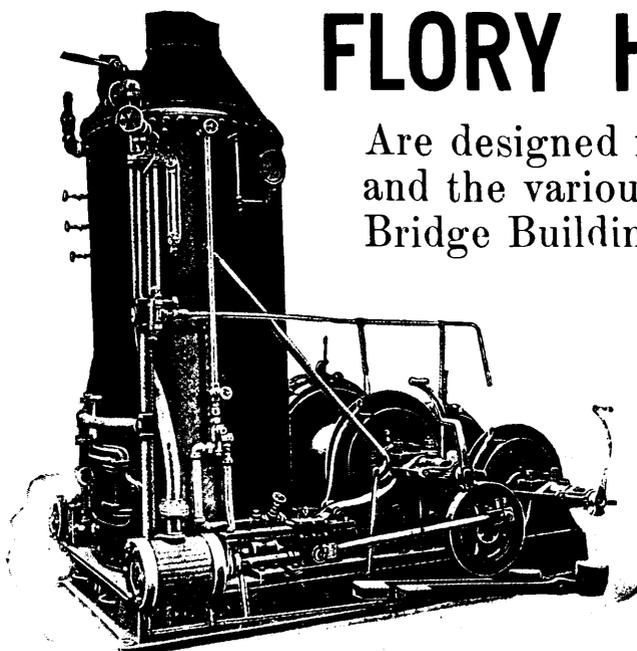
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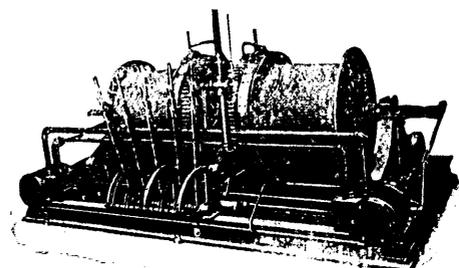
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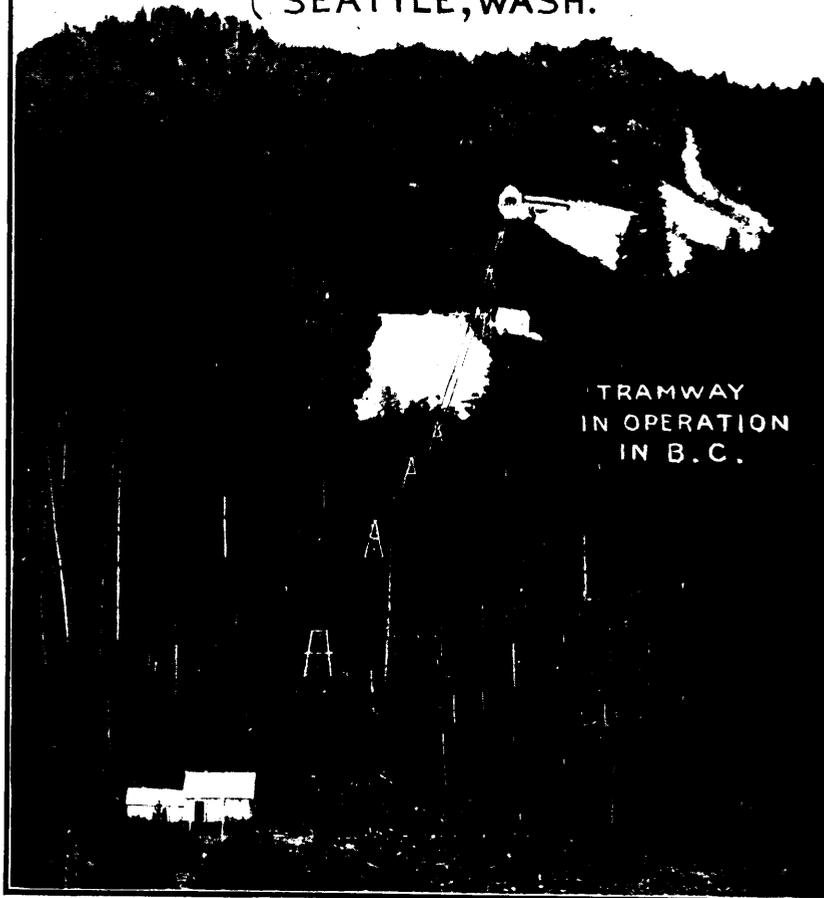
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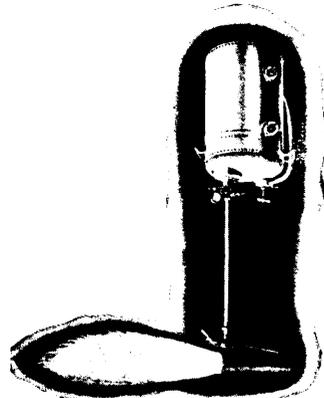
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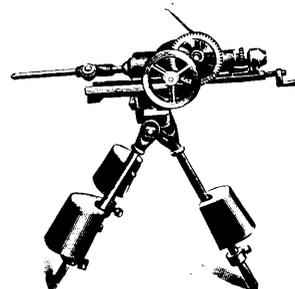
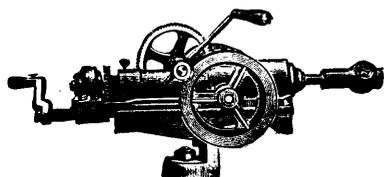
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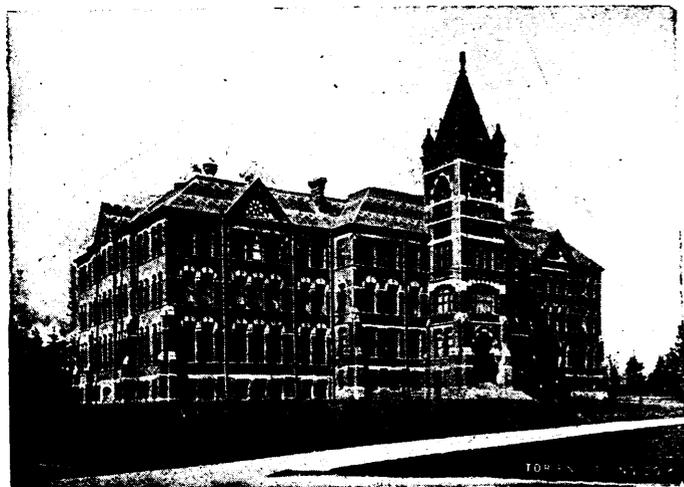
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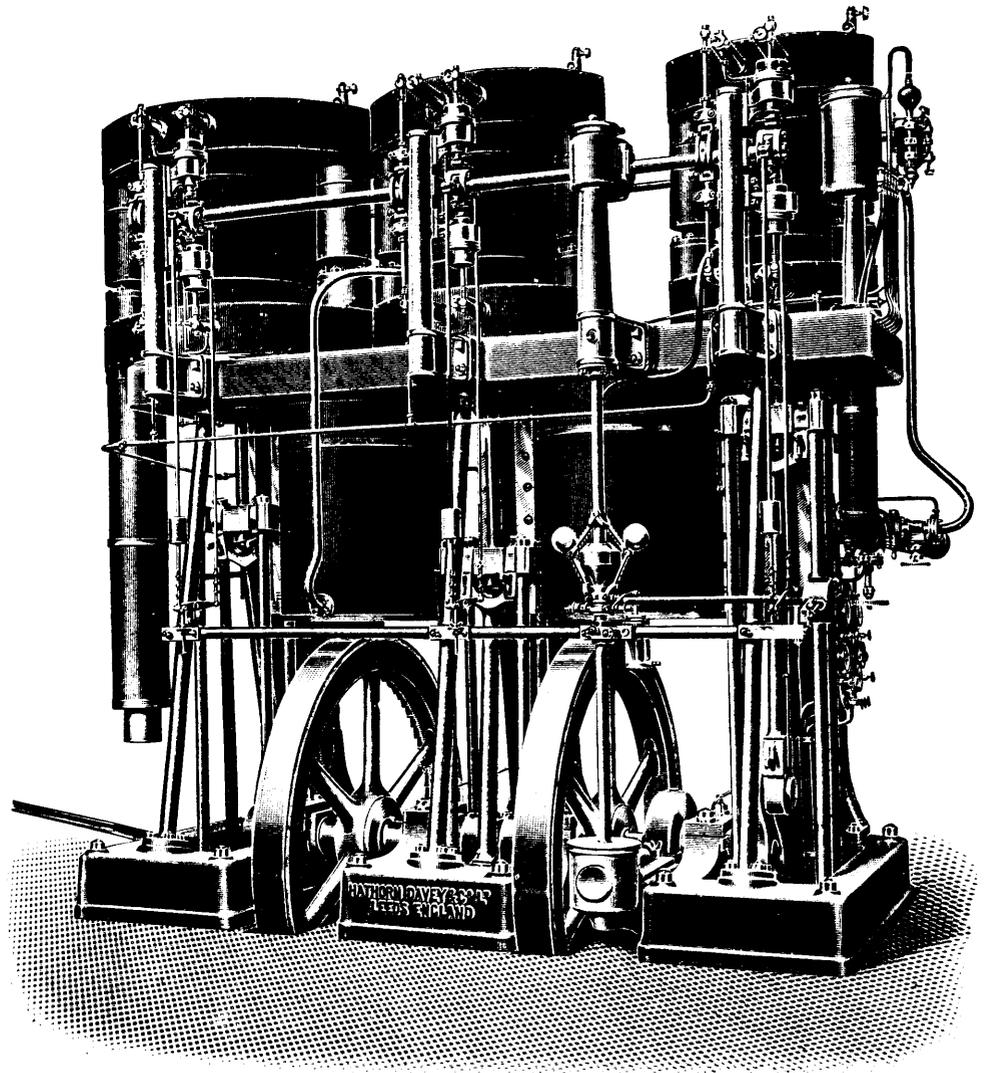
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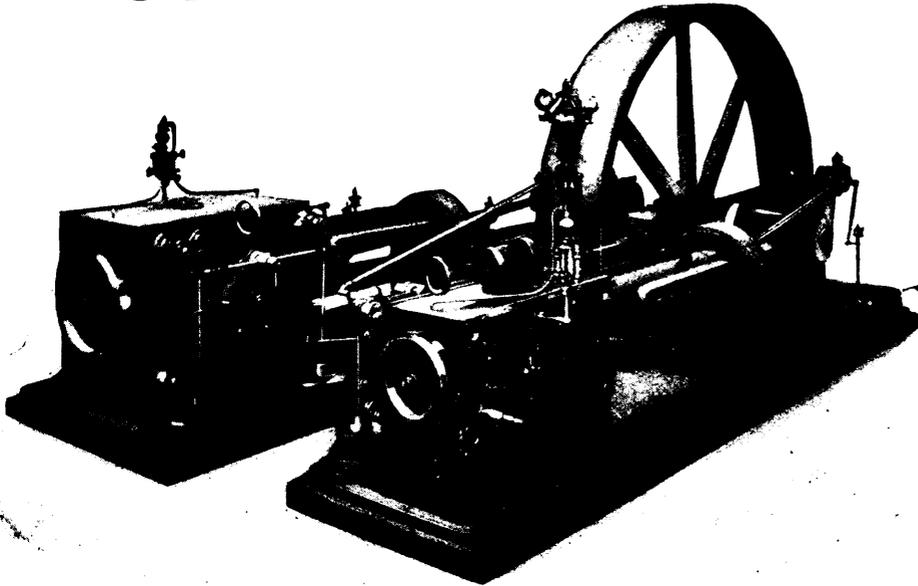
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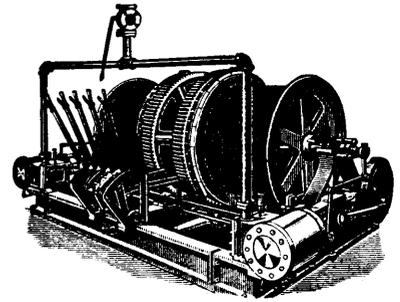
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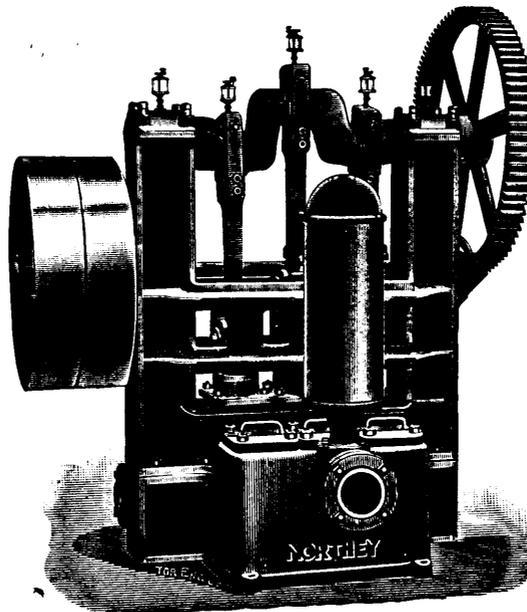
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## The Close of the Year in Cape Breton.

In the *Canadian Magazine* for December, under the heading "Canada for the Canadians," some information is vouchsafed to business men which will have created some consternation among many of those interested in the iron and steel industry at Sydney, Cape Breton. The writer, with a sublime indifference to truth, being gotten of a total ignorance of the subject he so airily discourses about, tells the *Magazine's* readers that the directors of the Dominion Iron and Steel Company are crying out for immediate protection against the U. S. Steel Corporation, which is said to be selling steel rails in Canada at \$28.00 and making \$10.00 per ton profit out of the transaction, while the unfortunate Canadian company (which, by the way, as every decently informed person knows, is not making rails) cannot live under the aggressive competition, even though it is assisted to the extent of \$10 or \$15 per ton by duties and bounties! It is marvellous that a reputable magazine should permit a contributor to get off such absolute drivel as this under the guise of information for business men. Nor is this all. This cockshure writer can see deep beneath the surface of things, and professes to know that the trouble is not at all with the competition from the U. S. Steel Corporation, but is something quite different. The *Canadian Magazine's* Munchausen is plainly "in the know," and now gives it out that some time ago (in 1899 we presume) a smart Bostonian of the name of Whitney, went down to Cape Breton and erected some structures of iron and brick on novel and executive lines, added some smokestacks and tall chimneys, painted the whole red, and sold out, before operation, to some bright Canadians, at a very handsome profit. The bright Canucks find that they have a white elephant (painted red!) on their hands, and in their blind rage are lashing out at things in general and the U. S. Steel Corporation in particular. We would in all seriousness counsel the editor of the *Canadian Magazine* to carefully revise in future the information served out by this very imaginative writer to business men. Such pernicious nonsense cannot be anything but mischievous in its effect. Every one knows, or should know, that the bulk of the capital subscribed for the Sydney works came from Canada. Moreover, in justice to the "smart Bostonian of the name of Whitney" we may state that recent Sydney papers were full of a visit paid to that town by the gentleman in question after an absence of two years, and that he appears to have been received by the community in general with every mark of welcome and esteem. In fact it is evident from the comments of the press and from descriptions of the receptions accorded to him, that Mr. Henry M. Whitney occupies a very secure

niche in the hearts of the people of Cape Breton. They know that if at the inception of the great enterprise which he set on foot, he, with others, was over sanguine as to results, and made miscalculations as to time and cost, he cannot be held blameworthy for the fatal policy of paralysis and drift of the past two years, which has brought a great and promising industry perilously near to the ragged edge of bankruptcy.

To review the Sydney iron and steel situation at the close of this year is not a very cheerful task. 1903 goes out under a cloud of depression and uncertainty, which must to some extent curtail the enjoyment of the Yuletide festivities. The staff has been very materially reduced, and the salary list and pay-roll have been subjected to a severe pruning. For a while in the early days of December it looked as if the reduction in the pay of ordinary laborers would not be submitted to without a struggle. The P.W.A. delivered an ultimatum, which was met by the management with a calm statement that any attempt at a strike would be the signal for a total suspension of operations for the winter. The business community, already affected by the laying off of a large body of men, was aghast at the prospect, and largely through the good offices of a committee of citizens, the P.W.A. was induced to recognise the seriousness of the step involved by a strike, and to withdraw from what was, under the circumstances, an untenable position.

To the average onlooker, untutored in the mysteries that enwrap the workings of great corporations, the wonder is not that the company is now weeding out its staff and making wholesale reductions in salaries and pay rolls, but that this policy was not put into operation a year, or eighteen months, or even two years ago. The works at Sydney during this period of time might have been likened to a large stable of high-priced hunters eating their heads off during a prolonged frost. However the hope that springs eternal has by no means left the breasts of those whose fortunes are bound up with the steel works. The present situation, unpromising as it may appear at first sight, is in reality more hopeful than it has been at any time since 1900. With the depletion of the exchequer, the policy of drift appears to have at length been abandoned for one of action and common sense. In the new president, Mr. J. H. Plummer, has appeared a man who seems to appreciate what is required to save the situation. After January 1st, the local management is to be placed in the hands of Mr. Graham Fraser, who has for so long been identified with the fortunes of the Nova Scotia Steel and Coal Co. His past record may be taken as an assurance that the days of sky-rocketting at Sydney are over, and that business will henceforth be conducted on lines of caution and economy.

The longtalked of, and much discussed, separation of the Steel and Coal companies has just been consummated by a special session of the Nova Scotia Legislature, and the Steel company is now freed from a lease which experience has proved could only be a heavy, and ultimately fatal, incubus. The directors are in a position to go right ahead with the erection of an efficient washing plant (the lack of which has been the chief cause of the trouble experienced in maintaining an adequate output from the blast furnaces) and with the completion of the rod and continuous mills. When these are in operation, the company can confidently expect from the government such protection as will ensure the home market for its product of finished, or semi-finished material. This stage once reached, the future of the industry is bound to brighten and improve. Everyone will rejoice if prosperity should be the ultimate destiny of this undertaking, even though the severe losses which thousands of *bona fide* investors throughout the Dominion sustained by the sudden collapse of the company's securities last spring, be never recouped. It seems inevitable that the Dominion Iron and Steel Co. must go down to history with an unenviable reputation as having been unaccountably mismanaged to the verge of ruin, and also as having been the vehicle of unscrupulous stock exchange manipulation.

If sympathy is felt for impoverished investors, some should be extended to the town of Sydney, whose citizens have made sacrifices, and incurred heavy responsibilities, only to find the Banks sitting on them like the nightmare that follows a lobster supper. The prosperity of the town is so intimately bound up with, and dependent, upon the fortunes of the great industry which it helped to establish at its doors, that collapse or temporary suspension of operations means heavy loss, or ruin, to many of its business men. However, the darkest cloud has its silver lining, and we are with those who hold that the worst is over, and we feel that we can wish the Dominion Iron and Steel Co. a bright and prosperous New Year with better hope of fulfilment than we could twelve months ago.

The history of the Dominion Coal Company in 1903 has been strangely checkered. The lease of it to the steel company in 1902, under terms of which 8 p.c. was guaranteed to the common stockholders, had given a market value to that stock which time has proved to have been fictitious. Following close upon the heels of the phenomenal collapse in the Spring, of the steel company's securities, which of course had a sympathetic effect on the stocks of the leased corporation, came the disastrous fire at one of its largest collieries, Dominion No. 1. Failure to get this fire under control, and the danger that threatened of its spreading to other collieries, caused quite a panic, which was not allayed by the sudden and unexpected resignation of the general manager, Mr. Cornelius Shields. The mine had finally to be abandoned to the process of flooding, and fortunately this was accomplished, and the fire extinguished, without any further disaster. Notwithstanding that this colliery has been practically a non-producer for many months, the output for the year is only fractionally below what it was last year.

The demand for coal has continued very good during the year and the season's operations, in spite of the heavy expenditure incurred at No. 1 Colliery, must make a very encouraging financial showing. At the present time the output is very large, having reached as high as 14,500 tons per day. No. 1 is making itself felt again, while the mammoth No. 2 has now assumed the lead, which it is likely to steadily increase from this time on. The old reliable Reserve, although surpassed at least by its younger and lustier rival, is still keeping up its record in a wonderful manner. The Hub mine has been again pumped out, and plans are being prepared for the opening of fresh shafts. It is probable that the splendid property lying between Sydney Harbor and

Lingan will be exploited ere long, and that new seams will be given a chance of measuring their qualities against the Phelan seam which has supplied the company with the bulk of its output for many years past.

With the recent granting by the Provincial Legislature of the decree nisi, whereby the coal company is freed from an ill fated union with its dissipated and spendthrift Steel consort, the officials of the former Company have migrated again to Glace Bay, as headquarters, and the auditing department will likewise be moved down to that point from Montreal. At the recent meeting in Montreal, Mr. F. L. Wanklyn was appointed Vice-President, as an understudy to Mr. James Ross, who expects to spend a good deal of his time abroad, and with Mr. G. H. Duggan, C.E. and an able and tried band of assistants to back him up in Cape Breton, the interests of the company should be well looked after. A new superintendent of mines has been appointed to succeed Mr. Ludwig, in the person of Mr. Austen King, who comes with a high reputation from Pennsylvania. We imply no disparagement of Mr. King's qualifications and abilities, if we venture to question the wisdom of introducing as superintendent of mines a man whose previous training may not have fitted him, and indeed may to some degree have unfitted him for this important post. Granted that he be as talented as they are made, a stranger from a foreign coalfield coming to this position is brought against an entirely new order of things, different class of labor, different methods of mining, different mine's regulations, a different character of mines, and of everything connected therewith, which must necessarily take him a very long time to thoroughly master and get accustomed to. We hesitate to believe that Cape Breton and Nova Scotia are so impoverished in respect to good, sound, pitmen that these importations from a far country are necessary.

While there is no diminution of activity in sight at present, and while indeed preparations are being pushed forward for a largely increased output, signs are not wanting that in 1904 the Dominion Coal Company will be put to it to market the larger quantity they expect to ship, at the level of profit which has prevailed during the past two years. The shipments from competing sources are steadily increasing, and with the re-imposition on the 15th January of the American duty (which it will be remembered was suspended for a year, as a result of the strike in the anthracite region) the United States, outside the regular shipments to Everett, will practically be closed to the importation, under normal conditions, of provincial coal. The Canadian demand is not elastic enough to respond to any marked increase in supply, but the Dominion Coal Company's sales department under the management of our genial friend Mr. A. Dick, is enterprising, and resourceful, and may be trusted to find, as it has already done in the past, fresh outlets abroad for any surplus coal.

At the close of a year that has been marked by much that has been painful, or even disastrous, for both concerns, we welcome the brighter prospects that now appear to lie before the Dominion Iron and Steel and the Dominion Coal Companies and we extend the REVIEW's best wishes for a prosperous New Year to both.

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CANADIAN MINING INSTITUTE.—At a largely attended meeting of the Toronto members of this progressive organisation arrangements for the annual meetings to be held on the 2nd, 3rd and 4th March next, in that city, were forwarded. Mr. W. G. Miller, Provincial Geologist, was appointed secretary of the local Committee of Arrangements. The meetings will be held in the fine new King Edward Hotel. On the Saturday following the meeting there will be an excursion to the power plants, electro-metallurgical and other works of interest at Niagara Falls. The secretary, Mr. B. T. A. Bell, has a fine programme of papers already arranged for these meetings.

### The Centre Star Report

The fifth annual report of the Centre Star Mining Company, submitted at the annual meeting held November 24th, presents the company's affairs in the most favourable light that the public has yet seen. For the first time in its existence the Company is reported free from all indebtedness, and in possession of an earned surplus for the year of \$88,157.12; the balance of profit and loss account carried forward being \$150,798.35. This showing is a most creditable one, and is altogether due to the energy and ability of its manager Mr. E. B. Kirby.

The tonnage produced and sold amounted to 88,387 tons, of an assay value of \$1,153.390, or \$13.05 per ton; the total freight, treatment and marketing charges amounted to \$7.05 per ton, leaving a local value of \$6 to the ton of ore. The total expense of production, including all costs, was \$3.30 per ton shipped, of which \$2.67 is given as the mining cost, and \$0.63 as office and administration costs. The real profit per ton, therefore, was \$2.70 on ore assaying \$13.05, or a profit margin of 20 p.c. on the assay value.

We advise shareholders to carefully compare the value and costs per ton for 1903, with the same figures for previous years, as in this way only will be appreciated the efforts and successes made by Mr. Kirby during the last two or three years, and for which he is entitled to the very highest credit. THE REVIEW has made this comparison, and, holding that the difficulties and disadvantages prevailing during the year ending Sept. 30th, 1902, exclude that year from any just comparison, has taken the year 1901 as the best year by which to show the magnitude of what has been accomplished.

The tonnage for 1901 closely approximates that for 1903, being 80,419 against 88,387. The assay value for 1901 was \$18.12 per ton, for 1903 was \$13.05, showing a shrinkage of \$5.07 per ton. The total charges (freight, treatment and marketing) for 1901 were \$9.48, for 1903, \$7.05; showing a reduction of \$2.43, which reduction is due to Mr. Kirby's efforts with the Canadian Smelting Works and the Canadian Pacific Railway. The local value of the ore in 1901 was \$8.63 and in 1903 was \$6.00, showing a decrease, in what the Company call "smelter's net value," of \$2.63. To offset the reduction in assay value of \$5.07, the company has effected a saving of \$2.43 in freight and treatment charges; and for the shrinkage of \$2.63 in net value, Mr. Kirby has effected reductions in the mining costs which, from his own tables, show figures of \$3.21 for the year ending 1901, and of \$2.67 for the year ending 1903, a saving of 54c. The amount of money expended on development work is much less than in previous years, being only 60 p.c. of the amount spent in 1901, and about 43 p.c. of what was expended in 1902.

The reasons for this decreased expenditure may be inferred from Mr. Kirby's report, which is significant as containing two statements of great import to the district of Rossland. There is no better authority on the camp than Mr. Kirby, and when he states that all the productive mines there have experienced a general change in the character of their ore deposits as depth is attained—having passed from high grade smelting ores to ores too low in grade to be treated directly by smelting, and that therefore they require a concentration of values before they can be marketed—the public may accept the statement as an absolute fact.

The second noteworthy and significant feature in the report is, the direct assertion by Mr. Kirby of the feasibility and profit of concentrating the pyrrhotite ores of the camp, and the statement that a subsidiary corporation is now building a mill of 200 tons daily capacity for such concentration, the mill being designed so that it can be promptly doubled in its capacity.

The two statements noted above are the main features of the

report; the decline of values is the experience of most mining districts throughout the world; the building of a large plant to concentrate the ore is the sequel to the announcement made in the report for 1902, and our comments at that time need not be repeated. It is perhaps to be regretted, from the standpoint of our readers, that Mr. Kirby has not yet seen fit to outline to his shareholders the process which he deems will be successful for the concentration of low grade ores, but there are doubtless many personal and company reasons why it is unadvisable at present to publish such details. We can only hope that after the Company is thoroughly satisfied Mr. Kirby will contribute to the Canadian Mining Institute the details of the method which he has perfected.

THE REVIEW sincerely hopes that an optimistic view may be taken of the Centre Star process for the concentration of low grade ores, since the practical success of any such method means an active life, not only to that particular district, but also, probably, to other districts in British Columbia, and means the restoration to the Province of some of the favor which it has lost during the last three or four years. We do not look for the immediate success of any installation, feeling that the problem presents many difficult details which require time for their successful treatment, but we do think that this beginning on the part of the Centre Star Company may mean the ultimate establishment of a permanent industry in the Rossland District. The LeRoi No 2 Company has, according to various announcements in the press during last 12 months, made a trial of the Elmore Process of oil concentration, which is uniformly reported to be successful.

While we are not "in the know" respecting Mr. Kirby's process, we have been informed that it differs essentially from the Elmore, and that it has been thoroughly tested on a considerable scale at the old works at Silica which were remodelled for that purpose. The Company and the shareholders are to be congratulated upon having retained the services of one who is so well able to undertake the solution of difficult problems as their general manager. THE REVIEW extends its congratulations to Mr. Kirby, and hopes that next year it may be able to do the same to the shareholders of the Centre Star Company.

### Hand Sorting vs. Milling.

The Arlington Mine at Erie, B.C. is an irregular vein in a slate formation. The vein has a very slight dip to the west, and sometimes lies conformably with the slates, and sometimes cutting across them. The slate formation is very much broken up and contorted, and there are layers of porphyry sometimes following the bedding of the slates and sometimes cutting across them at various angles and with different strikes. The ore consists of mixed sulphides of iron, lead and zinc; and the gold values vary greatly, sometimes values as high as 19 oz. of gold per ton in the mine car samples occur where the ore contains a larger proportion of zinc sulphides. The vein varies from a few inches to as much as 25 feet in thickness, but the sulphides are always in separate and distinct layers or bunches free from the surrounding vein matter, and the remaining vein matter contains practically no value. This fact of the ore being separate from the vein matter has an important effect on the question of hand sorting or milling, as also the fact that concentration only increases the value of the ore about (ten) 10 p.c., that is the clean ore shipped averaged \$49.35 per ton, while the concentrates averaged \$54.66 (assay value).

During the fifteen months from March 1901 to May, 1902 a concentrator and tramway were built and the mine was worked as a concentrating proposition, the whole width of the vein being broken in the stopes and put through the concentrator; a portion of the clean ore being sorted by hand and sent direct to the smelter.





MR. HIRAM DONKIN, C.E.,

Who is reported to have been re-engaged in a directing position with the Dominion Coal Company. Mr Donkin was for several years manager of the company, and since then has held an important position with the Nova Scotia Steel and Coal Company.



CAPTAIN R. G. EDWARDS LECKIE, M.E.,

Who, after serving with distinction in South Africa, was dangerously wounded by a leopard in Somaliland where he holds an important gold mining concession. Captain Leckie is now on his way to Canada and, we are glad to say, is making a speedy recovery.



MR. EUGENE COSTE, M.E., TORONTO.

Re-nominated as President of the Canadian Mining Institute for the year 1904-1905.



MR. GRAHAM FRASER, SYDNEY, C.B.

Who assumes on 1st January the direction of the affairs of the Dominion Iron and Steel Company.



MR. LESLIE HILL, C. & M.E.

Who has done so well with the Arlington Mine, at Erie, B.C.

of the deposits and surrounding area as could be made at the season of the year, snow having already begun to fall in the district.

The deposits were discovered during the building of the Temiscaming & Northern Ontario, the government railway, which is now under construction from North Bay junction, on the Canadian Pacific, to the head of Lake Temiscaming. The road-bed of this new railway runs almost over the top of the first of the deposits discovered. The ore bodies lie five miles south of Haileybury, one of the two sister villages on the Ontario side of the northern part of Lake Temiscaming. Haileybury, following the railway, lies about 106 miles north of North Bay station, which is, by the Grand Trunk Railway, 227 miles north of the City of Toronto.

As the deposits were discovered quite recently, and the surface is now covered with snow, very little prospecting has been done in the surrounding area. The discoveries were made by men employed on the railway, and not by regular prospectors; hence the work has not been done as systematically as it might have been.

When I visited the locality, recently, four veins had been located in the vicinity of a small body of water known as Long Lake, which is not shown on existing maps. It lies about one-half mile south of the southern boundary of lots 8 and 9 in the first Concession of the Township of Bucke. The reports of other finds were not verified.

Each of the four veins visited was found to carry cobalt. Nickel also appears to be present in all of them; but as the weathering of the cobalt compounds masks, at times, the nickel colors, this latter metal was not definitely recognized in two of the deposits, although it doubtless occurs wherever the cobalt is found. Three of the veins are rich in native silver. The veins occur in unsurveyed territory, and, as the locations are as yet unnamed, we shall speak of them as Nos. 1, 2, 3 and 4. The outcrop of No. 2 lies about one-half mile southwest of No. 1, and No. 3 the same distance southwest of No. 2. The outcrop of the fourth vein is about one-half mile southeastward of No. 3.

Very little work has been done on any of the veins, and as the surface is pretty well covered with moss and soil, it is impossible to state what is their horizontal extent.

All of the veins cut through one or both of the formations known in the district as Huronian slate and breccia-conglomerate. The latter rock is considered to be composed of volcanic ejectamenta—grains and fragments of rock of various kinds which have become consolidated. The slate conglomerate of older Canadian writers, Logan and Murray, is a variety. The slate along the railway cuts, in the vicinity of Long Lake, contains occasionally fragments of pink granite, which are, at times, a couple of inches or more in diameter. On the faces of some of the vertical cliffs, the well-banded slate at the bottom is found to pass gradually into massive breccia-conglomerate at the top, the fragments in the latter being of varied composition, and ranging in size from small grain-like fragments to pieces of rock a foot in diameter.

The presence of dikes or sheets of some of the darker-colored eruptives was suspected, but they were not definitely recognized. In the field they would resemble rather closely some of the more massive varieties of the slate and finer-grained breccia.

The slate and conglomerate have a slight dip, and the veins referred to cut them almost vertically. The strike of veins Nos. 1 and 3 is approximately northeast and southwest; that of 4 is east and west; that of 2, northwest and southeast, Diabase and gabbro invade these fragmental rocks in some parts of the district, and appear to underlie most of the area. About three miles to the northward of Long Lake, Silurian limestone overlies the Huronian, but the limestone is undoubtedly of younger age than the veins.

Vein No. 1 lies east of the railway track, at the edge of a swamp, about one-quarter mile north of the end of Long Lake. It has been

uncovered at three points, which are within a few yards of one another. As the surface of the rock is low here, and little of it is exposed, it is difficult to tell much about the form of the deposit. Medium grained, dark-colored conglomerate is found on one wall. At the widest opening, the deposit has a width of over 6 ft., but the vein matter is more or less mixed with rock. The ore consists of niccolite, or the arsenide of nickel, and smaltite, the diarsenide of cobalt, together with much native silver. Niccolite contains, theoretically, 43.9 per cent of Nickel and 56.1 of arsenic. Smaltite carries 28.2 per cent of cobalt and 71.8 of arsenic. It may be added that the ore of nickel now worked in Ontario, the iron sulphide or pyrrhotite of Sudbury, in which nickel occurs not as an essential but as an accidental constituent, carries, on the average, less than 5 per cent of the metal. On weathered surfaces the vein matter is coated with the beautiful pink decomposition product, cobalt bloom. The green nickel stain is also seen on some surfaces, but is usually masked by that of the cobalt. This nickel compound is probably the arsenate, annabergite, but nickel silicate may also be present. The secondary mineral, arsenolite, was seen on some specimens. The native silver occurs as films, or leaves and fine threads, or moss-like forms, through the nickel and cobalt minerals, especially in the niccolite, as well as in cracks in the rock and in the calcite veinstone. In weathered portions of the ore the silver shows distinctly. Some lumps of weathered ore, weighing from 10 to 50 lb., carry a high percentage of silver. One sheet composed chiefly of silver, attached to a rock surface, had a thickness of nearly 0.375 in. and a diameter of about 1 ft. Professor Wm. Nicol has recognized the antimonic silver, dyscrasite, as was suspected in the field, in association with the native silver. He has also proved the presence of chloanthite,  $NiAs_2$ . It is associated with the niccolite, and also occurs, pretty free from cobalt, in some of the nodular masses in the calcite. The silver appears to have crystallized earlier than the niccolite, which has been deposited around it. The cobalt arsenide has formed still later than the niccolite.

Little laboratory work has yet been done on the specimens collected. Analyses of the ore, unless of samples representing a large quantity, are of little economic value, although they are of scientific interest. A sample showing native silver was found by Mr. A. G. Burrows to possess the following percentage composition: silver 26.24, value \$5,237.60 per ton cobalt 8.34, nickel 5.26, arsenic 13.28. Another sample composed essentially of niccolite contained 5.02 oz. of silver to the ton, and nickel 26.64, cobalt 6.16, arsenic 45.64 per cent.

A small hand specimen of the rock, which occurs mixed with the ore and gives it the character of a brecciated vein, shows a sharp contact between the fine grained slate, ash rock, and a medium grained rock of similar composition.

As so little work has been done on this ore body, it is difficult to determine whether the three openings belong to one vein, or whether the ore occurs in a more irregular deposit, although the chief opening appears to be on a vein-like body. The ore is undoubtedly very rich, containing values in nickel, cobalt, silver and arsenic, and a comparatively small vein could be worked at a handsome profit.

On location No. 2 the ore-body is distinctly vein-like in form. The ore here is a mixture of smaltite, and probably some closely related arsenides of cobalt, such as safflorite, and niccolite. The only complete analysis which has yet been made of the ore from this locality was that of a sample from this vein. It was found to have the following percentage composition: Cobalt, 16.8; nickel, 7; iron, 6.3; arsenic, 69; rock matter, 0.9; total, 100. An average sample taken by the writer across the vein at one point gave the following percentages: Cobalt, 16.76; nickel, 6.24; arsenic, 66.60; sulphur, 3.37. Antimony and silver were found to be absent. This ore-body, unlike the other three

examined, carries no silver in the parts so far uncovered. Three openings have been made on the vein over a length of 300 ft. The massive ore has a width of 14 in., but vugs in the wall-rock, 2 ft. or more from the vein, are filled with cobalt bloom. The rock of both walls is slate. The walls are well defined, and the vein dips almost vertically, the strike being toward the southeast. The vein lies on the hillside, a few hundred yards east of Long lake and the railway, and, unlike ore-body No. 1, is at a height of about 70 ft. above the water level. Although the width of this vein is not great, the character of the ore is such as to make it promising, at the present prices of the metals contained in it.

The ore has a massive appearance, and a rather dark-gray color, where not coated with cobalt bloom. When examined carefully, however, in hand specimens, especially if a polished surface be examined with a magnifying glass, it is seen to be a mixture of a gray mineral, which is chiefly smaltite, and the reddish mineral, niccolite. Smaltite and the corresponding arsenide of nickel, chloanthite, are claimed by most authors to pass into one another by the substitution of cobalt for nickel, and *vice versa*. Niccolite, in the analyses quoted by Dana and others, carries only a small percentage of cobalt and iron, while smaltite and the other diarsenides of cobalt frequently contain much iron and nickel. In the ore under consideration, the cobalt and nickel appear to be, for the most part, in distinct compounds. In the analysis quoted, if we consider the 7 per cent. of nickel to exist as niccolite, and the percentages of iron and cobalt, 6.3 and 16.8, respectively, to exist as smaltite, the theoretical percentage of arsenic in the ore should be 68.47, instead of 69, as found by analysis. The percentage of niccolite by weight would be 15.94, or about one-seventh part of the whole by volume, since niccolite has a somewhat higher specific gravity than smaltite. The specimens, when examined with the magnifying glass, agree with this. The niccolite has crystallized earlier than the smaltite, which forms the ground-mass through which the niccolite grains are set.

Minute, brilliant, silver-white or tin-white crystals occur sparingly, embedded in the wall-rock and in the ore. The crystals occur in cubes, and in combinations of this form with the pyritohedron, or rhombic dodecahedron, and octahedron. Prof. Nicol who has measured some of these on the goniometer has found them to be smaltite. The white or grey colored arsenides show a tendency to form globular or spheroidal masses, with a radiated structure. Some of these masses in the calcite have a diameter of over half an inch. The ore is at times somewhat porous, spaces being left between the globules, which are tarnished almost black on their surfaces. Where not coated with cobalt bloom, the weathered surface of the ore has a dark color, not unlike that of the wall-rock. On a fresh surface, the more massive ore resembles mispickel, but is somewhat darker in color. Small grains of quartz are found sparingly in the ore. The proportion of nickel to cobalt in this case is less than that in No. 1. A more detailed study of the form and chemical composition of the minerals is being made.

A deposit carrying galena and copper pyrites lies a short distance southeast of vein No. 2. Very little of its surface is uncovered and no analyses have been made of the samples collected. Grains and small masses of copper pyrites were seen in the slate, in the railway cuts, in the vicinity of deposit No. 1.

Ore-body No. 3, so far as could be seen, is similar in character to No. 1. It lies at the southern edge of Long lake. The ore consists of native silver, smaltite and cobalt bloom, and, in all probability, niccolite also.

Vein No. 4, although having the smallest width of the four, is, in many respects, the most interesting of the group. Here a perpendi-

cular bare cliff of rock, 60 or 70 ft. high, faces west. The vein, whose width averages not more than 8 in., cuts this face at right angles, and has an almost vertical dip. The vein is weathered away, leaving a crack in the face of the cliff 2 ft., in some places 4 or 5 ft., in depth. When I saw it first, it had not been disturbed. Thin leaves of silver up to 2 in. in diameter were lying on the ledges, and the decomposed vein matter was cemented together by the metal, like fungus in rotten wood. It was a vein such as one reads of in textbooks, but which is rarely seen, being so clearly defined and so rich in contents. It was found impossible to get a fresh sample of the ore with the prospecting-pick, the vein being so much decomposed. The weathered specimens, however, in addition to the native silver, contained cobalt bloom; and the unaltered ore will be found, in all probability, to consist of smaltite and niccolite, in addition to the silver. It may also be added that, in one part of the vein, a distinct banded structure was noticed. Across a distance of 8 in. there were 12 or 14 layers of ore lying parallel to the walls. At the bottom of the cliff the vein cuts thin, banded, dark-grey or greenish, at times almost black, slate, which has a slight dip. This slate passes gradually, so far as could be determined from the steep character of the cliff, into coarse breccia-conglomerate in the upper part. The fragments in the conglomerate consist of quartz, slate, granite and other rocks.

On some of the weathered surfaces of the native silver specimens there are small, black, spheroidal masses, with little luster. These appear to be the hydrated oxide of cobalt, heterogenite. Some of the deposits on the silver resemble asbolite. The carbonates of cobalt and nickel are also probably present. Antimony and sulphur have been detected in the ore of veins 1 and 2. Detailed analyses are required to determine the character of some of the silver-bearing minerals, which are present in small amounts. Bismuth, copper and manganese, in an association of ores such as we have in these deposits, are to be looked for.

These recently-discovered ore bodies lie about 90 miles northeast of the town of Sudbury, in the vicinity of which are situated the well-known nickel mines. The ore of the latter is of a different character from that of the Haileybury deposits, being essentially pyrrhotite and copper pyrites. The rock associated with the Sudbury deposits, which are not veins, but deposits of irregular shape, is norite, a variety of gabbro; the ore itself is claimed by most writers to be of igneous origin. It is thus seen that there is little in common between the ore-bodies of the two localities, with the exception that nickel is a characteristic metal of each. The Sudbury pyrrhotites carry a small percentage of cobalt in addition to nickel. The minerals niccolite, danaite, and other arsenical compounds, have been found in some of the Sudbury deposits, but only in small quantities.

It is of interest to note that a deposit of sulpharsenide of iron, mispickel, was discovered a few years ago near Net Lake, which lies about 25 miles to the southwestward of the Haileybury deposits. This mispickel, however, does not carry appreciable amounts of nickel, cobalt or silver.

On the Quebec side of Lake Temiscaming, about nine miles to the northeastward of the Haileybury deposits, an ore body, known as the Wright silver mine, was discovered many years ago by some of the early explorers of that region. During recent years, this deposit has been worked for its lead and silver contents. The deposit is unique in character, the wall-rock being Huronian breccia-conglomerate, the fragments in which are, at times, cemented together by argentiferous galena.

Silver-bearing galena with copper pyrites is also found on an island in Cross lake which lies southeast of Lake Temagami, and at Lady Evelyn Lake.

The only area in Ontario, or central Canada, which has hitherto been found to contain deposits of rich silver ore is that which lies near the head of Lake Superior, nearly 500 miles from Haileybury. While native silver has been found in considerable quantity in these deposits, the sulphide, argentite, is the more characteristic ore. The Silver Islet mine, near Port Arthur, is well known to those interested in the metal industry. Deposits of somewhat similar character, which occur on the mainland, have also been frequently described. The report on "Mining and Geology on Lake Superior," by Mr. E. D. Ingall, of the Canadian Geological Survey, gives an account of this silver-bearing area.

The silver veins in the vicinity of Port Arthur, like those of Haileybury, cut through slate, but the Port Arthur slates are held to be of later age—Animikie—than those of Haileybury, which are what is called, in a general way, Huronian. Much work remains to be done on our metamorphic and igneous rocks before the various formations can be correctly correlated. Both the Port Arthur and Haileybury slates have been disturbed by eruptions of diabase and related rocks.

The rich silver-bearing veins in the Port Arthur district, like those of Haileybury, occur for the most part as vertical fissures which cut fragmental rocks whose beds lie in a nearly horizontal position. Although the fragmental material of which the silver-bearing rocks are composed is not similar in the two districts, the writer is inclined to believe that the ash rocks and agglomerates of Haileybury are of almost, if not exactly the same age, as the argillites Animikie, of the head of Lake Superior.

In this paper the term slate has been used in referring to the fine grained and delicately laminated rocks through which the Haileybury veins cut. This term properly refers to argillites and should not be used except as a convenient field term for all of the finely laminated rocks in the area. Thin sections when examined under the microscope show that the specimens so far investigated represent ash rocks. Coarser varieties, in which the fragments possess a size similar to that of the grains of minerals in a medium grained igneous rock, are found to be made up of pieces of orthoclase, plagioclase, trachytic material, chlorite and calcite which is an infiltration product. The layers of some of the slate-like rocks which lie at the bottom of the cliffs have not been examined in the laboratory.

A correlation of these Haileybury rocks with the slates and tuffs of the area which was marked as being doubtfully Cambrian on Dr. Robert Bell's map of the Sudbury district would be interesting.

Dr. A. E. Barlow has given a very interesting account, (*Geol. Surv. Can., Vol. X, p. 194 I*) of the contact between a granite and the overlying fragmental rocks in the vicinity of Baie des Pères, on the opposite side of Lake Temiscaming from Haileybury. He has shown that this is, so far as has been observed, a unique occurrence—some of the Huronian fragmental material overlying the granite having been derived from the weathering of this rock *in situ*. The present writer recorded the occurrence, some years ago, of a small outlier of Grenville limestone in the vicinity of Lake Kippewa, east of Lake Temiscaming. This limestone and the associated garnetiferous schist have been much disturbed by an intrusion of granite apparently similar to that of Lake Temiscaming. It would, therefore, appear that the Baie des Pères fragmental rocks which rest on the eroded surface of the granite are very much younger than the Grenville veins of the indefinitely so-called Laurentian. The question then arises—are we at present certain that the Baie des Pères fragmental rocks are older than the Animikie?

It is known that rocks similar in character to those of Haileybury lie to the northward. In the writer's report on "Lake Temiscaming to the Height of Land" published in Vol. XI of the Report of the

Bureau Mines, 1902, the following statements are made concerning the slate and breccia-conglomerate or agglomerate in the area examined. P. 217:—"Slate is also seen at the outlet of the lake, passing into conglomerate a short distance down the river. The latter rock appears to overlie the former." P. 219, "On the east shore near this point, the rock has a bedded appearance, the layers being ten or twelve inches thick, slate forming the lower layers with an impure quartzite above. Along this lake these rocks dip at a low angle, 15°, to the southwest. The quartzite, or graywacke carrying quartz grains, lies above the slate, and the conglomerate appears to overlie the quartzite. If this is their order they have either been inverted or they possess a different relationship from that given for similar rocks by the Geological Survey in the report on the Lake Temiscaming map sheet. The question as to their relationship is of economic interest on account of the occurrence of iron ores." P. 220, "The slate along the shore here has a dip of about 7° to the eastward or towards the island just mentioned. A hill up the shore to the northward was found to be composed of conglomerate containing fragments of slate, quartz, gray granite, and a porphyritic gray granite, together with a few red Jasper pebbles associated with hematite. The conglomerate appears to overlie the slate and the whole dips towards the islands, which also contain conglomerate." The word "appears" was used in these sentences on account of it having been held by other writers in the field to the south that the conglomerates or agglomerates were the basal rocks. The present writer having made a hasty examination of the area did not wish to state positively that the rocks, as he saw them, occupied their original relative positions, although they appeared little disturbed. Some of the agglomerate is very loosely cemented together.

Although cobalt and nickel minerals have not been found in quantity near Port Arthur, it is interesting to know that the ore of the Silver Islet and some of the other mines was, at times, coated with cobalt bloom. Niccolite and other minerals carrying cobalt and nickel occur in small amounts in some of these deposits. The only deposits in which quicksilver has been found in Ontario is that of Silver Islet, where chloride of silver is also said to occur as a decomposition product.

Small quantities of cobalt, nickel and silver-bearing minerals occur on Michipicoton Island, Lake Superior. Arsenical compounds of the first two metals have been found at several other localities in Ontario and at Calumet Island, Quebec. It will be noticed that the association of minerals in these Haileybury veins is not unlike that found in some well-known deposits of Germany and other countries. Since these German ore bodies have been worked for many years methods for extracting the metals, cobalt and nickel, from ores of this kind are well proved. Hence little experimenting will have to be done on the Haileybury minerals.

Although little prospecting has been done in the vicinity of the Haileybury deposits, it would appear, from the discoveries already made, that ore-bodies occur there which can be worked profitably for the metals which have been mentioned. It is scarcely probable that nickel will be found in sufficient quantity in these deposits to interfere materially with the lower grade, but large, deposits of the Sudbury area.

Slate and conglomerate, similar in character to those of Long Lake, cover a very large, as yet little prospected, area in northern Ontario. These rocks, along the government railway, a considerable distance south of the deposits described in this paper, contain indications of the presence of cobalt ore.

It is stated in "The Mineral Industry" that "cobalt, which is used in the arts, chiefly in the form of oxide, is obtained from New Caledonia, Australia and Germany, and smelted in France, Germany

and Great Britain, the Messrs. Vivian, of Swansea, being the chief buyers in the last-named country." Cobalt oxide is produced at one plant in the United States.

The ore of New Caledonia, which is the world's largest producer, shipping about 3,000 tons yearly, is cobaltiferous wad, containing 25 to 30 per cent manganese and 2 to 8 per cent cobalt oxide (CoO). The ore of New South Wales is similar in character. In both countries the cobalt ore is a decomposition product, and occurs in irregular deposits, similar to those of bog iron ore.

"At the end of 1901 and the beginning of 1902 the price of cobalt ore, containing 4 per cent. cobalt, in New Caledonia, was forced up higher than circumstances warranted. For a long time the price in Europe did not justify more than 90 fr. per ton being paid for this quality of ore at the mines, but the price steadily rose to 330 fr. (about \$66) until recently, since which it has receded." The black oxide of cobalt sells at from \$2.26 to \$2.30 per lb., or the metallic cobalt in the compound brings about \$3 per lb. It would thus seem that the refiners should make a much larger profit than the miners. The market will not, however, stand a greatly increased production without the prices materially decreasing. It is claimed that there has been a combination among refiners to keep up the prices of the artificial cobalt products.

A paper recently published, "Cobalt Mining in New Caledonia," by Mr. Colvocoresses' Eng. and Min. Journ., Nov. 28th, 1903, gives a later account of the industry in that country. It is shown that in 1902 the output was 7512 tons, or nearly double that of any preceding year, the statistics being given from 1889. The prices have kept up better than it was expected they would two years ago, being in September, 1903, 350 fr. (about \$70) for 5 per cent. ore with a rise of 12 fr. per ton for each 0.1 per cent. above.

I would be pleased to receive inquiries from buyers of cobalt ore, and other minerals which are associated with it in the vicinity of Hailybury, with the object of putting them into communication with producers. Shipments could be made during the coming winter.

## EN PASSANT.

Mr. Eugene Coste, E.M., probably the foremost living authority on the subject of Natural Gas and Petroleum, has been unanimously nominated to a second term as President of the Canadian Mining Institute. Prior to the discovery and development of the Welland Gas Field under Mr. Coste's able supervision he held the position, for a number of years, as Chief of the Division of Mines and Mineral Statistics in our Geological Survey.

Mr. Lucien S. Robe, C., & M.E., who has charge of the important hydraulic gold mining operations on Miller Creek, Y.T., owned by the N.A. T. & T. Company, has consented to present a paper at the ensuing annual meeting of the Canadian Mining Institute on the subject of "Hydraulic Mining in the Yukon: Its Present and Future". Mr. Robe is one of the ablest engineers in the Yukon, and it is expected he will have something of interest to say concerning the regulations governing hydraulicking in our great northwestern gold fields.

It is understood that the Yukon Hydraulic Commission has secured the services of Mr. John E. Hardman, Mining Engineer, Montreal, and Mr. John B. Hobson, Mining Engineer, Bullion B.C., as consulting mining engineers to the Commission. Owing to the voluminous character of the evidence to be considered and the enormous quantity of Exhibits—over 300, we believe—it is not expected that the report of the Commissioners will be made public for some time, although the Commissioners, Mr. Justice Britton and Mr. B. T. A. Bell, are understood to be steadily working on the enquiry.

Mr. A. N. C. Treadgold, of the Treadgold Water Concession, who has been in Ottawa for some time, since the close of the summer mining season in the Yukon, sailed for the Old Country the last week of this year.

Mr. William Blakemore, Mining Engineer, has removed from Montreal to Nelson, B.C., where he will practice in future. He will, we are sure, have the sympathy of a very large circle of mining friends in the severe loss he has sustained by the death of his eldest daughter, Susan Mary, a very loveable girl.

Mr. E. B. Kirby, F.M., the indefatigable general manager of the Centre Star and War Eagle mines, is the unanimous choice of the Nominating Committee for the only vacancy in the vice-presidency of the Council of the Canadian Mining Institute occurring this year.

Mr. S. H. Boright, Sutton, Que., a student in Mining Engineering at McGill University, has been awarded by The Canadian Mining Institute a cash prize of twenty-five dollars for his paper "On the Geology of the Northern Portion of the Boisdale Hills Anticline." A similar amount has been awarded by the Institute to Norman W. Parlee, of Rossland, B.C., for his paper on "Rock Drilling and Blasting," contributed to the Mining Section. There were nine papers presented by students. The award of the President's gold medal in the same competition is not yet announced.

Dr. Eugene Haanel, Dominion Superintendent of Mines, Ottawa, will leave for Europe early in the New Year, having been appointed by the Government, chief of a commission to enquire into the question of the "Electric Smelting of Iron Ores." Dr. Haanel will be accompanied by an electrical engineer, a draughtsman, photographer, and secretary. The report of this commission will be invaluable.

Mr. A. J. Beaudette, Territorial Mining Engineer, Dawson, Y.T., will spend the winter in California continuing his investigations into the methods of hydraulicking and water supply in that state.

L. Wrigglesworth & Co., who have the contract for the construction of 250 coke ovens for the Crow's Nest Pass Coal Company, at Michel, state that owing to the delay in the delivery of the brick they were unable to complete their contract within the specified time. They have already completed 116 ovens and have entered into a bond to complete the remainder by July 1st, 1904. The contract price for the 250 ovens will exceed \$250,000. In a contract of this kind 300,000 silica brick and 155,000 firebrick are used. The latter are very expensive, and cost delivered at Michel from 8 to 14 cents apiece. The fire brick are imported from Pittsburg. Experience has proven in the coal fields of Pennsylvania, where coke is made at Connellsville and elsewhere, that the silica brick for crowns is the best. These are also imported from Pittsburg. The duty and the cost of transportation are large items, and cut quite a figure in the cost of the construction of the ovens.

Mr. John B. Hobson, managing engineer for the Consolidated Cariboo Hydraulic Mining Company, Bullion, B.C., is now in Toronto conferring with the directors of his company. Mr. Hobson's operations have for the past four years suffered from exceptionally dry seasons but he reports the outlook for 1904 as more hopeful.

Mr. J. Walter Wells, formerly in charge of the Ontario Government Assay Office at Belleville, has been appointed Chief Assayer for the Dominion Government at Vancouver, handling the gold dust and bullion from the Yukon and western mines.

It is understood that the resignation of Mr. Albert I. Goodell as superintendent of the Montreal & Boston Copper Co's. smelter at Boundary Falls, B.C., tendered to the directors several months ago, has now taken effect. The name of Mr. Goodell's successor has not yet been announced.

Mr. W. B. Hudson, of Nelson, B.C., late foreman at the Enterprise mine, left recently for San Francisco, and will spend the winter in the Golden State.

Mr. A. H. Reeder, who succeeded J. H. Tonkin as general manager of the Crow's Nest Pass Co. has in turn thrown up the position and departed eastward with his family. The name of Mr. Reeder's successor is unknown as yet, and no reason is ascribed for his unexpected resignation.

Mr. G. W. Cornish, an Australian mining man who was recently in Ottawa, on his way to British Columbia, has reached the coast and will make his headquarters at Greenwood, B.C., from which point he will thoroughly

explore the surrounding district. Mr. Cornish came to Canada from England for the purpose of looking up some mining propositions in the western province which he has been commissioned to secure by Australian capitalists. Mr. Cornish was the mining representative of the Queensland government at the Glasgow exhibition in 1901, and also at the Harls Court exhibition in London.

Mr. Jos. Mackay, for some time past sub-recorder at Harper's Creek, Horsefly, Cariboo, has returned to the Coast, the sub-recording office he has had charge of having been closed. Mr Mackay was sent up to the district in January 1902, at the time of the excitement in connection with the reported finds of rich placer ground on Eureka Creek at the headquarters of the Horsefly.

Mr. W. Yolen Williams, superintendent of the Granby mines, has left Phoenix on a two-months' vacation to Minnesota and Michigan.

Mr. J. D. Graham, formerly Gold Commissioner for the Atlin district, has returned from a visit to France, and is now in Victoria.

Mr. E. F. Reynolds, of Wilkesbarre, Pa., has been engaged by the International Coal & Coke Co. as general superintendent.

Mr. P. Kirkgaarde, superintendent of the Canadian Goldfields Limited, at Deloro, Ont., has been appointed manager of a large company recently organized in Toronto to exploit the extensive corundum deposits of Eastern Ontario. The company has already secured about 600 acres in the township of Raglan in Renfrew county, and it is said will erect at once one of the largest corundum plants in the world. Among those connected with the project are W. B. Rankin, the president of the Canadian Niagara Power company; H. P. Coburn, Sawyer-Massey Co., Hamilton; J. H. Tilden, of the Gurney-Tilden Co., Hamilton; J. H. Jewell and H. H. Dewart, Toronto, and a number of Buffalo and New York men.

Mr. C. Morris, late mine superintendent at Blairmore, Alta., has left on a visit to his old home in Glenmorganshire, Wales. Mr. Morris is the pioneer mine superintendent of the district, he having had charge of the mines at Frank up to the time of the great rock slide and after that took charge of the mines at Blairmore.

Mr. A. L. Dean, formerly superintendent of the Canadian Smelting Works, at Trail, has left Victoria for Tasmania, having been appointed metallurgist at the Mt. Lyell Mining & Railway Co.'s smelter on the west coast of Tasmania.

Mr. H. T. Pemberton, of Boundary Falls, B.C., was in Montreal recently on a visit to the head office of the Montreal & Boston Co., of which company he is the business manager at the mines.

Mr. Charles Dempster a leading mining promoter of Rossland, B.C. who was recently on a visit to the Dominion capital on business connected with several mining propositions in which he is interested, has returned to his western home. Mr. Dempster now informs his Rossland friends that while in the east he noted an appreciably better feeling towards mining investments in the western province.

Mr. Ronald Harris, a mining engineer well known in the Kootenays, but he now makes his headquarters in London, England, has returned home after a short visit to British Columbia. It is about three years since Mr Harris left Southern British Columbia to go to West Africa for an English syndicate composed of the Tarbutts and Harrison and Barchard, the erstwhile owners of the B.C. mine in the Boundary. He has spent most of his time since then between the Gold Coast and London.

It is stated that Mr. Andrew Laidlaw, well known in Rossland and Boundary as the original promoter of the Boundary Falls smelter proposition, has closed a deal with Montreal capitalists for the sale of valuable coal lands on Fording river in East Kootenay.

Mr. J. H. Plummer and Mr. William McMaster, Directors of the Dominion Iron and Steel Co. were in Ottawa, on 28th, conferring with the Minister of Finance, in matters concerning the operations of the company.

## CENTRE STAR.

### Manager Kirby's Fifth Annual Report Much Better Reading than its Predecessors.

We print below an extract from the Fifth Annual Report of the Directors' of the Centre Star Mining Company, to which editorial reference is made in this issue:—

**EXPLANATORY NOTE:** The values given are based upon the price of 12 cents for copper instead of 16.25 cents, as in previous reports.

It is the usual practice of mines in pricing and recording ore to use the "FULL ASSAY VALUE" instead of the "SMELTER'S GROSS ASSAY VALUE" which is less. While this plan is often preferable it has so far been more convenient at the Centre Star Mine to use the latter value, which as shown by the table opposite, has on shipping grades ranged from \$2.47 to \$3.93 less than the Full Assay Value.

Developments up to date show that the Centre Star Mine has experienced the same general change in the character of its ore deposits which has occurred in all other productive mines of the Rossland District, and which is the general rule throughout the mining districts of the world. This is the transition from the occurrence of high grade bonanza ore bodies, capable of profit under the expensive process of smelting, to masses of lower grade, requiring a cheaper treatment by milling.

As the bodies of smelting ore in the vein become less frequent and their average size diminishes, the proportion of this ore to the increasing quantity of development or dead work required to expose it rapidly lessens to a point where its profit is consumed by the cost of the dead work. The relief to be derived from milling will therefore be not only in the direct saving of cost expected, but also in the increased proportion of pay ore to development work, while the stoping of low grade blocks will assist the exploration work by disclosing the unknown bodies of smelting ore contained within their limits.

The ore sales during the year have been 88,387 tons, averaging \$10.58 smelter's gross assay value. The average assay contents were: Gold, 0.50 oz.; Silver, 0.40 oz.; Copper, 0.99%. The net profit in excess of all expenditure was \$228,358.90, which has covered the indebtedness of the Company and left a surplus of \$88,157.12 in the treasury. The reserves of smelting ore at the present moment are not large, and are of such shape that their dimensions cannot be accurately estimated.

The development work of the year has continued to add to the great masses of ore too low in grade for smelting, but rich enough to afford a profit to successful milling. Now that the mill of The Rossland Power Company assures an outlet for these ores within a few months, their contents will soon be available. It is impossible to present any reliable estimate of their quantity or precise value, because their limits have not been defined, and until milling begins they cannot be exposed and sampled accurately without excessive expense. They occur in extensive bodies 15 to 30 feet in width, and exposed very imperfectly by the mine workings, since these have in the past been directed to the exposure of smelting ore bodies only.

#### DETAILS OF DEVELOPMENT.

*Fourth Level.*—(431 feet in depth measured on the vein).

The fourth level east has been extended to a point 690 feet from the shaft. From the 340 to the 400 foot point, no values. At the 400 foot point a cross-cut shows the ore to be 10 feet in width, averaging \$3.45 smelter's gross assay value. From the 400 to the 470 foot point the ore averaged \$4.40 smelter's gross assay value. From the 470 to the 500 foot point the ore averaged \$14.70 smelter's gross assay value. From the 500 to the 680 foot point the average is \$6.20 smelter's gross assay value, at the 500 foot point the ore is 35 feet wide, averaging \$5.00 smelter's gross assay value.

*Fifth Level.*—(608 feet in depth measured on the vein).

In the fifth level west at a point 65 feet west of the shaft crosscut winze No. 583 has been sunk 65 feet on the vein, in ore averaging \$3.60 smelter's gross assay value. From the bottom of the winze 45 feet of headings have been driven, showing no values. At the 340 foot point raise No. 595 has been made on the vein to connect with the fourth level. For the first 50 feet there were no values. From the 50 to the 70 foot point the ore streak widens from 18 inches to 10 feet, averaging \$3.80 smelter's gross assay values. From the 70 to the 100 foot point the vein is 18 feet wide, but low grade. From the 100 to the 175 foot point the ore averages \$4.70 smelter's gross assay value. Seventy feet above the level an intermediate drift has been driven 75 feet west along the vein. The ore has been exposed for a width of 12 feet, averaging \$4.00 smelter's gross assay value.

The fifth level east has been extended to a point 358 feet from the shaft crosscut. From the 187 to the 217 foot point the ore is 8 feet wide, averaging

\$9.80 smelter's gross assay value. From the 217 to the 358 foot point, no values.

*Sixth Level.*—(778 feet in depth measured on the vein).

The main level east has been extended to a point 1,060 feet from the shaft crosscut. At the 934 foot point an ore body begins 20 to 30 feet in width, and averaging \$20.00 smelter's gross assay value. At the 985 foot point the vein is shown in a crosscut to be 28 feet in width, and heavily mineralized; 15 feet of this width averaging \$16.00 smelter's gross assay value, and the remaining 13 feet averaging \$3.50 smelter's gross assay value. To the 1,030 point the ore is low grade. From the 1,030 ft. to the 1,060 ft. point the ore is 15 to 20 feet wide, averaging \$6.00 smelter's gross assay value. At the 945 foot point, winze No. 618 has been sunk 14 feet on the vein, showing ore of low grade.

*Seventh Level.*—(924 feet in depth measured on the vein).

The main level east has been advanced from the 398 foot point to a point 615 feet from the shaft crosscut. The vein is shown by several crosscuts to be 15 to 20 feet wide, and heavily mineralized, but of low grade.

*Eighth Level.*—(1,077 feet in depth measured on the vein)

The main level west has reached a point 285 feet from the shaft crosscut.

The vein is heavily mineralized but of no value except from the 27 to the 64 foot point, where it averaged \$14.80 smelter's gross assay value.

The main level east has reached a point 425 feet from the shaft crosscut.

The vein is heavily mineralized, but of no value.

*Ninth Level.*—(1,222 feet in depth measured on the vein).

At the point of intersection by the shaft crosscut the vein is heavily mineralized, and 47 feet in width, but of low grade.

The ninth level west on the hanging side of the vein has reached a point 109 feet from the shaft crosscut, no values. A heading on the foot wall side advanced 17½ feet through heavily mineralized ore, averaging \$3.95 smelter's gross assay value.

Ninth level east on hanging side of the vein has advanced 114 feet, exposing heavy sulphides of no value. On the foot wall side a heading has been driven 20 feet through ore averaging \$3.65 smelter's gross assay value.

GENERAL REMARKS.

The necessity for milling has long been foreseen, but although every effort has been made towards the desired end, there has been unexpected delay, owing to unusual difficulties and obstacles. The technical problem presented by the nature of the ore has been a serious one, and the business arrangements necessary for success has also taken time. A satisfactory method of treatment was devised some time ago, while the questions of location, water supply, land, freight rates, market for product, and the financing of the milling enterprise were finally settled last August.

The serious obstacle presented to large scale milling by the so-called 2% tax imposed by the British Columbia Government upon the gross-product of mines has not yet been removed. This tax has the peculiar effect of exacting an increasing proportion of the net profits as the grade of ore lowers. For instance, on the milling grades of the Centre Star and other Rossland mines it will take anywhere from 10 to 20% of the net profits, which greatly increases the difficulty of securing capital for milling operations. The disastrous effect of this tax in repressing the mining and milling of low grade ores throughout the Province has forced the mining communities to join in active measures for its repeal, and the matter is being steadily pressed by the Provincial Mining Association. It is believed that the new Legislature will not longer delay the relief so urgently demanded by popular sentiment.

A preliminary mill of 200 tons daily capacity, but designed for prompt enlargement to 400 tons, is now being built by The Rossland Power Company, Limited, and is located upon the line of the Canadian Pacific Railway near the town of Trail. It is expected to begin operations by early spring, affording the desired outlet for the milling ores of the Centre Star and War Eagle mines.

It is proper to call special attention to the reduction effected during the past year in the costs of mining, which have lowered all previous records. The figures are as follows:

|                                   |                   |
|-----------------------------------|-------------------|
| Winzes, . . . . .                 | \$38 77 per foot. |
| Raises, . . . . .                 | 29 97 "           |
| Drifts, . . . . .                 | 17 09 "           |
| Mining ore from stopes, . . . . . | 2 07 per ton.     |

The entire cost of mining and delivering ore on the cars, including its pro rata of general expenses, was \$2.07 per ton of ore from the stopes, and during several months ranged between \$1.93 and \$1.96. Including the additional ore broken by development headings, the average for the year was

\$1.97 (see table of costs). These figures would be satisfactory in most mining districts of the west, but in view of the extreme toughness of this ore and rock, the moderate rate of output and the severe conditions of mining here, they are very exceptional.

TABLE OF MINE COSTS.  
Twelve Months ending September 30th, 1903.

|                                                 | DEVELOPMENT WORK.   |                       |                  |                | ORE EXTRACTION. |
|-------------------------------------------------|---------------------|-----------------------|------------------|----------------|-----------------|
|                                                 | SINKING Main Shaft. | SINKING Small Shafts. | RAISING DRIFTING |                |                 |
|                                                 | Cost Per Foot.      | Cost Per Foot.        | Cost Per Foot.   | Cost Per Foot. | Cost Per Ton.   |
| Total Advanced, feet. . . . .                   |                     | 79.                   | 186.             | 2,903.5        |                 |
| Ore Stopped, tons. . . . .                      |                     |                       |                  |                | \$4,453.        |
| 1. Drilling. . . . .                            |                     | \$6 10                | \$7 31           | \$4 53         | 40.5            |
| 2. Blasting. . . . .                            |                     | 2 48                  | 2 40             | 1 08           | 03              |
| 3. Explosives. . . . .                          |                     | 3 13                  | 3 72             | 2 72           | 14.5            |
| 4. General Mine Supplies. . . . .               |                     | 51                    | 64               | 43             | 04              |
| 5. Mine Lighting—Candles. . . . .               |                     | 26                    | 19               | 14             | 01.5            |
| 6. " " Electric. . . . .                        |                     | 30                    | 22               | 13             | 01              |
| 7. Smithing. . . . .                            |                     | 1 00                  | 1 14             | 72             | 06.5            |
| 8. Tramming & Shovelling—Direct. . . . .        |                     | 5 51                  | 65               | 1 21           | 24              |
| 9. Tramming & Shovelling—Apportioned. . . . .   |                     |                       | 64               | 35             | 42              |
| 10. Timbering—Labor. . . . .                    |                     | 1 81                  | 3 08             | 02             | 19              |
| 11. " " Material. . . . .                       |                     |                       | 33               | 57             | 01              |
| 12. Machine Drill Fittings and Repairs. . . . . |                     |                       | 86               | 94             | 60              |
| 13. General Mine Labor. . . . .                 |                     | 1 57                  | 1 18             | 84             | 09              |
| 14. Hoisting—Underground. . . . .               |                     | 4 79                  |                  |                |                 |
| 15. " " Main Shaft. . . . .                     |                     | 1 48                  | 89               | 94             | 19              |
| 16. Compressed Air. . . . .                     |                     | 1 74                  | 2 08             | 1 07           | 12              |
| 17. Mine Ventilation. . . . .                   |                     | 23                    | 17               | 13             | 01.5            |
| 18. Pumping. . . . .                            |                     | 1 71                  | 1 09             | 34             | 03.5            |
| 19. Assaying. . . . .                           |                     | 55                    | 47               | 14             | 03              |
| 20. Surveying. . . . .                          |                     | 20                    | 17               | 11             | 01              |
| 21. General Expense. . . . .                    |                     | 3 57                  | 2 71             | 1 51           | 18.5            |
| Total. . . . .                                  |                     | 38 77                 | 29 97            | 17 09          | 2 06.5          |

ORE SOLD.

|                             |               |
|-----------------------------|---------------|
| Stopped. . . . .            | \$4,453 tons. |
| Met in Development. . . . . | 3,934 "       |
| Total. . . . .              | \$8,387 "     |

TOTAL HEADING OF CENTRE STAR MINE.

September 30th, 1903.

|                                                                   | SINKING     |         | RAISING | DRIFTING |
|-------------------------------------------------------------------|-------------|---------|---------|----------|
|                                                                   | Main Shaft. | Winzes. |         |          |
|                                                                   | Feet.       | Feet.   | Feet.   | Feet.    |
| Total Headings of Mine, Sept. 30, 1902. . . . .                   | 1,289.5     | 1,693.5 | 1,994.5 | 15,286.5 |
| Advance of Headings, Oct. 1st, 1902, to Sept. 30th, 1903. . . . . |             | 79.     | 186.    | 2,903.5  |
| Total Headings of Mine, Sept. 30th, 1903. . . . .                 | 1,289.5     | 1,772.5 | 2,180.5 | 18,190.  |

Rossland-Kootenay Mining.—The report of the directors of the Rossland-Kootenay Mining Company, Limited, to be submitted at the meeting to be held on Monday next, states that the debit balance of profit and loss account, £6,572, is mainly owing to the fact that the directors have decided to charge that account with the following items:—Proportion of mine development account; depreciation of buildings, plant, machinery, etc.; reserve for contingent expenses and legal charges in re Centre Star Mining Company suit. Owing to the irregular manner in which the values occur in the ore it has been found very difficult to determine the tonnage and value of the ore in reserve, and eventually it was decided that the only efficient way of settling the matter was by the shipment of substantial tonnage of ore. Accordingly some 5,000 tons have been shipped, and realised at rates showing a profit over the cost of production. Now that the directors possess accurate knowledge as to the positions and values of the various bodies of ore available, the shipment and realisation of the latter can be effected with the maximum of benefit to the company. During the period covered by the accounts, shipments have been necessarily limited to three and a half months, but these will now be pressed forward, and the directors have every hope that vigorous diamond-drill prospecting in the lower levels will materially add to the reserves of high-grade ore.

## OGILVIE GOLD DREDGING CO.

### Mr. Wm. Ogilvie's First Report to the Shareholders Disappointing.—Another Dredge Recommended.

The following report, under date of 9th, December, has been issued to shareholders in the Ogilvie Gold Dredging Company. The company operates on an extensive leasehold of dredging property on the Stewart River, Y.T. A description of the dredge which was designed by Mr. A. W. Robinson, an experienced dredging engineer of Montreal, was fully described in the March issue of the REVIEW:—

"I submit for your information the following brief resume of the operations of this Company during the past season. I regret the delay in presenting it, and plead in extenuation the non-arrival of the assay returns of the last deposit of gold dust with the Canadian Bank of Commerce at White Horse. This by the way has not reached me yet, but I deem it advisable not to wait any longer, though my report is incomplete without it.

During the last few hours' operations of our dredge last year, (in the fall of 1902) it was found that certain changes and additions would have to be made to suit more efficiently the conditions found. Material and parts suitable to the end in view were ordered in ample time for their arrival at White Horse early in April, but for some occult reason the parties favored with the order did not see fit to ship the bulk of it until the month of June, and we received it when most of the working season was gone.

Mr. Morley Ogilvie, with three men, and two heavily loaded canoes, left White Horse for the dredge on May 12th, but Lake Labarge, and the river below, being still covered with ice, their journey was so much hindered that it was the 25th when they reached the machine. I followed immediately after the lake opened to navigation, and reached the party on June 25th.

The dredge had wintered safely, and the men left in charge during the past winter had cut enough wood to run it all season. Work was commenced on it at once, and in a few days it was running, and a start was made to test as much of the Company's property as possible during the remaining portion of the season.

Our season's operations were much hindered, and the results lessened by—1st, the want of material ordered as mentioned, which was not available for use until within six weeks of the close of the season; 2nd, the unusually high state of water during all June and a good part of July; 3rd, the very low stage of water during the latter part of August and all September, this condition of the water hindered us from moving from place to place to a considerable extent, but in fairness it must be said that the first cause did more than all the others, times over, while we suffered the full effect of the second, because of the want of the material already referred to.

During the season a log or diary was kept, in which anything of note connected with the work was entered, and from this it is possible to make an estimate of the season's operations.

Our machine was supposed to lift 1,000 cubic yards of gravel in 24 hours, this being about 42 yards per hour. As a matter of fact it was found that, during the operations of prospecting, it only handled an average of about 30 yards, or 720 yards per 24 hours, this being slightly over 70% of the supposed capacity. In reviewing the situation, it may be said, though the season is not the success we hoped it would be, for the reasons mentioned, and as much time and delay was attendant on the work of prospecting, yet the results, we think, amply justify the Directors in seriously considering the desirability of building another dredge for next year's operations, but this time it should be a large one, not less than 3,000 cubic yards' capacity per day, which, in practice, will handle readily from 2,000 to 2,500 yards per day. The same crew run the larger one, the only difference will be the extra fuel and oil. The dredge depth of the present machine was not more than 25 feet below the surface of the water, and at only a few places was this depth attained, and in no place was bedrock reached. I consider that the next dredge should be capable of dredging to a depth of not less than 40 feet from the surface of the water.

*Result.*—Many miles of the river were prospected, and considerable time was given to the most notable locations, but some of the prospects were found only on the surface. It will be sufficient for the purpose of this report to indicate briefly the work done on one of these locations, and the results that can be achieved by the continuation of the operations. The figures quoted may be regarded as about a fair average, as much richer ground has been found in this locality. The pay was found from seven to nine feet below the surface of the gravel, but what the thickness of the pay stratum is

could not very well be determined, but it was deep enough and rich enough, when mixed with non-pay dirt above, to pay even with our small prospecting machine.

Here, after 42 hours work, out of which the dredge worked 34 hours and lifted 1,395 yards, I made a clean-up and got 25.1023 ozs. of amalgam, which is worth \$6.50 per oz., aggregating \$163.16, which, divided by the time, gives \$4.72 per hour. An examination has pretty well satisfied me that our living and operating expenses for the eight men at present engaged, including wood, board, oil, etc., will total \$2.24 per hour, leaving a balance in this particular case of \$2.48 per hour, which, in the 24 hours, would make the working expenses \$53.76. But this is not a fair statement of the case in this instance, for in this work we had to lift a lot of tailings made in a previous test, which increased our work and did not add anything to our receipts on this occasion. These tailings amounted to not less than 400 yards, from which good pay has already been taken. As the hourly lift for the time was a fraction of over 40 yards, if the tailings are converted into time they mean ten hours, leaving 24 hours effective work, which would average \$6.66 per hour, which gives a balance of \$4.42 per hour; this in 28 makes \$125.40, the working expenses remaining the same. In the season of 140 days the aggregate profit would be \$12,376.00 with the present dredge. In such ground a dredge of 3,000 yards capacity would give 2½ times as much with an increase in cost of only one item, wood, and assuming that the consumption of that would be doubled in the larger dredge it would make the hourly expenses \$2.93 while the output in such ground as that quoted would be increased to \$16.66 or at only 20 hours per day, \$333.33, while the expenses for 24 hours would stand at \$70.32, add 10% of this, if you like, for breakage, wear and tear, etc., and it stands \$77.35 and we have a daily balance of \$256.00 and for the season of 140 days a total of \$35,840.00, you may cut this in two if you like and still have a handsome profit on the money invested. At this particular location there is ground enough, I think, to keep a dredge a season, and I am quite satisfied that we will find in our leases many, many such places, some of them richer than the one above described.

## NEW COMPANIES.

### ONTARIO.

The Crowland Natural Gas Company, Limited.—Incorporated under the Statutes of Ontario, 4th November, 1903. Authorized capital, \$80,000, in 1,600 shares of \$50.00 each. Directors: J. H. Smith, T. F. White, J. H. Pew. Head office, Port Colborne, Ont. Formed to acquire the properties known as "The Crowland Natural Gas Company, Limited."

The Mikado Gold Mining Company, (1903) Limited—Incorporated under the laws of the Imperial Parliament of the United Kingdom of Great Britain and Ireland, and licensed under the Statutes of Ontario, 6th November, 1903. Authorized capital for use in Ontario, \$175,000. W. Davidson, Toronto, Ont., attorney. Formed to acquire the properties known as "The Mikado Gold Mining Company, (1903) Limited."

The Damascus Gold Mining Company, Limited.—Incorporated under the Statutes of Ontario, 13th November, 1903. Authorized capital, \$250,000, in 250,000 shares of \$1.00 each. Directors, J. S. Lovell, W. Bain, R. Gowans, E. W. McNeill, R. Richardson. Head office, Eridgeburg, Ont. Formed to acquire the properties known as "The Damascus Gold Mining Company, Limited."

The Grimsthorpe Mining Company, Limited.—Incorporated under the Statutes of Ontario, 20th November, 1903. Authorized capital, \$150,000, in 1,500 shares of \$100.00 each. Directors, G. G. S. Lindsey, F. Landenberger, Cora Anne Lindsey, W. B. Northup, W. R. Wadsworth. Head office, Toronto Ont. Formed to acquire the properties known as "The Grimsthorpe Mining Company, Limited."

The Toronto Iron and Steel Company, Limited.—Incorporated under the Statutes of Ontario 13th November, 1903. Authorized capital, \$40,000, in 400 shares of \$100.00 each. Directors, D. Muhlfelder, W. E. Friedman, R. E. Mills. Head office, Toronto, Ont. Formed to acquire the properties known as "The Toronto Iron and Steel Company, Limited."

The International Iron Mining Company, Limited.—Incorporated under the Statutes of Ontario, 29th October, 1902. Authorized capital, \$1,000,000, in 10,000 shares of \$100.00 each. Directors, J. F. McCarthy, L. Merritt, J. T. Hickman, H. R. Spencer, T. A. Merritt. Head office, Port Arthur, Ont. Formed to acquire the properties known as "The International Iron Mining Company, Limited."

The Canadian Consolidated Oil Company, Limited.—Incorporated under the Statutes of Ontario, 27th November, 1903. Authorized capital, \$1,000,000, in 10,000 shares of \$100.00 each. Directors, E. R. Clarkson, T. Ramsay, J. Dixon, L. Bauer, H. P. Coburn. Head office, Hamilton, Ont.

### BRITISH COLUMBIA.

The Great Northern Mines, Limited.—Incorporated under the Statutes of British Columbia, 7th November, 1903. Authorized capital, \$1,500,000, in 1,500,000 shares of one dollar (\$1) each. Formed to acquire the properties known as "The Great Northern Mines, Limited."

**The Perry Creek Gold Mining Company, Limited.**—Incorporated under the Statutes of British Columbia, 10th November, 1903. Authorized capital, \$500,000, in 500,000 shares of one dollar (\$1) each. Formed to acquire the properties known as "The Perry Creek Gold Mining Company, Limited."

**The Princess Royal Gold Mines, Limited.**—Incorporated under the Statutes of British Columbia, 24th November, 1903, as an Extra-Provincial Company. Authorized capital, \$1,250,000, in 1,250,000 shares of one dollar (\$1) each. Head office, Rothesay, Kings Co. N.B. Head office in British Columbia, Victoria, B.C. D. M. Eberts, Victoria, B.C., attorney. Formed to acquire the properties known as "The Princess Royal Gold Mines, Limited."

**The Lardeau-Duncan Mines, Limited.**—Incorporated under the Statutes of British Columbia, 7th December, 1903. Authorized capital, \$150,000, in 1,500,000 shares of ten cents (10c.) each. Formed to acquire the properties known as "The Lardeau-Duncan Mines, Limited."

**The Idaho-Alamo Consolidated Mines, Limited.**—Incorporated under Statutes of British Columbia, 7th December, 1903, as an Extra-Provincial Company. Authorized capital, £130,000 in 130,000 shares of £1. each. Head office, Scotland. Head office in this Province, Alamo, B.C. W. S. Jenkins, Alamo, B.C., attorney. Formed to acquire the properties known as "The Idaho-Alamo Consolidated Mines, Limited."

## COMPANY NOTES.

**Hastings, (B.C.) Exploration.**—During the month of November 65 tons of ore were shipped from the Arlington Mine (Erte) for which the smelter returns amounted to \$2,419.54. The expenses for the month were \$3,427.13 showing a loss on the month's operations of \$1,007.59. Owing to the changeable weather the roads were unfit for hauling and shipments were discontinued the 9th of the month, but the orebodies are full and shipping will be resumed as soon as sufficient snow falls to make good roads. Of the operations during the past financial year of this Company, of which reference is made elsewhere in this issue, the following is taken from the Directors, report to the shareholders. With regard to the Arlington Mine, the Directors informed the shareholders at the last general meeting, that Mr Hill, the Company's local manager and engineer, having advised there was very little pay ore in sight, instructions were issued to shut down the mine except so far as taking out that payable ore. They are, however, now able to state that owing to subsequent discoveries the mine has more than paid expenses during the past twelve months.

**Tyce Copper.**—Smelter, Cable gives results of smelting for 29 days of November: "Smelted—Tyce ore, 4,830 tons; Customs ore, 1,510 tons—6,340 tons. Matte produced from same, 700 tons. Gross value of contents (copper, silver, and gold), after allowing for costs of refining and purchase of Customs ore, \$65,735. N.B.—It is anticipated that the smelter will be shut down for about 20 days during the current month, for the usual repairs, and till the completion of the aerial ropeway." The circular adds:—Mine—"The following figures are taken from the mine superintendent's monthly reports of work done from April last to end of October, inclusive:—East drift, No. 1 (100 ft. level), 284½ ft.; crosscut north No. 6 (100 ft. level), 38 ft.; crosscut north No. 7 (100 ft. level), 96 ft.; crosscut No. 8 (100 ft. level), 11 ft.; upraise No. 3 (100 ft. level), 88 ft.; east drift No. 1 (165 ft. level), 180 ft.; crosscut north No. 1 (165 ft. level), 6ft.; crosscut north No. 2 (165 ft. level), 52 ft.; crosscut north No. 3 (165 ft. level), 152 ft.; crosscut north No. 4 (165 ft. level), 28 ft.; crosscut from upraise No. 3 (165 ft. level), 23 ft.; upraise from crosscut No. 4 (165 ft. level), 35 ft.; upraise No. 2 (165 ft. level), 25 ft.; crosscut from upraise No. 2 (165 ft. level), 20 ft.; east drift No. 1 (300 ft. level), 606½ ft.; upraise No. 1 (300 ft. level), 23 ft. Total, 1,668 ft. Aerial ropeway.—The work of carrying out the doubling of the capacity of the aerial tramway is in an advanced stage, and it is anticipated will be completed by about the middle of December. As soon as this is finished, it will ensure a more ample supply of ore to the smelter, and increased returns. Water.—The pumping station at the Chemainus River has been completed, and is supplying the mine with sufficient water for all purposes."

**Anglo-Klondyke Mining.**—the directors, in their report for the year ended September 30 last, state that the amount of available net profit (including a balance of £3,808 brought forward from last year) is £12,505, from which the directors recommend the declaration of a dividend of 10 per cent. (free of income-tax, on the ordinary shares, payable to all shareholders registered on November 30. This will absorb £12,329, leaving a balance of £176 to be carried forward to the next account. In view of the very heavy amounts that have been written off in previous years for depreciation, the directors are of opinion that it is unnecessary to write off anything further under that head on this occasion, and, considering the large cash balance (£27,921), they feel that they are consulting the shareholders' interests in dividing the profits close up, as, after payment of the above-mentioned dividend, there will still be an available cash balance of £15,591.

**British Columbia (Rossland and Slocan) Syndicate.**—The report of the British Columbia (Rossland and Slocan) Syndicate for 1902, to be presented at the meeting on the 23rd inst., states that the Snowshoe mine at Phoenix, owned by the Snowshoe Gold and Copper Mines, Ltd., in which this syndicate is the largest shareholder, has during the year been further extensively developed. Its development has shown up large bodies of ore, and during the year under consideration about 20,000 tons of ore have been shipped to the local smelters. Additional machinery has been installed, and shipments upon an increased scale have since been steadily maintained. The directors have been considering how best to develop some of the other properties owned by the syndicate, or to acquire interests capable of development in such a manner as to yield substantial profit, and in this connection considerable work has been done in various directions, which it is hoped it may be possible to turn to profitable account, as was done in the case of the Snowshoe. Many business proposals, some industrial and some for railway

construction under Government charters, have been put before the directors and investigated, and one or two of these are being further looked into on the spot. The profit and loss account shows a balance of £63, after writing off depreciation on furniture, office, expenses, directors' and auditor's fees, etc. The reserve fund consists of 79,000 shares in the Snowshoe Gold and Copper Mines, Ltd., valued at £79,000. The nominal capital of the company is £110,000, and of this amount at 31st December last 90,000 shares were issued. Of these 76,638 shares were fully paid, and 13,352 were 12s. 6d. paid, leaving a balance of 10,000 shares unissued.

**Brookfield Mining (Nova Scotia).**—Cablegram from the company's fiscal agents in Boston, U.S. A.:—"710 (tons ore) crushed during last month (yielded) 450 ozs. (gold). Mine looking much better than we expected. Ore is increasing in quantity and improving in quality. Cyanide process has been successful." (Office note.—The above yield of gold—value nearly \$9,000—shows a very large increase over previous returns.)

**Ymir.**—The mine manager reports the return for the month of October, 1903, by cable, as follows.—Sixty-five stamps ran 30 days, and crushed 5,500 tons (2,000 lb.) of ore, producing 937 oz. bullion. The estimated realisable value (gross) of the product is \$10,250; 305 tons of concentrates, shipped, gross estimated value, \$7,750; cyanide plant treated 2,650 tons (2,000 lb.) of tailings producing bullion having estimated gross value of \$1,950, sundry revenue, \$437—\$20,387; working expenses, \$24,250; loss, \$5,863. There has been expended during month on development, \$4,250.

**Velvet.**—The secretary has issued copies of a letter, dated 23rd October, from Mr. Allan Maclean, who has just returned from British Columbia, and is a director of the company. Mr. Maclean says:—"After carefully considering the adaptability of the smelting plants inspected in Mexico and elsewhere, we became thoroughly convinced that a small pyrite smelting plant, with a capacity up to 100 tons per day, would be most suitable to treat the ores of the Velvet and Portland mines, and the knowledge gained by our investigation, will enable the company to erect a very suitable plant at a moderate cost. The copper values shown in the Velvet and Portland mines by recent assays will be of great assistance in collecting the gold and silver contained in the ore, and no great difficulty should be experienced in securing a ratio of concentration of 20 to 1; that is, for each 20 tons of ore fed into the furnace, one ton of matte, containing the gold, silver, and copper contents should be produced. Had we been in a position to treat at the mine by concentration or pyritic smelting, the ore shipped during the past year, there would have been a saving, in the freight and treatment charges, amounting to nearly \$40,000. On account of the probable results to be gained, and the splendid equipment that the mine has for carrying on the further development work, I consider that it would be suicidal to abandon or to close it down. The suggestions made by Mr. William Thompson in his report (copies of which have also been issued) should, in my opinion, be carried out. To effect these, and in view of the position and trend of the ore bodies, an amalgamation of the Portland and Velvet mines would be mutually advantageous. At the same time I would suggest that the combined capital of the two companies be reduced to a sum upon which dividends could, with reasonable hope, be paid, when the concentration and smelting plants, now recommended, are in full operation."

**Le Roi.**—Cable from the manager: "Shipped from the mine to the Northport smelter during the past month 16,045 tons of ore, containing 5,305 ozs. of gold, 7,460 ozs. of silver, and 349,600 lbs. of copper. Has resulted in a loss of \$1,150, according to the usual calculations. Shipped from the dump to the Northport smelter during the past month 869 tons of ore, containing 187 ozs. of gold, 222 ozs. of silver, and 12,300 lbs. of copper. Estimated profit on this ore, \$550. Development work, 1,350 level—Have driven crosscut 123 ft. during the past month and have drifted 123 ft. on south vein. The ground through which we are now driving is somewhat encouraging, being well mineralised, but the grade of the ore is very variable. Have already shipped a small number of tons of ore from this work. (Office note.—The losses cabled in the last few months have been mainly due to necessary exploration work in the mine, considerable in amount, and charged, as usual, against the estimated profits on ore extracted.)

**The Cape Breton Coal & Iron Co.**—This company which was recently incorporated with an authorized capital of \$3,000,000, is being promoted by Iowa parties, who have opened an office at Des Moines. N. E. Coffin, a member of a law firm of that city, is president of the concern, and others interested are H. J. Deards, H. H. Reynolds, Charles Crane, J. M. Goodson, and other local professional and business men. It is stated that possession has been acquired of a 25,000-acre tract of land in Cape Breton, of which 16,000 acres are known to contain coal deposits, and the officers of the company are now endeavoring to dispose of enough of the stock to begin development work at an early date.

**The Cumberland Ry. & Coal Co.**—That Spring Hill, N. S., strike was short lived. After a week's idleness of 1,600 men, the outcome of the difficulty is a virtual victory for the management, as the new scale of measurement of coal cut will be considered in effect since December 1. It was the change of measurement which precipitated the strike, but after a conference with the management the new scale was accepted, and the men were ordered to return to work. We have seen the pay-rolls of men employed by this company and must say that with the earnings made, there should be no shirking of work; the average is better than many Canadian professional men are in receipt of.—Coal Trade Journal.

**Dominion Coal Co.**—The output of the Dominion Coal Co's collieries for the month of November shows a slight decrease over the output of the previous month. This is accounted for by the fact that in November there was one less working day, and also that the International mine, Bridgeport, is working one shift only. The breaking of a shaft at Caledonia also caused a decrease. The output from Dominion No. 1 mine is increasing well. Total output for November was 271,247 tons. Austin King, the new superintendent of mines, has arrived and has assumed charge.

**Nova Scotia Steel & Coal Co.**—The output from the mines of this company for the month of November show a decrease as compared with the month of October. This is accounted for by a falling off in the trade during

the latter part of the month, when they discontinued the night shift. Sydney No. 4 mine, strange to say, raised more coal by the single shift than was done during the early part of the summer, when the mine was worked night and day. The output was 45,977 tons. This is a decrease of 3,760 tons against October's output. At an early date the company is likely to purchase valuable and extensive iron deposits in Cuba. They have already secured options on several properties there, and R. E. Chambers, chief mining engineer of the company, is now on the way to Cuba to examine and report on the properties. Cuban ore is already largely used by this company to mix with ore from Belle Isle, Nfld., making the best quality of iron.

**Crow's Nest Pass Coal Co.**—The output of the Crow's Nest Pass collieries for the week ending December 18, was 20,397 tons; Coal Creek, 7490 tons; Michel, 3177 tons; Morrissey, 4730 tons; total output for the week, 20,397 tons; average daily output, 3400; total output for corresponding week last year, 11,032 tons, average daily output corresponding week last year, 1838 tons.

**B.C. (Rossland and Slocan) Syndicate.**—The ordinary general meeting of this company was recently held in London, Eng. The proceedings were brief, as Messrs. J. McMillan and Geo. S. Waterlow, both directors, not having returned from their visit to British Columbia at the time. The syndicate floated the Snowshoe mine during the year, retaining 116,000 shares of the stock, which was described by the chairman as a valuable asset. Klondyke claims held by the syndicate had not substantiated the hopes entertained for success and had been abandoned during the year.

**The Lake Superior Consolidated.**—The assets of the Consolidated Lake Superior Company held by Speyer & Co. for a loan of \$5,050,000, were bought in at a public auction by Speyer & Co., on the 15th inst. for \$4,500,000. Theirs was the only bid. The sale was held in spite of several protests by representatives of other creditors. The sale took place in the presence of a large crowd, which included former President Clergue of the Consolidated Lake Superior Company.

**The Nova Scotia Steel and Coal Co.**—The directors of the Nova Scotia Steel and Coal Co. met in New Glasgow, Dec. 21st, to consider the result of the year's operations. The coal output for the present year at Sydney Mines was shown to be in round figures eighty per cent. in excess of last year's yield, and the output of the Marsh Mine, near New Glasgow, 75 per cent. greater than the previous year. Two new colliers started at Sydney Mines have been brought up to the producing stage, and although not fully complete or anything like up to their maximum capacity, they produced one hundred thousand tons during the year. This company is the second largest producer of coal in the province, and it is estimated that 700,000 tons of coal will be raised next year. These figures came as somewhat of a surprise to the public, as it was not thought that the company was developing its very extensive coal fields to this extent. The increase in pig iron and steel was shown to be very considerable, and the output of ingots and finished steel considerably larger than in any previous year. The matter of increased dividend was not considered, and will not be till February next, as the dividend in the common stock is not payable till March 15th.

## CONCENTRATES.

Shipments of ore from the Rossland camp for the week ending December 12, and for the year to date, in tons, are as follows:

|                            | Week  | Year    |
|----------------------------|-------|---------|
| Le Roi.....                | 5,760 | 208,180 |
| Centre Star.....           | 1,500 | 75,526  |
| War Eagle.....             | 1,290 | 56,688  |
| Le Roi No. 2.....          | 410   | 24,915  |
| Le Roi No. 2 (milled)..... | 350   | 2,100   |
| Jumbo.....                 | 120   | 3,853   |
| Spitzee.....               | 60    | 480     |
| I. X. L. (milled).....     |       | 1,760   |
| Kootenay.....              |       | 6,798   |
| Giant.....                 |       | 850     |
| Iron Horse.....            |       | 40      |
| Velvet.....                |       | 3,376   |
| White Bear.....            |       | 297     |
| O. K.....                  |       | 25      |
| Homestake.....             |       | 90      |
| Totals.....                | 9,690 | 385,785 |

The most notable international gathering of engineers ever held in the United States, if not in the world, will take place in October, 1904, when a World's Engineering Congress is to be held at St. Louis, in connection with the great exposition. As already announced, the Iron and Steel Institute is to visit this country next year, and will hold meetings here in conjunction with the American Institute of Mining Engineers. A more remarkable event is forecasted in the announcement that the Institution of Civil Engineers is to visit the United States next year. This society has not only never before held a meeting in a foreign country, but, so far, has never held a formal meeting in England outside of London.

The shipments of coal by the Dominion Coal Co., Sydney, N.S., for the ten months ending October last, were 2,376,633 tons. For the same period last year the shipments were 2,435,667 tons. These figures show a decrease for the present year of 60,034 tons. This is accounted for by the fire at Dominion No. 1. The shipments of the Nova Scotia Steel & Coal Co. show an increase over last year.

A press despatch from Collingwood, Ont., dated the 20th inst., says:—As the result of the issuing of a writ by the American Trust Company against the Cramp Steel Company, the works and head office of which are located here, have been intirely closed down. No definite information regarding the company's situation can be learned, Major J. A. Currie, the secretary of the

company, being absent in Toronto, but in a letter to some friends in town Major Currie stated that the issuance of the writ was due to hasty action on the part of the American company, and expresses the assurance that the company will be placed on a sound financial basis within a short time. The company already has expended a large sum of money here in buildings and plant, the former being of a most substantial nature, while the latter is described by competent engineers to be unequalled by any in America.

Ore shipments from Boundary mines for the week ending Dec. 12th, 1903, and year to the same date, in tons, were as follows:—

|                  | Week   | Year    |
|------------------|--------|---------|
| Granby.....      | 11,018 | 358,524 |
| Mother Lode..... | 2,688  | 123,812 |
| Snowshoe.....    | 1,500  | 73,432  |
| Emma.....        | 297    | 20,546  |
| B. C.....        |        | 19,365  |
| Sunset.....      | 90     | 15,671  |
| Oro Denoro.....  | 528    | 14,153  |
| Athelstan.....   | 210    | 4,726   |
| Morrison.....    |        | 3,339   |
| Winnipeg.....    |        | 2,435   |
| Providence.....  |        | 910     |
| Elkhorn.....     |        | 213     |
| Senator.....     | 33     | 66      |
| Totals.....      | 16,064 | 653,762 |

The following figures taken from a recent report issued by the Director of the United States mint, shew the value of the gold and silver production during 1902 of the leading mining countries so far as the precious metals are concerned. As will be noticed Canada's gold production comes fourth on the list, being credited with an output of \$20,741,200:—

|                    | Gold.        | Silver.      |
|--------------------|--------------|--------------|
| United States..... | \$80,000,000 | \$71,575,575 |
| Australia.....     | \$1,578,800  | 10,377,100   |
| Mexico.....        | 10,153,100   | 77,804,100   |
| Canada.....        | 20,741,200   | 5,564,500    |
| Africa.....        | 39,023,700   |              |
| Spain.....         | 10,200       | 4,784,100    |
| Greece.....        |              | 1,409,500    |
| Columbia.....      | 2,532,600    | 2,297,000    |
| British India..... | 9,588,100    |              |

As compared with 1901, these figures show an increase in the production of gold of 1,572,914 ounces and a decrease of 8,042,914 ounces in the production of silver. During the year Africa increased her gold production from 439,704 ounces to 1,887,773 ounces and Australia increased her gold production to \$81,578,000, which is over a million and a half dollars in excess of the production of the United States, which again takes second place.

In a recent interview with a representative of a western exchange, Mr. Archibald Dick, Inspector of coal and metalliferous mines for East Kootenay, states that the output of coal from the Crow's Nest Pass mines was steadily increasing. The mines at Michel now turn out 1,400 tons of coal a day, and each month sees a still greater output. At Morrissey there has been considerable delay in operations during the past fortnight owing to a big mudslide which blocked the line, and which is still giving trouble. All but forty of the 220 coke ovens at the Morrissey mines are now finished and as soon as these are completed the work of turning out coke will be commenced there. At Michel about 160 of the new lot of ovens are ready, with about sixty more to complete. The electric light system, on which work has been going on at Michel for some time, was completed early this week, and the light is now turned on. The wires have been carried 500 feet into the No. 8 tunnel, which is now lit by electricity, and it is likely that further extensions will be made from time to time in the mines there.

One of the most remarkable dividend showings of the year 1903 will be that at the Daly-West mine at Park City, Utah, which (with a dividend of \$117,000 declared a few days ago) will make payments to its fortunate stockholders of \$1,332,000. This one mine has paid in dividends to date \$3,591,000, while there yet remains in the treasury the largest surplus the company has ever had. Still there are some people who will declare that all mining is a gamble.

The Pacific Coast Miner in a late issue says:—"British Columbia does not give great promise as a gold producer, but in silver, lead, copper and coal it is bound to take high rank. British Columbia's mineral wealth is vast, but is little developed up to date. Lack of capital is the principal drawback, but gradually capital is becoming aware of the great richness of that country and mines are being opened up in places that a few years ago were almost inaccessible. Enormous deposits of workable copper ores have been located."

**ONTARIO MINES OUTPUT.**—The output of the metalliferous mines and works of Ontario for the first nine months of 1903, as reported to the Bureau of Mines, was as follows:—Gold, 6,693 ozs., worth \$139,210; silver, 19,549 ozs., worth \$10,124; iron ore, 262,409 tons, worth \$376,102; pig iron, 59,783 tons, worth \$1,541,940; nickel, 5,393 tons, worth \$2,116,957; copper, 3,911 tons, worth \$330,263; zinc ore, 950 tons, worth \$7,600. Total value, \$4,030,197.

**NEW YUKON DIVISIONS.**—According to a proclamation issued by the Yukon government, the Yukon country is divided into nine districts, for the sake of more convenient administration. Each of the new districts will be a fully constituted mining sub-division, with a gold commissioner and a record office of its own. The names of the districts are: Forty Mile, Sixty Mile, Stewart, Clear Creek, Duncan Creek, Dawson, Pelly, Hootalinqua, and Whitehorse. Besides keeping the mining records the gold commissioners and their deputies will have to take charge of the land offices and timber inspector, in fact, transact all the clerical work which is now in the most cases taken to Dawson. The change meets with approval in the Yukon country.

**Mineral Fuel.**

The imports of mineral fuel into Canada, in the fiscal year ending June 30, 1903 and the value thereof, were as follows :

|                           | Tons      | Value.       |
|---------------------------|-----------|--------------|
| Bituminous and slack..... | 3,862,295 | \$8 197,034  |
| Anthracite.....           | 1,456,713 | 7,028,664    |
| Coke.....                 | 256,723   | 1,222,756    |
| Totals.....               | 5,575,731 | \$16,448,454 |

These imports were the output of mines chiefly in the states of West Virginia, Pennsylvania, Ohio, Indiana, and Illinois. The imports from all other countries, chiefly Great Britain, were as follows :

|                        | Tons    | Value.    |
|------------------------|---------|-----------|
| Bituminous and slack.. | 69,779  | \$22,884  |
| Anthracite and slack.. | 62,038  | 345,015   |
| Coke.....              | 15,638  | 70,469    |
| Totals....             | 147,455 | \$636 358 |

The duty upon bituminous coal is 53 cents per ton of 2,000 pounds and upon bituminous slack 20 per cent. but not to exceed 13 cents per ton. No duty is imposed upon either anthracite or coke.

Substantially all of the bituminous coal and slack imported into Canada from the United States finds entrance through ports in Ontario, in which province it finds its greatest consumption, the supply for Manitoba reaching through Port Arthur. And this is true also regarding anthracite and coke, there being a much smaller demand in Montreal. The demand for mineral fuel in the province of Quebec is supplied almost entirely from Nova Scotia mines; and that for the mountainous sections of the Far West and of British Columbia from the mines in that province. Ontario is the largest consumer of mineral fuel, but is not a producer.

Canada, however, is an exporter of bituminous coal, our exports in 1903 being as under :—

|                      | Tons      | Value.      |
|----------------------|-----------|-------------|
| Great Britain .....  | 25,335    | \$92,119    |
| United States.....   | 1 719,027 | 4,640,064   |
| Newfoundland.....    | 126,169   | 330,054     |
| Other countries..... | 109,420   | 390,197     |
| Totals.....          | 1,079,951 | \$5,452,434 |

These exports were almost entirely the output of Nova Scotia mines, 83 per cent. of which were to the New England states for consumption in industrial establishments there, and upon which, at present, no United States duty is imposed.

**Gold and Manganese Mining in British Columbia.**

Consul L. Edwin Dudley, writes from Vancouver, B.C., under date of August 13, 1903, as follows :—

I have recently visited Atlin, British Columbia, and vicinity. This district is very rich in gold, and there are large hydraulic plants being established there, some of which are already producing gold in very considerable quantities. There is one dredging plant in process of construction; it is expected that it will be in operation before the close of the present season. This dredging plant is the first that I have seen building in the interior. It is quite a different operation from dredging work on the bars of rivers which I have seen heretofore. A large basin is excavated, in which the dredge is built. A ditch, 7 miles long, brings water with which to fill this basin and float the dredge when completed. This will also furnish power to develop electricity to operate the machinery on the dredge. The advocates of the dredge proposition think it superior to the ordinary hydraulic work, for the earth that has been washed fills up the space immediately in the rear and is not thrown down into the stream, as is the case with the hydraulic companies. This dredge is expected to dig into the benches and make its way, leaving the ground very much as it found it, except that it will have extracted the gold.

The Atlin gold is generally not as fine as is found in the beds of streams in other districts. There are some individual miners who seem to be doing well in this district, but it does not appear to me to be a country in which men with small capital can do very much, but at the present time wages are very high. The ordinary pick-and-shovel men are paid \$3.50 per day and board, and their expenses into the country in the spring of the year and out again in the autumn are paid by their employers, and they can save nearly everything they earn if they are pleased to do so.

Returning to Atlin after a visit to one of the creeks, I noticed a great

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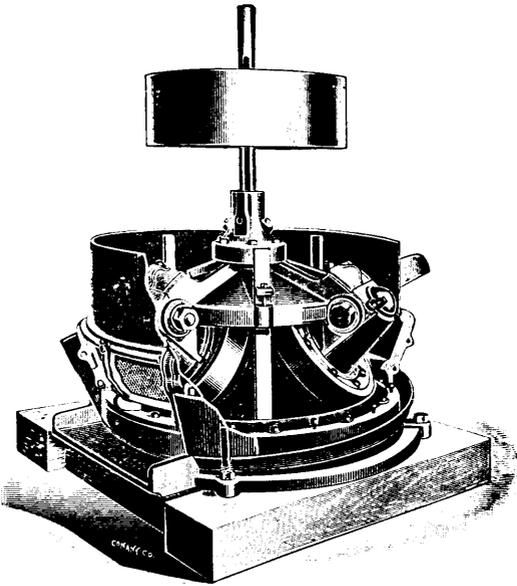
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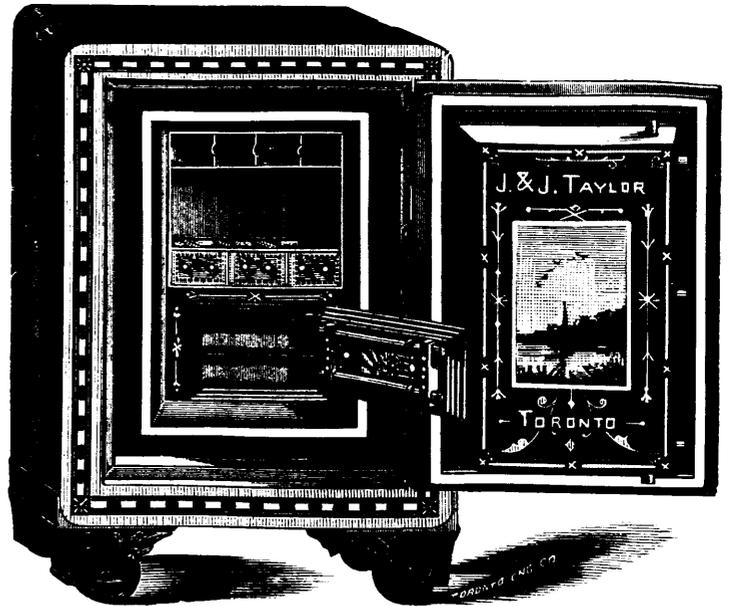
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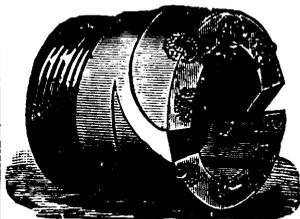
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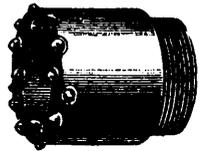
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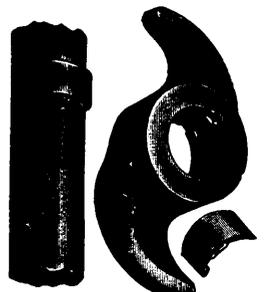
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# DOMINION OF CANADA

## SYNOPSIS OF REGULATIONS

### For Disposal of Minerals on Dominion Lands in Manitoba, the North-West Territories, and the Yukon Territory.

#### COAL.

Coal lands may be purchased at \$10.00 per acre for soft coal, and \$20.00 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at such rate as may from time to time be specified by Order-in-Council shall be collected on the gross output.

#### QUARTZ.

Persons of eighteen years and over and joint stock companies holding Free Miner's certificates may obtain entry for a mining location.

A Free Miner's Certificate is granted for one or more years, not exceeding five, upon payment in advance of \$10.00 per annum for an individual, and from \$50.00 to \$100.00 per annum for a company, according to capital.

A Free Miner having discovered mineral in place may locate a claim 1500 x 1500 feet by marking out the same with two legal posts, bearing location notices, one at each end of the line of the lode or vein.

The claim shall be recorded within fifteen days if located within ten miles of a Mining Recorder's Office, one additional day allowed for every additional ten miles or fraction. The fee for recording a claim is \$5.00.

At least \$100.00 must be expended on the claim each year or paid to the Mining Recorder in lieu thereof. When \$500.00 has been expended or paid the locator may, upon having a survey made and upon complying with other requirements, purchase the land at \$1.00 per acre.

Permission may be granted by the Minister of the Interior to locate claims containing iron and mica, also copper in the Yukon Territory, of an area not exceeding 160 acres.

The patent for a mining location shall provide for the payment of royalty on the sales not exceeding five per cent.

#### PLACER MINING, MANITOBA AND THE N.W.T., EXCEPTING THE YUKON TERRITORY.

Placer mining claims generally are 100 feet square; entry fee, \$5.00, renewable yearly. On the North Saskatchewan River claims are either bar or bench, the former being 100 feet long and extending between high and low water mark. The latter includes bar diggings, but extends back to the base of the hill or bank, but not exceeding 1,000 feet. Where steam power is used, claims 200 feet wide may be obtained.

#### DREDGING IN THE RIVERS OF MANITOBA AND THE N.W.T., EXCEPTING THE YUKON TERRITORY.

A Free Miner may obtain only two leases of five miles each for a term of twenty years, renewable in the discretion of the Minister of the Interior.

The lessee's right is confined to the submerged bed or bars of the river below low water mark, and subject to the rights of all persons who have, or who may receive entries for bar diggings or bench claims, except on the Saskatchewan River, where the lessee may dredge to high water mark on each alternate leasehold.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles, but where a person or company has obtained more than one lease one dredge for each fifteen miles or fraction is sufficient. Rental \$10.00 per annum for each mile of river leased. Royalty at the rate of two and a half per cent., collected on the output after it exceeds \$10,000.00.

#### DREDGING IN THE YUKON TERRITORY.

Six leases of five miles each may be granted to a free miner for a term of twenty years, also renewable.

The lessee's right is confined to the submerged bed or bars in the rivers below low water mark, that boundary to be fixed by its position on the 1st day of August in the year of the date of the lease.

The lessee shall have one dredge in operation within two years from the date of the lease, and one dredge for each five miles within six years from such date. Rental, \$100.00 per mile for first year, and \$10.00 per mile for each subsequent year. Royalty ten per cent on the output in excess of \$15,000.00.

#### PLACER MINING IN THE YUKON TERRITORY.

Creek, Gulch, River, and Hill claims shall not exceed 250 feet in length, measured on the base line or general direction of the creek or gulch, the width being from 1,000 to 2,000 feet. All other Placer claims shall be 250 feet square.

Claims are marked by two legal posts, one at each end bearing notices. Entry must be obtained within ten days if the claim is within ten miles of Mining Recorder's office. One extra day allowed for each additional ten miles or fraction.

The person or company staking a claim must hold a Free Miner's certificate.

The discoverer of a new mine is entitled to a claim 1,000 feet in length, and if the party consists of two, 1,500 feet altogether, on the output of which no royalty shall be charged, the rest of the party ordinary claims only.

Entry fee \$15.00. Royalty at the rate of 2½ per cent. on the value of the gold shipped from the Territory to be paid to the Comptroller.

No Free Miner shall receive a grant of more than one mining claim on each separate river, creek, or gulch, but the same miner may hold any number of claims by purchase, and Free Miners may work their claims in partnership, by filing notice and paying fee of \$2.00. A claim may be abandoned and another obtained on the same creek, gulch, or river, by giving notice, and paying a fee.

Work must be done on a claim each year to the value of at least \$200.00, or in lieu of work payment may be made to the Mining Recorder each year for the first three years of \$200.00, and after that \$400.00 for each year.

A certificate that work has been done or fee paid must be obtained each year; if not, the claim shall be deemed to be abandoned, and open to occupation and entry by a Free Miner.

The boundaries of a claim may be defined absolutely by having a survey made, and publishing notices in the *Yukon Official Gazette*.

#### HYDRAULIC MINING, YUKON TERRITORY.

Locations suitable for hydraulic mining, having a frontage of from one to five miles, and a depth of one mile or more, may be leased for twenty years, provided the ground has been prospected by the applicant or his agent; is found to be unsuitable for placer mining; and does not include within its boundaries any mining claims already granted. A rental of \$150.00 for each mile of frontage, at the rate of 2½ per cent. on the value of the gold shipped from the Territory. Operations must be commenced within one year from the date of the lease, and not less than \$5,000.00 must be expended annually. The lease excludes all base metals, quartz, and coal, and provides for the withdrawal of unoperated land for agricultural or building purposes.

#### PETROLEUM.

All unappropriated Dominion Lands shall, after the first of July, 1901, be open to prospecting for petroleum. Should the prospector discover oil in paying quantities he may acquire 640 acres of available land, including and surrounding his discovery, at the rate of \$1.00 an acre, subject to royalty at such rate as may be specified by Order in Council.

**JAMES A. SMART,**

Deputy of the Minister of the Interior.

OTTAWA, 9th Dec., 1901.

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The Mining Law gives absolute security to Title, and has been  
specially framed for the encouragement of Mining.

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 or 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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Iron in large bodies of magnetite and hematite ; copper in sulphide and native form ; gold, mostly in free milling quartz ; silver, native and sulphides ; zincblende, galena, pyrites, mica, graphite, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places, and are being worked at the present time.

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

**HONORABLE E. J. DAVIS,**

**Commissioner of Crown Lands,**

or

**THOS. W. GIBSON,**

**Director Bureau of Mines,**

**Toronto, Ontario.**



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## GOLD AND SILVER.

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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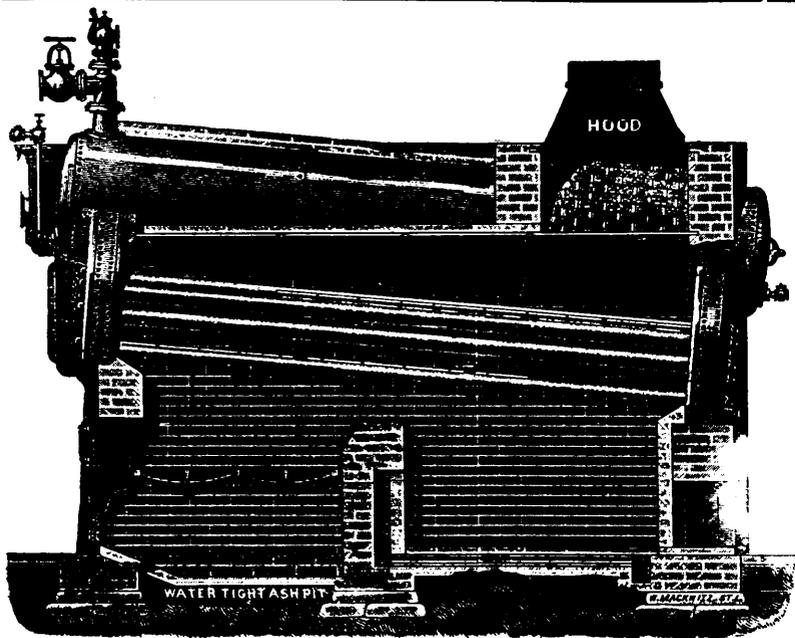
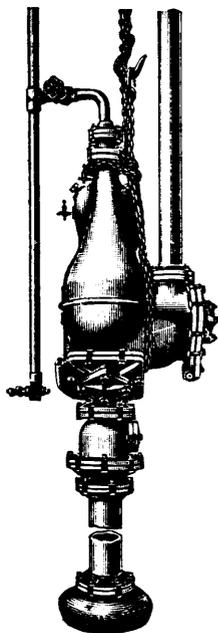
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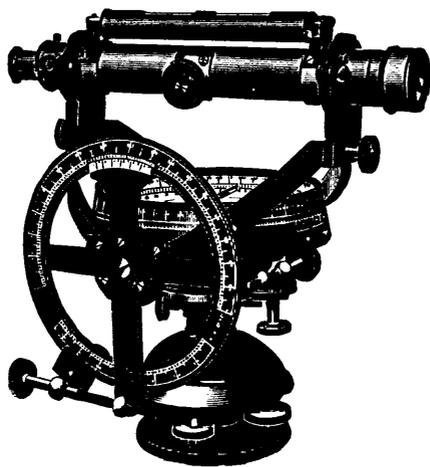


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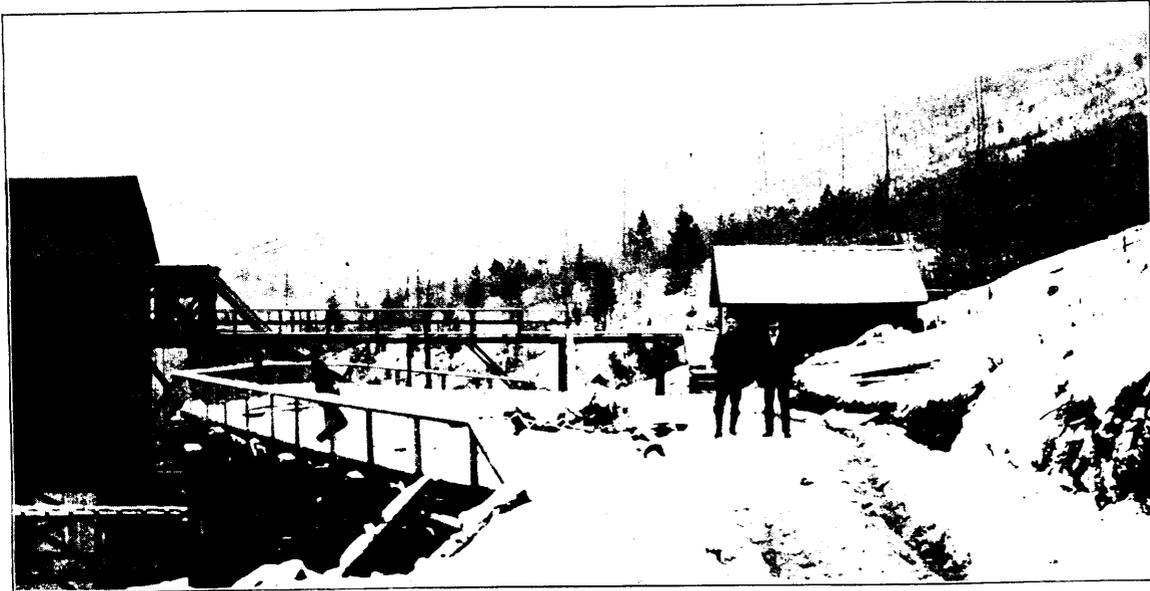
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