

Robert Bell

The **CANADIAN MINING REVIEW**

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MONTREAL, FEBRUARY, 1906.

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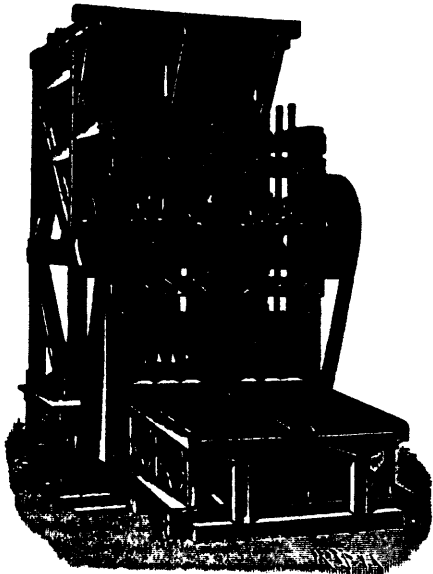
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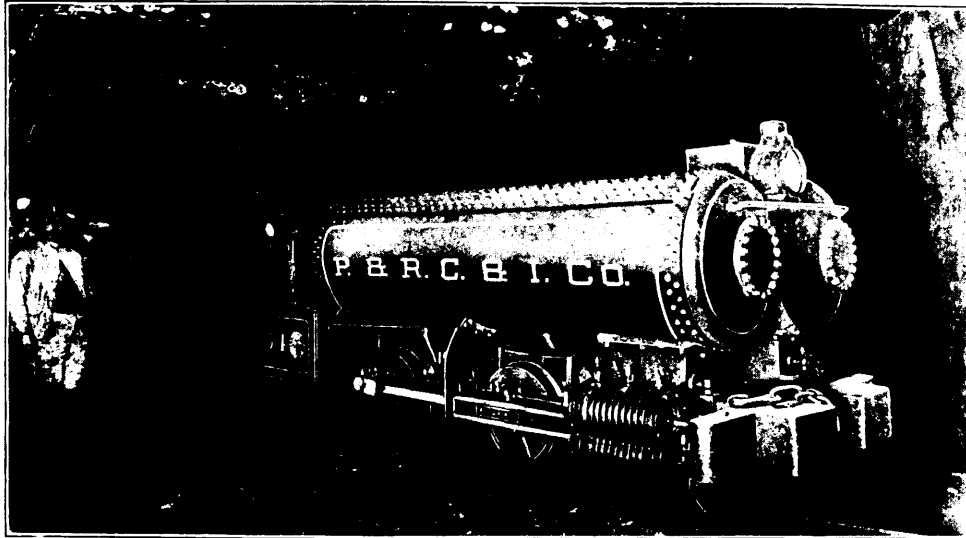
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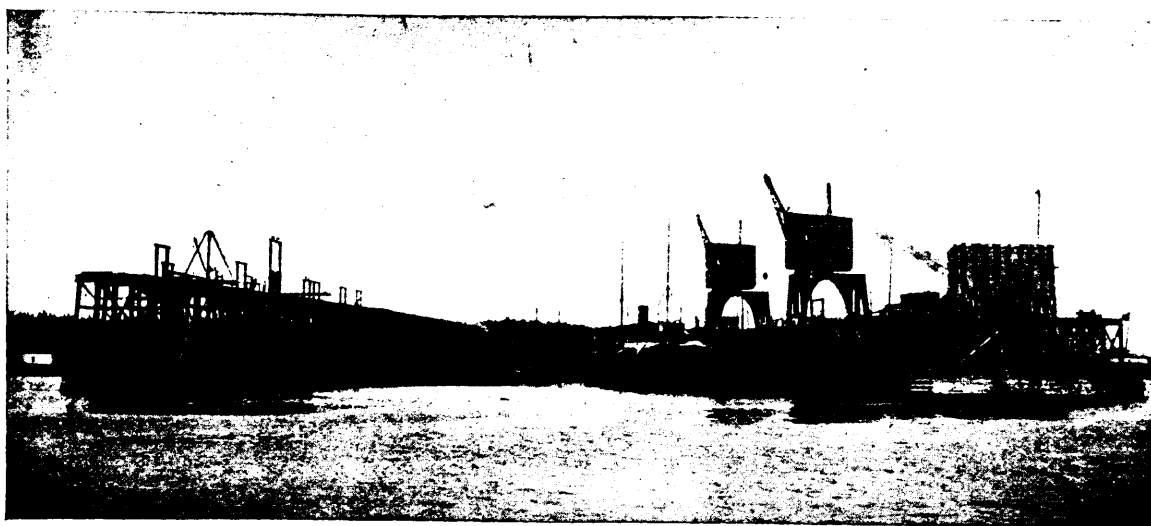
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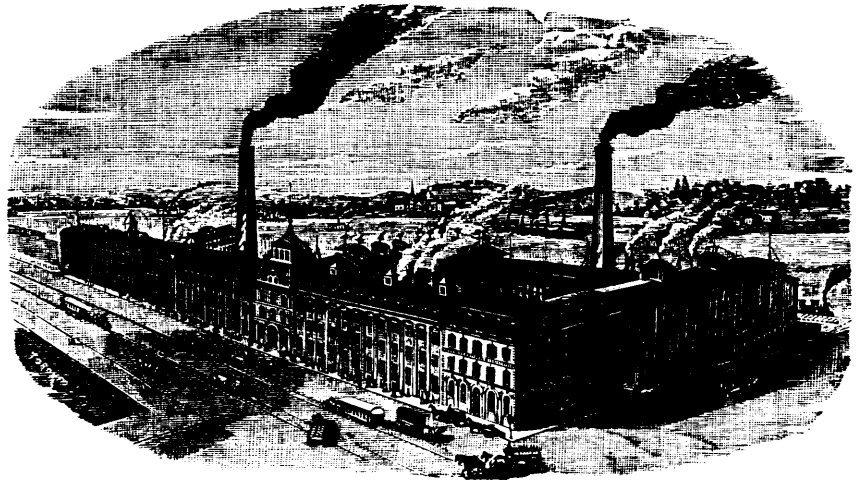
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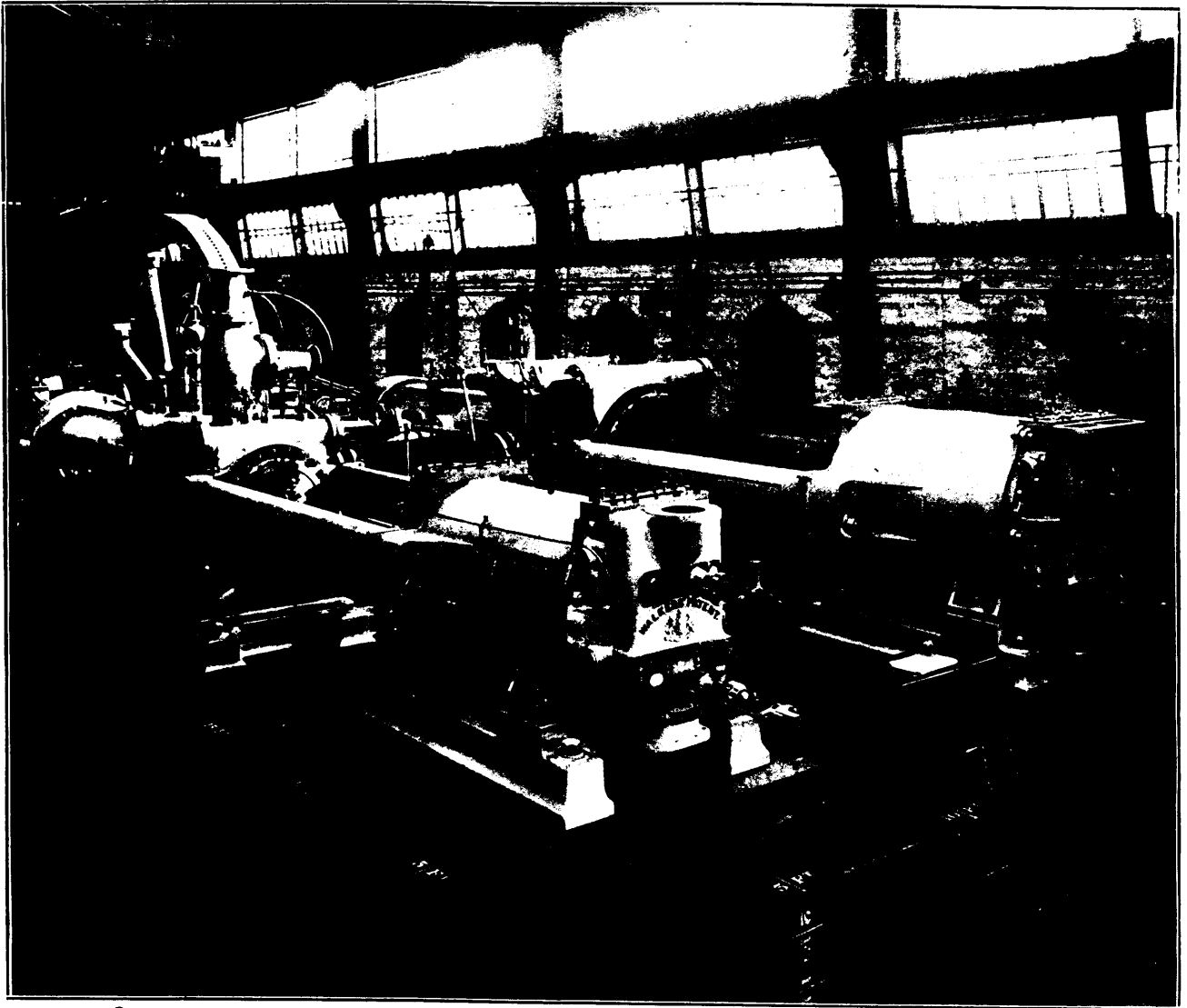
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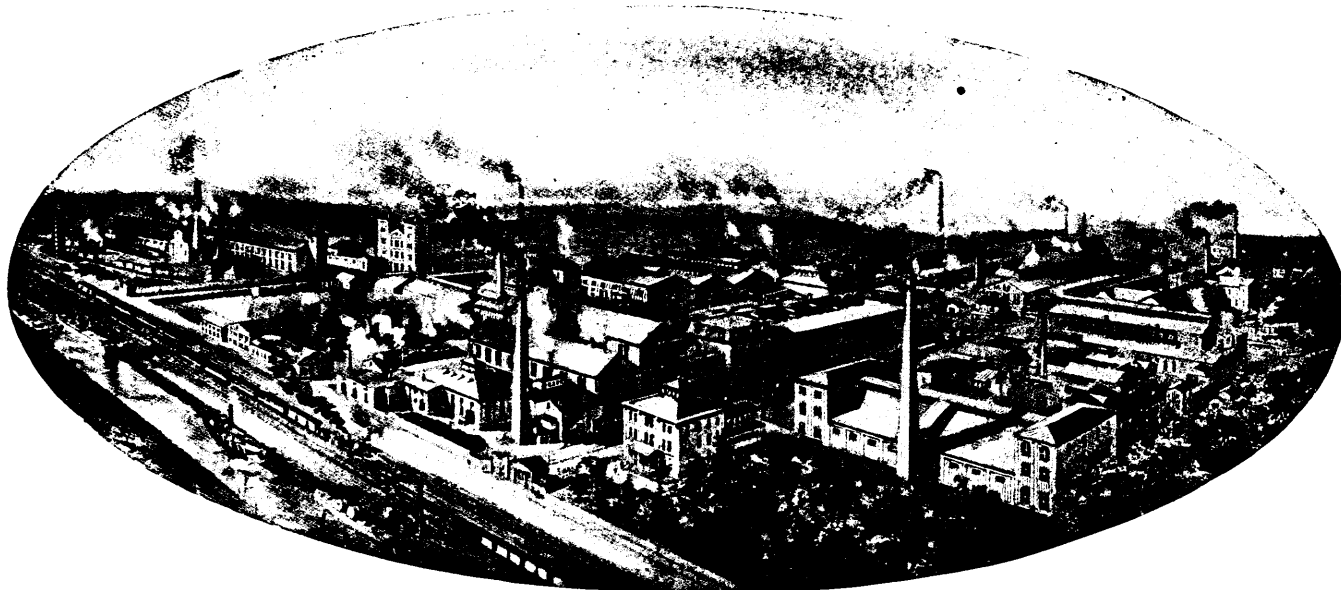
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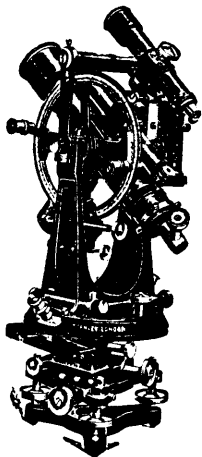
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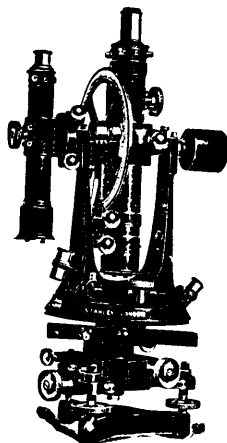
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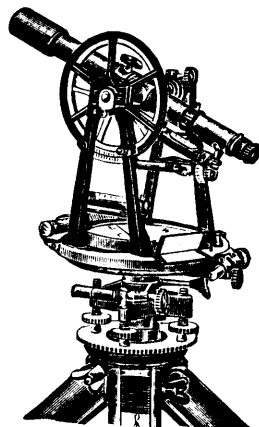
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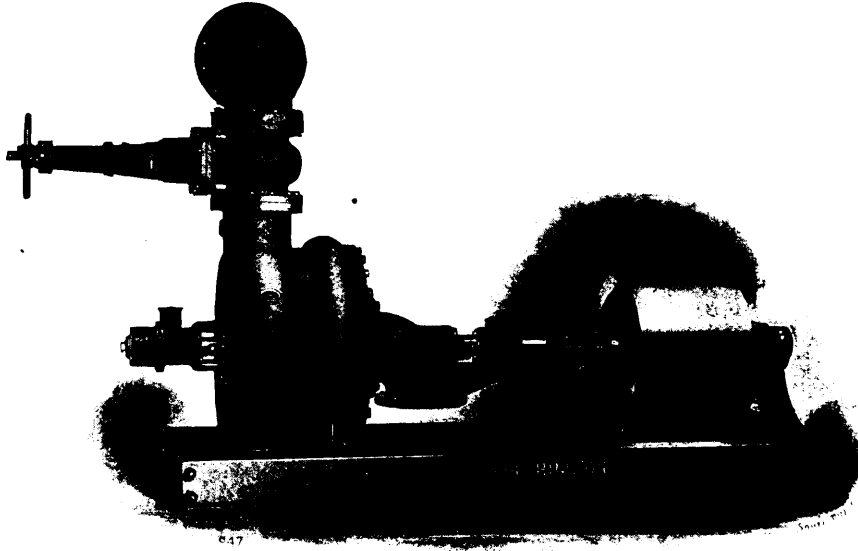
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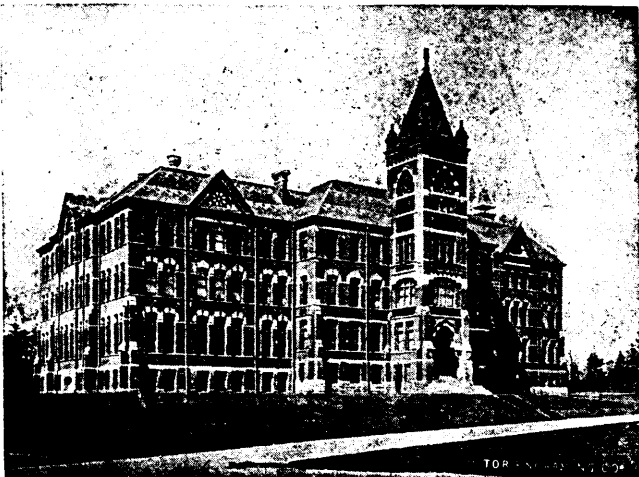
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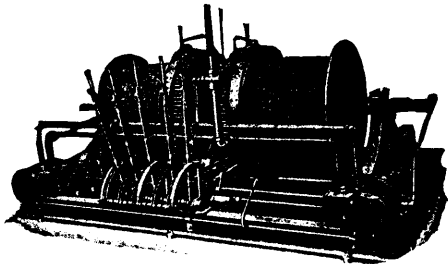
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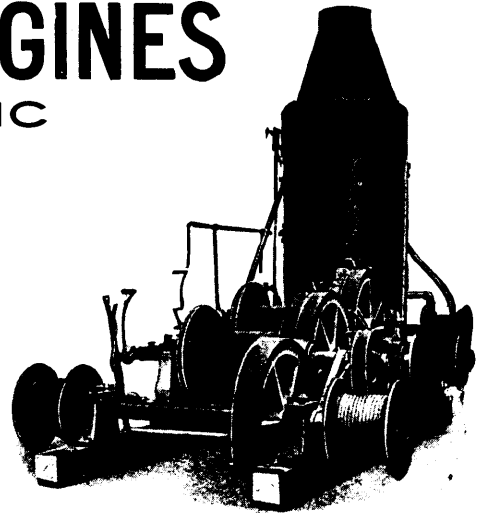
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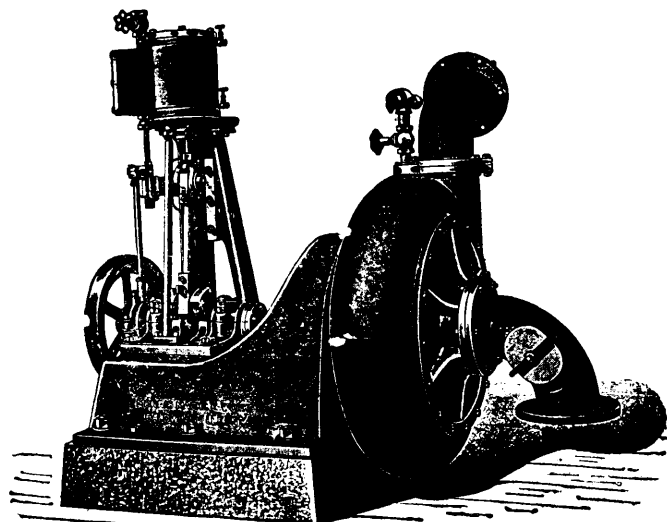
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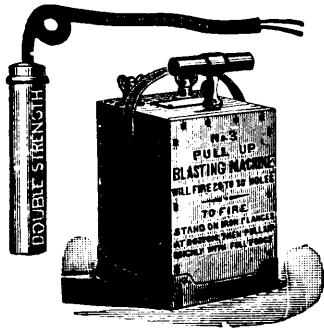
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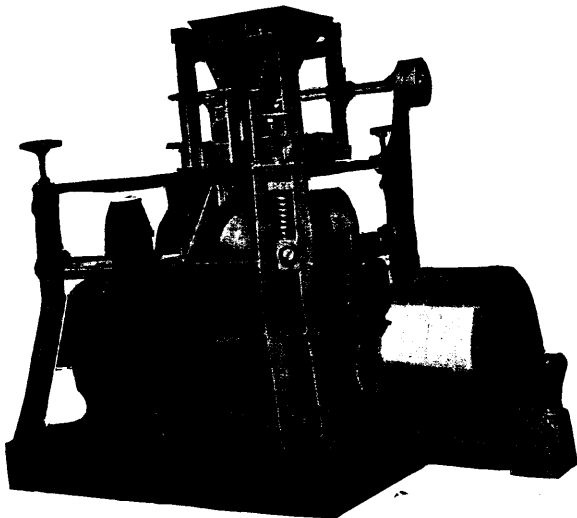
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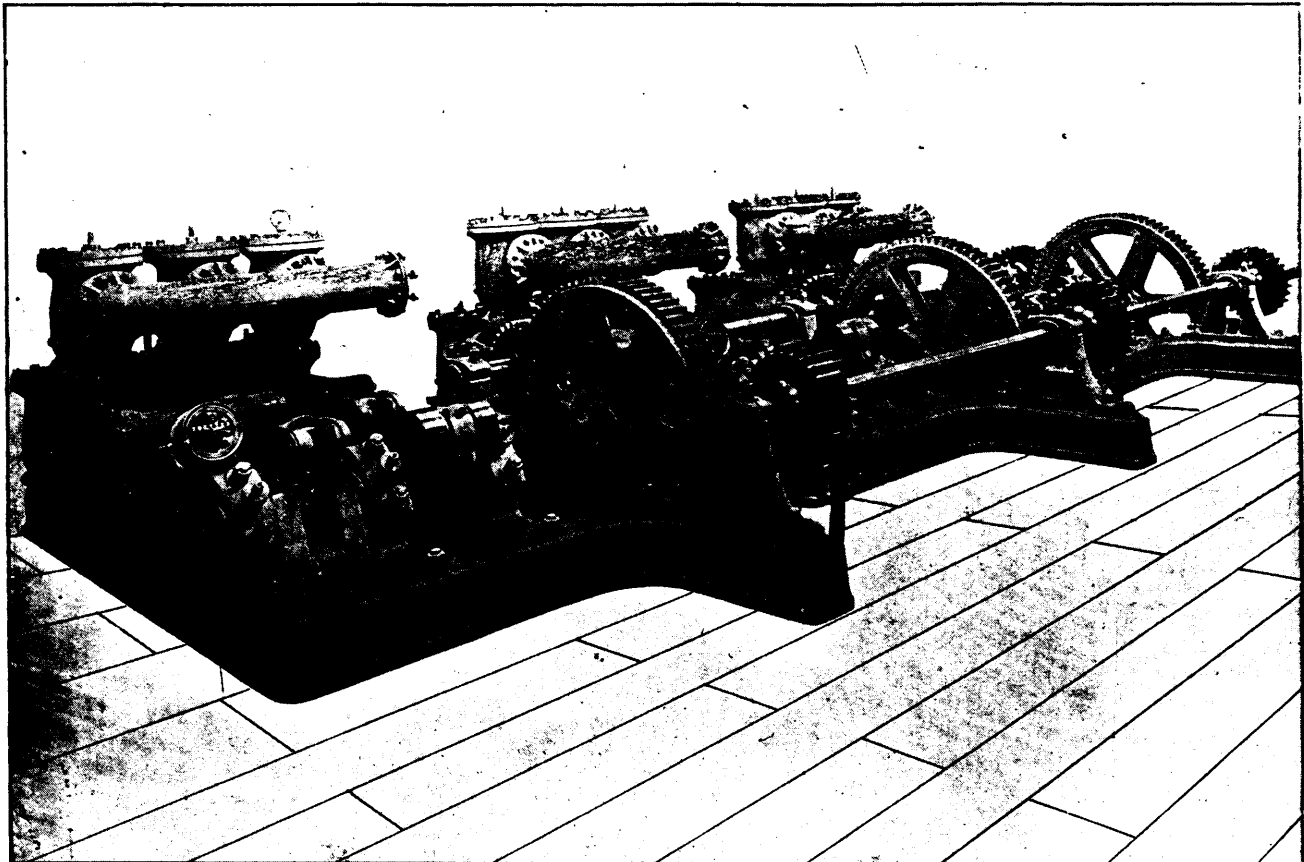
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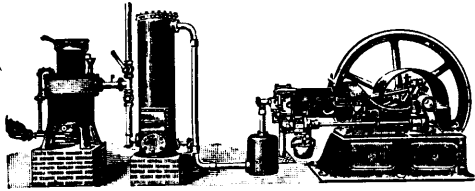
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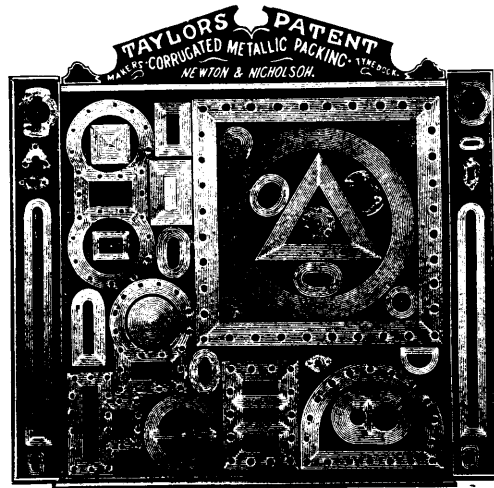
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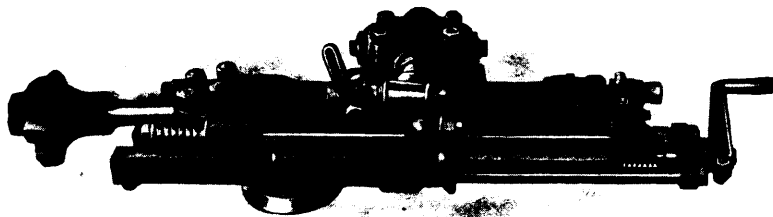
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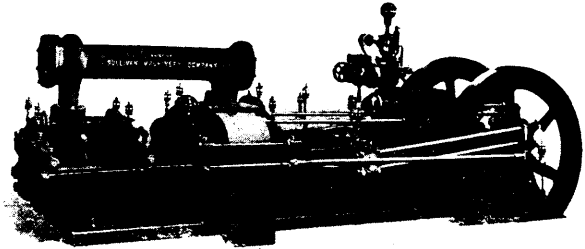
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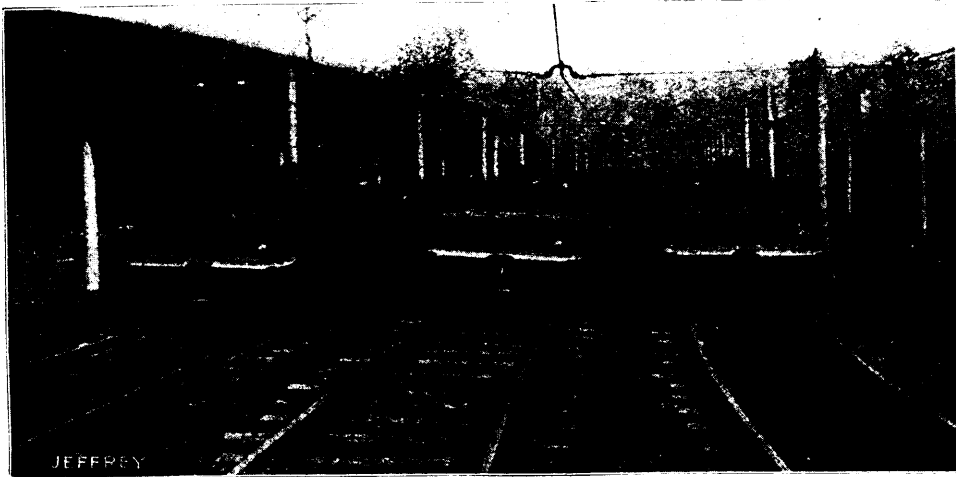
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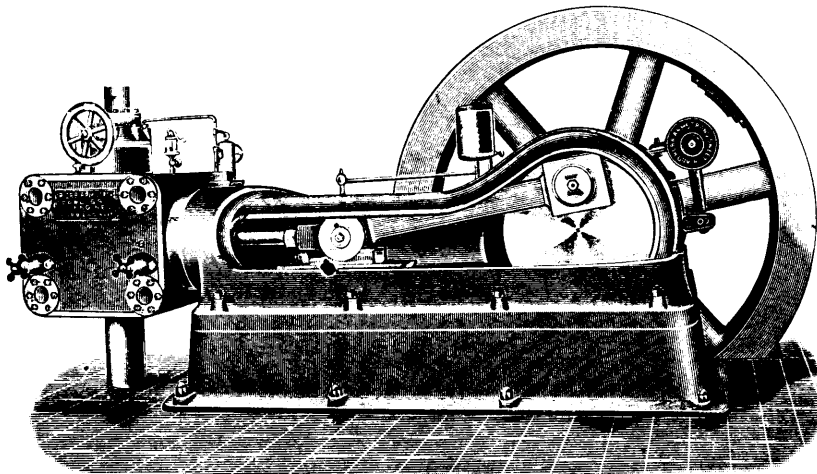
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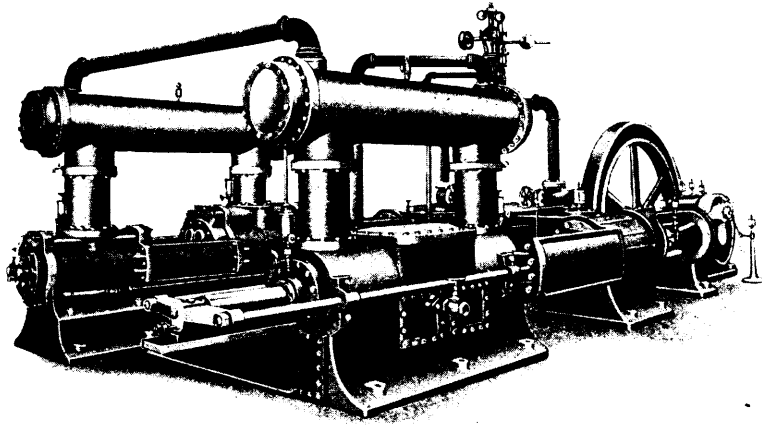
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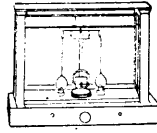
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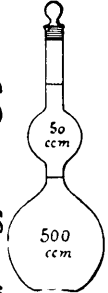
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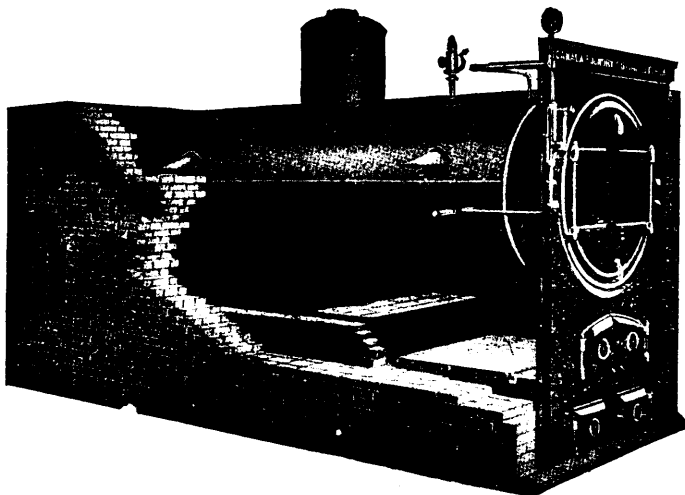
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A correspondent writing to the *Engineering and Mining Journal* on "The Ownership of Experiences," raises a question with which every engineer at some time in his career is confronted, namely: Whether the data acquired during the course of an extensive engineering practice, or during one phase thereof, is

the property of the engineer, or of the client employing him. Some courts (in the U.S.) have held that processes or inventions developed by men when in the employ of a corporation or employer are the property of that corporation or employer, but the letter referred to takes the ground, we think rightly, that data accumulated in engineering practice are the property of the engineer, and should remain so.

Our readers may remember that attempts at gold dredging on the Saskatchewan River have been, from time to time, made during the past ten years. All have been more or less directly the effort of one Dr. Roughsedge, a veterinary surgeon from Edmonton. After exhausting the willingness and resources of credulous investors in Ottawa, Montreal and other parts of Canada, this gentleman, some two years ago, turned his efforts towards the United States, and now publishes the fact that he has prevailed to the extent of being in a position to put on the river a dredge of "4000 tons" (sic.) capacity, costing \$57,000.00. The ability to make a satisfactory dividend from the 10c. dirt which, according to best authorities, is about the average contents of the property, is a matter anent which Dr. Roughsedge is discretely silent.

Even in a country where journalistic enterprise is taken as a matter of course, the extraordinary useful work of our New York contemporary, the *Engineering and Mining Journal* commands attention. We would, however, specially commend the annual review number of January 6th, which contains, in a series of most readable articles, a comprehensive summary of mining operations throughout the world for the past year. The labour in getting together and compiling this information must necessarily have been stupendous. Much space, we note, has been given to reviewing our Canadian industry, Mr. E. Jacobs contributing an interesting article on British Columbia, while Mr. T. W. Gibson and Mr. Dwight E. Woodbridge write on Ontario conditions. In a degree, the enterprise displayed by our Canadian press, especially in the west, is no less commendable. Thus the exhaustive review of British Columbia mining in 1905,

published in the *Nelson Daily News* on the first of the year was a quite remarkable achievement, and the same may be said of the Holiday Number of the *Phoenix Pioneer*, which is printed in magazine form, is most profusely illustrated, and contains some sixty pages devoted to a well-written description of the mineral resources and progress of the Boundary Creek district.

The Hon. J. Prevost, Minister of Colonization, Mines and Fisheries, in the Quebec Government, is contemplating a visit of inspection to the new Chibogamon district next summer in company with a qualified mining engineer, who will be specially engaged for the purpose. Mr. Prevost's object in undertaking this somewhat arduous journey is, we understand, to acquaint himself at first hand with the resources of the district and so place himself in a better position to form an opinion in regard to the steps that should be taken by the Government in assisting in the development of the region. The Province is to be congratulated in having as a Minister of Mines, a gentleman who takes so keen and personal an interest in the development of an industry, which is yet likely to occupy the first place in point of importance among the industries of Quebec. Before, however, that consummation is reached it is imperative that the present mining law should be repealed in favour of a measure that will better encourage individual effort and render difficult the present system of wholesale speculative blanketing of areas, so common. This, we believe, Mr. Prevost realizes. Meanwhile the interest that has recently been shown in the exploitation of new undeveloped mining regions is indicated by the fact that while for the fiscal year ending June 30th last, the revenue from the issuance of licenses was but approximately \$3,000, already during the six months the income derivable from this source has increased to over \$30,000.

The question of permitting the importation of Canadian zinc ores into the United States under the previous tariff ruling of the Treasury Department at Washington, which was distinctly advantageous to exporters, is again being raised, and a bill is about to be introduced into congress, providing that in future all zinc-bearing ores imported into the United States shall be subject to a duty of one cent per pound on the zinc contents. The definition of zinc-bearing ores, is stated as all ores, whether crude, concentrated or otherwise which contain zinc in any form or condition, either free or in combination, and in which zinc is more valuable than any other single component, irrespective of whether such ores are lead-bearing ores, or not. In discussing this bill, the *Mining Reporter*, (Denver, Col.) very truly remarks that to shut out Canadian zinc will undoubtedly cause this country to increase the production of its own metal, which will then be used, to the exclusion of over fifteen hundred tons now supplied annually by the United States. To pass the bill will temporarily benefit the producer of the ore and injure the smelter, and this period must then be followed by one of reconstruction, in which the various interests must effect a readjustment. On the whole, we question whether with improved home facilities for the treatment of zinc ores and the improved opportunities afforded for marketing the product in Europe, that the loss of the American market would be so serious to Canadian producers as at first glance might appear to be the case.

The hodge-podge of ideas respecting an economical and feasible process for obtaining satisfactory values from the silver-cobalt-nickel-arsenic ores of Temiscaming is adequately reflected in the numerous ridiculous paragraphs which are now going the rounds of the press. A majority of the producing mines are understood to have entered into a 5 years agreement with each other as to the disposition of their ores and to have decided to, themselves, solve the metallurgical problem by employing a chemist to experiment with the ores.

That, however, this combination is not entirely confident of its resources and abilities is indicated by a recent paragraph to the effect that it is also intends to ask the Ontario Government for a money grant towards defraying the cost of the proposed smelter. One wonders what has become of the offers to treat these ores which have been made by representatives of German houses, by metallurgists like Mr. Kirkgaard, and by Lieut. Van der Osten! And one also wonders why the opulent owners of these mines desire to share their profits and knowledge with the Ontario Government?

The mines of Coleman Township are both unique and valuable; but they are not, and will not be, exempt from the conditions which govern mining and metallurgical enterprises all over the world. No one can give the seller 100% of what he buys and have any margin for profit. We trust we may be in error, but the project seems to have elements of weakness which will require both time and money to overcome. A market for silver is always available, that for nickel usually, but the market for cobalt in large quantities has yet to be created.

Dividends in the Rand (S.A.) for 1905 amounted to the very satisfactory figures of \$24,250,000 (£4,849,582). The year of 1905 was an eventful one in the history of mining in South Africa. It was marked by the production of a new record in the gold fields, the total of the Transvaal reaching the figures of between \$101,000,000 and \$102,000,000, an increase of over \$23,000,000, while Rhodesia showed an increase of about \$3,000,000. It also showed that the solution of the labor difficulty, by the introduction of coolies, was effective; whether satisfactory or not (in a political sense) seems yet to be a matter of doubt.

During 1905 several new metallurgical methods or devices were introduced into the practice of the Gold Fields, the principal of which was the fine grinding or comminution of the ore; that tube mills will be the permanent practice is very doubtful, owing to the small capacity of the machinery, requiring a large number to deal with the huge quantity of material. The year was also noteworthy from the fact that it signaled the recognition of the economy of consolidation of properties, and many independent properties were benefitted thereby. There were slight reductions on milling costs, but no sensible diminishing of mining costs.

The reduction of milling costs has led to a generally lower grade of ore being milled at a profit; this result is not only due to reductions in the cost of the various parts of milling and cyanide practice but also to the large tonnage treated per stamp head.

Finally, the year was marked by what is called the beginning of the "base metal" industry, i.e., the opening and development of tin mining in Vlakklaagtz, and Enkeldoorn, and of copper mines in the northern Transvaal.

A correspondent writes: "I have been looking into the laws of the different Provinces in Canada, with respect to Mine Managers' Certificates, and I find, in general, that no Province has any provision for shortening the time of underground experience in favor of men educated in mining schools. It is of course necessary for the mine manager to have considerable underground experience before he is given even a second-class certificate, and still more before he is given a first-class certificate, authorizing him to have full charge of a mine. It is, however, perfectly obvious to any one that educated men, and particularly men educated in mining, can secure the necessary experience and information in a far less time than men with little or no schooling, and the law governing certificates should take account of this fact. As matters now stand, the law virtually discriminates against educated men in collieries, because the time spent at mining schools counts for nothing on the certificate, while even unintelligent labor is given full value. It seems to me that the British act (Coal Mines Regulation, 1887, Amendment 1903), is reasonable. It requires 5 years underground work for ordinary men but exempts graduates of special classes of mining schools, from 2 of the 5 years work."

Our correspondent's contention is, we think, well taken, in view, especially of the fact that graduates from mining schools in this country at least, frequently have spent a portion of their time while studying for their degree in acquiring practical experience. It should therefore be only necessary to call the attention of the proper authorities to the alleged injustice in order to have the matter set right.

We are indebted to the Editor of the *Mining and Scientific Press* for an advance proof of a leading article shortly to be published discussing the California State Mining Bureau, in which the delay in appointing a State Mineralogist, attributable to political intrigue, is compared with the present anomalous condition of affairs in connection with the Canadian Geological Survey. Our contemporary remarks that when "Dr. George M. Dawson died, Dr. Robert Bell succeeded temporarily to the duties of director. This happened five years ago, but Dr. Bell remains 'acting director.' A grave injustice has been done to him and to the Survey. The energies of the chief and of his subordinates have been weakened by the cliques formed to support one or other candidate for the position, the actual director has had his authority undermined by the uncertainty of his tenure of office and the Survey as a body has lacked the solidarity belonging to an organization having its properly appointed head. In other words, it is a mistake, either at Ottawa or at Sacramento, to sacrifice work of great usefulness to the exigencies of a political lobby." While this reference is not strictly accurate in point of fact, and therefore the parallel drawn is scarcely allowable, still it is undoubtedly true that neither Dr. Bell nor the Survey has been justly treated by the delay on the part of the authorities in appointing a successor to Dr. Dawson as director of the department. Dr. Bell was either competent to undertake the duties or he was not. If he was, why has he had the responsibility without the honour and the salary to which as director he would have been entitled; if he was not a fit person, why has he been permitted to administer the affairs of the department for five years? We still maintain that there is need for re-organization and reform in the

manner in which the Survey has been conducted in the past, and this may quite well be said without in any sense reflecting on the useful character of much of the work that has been done in recent years. We have therefore made no secret of our opinion that the task of re-organization, when it is commenced, should be entrusted to a young and energetic man, having special executive and administrative qualifications. But that view may be held without prejudicing one's sense of common fairness. Dr. Bell has grown old in the public service and his long record is one of which he has every reason to be proud. It is but just that his claims should be regarded, and this surely might be done without injury to the public interests.

The Tariff Commission which has been collecting evidence throughout the Dominion during the last few months with a view to possible tariff changes held a session at Sydney, C.B. on Friday, the 12th of January. It had been expected, in view of the somewhat strenuous and rabid utterances of members of the "Free Coal League" and its Halifax organ, that the session would have been largely attended, and that views of a widely divergent nature would have been expressed, but as a matter of fact little interest was actually shown. The Dominion Coal Co., through its chief sales agent, Mr. Alex Dick, and the Nova Scotia Steel & Coal Co. Ltd., through Mr. Harvey Graham, were the only coal companies to present an argument. Mr. John Moffat, the Secy. of the Provincial Workingmen's Association appeared on behalf of the coal miners of the Province, but it is noteworthy that none of the Pictou or Cumberland county mines thought it desirable to be represented. The argument for the maintenance of the present import duty was presented by Mr. Harvey Graham, who gave, briefly, a resumé of the coal production of N.S. for 1904, from which it appears that the total output for the year was 5,247,135 tons, of which 4,544,609 tons were marketed, and 702,526 tons were consumed by the collieries and workmen. The total number of persons employed was 11,650; the total royalty paid to the Nova Scotia Government was \$515,543.00. Of the total sales nearly one half (or 1,731,000 tons) were made to customers in the Province of Quebec. Competition with both American and English coal had been keen at all St. Lawrence River ports; and it was pointed out that if this market was lost through removal of the import duty the present production would be cut in half, with corresponding distress to the coal towns in Nova Scotia.

Perhaps the most significant portion of Mr. Graham's remarks was the statement that the efforts to find a foreign market in Europe, South America and the West Indies had been a failure with the exception of a partial success in Scandinavia. A strong case was also made out against the removal of the duty on anthracite culm or dust, which, in Ontario and western Quebec, is now being quite largely used for steam purposes.

Mr. Dick made the point that it would be difficult, or impossible, to check imports of coal intended exclusively for use in the manufacture of coke; that such coal could, and would be, also used for generating steam or power; that it would be impossible to prevent the distribution of coal, once it was imported free of duty.

Mr. Moffat confined himself to the reading of a resolution of his Grand Council, in which the P.W.A. put itself on record as opposed to any alteration of

the duty on soft coal, and is in favour of establishing a duty against the importation of anthracite dust. It would seem, meanwhile, that the present duties will, in all probability, remain in force.

It is satisfactory to learn that a very interesting programme has been prepared for the annual meeting of the Canadian Mining Institute next month. In all, some forty papers have been promised, many of which, dealing as they do with recent important mining and metallurgical developments in Canada, have a special value on this account. Thus, in addition to a lecture to be delivered by Mr. J. E. Hardman on the new Chibogamon region, Mr. A. P. Low, of the Geological Survey, Mr. J. Obalski, Inspector of Mines for the Province of Quebec, and Mr. Armand Muscovici, are contributing papers on the mineral resources of this new and promising area. Prof. W. G. Miller, Provincial Geologist of Ontario has kindly consented to lecture on Cobalt, while another new quarry district, that of Windy Arm, in the Yukon, will be described by Mr. R. G. McConnell. Among the contributions on metallurgical matters, may be mentioned an interesting account by Mr. R. R. Hedley, manager of the Hall Mining and Smelting Company's smelter at Nelson, of a new matte separator recently installed and now in successful use at these works; notes on stamp mill practice by Mr. Courtenay De Kalb; a paper by Mr. J. W. Evans, on some experiments in electric smelting of titaniferous iron ores of Hastings County, Ont.; and a contribution by Mr. H. E. T. Houltain of the Canada Corundum Company, on "Some phases of Concentration". The subject matter of this paper, we understand, refers to the method of operation as being greater than the importance of special design, which is the keynote of the present direction of progress in the west. Of late some interesting developments have taken place in connection with iron mining at Torbrook, N.S., and these will be described in a paper to be contributed by Mr. W. R. Parsons, manager of the Londonderry company; and, in view of the attention that is now being directed to the exploitation of British Columbia's iron resources, Mr. W. Blakemore's paper, on the possibility of steel manufacture in that Province should be most timely. Two papers, having for their text, the need for the revision of mining law in, respectively, Ontario and the Yukon are being prepared by Mr. J. M. Clark, K. C. of Toronto and Mr. J. B. Tyrrell, of Dawson. The Secretary, Mr. H. Mortimer Lamb, in his paper, calls attention to the present necessity for the establishment of a Federal Department of mines, in the hope that the Institute, if his views are endorsed, will take official action in bringing to the notice of the Government the claims of the mining industry for recognition in this regard. Altogether the meeting promises to be a most successful one, and it is to be hoped that a large attendance may be depended on.

THE TARIFF COMMISSION AND THE IRON INDUSTRY.

One of the most important, and, to the mining industry, the most interesting of the sessions of the Tariff Commission was held the last week in January in different towns in Nova Scotia. The interesting and important part of the sessions was the fact that they related to the continuance of the present duties

on coal and iron, a majority of the producers asking that the duty, (or its equivalent the bounty) on iron, both in the metallic state and in ores, should be increased. As the matter, perhaps, is one of special importance to a large number of our readers, we summarize the essential parts of the various arguments.

The plea for assistance to the iron ore producer as distinct from the assistance given to the iron master was presented to the Commission in the form of a pamphlet containing the list of the various arguments previously printed in the *Halifax Morning Chronicle*, and this plea was supported by a verbal address by Prof. J. E. Woodman, of Dalhousie College, Nova Scotia, who claimed to speak on behalf of a special committee of the Mining Society of Nova Scotia. The *Chronicle's* plea was as follows:—That, whatever the intentions of the promoters of the iron and steel industries of Nova Scotia have been, the public of the province expected that the large deposits of iron ore in that province would be developed and utilized to the benefit of the province at large; that expectation had not been realized by reason of the fact that the metallurgical plants drew the larger portion of their ore supplies from foreign sources; this importation of cheap foreign ores suffocated the feeble iron mining industry of the province. The point was made that the various iron and steel plants of the province did not consume 5,000 tons of native Nova Scotian iron ore in the course of a year; that the output of iron ore had dropped from 75,000 tons in 1892 to 12,000 tons in 1903; that but for the exception of the consumption of native ore utilized by the Londonderry Iron & Mining Company, the iron mining industry of Nova Scotia would be practically extinct; that the remedy for this was not the imposition of a duty on foreign ores, but the taxing of the public to place a bounty on *all native ore* produced; that this bounty should be paid directly to the iron *miner*; that the iron master is adequately protected; that the iron miner has no protection. The amount asked for was the sum of 50 cents a ton on ore having 50% of metallic iron.

The argument of the *Chronicle* is to the effect that, the introduction of Newfoundland ore in place of Nova Scotia ore was not due to the lack of excellence in the native ore, but solely to the selfishness of the Nova Scotia Steel and Coal Co., who, as the owner of the large deposits at Bell Isle, went into business as miners of ore for foreign markets and were able to supply the Ferrona and Sydney furnaces with cheaper iron ore than the Nova Scotia mines could give. A table which we extract shows the rapid growth of the iron ore trade from the Bell Isle mines and the very erratic production from the Mainland mines of Nova Scotia:

PRODUCTION OF IRON ORE.

Year	(Tons, 2,240 lbs.)	
	In Nova Scotia Tons	In Newf'dland Tons
1894 (7)	83,512	(nil)
1895	79,636	(8) 750
1896	65,932	38,450
1897	44,146	*58,940
1898	31,050	*102,000
1899	16,169	*306,880
1900	15,507	*317,216
1901	15,200	738,206
1902	15,214	728,721
1903	11,952	588,795
1904	49,619	589,739

*At the Bell Island Mines of Nova Scotia Steel Co. and Dominion Iron and Steel Co.

In the argument several interesting facts appear which may be worth noting. The chief of these is; that in 1904 the steel companies of Nova Scotia received in national bounties sums amounting to \$600,000.00; that the pay-rolls for the mines on Bell Isle amount to about \$300,000.00 per annum; the admission that foreign iron ores cannot be taxed at present for the reason that too great a storm would be created by the iron smelting companies now in existence; and therefore, that the most feasible method of robbing the people for the benefit of the iron industry, is to pay a bounty to the iron miner on every ton of ore smelted by a Dominion iron works.

Prof. Woodman, in his address supporting the claims of the *Chronicle's* pamphlet, illuminated the situation somewhat by acknowledging that the development of the iron ore production of Nova Scotia was hindered by two difficulties, the first one being that the ore bodies themselves were too scattered, or not sufficiently concentrated, to make economic mining possible; and secondly, that the value of the iron ores of Nova Scotia was less than that of the ores of the Lake Superior region, or other ore, that were imported by the smelting companies, qualifying this statement by an opinion of his own, that this second reason was not equivalent to saying that their values would not make them non-useful by the iron master. In other words, his plea was for the use of an inferior ore by the iron master. Such inferiority, one can imagine, is proposed to be met by the Government bounty on the ore mined, the gist of the arguments, both by the *Chronicle* and Prof. Woodman, being that, if an individual owned iron ore land, it should pay the Government to give such individual such assistance in shape of bounty that he could afford to sell his ore to a smelter at a sufficiently low price to enable the smelter to use it profitably in competition with better ores obtained from a foreign source. The statement which has been current for two or three years in the Eastern press, and which is backed up by the men who know best what they are talking about—such as Mr. Graham Fraser and Mr. Thos. Cantley—namely, that the search for iron ores in Nova Scotia has revealed no bodies which were worth utilizing economically, is repeated by the Professor, and, of course, is erroneous when considering the extremely valuable metallurgical work and practice which has been initiated and is now being carried on successfully by the Londonderry Iron & Mining Company at Torbrook and East mountain ores. In reply to questions by the Hon. The Minister of Finance, Professor Woodman admitted that the benefit of the bounty on pig iron was felt by the iron miner, but only indirectly. When it was suggested that the Government of Nova Scotia should follow the practice of the Ontario Government and give a bounty out of the local treasury, his reply was, that the Province was appealing for *federal* assistance, and not for *provincial*, and the gist of the whole argument was clearly apprehended by the Hon. Mr. Fielding in his statement that any bounty granted upon iron ore would have to be sufficient to make the iron master take the native ore in preference to the imported ore from Newfoundland.

At the Truro session, on January 27th, a logical plea for an increase of the duty on imported pig iron and for the continuance of the bounty on pig iron manufactured from native ores in Canada, was made by Mr. Thos. J. Drummond, President of the Londonderry Iron & Mining Company. Mr. Drummond showed that prior to 1897 the duty on imported pig iron was \$4.00 per ton; that by subsequent legislation it had been first reduced to \$2.50, which, by the

British preference of 33½%, had been further reduced to \$1.67. The bounty on pig iron previous to 1897 had been \$2.00 per ton, so that in the years prior to '97 the duty and the bounty together gave aid to the industry to the extent of \$6.00 per ton. Subsequent to 1897 the bounty was increased to \$3.00 per ton for one year, the bounty for subsequent years to be on a diminishing scale, so that all bounty would be removed by the end of the 10th year leaving only the import duty of \$1.67 on pig iron. Mr. Drummond asked that a bounty of \$2.00 per ton should be paid for a period of 5 years, and that the duty on imported pig iron should be increased to such an extent, as to give protection equivalent to \$2.50 per ton, regardless of preference duties so that for the next 5 years the industry might be sure of a total encouragement of \$4.50 per net ton. Mr. Drummond made clear one point in favour of the Ontario furnaces, by showing that foreign pig could be brought to the ports of the Maritime provinces at rates which would enable it to compete very strongly with the products of the Nova Scotia furnaces, but that when such imported pig iron had also to pay rail freights, in addition to the water freights, the price for such iron was materially increased, and hence it caused less competition with the iron produced by the furnaces in Ontario.

Mr. B. F. Pearson, speaking on the subject of "Aid to the iron industry" generally, made a plea for greater consideration to the proposal to give a bounty to makers of iron from native ore, native fuel and native fluxes. Mr. Pearson estimated that, of the cost of mining and smelting iron ore into pig iron, fully 90% was spent for labour (we very strongly question this); that in the further conversion of the pig into billets the cost was about \$5.00 per ton, of which only 25% was labour; that the further conversion into rods cost about \$5.00 per ton more, of which also not more than 25% was labour. He said that, in producing pig iron \$10.00 to \$12.00 per ton was paid for labour, (we are sure that in this respect Mr. Pearson is very much at sea). He further stated that in all but two counties in the Province of Nova Scotia there were large deposits of ore, and in the very next paragraph modified his statement by saying that, although these deposits of ore were known to be numerous and of high quality, yet *their extent was unknown*, and after paying a deserved tribute to the work of the last two or three years at Londonderry and Torbrook, spoke of other deposits concerning which all the information which we have is detrimental rather than advantageous.

THE U. S. GEOLOGICAL SURVEY AND THE STATE MINING BUREAUS.

In the course of an interesting address delivered at the meeting last November of the American Mining Congress, Dr. C. D. Walcott, director of the U.S. Geological Survey, after stating that the national organization was ready to co-operate, and was, in fact, already co-operating with the State Mining Bureaus, proceeded as follows:—

"Co-operation in the collection of statistics of mineral production is now in force, and has been carried on for several years between the United States Geological Survey and the state surveys of Iowa, Maryland and North Carolina, and arrangements are now being made with the State Geological Survey of Illinois for similar co-operation. The state geologists in these states act as agents of the United States Geological Survey. This office furnishes the stationery and the

franking privilege to the agents in these states for the purpose of collecting returns, principally from delinquent mineral producers the general plan providing that the first request for mineral statistics shall be sent out direct from the Washington office, and that the state geological surveys shall endeavor to procure returns from all those not responding to the first request.

"The survey is engaged in co-operative work in geology with the states of Maine, New Jersey, Alabama, Pennsylvania and Washington. The form of co-operation varies widely. In some states, as Maine and Pennsylvania, an appropriation is made by the state and placed in the hands of commissioners, who are authorized to arrange for co-operation with the federal survey. An amount equal to the state appropriation is allotted by the federal survey and the work is done entirely by the latter organization. By this form of co-operation the funds available for expenditure on geologic work within the state are doubled and the representative of the state indicates the order in which various geological problems in the various parts of the state shall be investigated.

"A commoner form of co-operation is that in which the federal survey and the state survey each carries out certain lines of investigation, and each furnishes to the other organization the results obtained. This form of co-operation prevents a duplication of work by state and federal organizations and secures harmonious results. It also supplements the state surveys by furnishing them the service of specialists who could not otherwise be secured.

"This survey has made no active effort to induce state organizations to enter into co-operative arrangements. On all proper occasions, however, it announces its willingness to consider any form of co-operation with the state organizations which may be appropriate for the particular conditions present in each case.

"Co-operation in topographic work is now carried on with California, Illinois, Kentucky, Maine, Maryland, Michigan, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania and West Virginia. The appropriations made by the state for co-operative surveys in topography are chiefly used for actual field work, in which are included the salaries of temporary employees, who are usually residents of the state, and for the living and travelling expenses of the field force. It may be used for paying office salaries only so far as it is necessary to equalize the expenses of both parties to the co-operation.

"The methods pursued for co-operation in hydrographic investigations are essentially those followed in topographic mapping. The funds furnished by the state are supplemented by an equal amount allotted from the appropriation for gauging streams and determining the water supply of the country. The field work is carried on under a general system which has resulted from an experience extending over many years. The engineers or hydrographers are especially trained for this work, and have charge of the field work, the details of which are entrusted as far as practicable, to local men.

"From the experience gained, certain conditions essential to the success of co-operation have been established. All work which is, in part, paid for by the Federal survey and which may be published by it, or on its authority, must be controlled by the director. He selects assistants to perform such work, or approves their selection. In its execution the work is subject to the supervision and approval of the appropriate chief of the Federal survey. Payments for continuous service on account of state co-operation can, under the

civil service rules, be made to a state official only in case he also receives a Federal appointment. Each year plans and estimates for the season are mutually prepared and a report of operations and results is submitted to the state officials, as is customary in the United States Survey. All agreements for co-operation are drawn in such a manner as not to conflict with the organic law of the survey in regard to collection, furnishing information or giving expert testimony.

"One important point to be considered in all such work is that the general plans and methods of the Federal survey cannot be set aside on account of state co-operation. At the present time the funds available for co-operation are so limited that its further extension is dependent upon an increase of appropriations by congress. It is against the policy of the survey to stop work on important areas or subjects in order that co-operation with individual states may be extended. The director is willing to enter into a co-operation agreement only when the interests of the country as a whole will be benefited. In the execution of the work, certain features must necessarily be taken up first, and if this order is in line with what the state desires, co-operation may be had to the greatest advantage, both to the state and to the Federal government. The general policy and work of the survey can be changed only by the direction of congress."

It seems to us that the above is suggestive of what might also be accomplished in Canada.

THE NEED OF A FEDERAL DEPARTMENT OF MINES.

The time was probably never so opportune as at present for the establishment at Ottawa of a Federal Department of Mines, under the direction of a responsible Minister of the Crown. The industry is now on the eve of great developments, and, in the next few years, under anything like favourable conditions, there should take place a quite unparalleled progress and growth in Canadian mining. Again, an industry whose annual production is already valued at over seventy million dollars, and which is therefore a considerable factor in contributing towards the general prosperity of the Dominion is surely entitled to that recognition and assistance which the creation of a distinct Department of Mines might be expected to afford. It has, we believe, been urged that the Dominion Government would scarcely be justified in establishing a Mines Department, since it could exercise no jurisdiction or control over the mines in the provinces. But that argument appears singularly ineffective, when attention is called to the useful work for years successfully carried on, under precisely similar conditions, that is so far as these limitations are concerned, by the Department of Agriculture. It is asked for the mining industry that it be aided and encouraged on just such lines. If, for example, Government experimental farms are justified, and no one will question it, there then should be equally good reasons for the establishment of well-equipped government metallurgical laboratories, where exhaustive experiments and tests might be conducted as occasion demanded. The need for such experimental works was indicated only recently, when, in connection with the Government zinc investigations in British Columbia, ore selected for concentration tests, was sent out of the country to Colorado for treatment. Obviously it would be an advantage if all such work in future could be undertaken at home under direct Government

supervision. Furthermore, in a case such as Rossland district furnishes, where already large sums have been spent in the endeavour to discover a cheap and efficient method of treating the lower grade ores; or, another instance, that of the refractory Cobalt ores, Government assistance might well be sought and be productive of the most important results.

In addition, of course, to the several experimental farms, the work of the Department of Agriculture embraces a very wide range. Not only is every farmer, every small settler even, in the Dominion, kept well supplied with literature of a practical nature, including special reports and bulletins, but there are free distributions of plants and seeds; and specialists are employed to tour the country to actually teach the farmer his business. These are but instances of the valuable character of a work that is doubtless in no small degree responsible for the prosperity now so general throughout rural Canada. In very like manner the mining industry might be helped forward. What is now chiefly desired is the dissemination of practical information, that will advantage alike the miner, the prospector and the investor; and such information should, of course, be absolutely dependable and accurate. The mineral resources of the country also require to be more extensively advertised abroad and attention called to such progress as is being made. This might best be accomplished by the publication of statistics at regular and at more frequent intervals than at present; while even the very up-to-date methods of the U.S. Geological Survey of issuing and judiciously circulating a weekly bulletin summarizing the work of the department for these periods, might ultimately be adopted. It is not, however, the purpose of this article to go at length into details, but merely to point out that there is ample scope and work—which, in fact, might be extended indefinitely—for a Federal Department of Mines.

THE CENTRE STAR AMALGAMATION.

At a meeting of the shareholders of the Centre Star Mining Company, held on January 27th at Toronto, the plan as proposed by the directors for the consolidation of the properties of this company, the St. Eugene Mining Company, the Trail Smelter and the Rossland Power Company, was duly approved. Under this arrangement the capitalization of the consolidated property has been placed at \$5,500,000.00, of which, shares to the equivalent of \$4,698,800.00 will be issued to shareholders, in exchange for their present holdings, on the basis agreed, while \$801,200.00 will be reserved for treasury uses. The respective companies are also contributing \$600,000.00 pro rata to provide working capital. Previous to the meeting the directors issued the following circular:—

Your directors have for some time past been of the opinion that a consolidation of the properties of the Centre Star Mining Company (including those of the War Eagle Mining Company), the St. Eugene Mining Company, the Trail smelter and the Rossland Power Company, was desirable and in the interest of the shareholders of your company, and to that end caused an examination of the various properties to be made, and reports thereon to be prepared by Professor R. W. Brock, of the Dominion Geological Survey; John H. McKenzie, formerly general manager of the Le Roi mines, and a member of the firm of Bradley & McKenzie, mining engineers of San Francisco; James Cronin, general manager of the Centre Star, War

Eagle and St. Eugene mines; R. H. Stewart, E.M. superintendent of the Centre Star and War Eagle, and J. M. Turnbull, E.M.

Your directors in pursuance of the general scheme for amalgamation of the properties above mentioned, have, as you have already been advised, entered into an agreement providing for the sale of the entire assets of your company to the Canadian Consolidated Mines, Limited, in consideration of the issue of 15,555 shares (of the par value of \$100 each) of the capital stock of the last named company the consideration for the sale being based upon the report of the experts named above.

The capitalization of the Canadian Consolidated Mines, Limited, will be \$5,500,000, of which the sum of \$4,698,800 stock will be issued in consideration of the purchase of the entire assets of the following companies, in the following proportion, that is to say:

The St. Eugene Consolidated Mining Co., Ltd	\$2,333,300
Centre Star Mining Co., including War Eagle properties.	1,555,500
Trail smelter	750,000
Rossland Power Company.	60,000
Total.	\$4,698,800

The remaining \$801,200 will be for the present retained in the treasury.

Your directors consider it absolutely necessary that the new company should commence business with the full complement of supplies and with not less than, approximately, \$600,000 in cash as working capital, and accordingly have arranged that this amount should be contributed by this company, the St. Eugene company and the Trail smelter in proportion to the relative values fixed by them for the purpose of amalgamation, the working capital so contributed being included in the values above stated.

Your directors are of the opinion that the amalgamation is very greatly in the interests of the shareholders of all the companies, as affording greater security for the payment of dividends, both in relation to a consistent or average production of ore and as giving to the amalgamated company a self-contained business not dependent upon its ability to make satisfactory contracts with independent smelters.

THE COPPER SITUATION.

The National Conduit & Cable Company reports copper as remarkably steady and strong at about the level of 187c. for electrolytic wire bars for delivery from three to six months hence

The danger of any decided reaction this side of June or July has been reduced to a minimum by aggressive buying on the part of some large consumers and running through to July. An era of high prices has been established and conditions have swung around in favor of keeping business up to the new level of prices.

The production has increased considerably over previous years. It is probable the United States copper production last year was not far from 395,000 to 400,000 tons, as against 362,739 tons, or an increase of about 10%, which is only about normal for the domestic output. Consumption for 1905 in this country is estimated at between 600,000,000 and 650,000,000 pounds. The year 1906 began with a scarcity of available copper, and the question of ready stocks is less of a factor than in many years. The trade reports from London are of an encouraging nature. Stocks of copper in Europe are small and with a strong statistical position there is no chance for the market to be other than firm.

THE CALCITE VEIN--A TALE OF COBALT.

By Dr. W. H. DRUMMOND.

I used to be leevin' on Bonami,
Fines' place on de lake, you bet!
An' dough I go off only wance, sapree!
I t'ink I will leev' dere yet,
Wit' tree growin' down to de water side,
W'ere leetle bird dance an' sing—
Only come an' see you don't shout wit' me,
Hooraw! for Temiskaming!

But silver boom an' de cobalt bloom
P'ay de devil wit' Bonami,
So off on de wood we all mus' go,
Leevin' de familee—
Shovel an' pick, hammer an' drill,
We carry dem ev'ry w'ere,
For workin' away all night an' day
Till it's tam to be millionaire.

So it aint very long w'en I mak' de strike,
W'at dey're callin' the vein cal-cite,
Quarter an inch, jus' a leetle "pinch"
But soon she is come all right
An' widen out beeg: mebbe wan'sixteen
An' now we have got her sure!
So we jomp on our hat, w'en she go lak' dat,
Me an' Bateese Couture!

Early in spring we see dat vein,
W'en de pat-ridge begin to drum,
De leaf on de bush start in wit' a rush,
An' de skeeter commence to come—
Very nice tam on de wood for sure,
If you want to be goin' die,
Skeeter at night till it's come daylight,
An' affer dat, small black fly!

Couple o' gang lak dat ma frien',
'Specially near de swamp
An' hongry too, dey can bite an' chew
An' kip you upon de jomp—
But never you min', only work away
So long as de vein is dere—
For a t'ing so small don't count at all,
If you want to be millionaire.

"An' dis is de price, " Bateese he say,
"T'ree million or not'ing at all!"
An' I say "you're crazy, it's five you mean
An' more, if you wait till fall!
An' s'pose de silver was come along
An' cobalt she bloom an' bloom,
We look very sick if we sole too quick
An' ev'ry t'ing's on de boom."

De cash we refuse w'en dey hear de news,
W'en I t'ink of dat cash to-day,
I feel lak a mouse on a great beeg house
W'en de familee move away.
One million, two million, no use to us—
Me an' Bateese Couture,
So we work away ev'ry night an' day
De sam; we was always poor.

An' den wan morning a stranger man,
A man wit' hees hair all w'ite,
Look very wise, an' he's moche surprise
W'en he's seein' dat vein cal-cite—
An' he say, "Ma frien', for de good advice
I hope you'll mak' some room—
From sweetheart girl to de wide, wide worl'
Ketch ev'ry t'ing on de bloom!

Kip your eye on de vein' for dere's many a slip
Till you drink of de silver cup,
An' if you're not goin' to go 'way down—
You're goin' to go 'way, 'way up."

"Now w'at does he mean," Bateese he say,
Affer de ole man lef',
"Mebbe want to buy, but he t'ink it's high
So we'll finish de job ourse'f,
Purty quick too," an' den hooraw.
We furn it de compagnie,
An' to geev dem a sight on de vein cal-cite
We work it on Bonami.

Can't count de money dai's comin' in,
Sam' as de lotterie,
Ev'ry wan try, till bimeby
Dere's not many dollar on Bonami.
An' de gang we put onto de job right off,
Nearly twenty beside de cook,
Hammer an' drill till dey're nearly kill,
An' feller to watch de book.

Too many man, an' I see it now,
An' I'm sorry 'cos I'm de boss,
For walkin' aroun' all over de groun'
Dat's reason de vein get los'—
Easy enough wit' de lantern too,
Seein' dat vein las' night,
But to-day I'm out, lookin' all about
An' w'ere is dat vein cal-cite?

Very curious t'ing, but you can't blame me,
For I try very hard I'm sure—
Helpin' dem on till de vein is gone,
Me an' Bateese Couture,
So of course I wonder de way she go—
An' twenty cent too, a share,
An' I can't understan' dat stranger man
W'at he mean w'en he's sayin' dere

"Kip your eye on de vein for dere's many a slip
Till you drink of de silver cup,
An' if you're not goin' to go 'way down,
You're goin' to go 'way, 'way up!"

NOTE ON A NEW INSTRUMENT FOR SURVEYING DEEP BORE HOLES.

By J. B. PORTER, D.Sc., M. Can., Soc.C. E.

Read before the Mining Section, 30th November, 1905.

It is a well-known fact that deep borings are seldom true, and although artesian wells seldom depart very much from the vertical owing to the method of drilling them, yet diamond drill holes and other borings with rotary apparatus very frequently drift very far out of line. So long as the hole is not deep this drifting is not a serious matter, but on holes of say 1,000 feet, the departure from line sometimes exceeds ten per cent. In extreme cases such as certain very deep recent borings near Johannesburg, holes which were intended to be vertical have drifted more than 2,500 feet to one side of their aim.

In view of the great cost of these deep borings it is extremely desirable that the exact location of cores brought to the surface should be determinable, and a number of devices have been introduced within the last few years for the purpose of surveying holes. Most of these devices are comparatively crude and their use involves a great deal of labor.

The apparatus most generally used of late years has been a cylinder of glass, partially filled with hydrofluoric acid. This cylinder, usually less than one inch diameter, is inclosed in a brass case and attached to the end of a string of screwed rods and lowered into the hole to a known depth where it is left for some hours and then withdrawn. The inclination of the hole can easily be read from the glass vessel, as the upper surface of the hydrofluoric acid etches the glass quite distinctly, but the direction of the hole can only be determined by marking the orientation of the top rod while the etching is taking place, marking each joint when the rods are taken apart and finally screwing them together again on the surface in order to compare the orientation marks with the etching on the glass tube. By surveying points at distances of say 300 or even 500 feet, the general course of a bore hole can be determined by the

method above described, but the method is laborious and costly and owing to almost unavoidable twisting of the rods the results have seldom proved very satisfactory.

Another method of surveying involves the use of plummets and compasses immersed in a solution of gelatine which slowly hardens after the apparatus has been sent down the hole. This device, although very ingenious, has proved very difficult in use and has not met with much success, especially in deep holes. A very recent form of the apparatus uses paraffine in place of gelatine. The instrument contains an electric resistance and is connected with a dynamo on the surface by double insulated cables. The compass and plummet remain fixed in the solid paraffine while the instrument is lowered to the station in the hole. Current is then sent through the cable and the paraffine melted. The current is then shut off and after sufficient time has elapsed for the paraffine to solidify the instrument is reeled in and its records read. The apparatus should give accurate results, but the long line of insulated cable is costly and liable to injury. (Marriott—Trans. Inst. Min. and Met., Feb., 1905.)

A few months ago an instrument maker in Johannesburg designed a very ingenious apparatus containing compass, plummets, small cameras and electric light, the whole connected with a small adjustable clock so that the light could be turned on for a given period after the apparatus had been lowered into the hole. This apparatus was described by its inventor, Wm. Helme, at a meeting of the Institute of Mining Surveyors of the Transvaal on May 27th, 1905. It has since been used in surveying a number of holes and has proven extremely satisfactory.

A prominent mining engineer of the author's acquaintance states that he has had the machine tested by surveying several holes twice and has found the readings to agree so closely in all cases that he scarcely considers it necessary to take check readings unless the first set show some unusual change of direction in the hole. The apparatus, instead of requiring rods, the use of which involves a great expenditure of time and labor, and the use of a derrick and a power hoist, can be lowered on the end of a piece of flexible wire from a large reel and thus several observations per day may be taken by two men.

The writer has not had an opportunity to use the instrument in actual surveying, but has taken a number of observations with it on the surface and has found its records interesting and apparently exact. He therefore feels justified in submitting the following brief description of the instrument taken from the original paper by its inventor.

GENERAL DESCRIPTION.

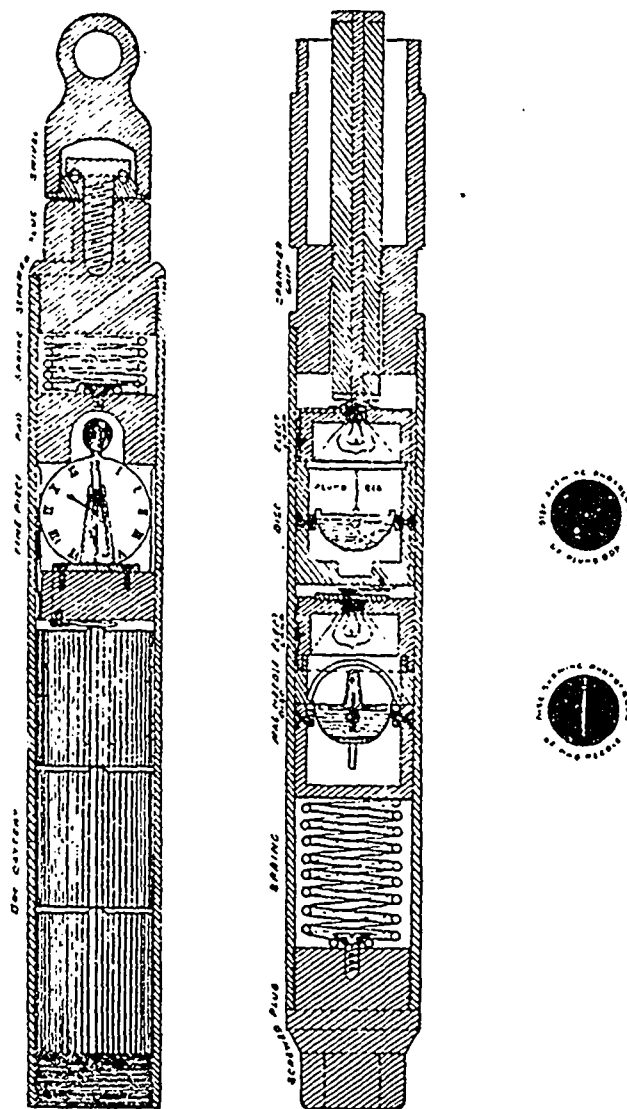
Briefly described, this instrument is one in which both dip and deviation are recorded by means of photographs of the positions of both a plumb-bob and a magnetic needle at any desired point in a bore-hole. The photographs are taken by means of two small electric lamps lit by a "time contact."

DETAILED DESCRIPTION.

The instrument comprises a brass cylinder 20 to 30 inches long; both length and diameter are varied to suit the particular requirements. The cylinder is made in two portions, which screw together quite flush shoulder to shoulder. The top and bottom are closed by means of tightly-fitting screwed plugs. To the top plug is attached a brass swivel with an eye piece, by which the instrument is suspended. The swivel is fitted to the plug with ball bearings. The object of this swivel is to prevent the wire, which is used in low-

ering the instrument, from twisting; also, to minimise risk of the instrument kicking against the sides of the borehole when being lowered or raised. Inside the cylinder, immediately beneath the top plug, is a spring resting on a pad, which keeps firmly in position a small watch or timepiece. Below the watch is a dry battery. Below this again is arranged a tiny electric lamp, and below the lamp is a glass plate, from the centre of which hangs a small plumb-bob. Below the plumb-bob is a circular brass plate supported on gimbal bearings, so that it always remains in a horizontal position. On this plate is placed a small disc of sensitised paper.

DIAGRAM OF INSTRUMENT



Below this is another electric lamp, and below this again is a compass, which is also supported on gimbal bearings. On the dial plate of the compass is placed another disc of sensitised paper; each disc is pierced by a pin-prick in the centre, and another on one side, and both discs are fixed in exactly the same relative position, one above the other, when in the instrument. The whole is kept firmly in position from below by another spring placed under the little cup holding the magnetic needle, and resting on the bottom screwed plug. When the hand of the watch is passing the 12 o'clock point on the dial, it makes contact for about 15

seconds with a small projecting spring made of copper foil, which is connected with one line from the battery. The hand of the watch is connected with the other line; and so, when in contact with the spring, the circuit is completed; both electric lamps are lighted; and photographs are taken of the positions of the plumb-bob and the magnetic needle. It is only necessary to set the watch so that the hand will only pass the 12 o'clock point after sufficient time has elapsed to allow for the instrument being lowered to the required depth, and also to allow for the plumb-bob and magnetic needle having come to rest. In practice, it is usual to take readings at, say, every 200 feet to 300 feet, and two readings should invariably be taken in each instance. When once the photographs have been obtained, the rest of the work is easy; for the height of the point of suspension of the plumb-bob above the centre of the disc being known, and the distance of the lower end of the plumb-bob from the centre of the disc having been obtained by accurately measuring the distance between the centre of the photograph of the plumb-bob and the centre of the disc, angle of dip can be calculated. The direction is also easily obtained by placing the two discs in the same relative positions which they occupied while in the instrument, which can at once be done by means of the two pin-pricks on each. The direction of the line joining the centre with the image of the plumb-bob on the one disc will then (unless it happens to fall in the magnetic meridian) make an angle with the photograph of the magnetic needle on the other disc, and from this angle the magnetic direction of the path of the borehole at that particular point is determined. In surveying a borehole, say 4,000 feet in length, two sets of readings should first be obtained at regular intervals, which should not exceed 250 feet in length. When these have been obtained, the dip and deviation must be calculated for each point, and then sufficient data are available to plot, in plan and section, the true path taken by the borehole. (Proc. Institute of Mine Surveyors, Transvaal, May 27, 1905.)

THE WEST GORE ANTIMONY DEPOSITS.

By ALEX. McNEIL, President of the Dominion Antimony Co. Ltd.

This is written at the editor's request for information about the West Gore Antimony deposits. The number of such inquiries now coming from foreign countries shows that this property is becoming known abroad. Enough has been learned to say that Nova Scotia will in the future be an important producer of antimony and your readers may therefore be interested in the matter.

Antimony was discovered at West Gore, Hants County, Nova Scotia, twenty-five years ago. In Nova Scotia, antimony as a mineral passes to the owner of the soil. The formers who made the discovery undertook the development and operation of the mine. Making a mine and building a load of hay are two different things, but it is fair to say that the West Gore mine in those days was managed as well as many Nova Scotia gold mines have been. Several thousand tons or high grade ore were taken out and shipped and sold to Swansea smelters. The ore was sold at the time for its antimony contents. The present company believe that the ore then shipped contained between \$100,000 and \$200,000 in gold, about which nothing was said by seller or buyer.

A good mine with high values can stand bad management to a certain depth. In this case it went to 400 ft., and stopped. Then it became an abandoned mine for a decade. During the interval some prospecting in search of a southern vein resulted successfully and a small quantity of very good ore was taken from there.

The property was taken over from the writer by the Dominion Antimony Company, Limited, at the beginning of 1903. Since that time the old mine has been unwatered and the underground workings remodelled so that prospecting could be carried on systematically and economically. There has been no cessation of work since. The main shaft was carried down a little over 500 ft., levels were extended on the 2, 3, 4, and 500 ft. level. At 260 feet east on the 500 ft. level a winze was put down 200 feet and a level driven back toward the main shaft. About the same distance west on the 500 ft. level similar work is proceeding. The main purpose of this was to determine the advisability and correct position for a larger main shaft which will be driven vertically to intersect the vein at about 1000 feet. The vein on which this work is being done is a fissure. It is very clearly defined, especially on the 700 ft. level. Sometimes the vein narrows to a foot or two; sometimes it widens to eight or nine feet. Generally on the 700 ft. level there is an average of two to four feet of very good ore. The development work so far carried on, with a small amount of necessary stoping, has yielded about 700 tons of high grade ore and 7,000 tons of second class ore. The separation is arbitrary and mechanical and made for the purpose of selling ore containing over 40% antimony. This first-class ore has averaged about 45% antimony and a little over \$50. in gold per ton. The dump ore, so far as can be judged on the sampling done, contains between \$20 to \$30, in both metals.

The policy pursued by the company in making the mine has been a fairly conservative one. A small but effective prospecting plant housed in plain but well arranged buildings enabled the Company to put in underground development most of the eighty odd thousand dollars, that have been spent. Then the Company looked around for a good man for Manager. They found him located in Boise City, Idaho, accepted his terms with regard to salary, built the kind of house he wanted for his family, and showed that it trusted his honesty and judgment by accepting his plan of work. The result has been satisfactory.

West Gore is a pretty valley with fertile farms that can grow good apples. It also grows good young men who leave it for the United States and other parts when they grow up. Since the building of the Midland Railway one can reach this section by rail which is 2½ miles from the mine. From Clarkesville on the railway over a fairly good road, part of which has been built by the Company, one reaches nearly the highest point in the County, which, although a highland for Hants, is not more than a good sized hill. Up on this hill the Company has acquired territory until it now owns about 500 acres, covering about 1½ miles on the strike of the veins. Antimony float has been found in various directions from the mine. At Central Rawdon, five miles away, there was enough antimony in the gold ore to make profitable recovery by amalgamation impossible.

The problem of recovering both the antimony and the gold was taken up as soon as the present operations began at the mines. It is not a new question, for antimony-gold ore has been found in other places, and at various times large sums have been spent upon processes for recovery, which, for one reason or other, have

turned out unprofitable. The Company working at West Gore first turned its attention to concentration. Experiments carried on upon quantities of several tons in a regular mill plant established that a good concentrate could be obtained. Dry concentration on a smaller quantity was also successful. The necessary loss in concentration and the comparatively low values obtained in the ordinary market for the metal contents, induced the Company to carry on an elaborate series of experiments with a view to reaching direct recovery or the gold contents at the mine. The Company was encouraged in its work by the fact that in the market the price for the gold contents rose while it was at work from 50% of assay value to a basis of paying full value less \$10. It may safely be said that the treatment of antimony-gold ore for the recovery of a high percentage of both metals at a moderate cost has been solved. A similar ore in France led to the problem being submitted to J. S. MacArthur of Glasgow, celebrated for his connection with the cyanide treatment. By using a weak solution of caustic soda, Mr. MacArthur found that he could put the stibnite readily and quickly in solution and by drawing the carbonic acid gas from the fires he could precipitate the antimony in a brown powder. As the gold was not affected by his process it remained in the residue. The residue was treated by calcination and cyanide and 95% of the gold recovered. When Mr. MacArthur visited the mine at West Gore he found a new problem facing him. The eastern winze had passed through a heavy body of native antimony. There is not known a similar body of native antimony in the world, although it has been found in small quantities in other parts. Its occurrence here necessitated further experimental work by Mr. MacArthur which, it is understood, has resulted successfully. After three years of investigation the Dominion Antimony Company has reached the conclusion that it can proceed to treat its own ores, and the work of doing that will be begun during the present year. The experimental work of this Company will be the subject of a special paper in the Nova Scotia Government mine report of the present year, prepared therefor by D'Arcy Weatherbe, the capable metal mine Inspector of the province. Many mining men of prominence have visited the works at West Gore, and they have all expressed their opinion as favourable to the future of the mine there.

MINING IN QUEBEC IN 1905.

(By our special commissioner.)

Mining operations in the Province of Quebec were carried on during the past year with regularity and success.

Asbestos has been in good demand, and the mines at Thetford, Black Lake and Danville have been working to full capacity, with the result that the output will be exceptionally great. New properties have also been developed at Tingwick and Wolfestown and the mica market conditions appear to have improved,

and the principal mines of the Ottawa region have been steadily operated. The price for small mica is considered satisfactory, but for larger sizes conditions are not so advantageous. Several firms at Ottawa are now taking the mica produced in Quebec and Ottawa, it being split by them and then shipped to the United States. It is a matter perhaps noteworthy to state that these same firms are also handling Indian mica. Attention has recently been called to the white mica mines of the Province, on account of the rare metals, such as radium, thorium, uranium, cerium and others which are found in association with muscovite, and, it is alleged, occur in workable quantities. A company has been organized to develop several of these mines in our Laurentian range.

Phosphate is obtained in small quantities in working the amber mica mines, and is utilized chiefly at Buckingham, in competition with American phosphate.

Chrome mining and concentration is becoming a permanent industry in Coleraine, and the production is steadily increasing every year. The concentrates are high grade and regular in composition. They find a fair market in the United States, although they are brought in competition with the Caledonia ores, which are produced chiefly, and on a large scale.

The conversion of iron ore into pig has been in progress at Drummondville and Radnor. Good results attended last year, as usual, the working of the well known copper mines of Capelton, a part of the product being utilized locally in the manufacture of sulphuric acid, while the remainder was shipped to the United States. There are meanwhile rumours of the re-opening of some of the old copper properties in the district of Sherbrooke.

At Three Rivers the ochre production has been continued.

Conditions in Graphite mining continue difficult, but an improvement has taken place and this branch of the industry is likely ere long to assume much greater proportions. There is no change in the condition of Feldspar and Baryte.

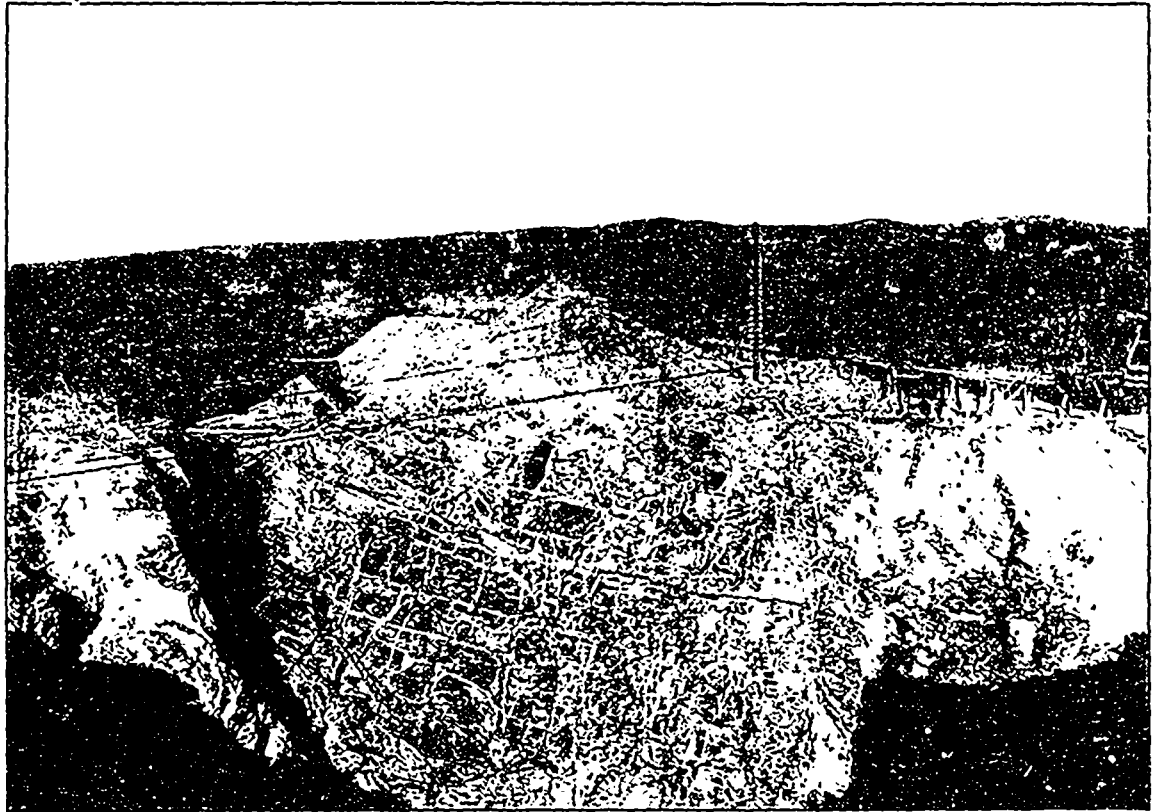
Natural gas is now being used in the Eastern Townships for domestic purposes in several of the villages near Three Rivers, while successful experiments have been carried on for the compression of peat near Farnham.

On the north shore of the St. Lawrence a large quantity of magnetic sand has been ascertained, and recent tests indicate the possibility of successful concentration and utilization of this material.

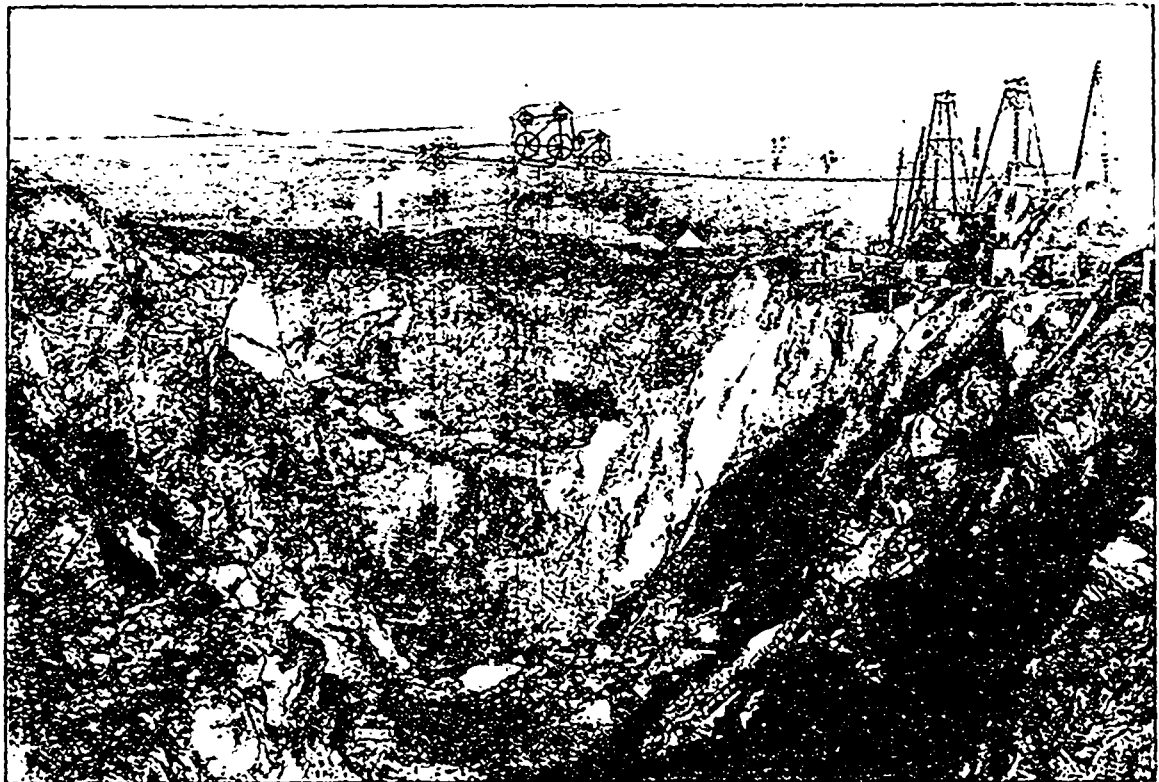
The building and ornamental stone quarries have been worked extensively, and it is also worth recording that cement works have been established at Hull, and are producing from 1500 to 1800 bbls. of material a day.

Speaking generally, the mining industry in Quebec during the year has made a steady advance, which, in the near future will be considerably accelerated. Not the least notable of the year's developments is the confirmation of the improved and promising discoveries in the Chibogamoo district, and there is every reason to believe that this region in Northern Quebec will become in due course a profitable field of mining operation.

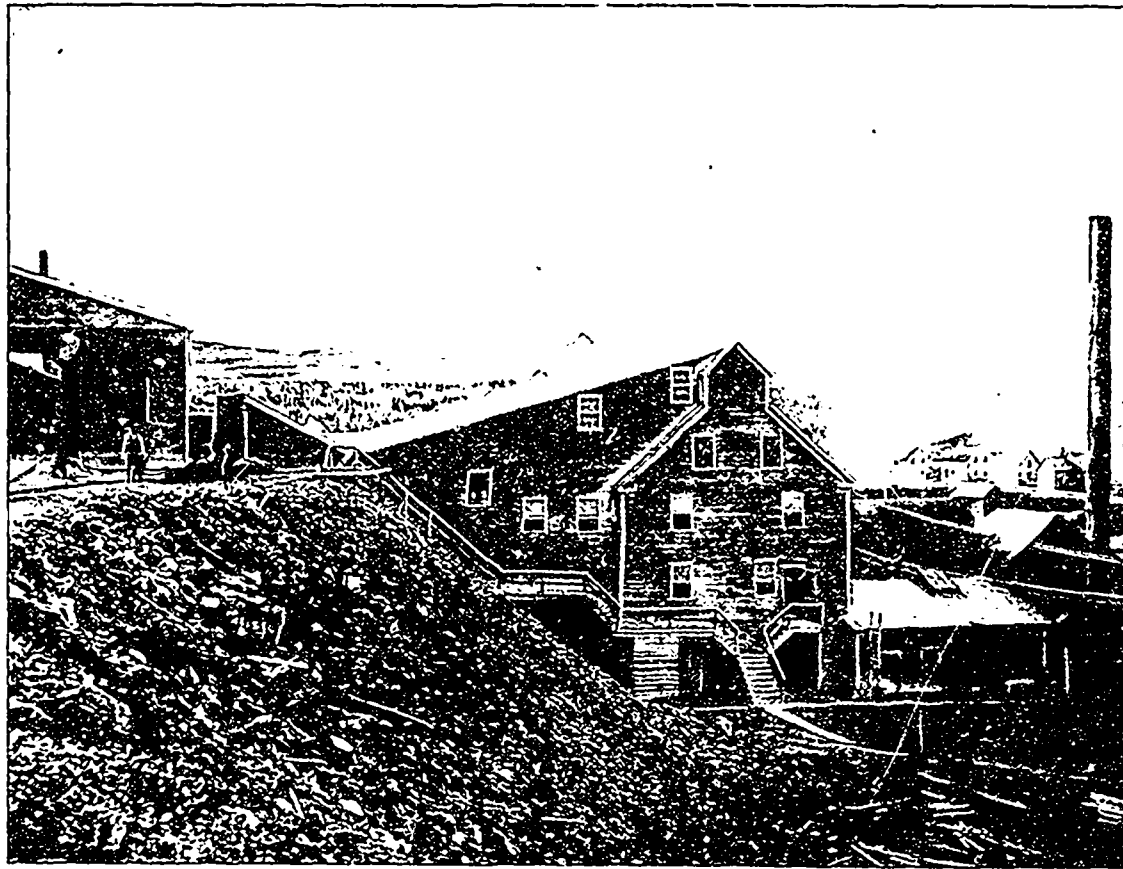
MINING IN QUEBEC IN 1905.



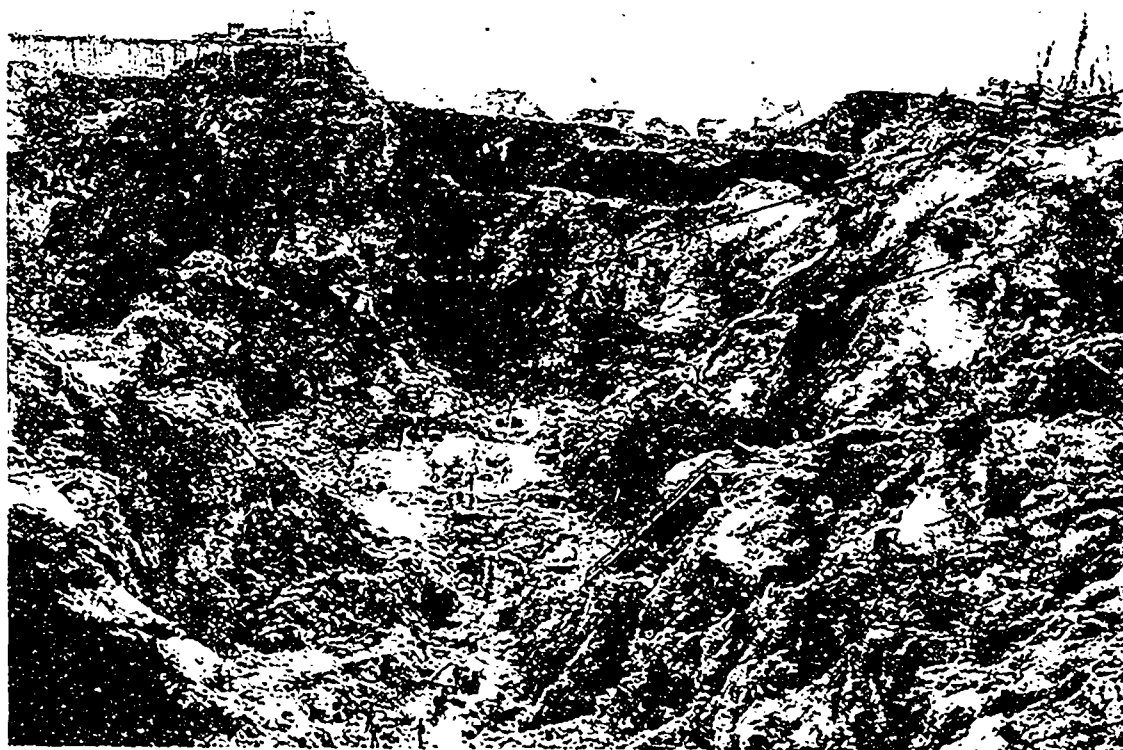
SEAMY PARTINGS CONTAINING ASBESTOS IN THE UNION MINES, BLACK LAKE.



MINING IN QUEBEC IN 1905.



THE FIBERIZING PLANT OF THE BELL'S ASBESTOS CO., THETFORD.

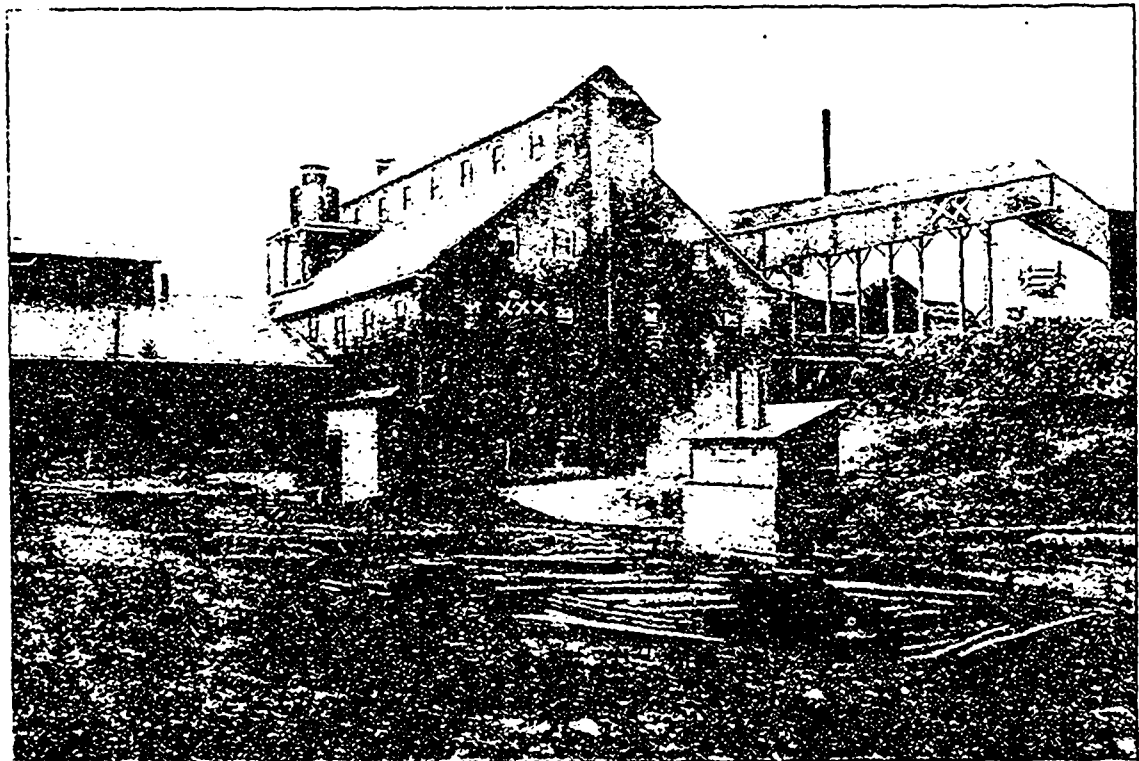


QUARRY OF THE BELL'S ASBESTOS CO., THETFORD--Looking West.

MINING IN QUEBEC IN 1905.

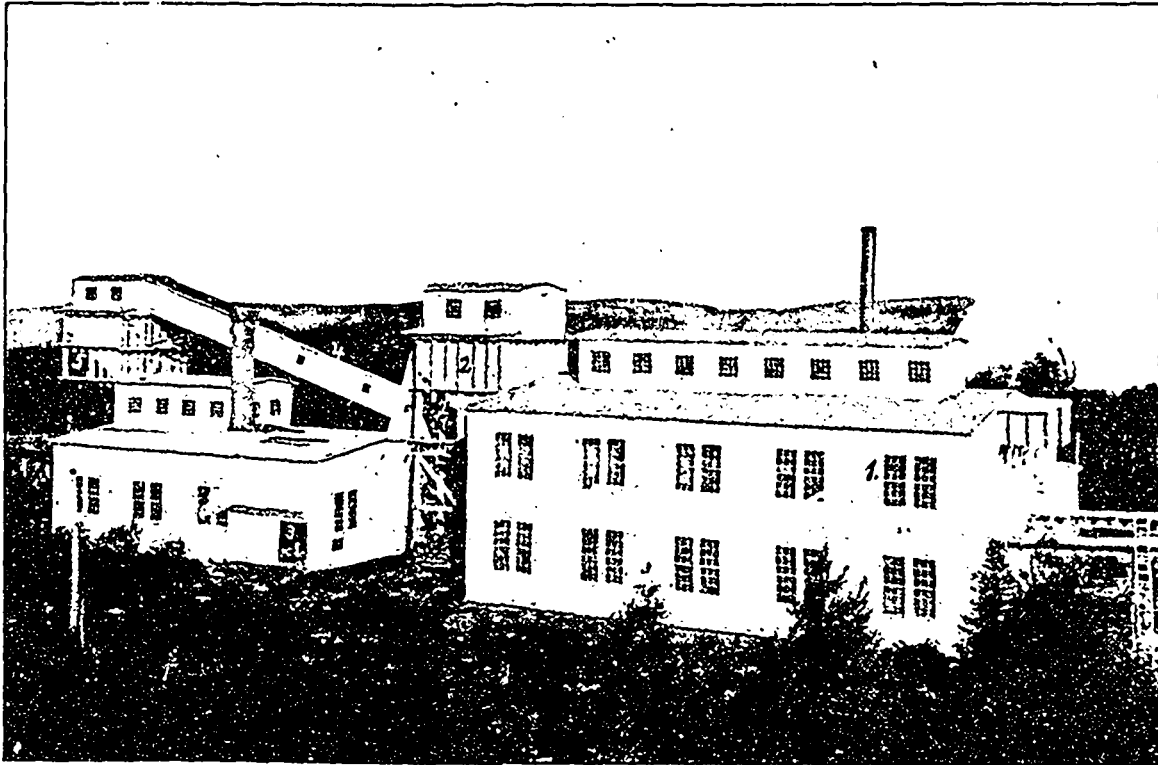


ARRANGEMENT OF CABLE DERRICKS AND TRACKS NEAR BORDER OF PIT—King Bro's. Mine, Thetford.

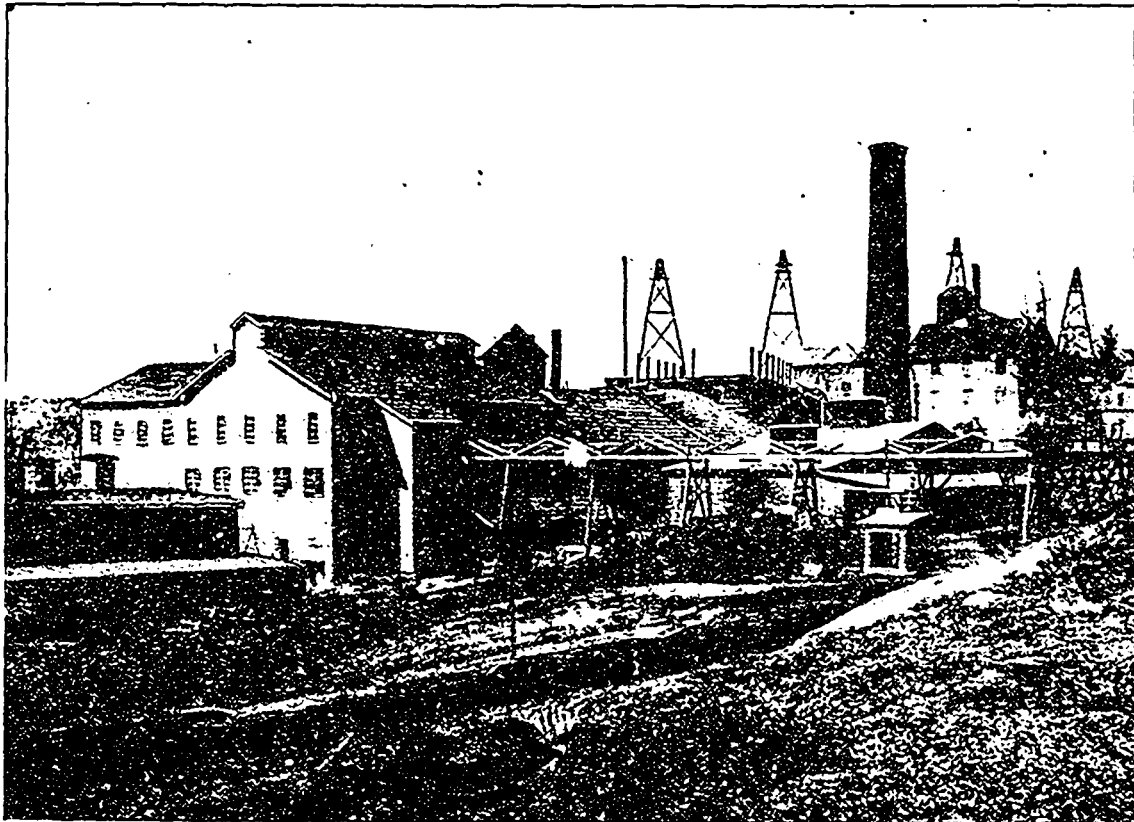


NEW 500 TONS ASBESTOS SEPARATION PLANT OF KING BROS., THETFORD.

MINING IN QUEBEC IN 1905.

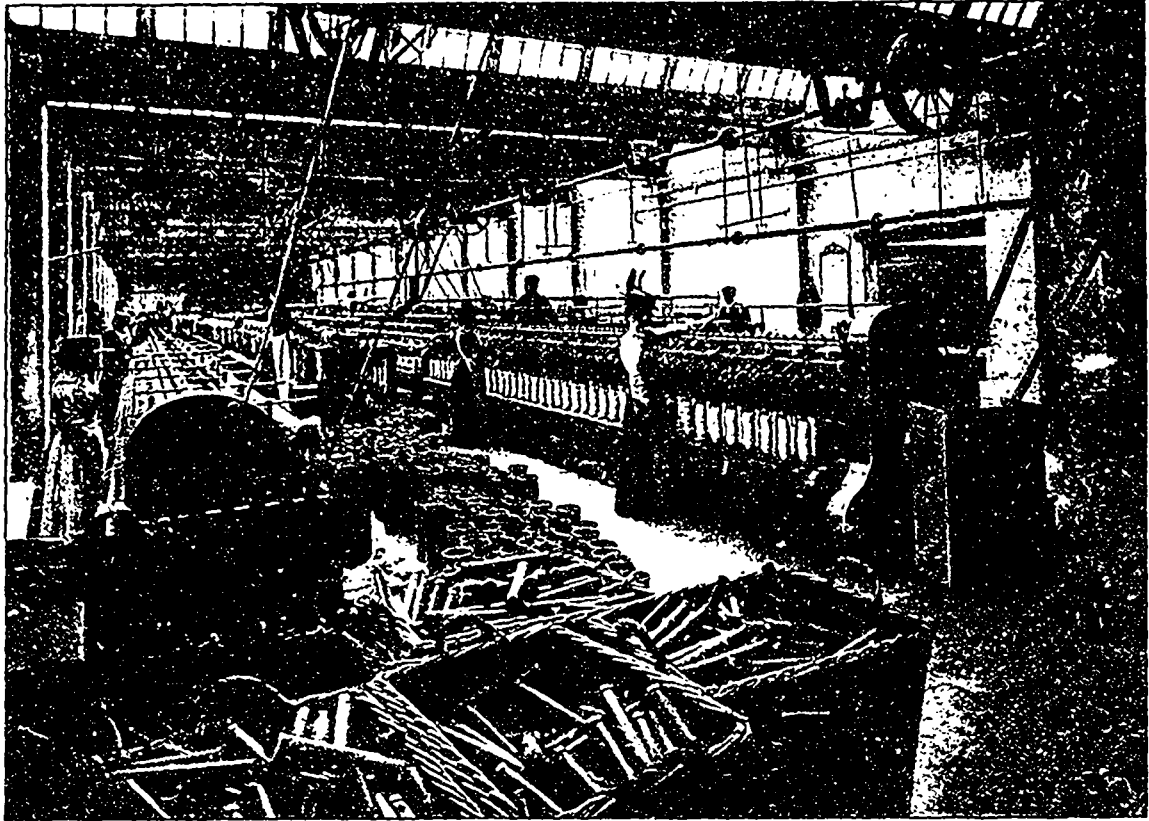


NEW FIBERIZING PLANT OF AMERICAN ASBESTOS CO., BLACK LAKE—Fiberizing Mill, etc.

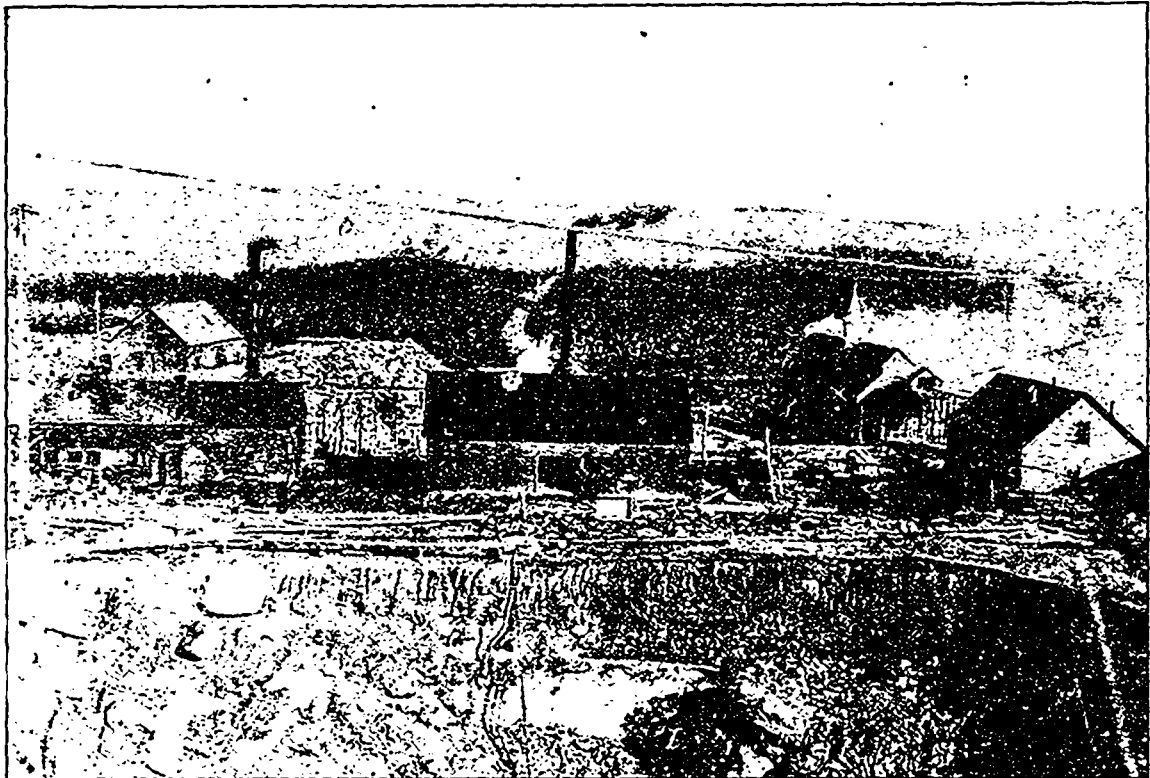


THE ASBESTOS AND ASBESTIC COY'S PLANT, DANVILLE.

MINING IN QUEBEC IN 1905.

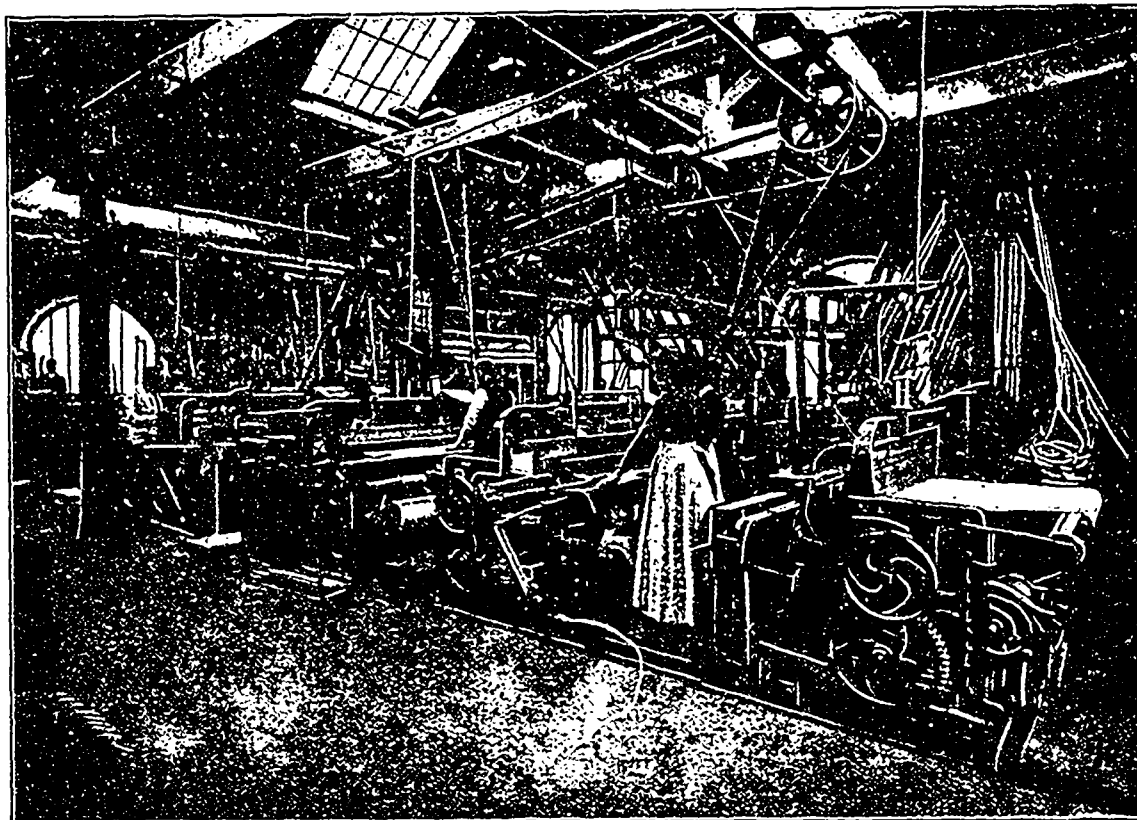


THE UNITED ASBESTOS CO'S WORKS—Spinning Dept.

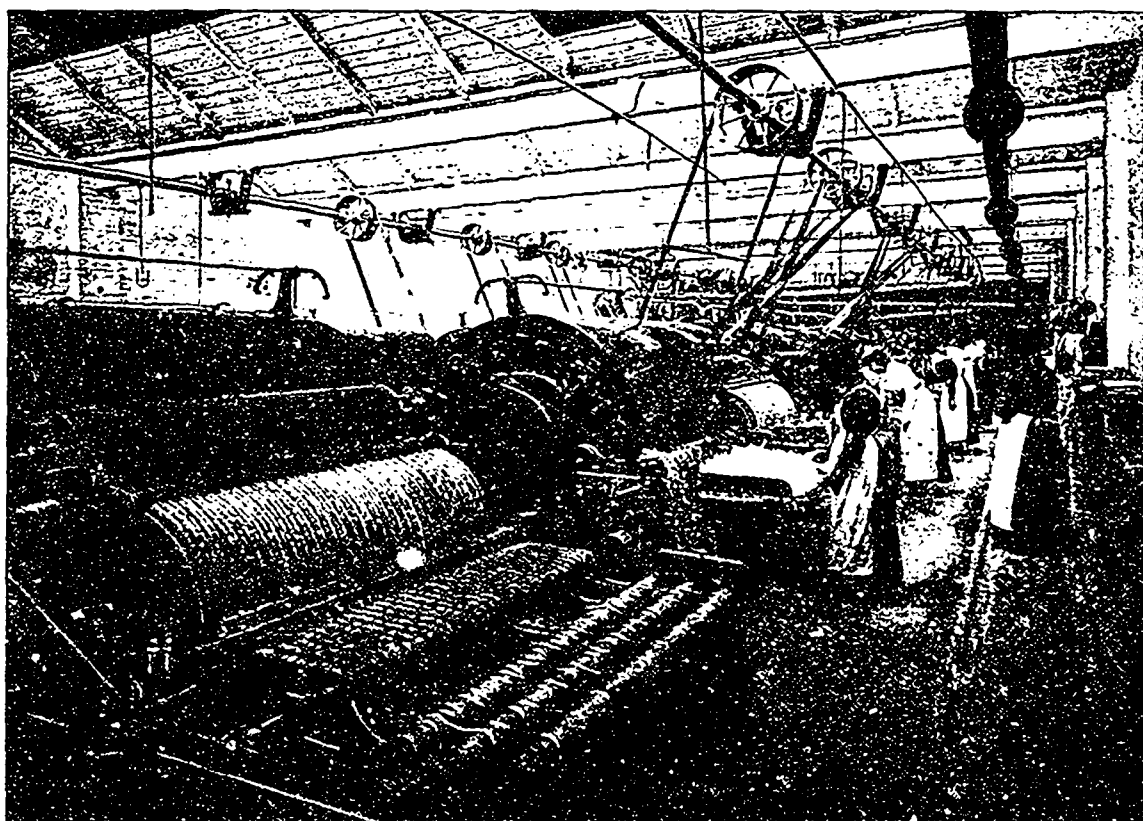


THE PLANT OF THE JOHNSON'S ASBESTOS CO., BLACK LAKE.

MINING IN QUEBEC IN 1905.



UNITED ASBESTOS Co's WORKS—Weaving and Braiding Department.



UNITED ASBESTOS Co's WORKS—Weaving Department.

THE BEARING OF ENGINEERING ON MINING. With Especial Reference to Mining Education.*

By Prof. J. B. PORTER, Hon. D.Sc.
(Continued from the January Review.)

About sixty or seventy years ago civil engineering had become a sufficiently definite profession to attract the attention of the schools and many colleges and universities, both at Home and abroad, created departments of engineering. In most cases a single instructor or professor was called upon to do the work; at best the staff was meagre, and experimental apparatus of the simplest kind had to suffice; but again the day was saved by the enthusiasm of these pioneers in a new educational field. The teaching was of necessity chiefly general and theoretical, and details, when treated at all, were discussed informally. The result of this method and of this enthusiasm was that the young men went out with high heart, ready for any fate, and therefore their success was great. Of these men are the great engineers of the present day.

As engineering science developed, its practice became specialised and forty odd years ago the schools began to follow suit. Mining and metallurgy had always been considered somewhat apart, and often were the first subjects to receive special consideration. In other cases, schools originally instituted as schools of mines crystallised out successively departments of civil, mechanical, electrical engineering, etc.

This process of differentiation has gone further in the United States than elsewhere, and no less than thirteen separate and distinct engineering courses are offered with more promised for the immediate future*. Even in Canada, where we are accused of being conservative, my own University offers its bewildered matriculant six or seven formal engineering courses, and some of these again branch in the final year. These special courses are no doubt necessary, and their number will probably increase; but great harm will be done to engineering in a broad sense if this tendency to specialised teaching cannot be kept within strict bounds.

The same fundamental sciences underlie all branches; the same training in physics, mathematics, and mechanics is essential to a true understanding of each profession and the man who learns these and other basal subjects thoroughly, even at the expense of technical training, is far more likely to succeed ultimately even in any special technical work than the man who has received elaborate training in one line, but whose first principles are "weak." Furthermore, not one student in a dozen knows when he comes up to the University which branch of engineering he really prefers; still less does he know which one he will ultimately practise. Young engineers are no less subject to chance and circumstance than other men; and for this reason, even if there were no better one, we should strive first to make our men engineers, and then and then only give them special training.

The fact that no man can tell in advance what his life's work will be is sometimes used as an argument in favour of a general engineering course, with a smattering of everything. An intelligent boy who keeps his eyes open will learn not a little of many practical things in connection with his theoretical studies, and the most effective method of teaching is to point theory with practical illustration whenever this can be done without losing sight of the main issue. It is, however, a most serious mistake to make a course general rather than

*Architectural, chemical, civil, commercial, electrical, hydraulic, mechanical, metallurgical, mining, municipal, naval, railway, and sanitary engineering.

thorough, and even a speciality really well taught is better than broad, but shallow instruction.

The courses in mining engineering offered by the best schools, especially in the United States and Canada, are frequently criticised as having the fault I have just named: in brief of being too broad and of attempting too much. Mining engineers, in all but a few favoured localities, are usually alone so far as trained associates go, and the problems they have to face are more varied than those coming to any other engineers. General engineering work and surveying are their daily task; simple problems in electrical and mechanical engineering must be disposed of without the assistance of specialists, and a good knowledge of geology with some mineralogy and chemistry is absolutely essential. No other engineer must know so many things; and, therefore, in general, we teach our mining students more subjects than are ordinarily given in other engineering courses. It is a fair question, however, whether even electrical and mechanical engineers would not be the better for a fair knowledge of geology, and such simple chemistry as we give our candidates for mining degrees.

Mining courses are sometimes objected to by another class of critics, the so-called practical men, as being too theoretical, and by a third class as being too technical and material at the expense of theory. These criticisms neutralize one another to a large extent, but I fear that the last has occasional justification, and shall deal with it later.

Thus far, I have not touched upon a matter that is just now receiving a great deal of attention, viz., the extent to which practical and technical training should enter into an engineering education. This subject has recently been discussed by so many different learned bodies and individuals that I approach it with hesitation. It is, however, of vital importance to engineering education, and must be carefully considered.

The last word on technical education is in the form of a report or to speak more correctly, a series of questions, issued a few weeks ago by the Committee on Engineering Education of the Institution of Civil Engineers. This committee, under the chairmanship of the last president of the Institution, Sir William White, has evidently considered the subject very carefully, and has made up its mind on certain points. On others it is apparently divided, and the alternative opinions are stated briefly and impartially. The paper is now in the hands of a number of engineers and educators, who have been asked to reply to certain questions; and the committee will no doubt give due weight to their opinions when it draws up its final report.

It would be improper for me to discuss this paper at length; but I think I may state certain conclusions, with which I heartily concur, without betraying any confidence. The committee is apparently convinced (a) that engineering students in all branches should take the same course in the elementary sciences, and in certain advanced subjects; and that technical work and studies in their special branch should be deferred to the last part of the course. This point has already been sufficiently discussed.

The committee thinks that: (b) Engineering students should have some practical elementary manual training, and that this had best be regular work in shops of one or more kinds. The amount of this work, its exact nature, and whether it should precede, accompany, or follow the academic work are, however, matters on which the committee does not express a definite opinion. (c) The committee thinks that students should also have some practical technical training in works. The nature and amount of this training, and whether it

should precede, accompany, or follow the technical part of the course, are not definitely decided.

An engineering student, whatever his specialty, should undoubtedly do some shop work on the ordinary materials of construction at a very early period in his course. He will not be able to spare time enough to become a skilled workman, or even a half-skilled apprentice, and he must be made to fully understand this; but he can and should work long enough to know something of the use of tools, and to understand the qualities of the materials of construction which he is about to study theoretically. This elementary shop work is often attempted in workshops connected with the technical schools themselves, and frequently it can be done in the afternoons while regular studies are going on. This method is economical of time, and there are many advantages in having the teaching and shop work under the same direction; but unless a boy is to get thorough practical training later it is better for him to get his experience in ordinary shops, where he would be required to work full time under ordinary shop discipline. In no other way can he be made to realize what work really is; the intimate acquaintance with workmen is also very useful.

This shop work if done outside of the school can usually be arranged for the long vacation which should be long enough to give time for it, and for a reasonable holiday. Two periods of two or three months each in two successive vacations should suffice for an ordinary boy, especially as practical technical training is also required at a later period in his course. This latter technical work is even more important, in my opinion, than the shop experience. It should, if possible, follow the general science teaching, and precede the specialisation.

These students should first be taken to the mines in a body and be given an opportunity to study works under the guidance of a staff of competent instructors. After a month or six weeks of this field class work each student should obtain bona-fide employment in some works in his chosen speciality, but the exact nature of the work is of no very great moment, so long as it is good engineering work, done by good workmen intelligently directed. The important thing again is to get the student in touch with real work and real wage-earners, and to give him an idea of scale. The elementary shop work may be done if necessary at convenient times in a school workshop, but this technical work must be real in every respect. The student should, for the time being, become a plain workman on wages, responsible to his foreman for certain duties, and liable to penalty or discharge for cause.

The time to be given to the work must depend on circumstances. Three months, under the right sort of foreman, in a small but interesting mine or works, will teach as much as a year of ill-directed drudgery. Furthermore, students differ greatly in the readiness with which they take to practical work. I have known men who were the better students for having had many years of hard apprenticeship; but very frequently the man who has spent even one year in practice finds it difficult to return to his classes. He is earning money at work, and can often ill-afford to give it up, and again become dependent on his people. Study also often proves irksome, and sometimes very difficult, after a man has been actively employed in work. As a result, many men fail to return to their final studies, and thus lose what should be the most useful part of their education.

If a definite time for practical experience must be set in advance, I should say that two periods of about four months each in different works, or one period of a year would be about right; but in this, as in all other matters of technical education, it is far better to make the regu-

lations somewhat elastic in respect of field work and advanced study. Much time can be saved the students, and their work made more effective, if each case is separately considered by the responsible head of their school.

The final studies may now be considered. The student fresh from the field, but not yet forgetful of school methods, usually begins this advanced work with enthusiasm. The teaching may now be distinctly specialised and quite technical, but care must be taken to keep fundamental principles in sight, and the detailed technical work should be carefully laid out to cover only certain important typical operations. This academic work can be made much more interesting and effective by the free use of technical laboratories, in which engineering machinery (and in our case ore-dressing and metallurgical apparatus) can be used; but here, as in the lecture-room, care must be taken to teach principles, not processes. Certain processes must of course be used, and a good deal of careful detailed work done; but the primary purpose must always be to teach general principles, and mere technology must be kept in a secondary place. The best function of laboratories, aside from the limited use necessary to illustrate fundamental principles, is to develop the individuality of the students. Each man should be given certain carefully selected pieces of independent work, and he should be encouraged to attack the task in his own way. One or two comparatively heavy investigations are far better than many short experiments, and the instructor in charge can often do his men far more good by showing interest, and yet letting them work out their own salvation whenever possible, than by being too ready to set up apparatus and smooth over difficulties. This advanced individual work can utilise to the full the resources of even the most magnificently equipped laboratories; but care should always be taken, especially in schools which like my own are very rich in practical apparatus, to see that the students do a few things thoughtfully, and with a clear apprehension of their bearing, rather than that they get shallower experience of many processes and machines.

In connection with this advanced study the men should be taught to write up their work, and to apply the knowledge gained in works, laboratories, and lecture rooms, to some practical problems in engineering. In this, questions of estimates and costs should be considered, for our men now are about to go out into the world, where costs form an essential element in every enterprise. Estimates made even by advanced students are likely to be far from right, but their preparation gives the men extremely valuable experience, and a competent instructor can do excellent work by discussing economic matters with his men in this stage of their training.

This should end the school course in engineering, for no amount of mere teaching will turn a boy into an engineer, still less into a mining engineer. If, however, we give him a good grounding in science and the principles of engineering, then put him in touch with practical engineering work, and finally teach him the elements of the technology of his subject, we shall have prepared him as well as any school can prepare a man to go out into the world and learn to become a good engineer.

The course that I have outlined is, I think, decidedly better than anything that is now offered by the schools at home or abroad, because it makes a certain amount of practical work obligatory, and yet connects and even combines this work with at least as much theoretical and pure science study as is now required. It has, however, the disadvantage of taking four or five years,

instead of three or four as at present, and it presupposes the most cordial support of the works and mine managers.

The feeling of managers and superintendents has changed greatly in the last few years, and tolerance, at least, can now be counted on, even when warmer feelings are still lacking; but even the most friendly manager cannot be blamed for feeling some hesitation about subscribing to a scheme that will require him to regularly take on student workmen. He will say that such boys are in the way, do not earn their pay, add to his anxiety, cause dissatisfaction among his regular workmen, and in the end leave him and go back to school just when they are beginning to be of use. If he is very well disposed, he may even ask to be let off with a contribution to the school funds, or to some approved charity. If he is a mere man, his request will be quite different. The objections stated are all quite real, but like objections to many other good things they become comparatively unimportant when fairly faced. A few years ago I persuaded some of my friends in Canada and the United States to try the plan, and gave them each one or two young men for the experiment. The students did not prove troublesome, quickly made friends among the workmen, and in many cases even earned their pay. It is true that they had to go back to school after a few months, but not infrequently they took back with them a promise of permanent employment and returned to the mine immediately after taking their degrees. In brief, the managers have found the difficulties far less than they expected, and in part, at least, counterbalanced by the fact that they now come to know intimately a number of young men from whom they can select the best later, if they need to increase their staff. Nearly every manager who has tried the plan is willing to take on the next year, and some have become really interested in the students, on whom they are able to confer such great benefits, and thus have become active and invaluable assistants in the work of mining education.

I make no claim to have been the first to use this means of supplementing a mining school education. Individual students have done holiday or interim work in mines ever since mining schools began; but it does not give me great satisfaction to be able to say that my friends, the mine and smelter managers, have come forward so cordially, that for several years I have been able each summer to secure an engagement at at least living wages for every boy in my classes who has been willing to work. Over 80 per cent. of them do actually work in this way each summer, although our regulations do not as yet require them to do so.

One other difficulty in my plan is that it requires a larger staff of instructors than ordinary teaching, and these instructors must be good men, heartily interested in their work. Formal lectures and set exercises may perhaps be acceptably given to classes by men whose chief interest is outside the class room; but no man can succeed in such close individual teaching as I have recommended, unless he give his whole time and his whole heart to his work. The responsible heads of the several engineering departments of the school should be men who have had considerable and successful practical experience, and they must keep in touch with their profession by travel, and by taking occasional professional and consulting engagements. This not only keeps them fit and fully informed, but it greatly strengthens their influence with their students. Their professional work must, however, be completely subordinated to their main duty of teaching. There are few professions that require more constant and earnest effort, and the men who are to guide the final professional studies of

young engineers must be free from conflicting or diverting interests.

The subordinate teachers need not all be experienced men, in the sense of having spent many years in works, but they should be sufficiently familiar with practice to fully appreciate the professional or technical bearing of the subjects taught. Practicing engineers should also be engaged for occasional special lectures, or short courses. If these men are eminent in their profession, they will stimulate the students greatly, and will also have a good effect on the regular members of the teaching staff.

TACTICS AT THE LE ROI MEETING.

A circular letter has been issued to shareholders of the Le Roi Company, by Mr. C. Williamson Milne, whose statements substantiate the view we took in last month's issue of the *MINING REVIEW*, regarding the unfair practice that was used by Mr. McMillan and his supporters at the recent meeting of his company. After referring to the fact that he was unable to obtain a hearing at the meeting, in consequence of the opposition of Mr. McMillan's supporters who appeared to be determined that no one except those who were prepared to attack the Board should have a patient hearing, Mr. Milne states that although, since giving his views with regard to the benefits likely to accrue to the Le Roi by amalgamation, he has since heard that a number of the present shareholders are opposed to the scheme. He uses the words "present shareholders" advisedly, for he states it has been an open secret in the city for a long time that certain interested parties had been buying for control, and that the nominees into whose names the shares were going would vote according to instructions, and against amalgamation.

The circular states: Some of us should much like a disclaimer from Mr. McMillan that he is in any way directly or indirectly associated with these astute Americans. The innocent fashion in which some of the provincial shareholders have been led to believe that there was an organized conspiracy between the Board and the representatives of the Canadian companies to practically "steal" the Le Roi property would be amusing if it were not deplorable.

Mr. McMillan has spoken of various valuations placed upon the Canadian Smelting Works, which are owned by the Canadian Pacific Railway. These valuations have not differed to any extent. In the first instance Mr. McMillan is discussing a price provided in a cash option at £120,000, which checks closely the valuation made at a later date by John H. Mackenzie, viz.: 18 per cent. of £800,000 or £144,000, payable not in cash but in shares, and including I understand, all additional plant and machinery added after the date of the option referred to as well as the Trail concentrator, which Mr. McMillan says cost some £60,000. In the second instance, by taking 18 per cent. of £1,100,000 (£198,000), Mr. McMillan is giving you a valuation not upon the Trail smelter plant alone, but upon plant, plus cash contribution by the Canadian Smelting Works for working capital, coke, coal, limestone, stores, and supplies.

Reference to the valuation by Mr. Mackenzie is made on page 7 of the director's report as being about £800,000 and distinctly states that, instead of distributing £800,000, the value of the combined properties and plants, that £1,100,000 is to be "divided proportionately". The difference between £1,100,000 and £800,000 was to pay the respective companies for their cash contribution (working capital) plus coke, coal, limestone, stores and supplies, which were to be determined finally by Messrs. Clarkson, Cross & Helliwell, chartered accountants and local auditors, for all the mining companies, including the Le Roi Mining company. This amount of £300,000 would probably have been more than the value of the above, and any balance would have been left unissued or distributed proportionately between the various companies.

Mr. McMillan explicitly stated at the meeting that he was personally offered £15,000 provided this scheme went through. When opportunity offered, I pointed out that a public statement of this kind, unsupported by any evidence, left a most monstrous imputation on every gentleman who had been connected with these negotiations, and that Mr. McMillan was in duty bound to disclose the name of the parties who made the offer—but failed to elicit any response.

The Centre Star and War Eagle are and have been producing about 15,000 tons monthly of ore similar in grade to the 10,000 of 12,000 tons being produced by the Le Roi, while the St. Eugene is mining 12,000 to 15,000 tons monthly from which are produced 2,500 to 3,000 tons of lead concentrates of a gross value of about £13 per ton. If the Canadian lead bounty were cancelled, the St. Eugene could sell every ton of concentrates in Europe and net as much as they are at present receiving.

Mr. Aldridge informs me that the Canadian companies earned last year, over and above all expenses, improvements and construction £180,000. They have a cash reserve of £162,000 earned through operations.

Throughout the whole of the controversy, Mr. McMillan has repeatedly made statements which call for confirmation. The proposal to loan a blower (costing when new about £400) to Trail smelter, on business terms, advantageous to the Le Roi company, becomes the dismantling of the Northport smelter and a hysterical application is made to the United States courts for an injunction. We have six blowers at Northport and have seldom used more than two and never more than four at the same time in the past three years, so that we could have suffered no loss, but stood to gain (if we elected to sell) by this friendly act.

Mr. McMillan complains of vulgar personal abuse aimed at him by the directors. I have referred to the circulars issued by the board, but they bear no evidence of anything of the sort. On the other hand the reference to Mr. Geo. S. Waterlow in Mr. McMillan's circulars are, to put it mildly, in the worst possible taste, and contain innuendoes that seem to border on the libellous.

Mr. McMillan prepared to recommend the payment of a dividend for the year ending June, 1905. By his own showing, only last year we were in such desperate straits for working capital that the Bank of Montreal asked for the deposit of the title deeds to our property. A dividend of only 4 per cent. would absorb roughly, £40,000 and we have not got the cash with which to pay it. Such cash as we have is urgently needed for working capital, but Mr. McMillan would deplete our cash resources as cheerfully and recklessly as he has depleted the mine of its ore reserves, and again go back to the old policy of "trusting to luck and to the clemency of the Bank of Montreal." Such a policy is fatuous in the extreme. If luck is with us again it may succeed, if otherwise, disaster will follow; but why risk disaster?

We have a mine in the Le Roi with magnificent possibilities, but you must give it a chance by spending considerable sums of money on energetic exploration and development work.

From the "alone I did it" tone of his circulars, one would almost infer that Mr. McMillan had at any rate discovered the pay ore shoots in the mine, if indeed, he did not place them there. He did neither, and he cannot guarantee to keep up the present ore shipments for any lengthy period, and at the same time increase the payable ore reserves in the mine.

It seems fair to assume that if returned to power Mr. McMillan will at the earliest opportunity restart the Northport smelter, notwithstanding the fact, which seems to me to have been conclusively proven, that by doing so the Le Roi company loses one dollar, at least, on every ton of ore smelted. For years past, the Northport smelter has proved a sump for the revenues of the Le Roi company. I have applied for and obtained the official figures from the 30th June, 1901, to the 30th June, 1904, showing the deficiencies on the Northport smelter, figures, due to over-estimation of profits. These deficiencies have only been ascertained at the various periods when the Northport smelter has been cleaned up. In the aggregate, the difference between the estimated valuation of profits and the actual results has been no less a sum than £172,000. Either there has been gross miscalculation on the part of the smelter managers or the metallurgical losses have been enormous. The figures for each year are as follows:—

Deficiency for year ending:—	
June 30, 1901	\$250,000
June 30, 1902	233,000
June 30, 1903	129,622
June 30, 1904, (say)	250,000
	\$862,622

being equal to £172,524.

In view of the facts which have been submitted to us with reference to the Northport smelter, it would be madness to return Mr. McMillan, or his nominees to power without having a definite assurance for him and them that the Northport smelter will not be reopened. This, it seems to me, is one of the main issues of the controversy.

What, then, are Mr. McMillan's qualifications for the post. In his circulars he has made several references to the lack of practical knowledge on the part of Sir Henry Tyler and Mr. Waterlow. Where and when did Mr. McMillan get his practical and technical training in mining and metallurgy? Up till about 1897 he was emigration officer for the Province of Manitoba. Since then he has been a mining broker in Rossland and associated with the following companies:

- British Columbia (Rossland and Slocan) Syndicate, Limited.
- The Snowshoe Gold and Copper Mining Co., Limited.

None of the numerous properties owned by these companies, so far as I can learn, are operating at a profit to-day in Canada. During his tenure of office with the Le Roi he has, despite the expressed wishes of its chairman, persisted in sending the Le

Roi ores to Northport resulting in the reduction of the company's profits during the past year alone by a sum of no less than £20,000.

Mr. McMillan has indulged in a number of cheap sneers at Messrs. Bradley and Mackenzie, the consulting engineers, who have been placed in charge of the Le Roi mine. Mr. Mackenzie's policy has never been proved to be wrong; indeed, Mr. McMillan has taken credit to himself for results which were largely due to the directions given by Mr. Mackenzie. Messrs. Bradley and Mackenzie are consulting engineers in the western states of U.S. to Messrs. Werner, Beit & Co., and to the Exploration Company Limited, of London. These concerns do not have the reputation of being content to employ engineers who are not in the first rank in their profession. Messrs. Bradley and Mackenzie are also consulting engineers of the Alaska Treadwell, Alaska Mexican, and Alaska United, three of the first mining properties on the American continent. Mr. Bradley is president and consulting engineer of the Bunker Hill and Sullivan mine in Idaho, the largest silver-lead producing mine in the United States.

It is the advice of men controlling interests such as these which Mr. McMillan affects to despise, setting up in opposition the views of himself and one or two subordinates appointed by him. After the attacks which have been made upon them, there is no hope that Messrs. Bradley and Mackenzie will continue, even if asked to do so, to operate the Le Roi property, but it is interesting to turn for a moment to the comparative expense under their regime and that of Mr. McMillan.

Messrs. Bradley and Mackenzie agreed to act as managers and consulting engineers for a fee of £1200. With the smelter shut down the only additional executive officers whom the company would have required to pay were, mine foreman at a salary of £600 per annum and a competent office manager at a salary of £500—altogether £2300.

Under Mr. McMillan, his own salary, at one time £2500, latterly reduced to £1500. Mr. Astley, mine superintendent, received £1600; Mr. Goddell, the smelter manager, £1600; the manager of the Rossland office, £720; and the mine foreman £720. The office manager at Northport £600; bookkeeper at Northport £300; and the mine representative at Northport (Mr. McMillan's brother), £360; altogether £7400. An object lesson, this, in economy!

Now I wish to put myself right in one particular. It may be remarked that at the meeting of the Le Roi shareholders in January 1905, I said: "I think it is due to Mr. McMillan that the shareholders of this company should expressly thank him for the way in which he stood in the breach, when, in September last he took up the general managership of the company on terms which, if the amount is any criterion, indicate a very modest scale of remuneration indeed."

The accounts for 1904 showed that Mr. McMillan had received as managing director, in salary and expenses, the sum of £625. I never dreamt at that time that Mr. McMillan was likely to rate his abilities at £2500 or even £2000 per annum, and I would have been just as ready to characterize as monstrous, such a scale of remuneration as I was prepared to commend the payment of £500 as a modest fee for his commercial services.

REMUNERATION OF BOARD.

I would remind the shareholders that the present board have worked for three years without fee or reward of any kind and that if Mr. McMillan's advice is taken and a dividend paid, the directors are entitled to participate, and will receive remuneration for the first time. That they have not recommended a dividend is in itself conclusive evidence that their policy has not been a personal or a selfish one, but conceived only in the interests of the shareholders.

The only director who has made money out of the company during the past three years is Mr. McMillan. Mr. McMillan has doubtless worked hard, and done his best according to his knowledge and ability, but he has already been handsomely paid for any services he may have rendered in the past.

REPORT OF THE MINING COMMITTEE OF THE HALIFAX BOARD OF TRADE.

The annual meeting of the Halifax Board of Trade was held on January 16th. The Mining committee presented the following report:—

Mining has not received the careful consideration, attention and support from the members of the committee its magnitude and more extensive possibilities would seem to demand.

When we seriously reflect, it must be apparent that the commercial, economic and political prosperity of this province, and particularly the City of Halifax, depends largely upon the successful development of this most important branch of our commercial life; and further reflections must reveal the necessity of a serious and well organized campaign by the members of

this board, if we are to broaden and strengthen this corner stone of our commercial foundation.

It has occurred to me that perhaps in some instances, we have exerted our energies on subjects minor, and left the major ones to shift for themselves. However, I trust the present year we may record a more active and energetic movement by its members in the support of this the most important of our provincial natural resources—its mines.

Coal Mining.—Owing to severity of the weather during the winter of 1905 and the re-establishment of the duty on coal going into the United States markets, there has not been the increase in the production of this commodity as was anticipated.

Many of the mining companies have however, enjoyed a large share of prosperity; prices have been successfully maintained, with no immediate prospects of depreciation in either price or output. Unfortunately the local consumer does not enjoy the same degree of satisfaction—to whom there seems to be no immediate prospect of relief. It is an open question whether or not the present existing conditions are not detrimental to other important branches of industries. However, the remedy, if one is desired, remains in the hands of the consumer, rather than in those of the producer, as is generally supposed.

In Cape Breton new prospects are being developed on extensive plans made for larger output in the near future. In the Pictou field two new shafts have been sunk, one to the Ford, the other to the cage pit seam. When these mines are fully developed they will largely augment the output from these fields. At DeBert and Maccan satisfactory developments are being carried on; while in the western part of Cumberland County there is said to be a new and extensive field yet undeveloped, portions of which are being prospected by the Standard Coal and Railway Co., who are said to have already cut a ten-foot seam. This field, when fully developed, should add largely to the natural resources and wealth of the Province.

Iron Ore.—Iron ore deposits are receiving more recognition, but not as much as we would desire. While the future looks extremely encouraging and with proper and sufficient inducements many promising prospects should develop into fairly large proportions. And could the bounty now paid by the Dominion Government on metallic iron made in Canada be so apportioned that specific bounty would be paid to the producers of Canadian iron ore there would then immediately spring into existence a large number of individual mines.

When we seriously consider that were an export duty to be placed upon raw ores now being imported and used by the steel plants of this province it would seriously cripple, if not entirely destroy these industries, which have cost people so much, makes this problem one of extremely vital importance to the people of this province, and further shows the wisdom of placing the industry in a position absolutely independent of any foreign manipulation. The independence of the industry should be maintained, but this can only be done by encouraging the development of raw material found within our own Dominion or provincial limits.

I would, therefore, strongly advise the appointment of a committee from this Society to more fully consider this question in all its branches; that this committee should be instructed to place its finding before the Tariff Revision Commission, urging the necessity of the re-adjustment of the bounty now paid in favor of the producers of native ores.

The Mining Society of Nova Scotia, already alive to the situation, and its importance, have appointed a committee to deal with this matter, and a unity of these two committees is strongly recommended.

Prospecting for Oil.—During the year 1905 prospecting for oil had been continued at or near Cheverie, and, as I understand without any discouraging features being met with, and that prospecting will be continued during the coming summer.

Gold Mining.—There has been little or no marked improvement in this industry during the past year.

At the suggestion of a committee appointed by the Mining Society of Nova Scotia, the local government was induced to employ an expert engineer to examine into the gold fields of this province and to report on the same. This examination has been made, and results are anxiously looked for.

This industry is one of decided importance to the City of Halifax, and should receive greater recognition from this Board, as the present depressed condition means a loss to the city of not less than \$500,000 per annum.

The Mining Society at its next annual meeting will no doubt go more fully into the subject and possibly make further recommendations to the Government, and the co-operation of this Board will strengthen their position.

(Sgd.) A. A. HAYWARD,
Chairman Mining Com.

A BANK MANAGER ON MINING IN CANADA.

At the recent annual meeting of the shareholders of the Canadian Bank of Commerce, an interesting report was

submitted by the general manager. Regarding mining in Canada during the past year, reference was first made to the gratifying and important industrial fact of the further improvement in the conditions surrounding the manufacture of iron and steel, and particularly the beginning of the manufacture of rails, the excellent quality of which was at once demonstrated in the Maritime Provinces. In Ontario, it was stated, interesting mining has been stimulated by the discovery of the rich deposits of silver-cobalt ores in the Cobalt area. It is stated that several million dollars worth of ore will be taken from these veins within the small area mentioned. Allusion is made, however, to the refractory nature of the ores, but the hope is expressed that before long a satisfactory method of treatment will be available. The report proceeds to say that during the coming summer there will probably be a considerable influx of population into the district surrounding Cobalt, and signs are not wanting that an attempt will be made to create not only a mining, but a mining stock boom. The report remarks that serious losses to the public have in the past resulted from attempts to capitalize mere prospects which only producing mines should command, and it is hoped that no encouragement should be given to any movement of the kind.

In Saskatchewan and Alberta, each of which provinces are much larger than Manitoba, coal, oil and other natural resources are now being developed.

In British Columbia coal mining shows a handsome increase in production, and several new mines are being opened. It is stated that there seems to be no reason established, in view of the unlimited supplies of raw material, why British Columbia should not take its place among the great coal-producing countries of the world.

Copper mining and smelting are now established and profitable industries. They require large capital and completed technical knowledge, but the results of such a combination seem to be as sure as in other well-managed manufacturing businesses. The year's output of the Boundary mining district is about 1,000,000 tons. There is a marked improvement in lead and silver mining and the outlook seems better than for many years.

ONTARIO MINING INTELLIGENCE.

FROM OUR OWN CORRESPONDENT.

Before the Canadian Section of the Society of Chemical Industry, Prof. Miller recently read a paper on the Mineral Deposits at Cobalt. Referring to the richness of Northern Ontario he pointed out that nickel of the value of from \$50,000,000 to \$60,000,000, in a refined state, had been produced in the Sudbury district. Eastern Ontario was also rich in minerals, mica and corundum superior to any in the world being produced there. There are three magnetic metals in nature, all of which are found in Ontario. The educational system was largely to blame, Prof. Miller thought, for the slow development of the province. He cautioned the people against booms—mining on paper. Only 7 per cent. of the mines in the Yukon had paid. So great was the demand for information about the Cobalt district that 7,000 maps had been distributed by the Bureau of Mines, and 9,000 more had been ordered, 5000 copies of the report had been distributed and more were wanted. Inquiries were coming from all parts of the world. Referring to waste in mining, Prof. Miller stated that \$3,000 worth of sulphur was lost every day at Sudbury in the roast heaps. In the course of the evening Prof. Miller exhibited a number of German nickel coins and strongly advocated the adoption of a nickel coinage for Canada.

Proceedings have been taken at the instance of the Ontario Government to set aside the leases held by the Temiskaming and Hudson's Bay Mining Co., the Nipissing Mining Co., and the White Silver Co., on the ground of fraud and misrepresentation, it being alleged that there was no valuable discovery made at the time the leases were applied for. In each case transfers have been made, the present holders not being the original lessees. This complicates the case, the present holders, in some cases at least being innocent parties who obtained mining rights for a valuable consideration.

A branch of the Canadian Mining Institute of Canada has been formed at Toronto. Mr. Eugene Coste having been elected chairman, Mr. W. Dillon-Mills, secretary, and Mr. Geo. R. Mickle, treasurer. One of the first acts of the branch will be to take up and discuss the proposed changes in the Ontario Mining Law.

The annual meeting of the Canadian Society of Civil Engineers was held at Toronto, Jan. 30, 31, Feb. 1, 2. The only paper bearing directly on mining was one by Dr. J. B. Porter, of McGill College, on Diamond Mining at Kimberley, South

Africa, illustrated with lantern slides. It was full of interest and the audience was most appreciative.

Samples of steel made by the electric process at Deseronto, have reached the Bureau of Mines at Toronto, and appear to be of excellent quality. They are produced from sulphurous ore from the Coe Hill mine and titanium from the Horton mine. One sample was produced in 15 and the other in 20 minutes. The steel was produced direct from the ores, but the experiments were merely conducted on a small scale by way of laboratory test.

The Canadian Copper Company's new smelter at Copper Cliff is now in operation. The cost of the works was approximately \$100,000. The plant, which has a capacity of 10 tons a day, is not adapted for saving the cobalt or other constituents of the Cobalt ores with the exception of the silver and arsenic.

A German Syndicate is said to have been formed to explore for minerals in Canada on an extensive scale and is said to have unlimited capital at its disposal.

Mr. Controller Jones is our authority for the statement that negotiations for the establishment of extensive iron smelting works in the east end of Toronto have reached such a stage that the works are now practically assured, in order to treat Hutton and Temagami ore, which will be delivered on the spot by the James Bay and Grand Trunk railways.

Judgment has been given by the Court of Appeal for Ontario in the case of the Wakefield Mica Co. The liquidator appealed from the judgment of Judge Anglin, but the appeal was dismissed. Messrs. J. S. King and C. A. Johnston are held not to be contributory and that the Mica Co. was never validly organized, no meeting of the shareholders or directors ever having been held.

A very valuable discovery of iron ore has been made north-east of Sudbury. The ore is very low in sulphur and phosphorus and will make a Bessemer steel of high quality. Railway facilities will be afforded, it is stated, if the ore proves as valuable as is at present believed.

Messrs. MacKenzie & Mann have secured an option for which they are said to have paid \$10,000, on a group of iron properties in Hutton and vicinity.

As a way out of the difficulty about the Gillies timber limits adjoining Cobalt, Mr. J. M. Clarke, K.C., proposes that the mining lands within the limits be handed over to the provincial university to provide an endowment. Some Ontario papers speak favorably of the proposal, and the university authorities are urging the government to act on the suggestion.

Diamond drill tests on the iron property at the north-east angle of Lake Temagami have afforded satisfactory results, and it is said offers have since been made for the property which is owned by Mr. T. B. Caldwell, M.P., Sir Wm. Mulock and Mr. E. O'Connor of Temagami.

A dispute has arisen over the ownership of the Violet mine in the Township of Bucke. The Hon. F. Cochrane, Minister of Lands and Mines has meanwhile heard the evidence and reserved decision. Mr. H. J. M. Rothschild, of New Liskeard, is the claimant. The mine has been worked for some months by Mr. J. O. Handy, of Pittsburg.

A United States syndicate has secured an option for, it is reported \$150,000, on the Tip-top copper mine, situated on the line of the Canadian Northern Railway, about 80 miles west of Port Arthur. The mine is owned by Lt. Col. Ray, of Port Arthur; Folger Bros. of Kingston and some United States investors.

An offer of \$1,000,000 is understood to have been made for the Tretheway mine at Cobalt. Mr. W. G. Tretheway, who has the largest interest, was disposed to accept, but his partners deemed the offer a not sufficiently tempting one.

Recent tests of the copper ore found at Cloud Bay, near Port Arthur, show very satisfactory results, samples having yielded as high as 26 per cent. The vein is said to be identical with that of the Calumet mine and is 23 feet wide in some places. A Boston company is meanwhile arranging to work the property.

Mr. Wm. Curtis, who was connected with the Silver Islet mine when it was producing heavily, passed through Toronto recently on his way from Cobalt where he had been making investigations on behalf of Detroit investors. Mr. Curtis expressed a very favourable view of what he saw in the new silver district.

The Michipicoten Gold Mining Co. having leased ten claims is making arrangements with the Michipicoten Power Co. for power for a fifty stamp mill which the company propose to erect. The Company's representative is Mr. J. J. Heilmann of Pittsburg.

Captain Lawson, mine superintendent at Copper Cliff, has been promoted to be general manager of the Canadian Copper Co's works.

Edison having secured mining claims on the Montreal River, is arranging for the accommodation of the men to be employed on the work.

Companies are announced almost every day to exploit Cobalt properties. The best properties are not for sale, and

many of the new concerns have no property, or if they have it is not within the mineral belt. There are indications of many wild-cat schemes. One advertisement announces that there is a vein of calcite on the promoter's property. Probably the statement is true, but it is probably intended to deceive the ignorant who are not aware of the nature of calcite. There is every prospect of a great rush to Cobalt in the spring and doubtless wild-catting will be very general.

The sub-station of the Huronian Power Co. at Copper Cliff is nearing completion and power from High Falls was expected to be produced on about Feb. 1. The station is built of iron and concrete and when completed will have cost over \$250,000. It will be of great service in furnishing power for mining and smelting operations.

COAL NOTES.

NOVA SCOTIA.

At a meeting held at Glace Bay on January 22nd, at which were present representatives of the Dominion Coal Company, of the Government and of the P.W.A., the report was submitted embodying the tests made during the past few months, in connection with the different powders used at the several collieries. A decision was finally arrived at that the companies would supply Bobbinite and Bull Dog powders, and that the men were to be allowed to use which they pleased. In the matter of price it was agreed that the company should supply the powder at a reduction if the matter can be arranged with the powder manufacturers.

The Dominion Iron & Steel Company's rod mill will be closed down for several weeks as the supply of wire rods on hand is at present greatly in excess of market requirements. Several thousand tons of wire is now in storage in the company's warehouse, ready for shipment.

Tests continue to be made of Crow's Nest coal for railway purposes, some recent results having proved most satisfactory in competition with other western coals; thus, a test made by the engineers of the Northern Pacific Railway yielded the following results:—

Pounds of water evaporated per pound coal at feed temperature, 33 degrees F., 8.1.

Pounds water evaporated per pound coal from and at 212 F., 9.95.

Pounds coal burned per 1,000-ton-mile on up grade of 0.25 per cent. for 115 miles, 120.19.

BRITISH COLUMBIA.

It is reported in consequence of the present increased demand for coal lands in Alberta and Saskatchewan, and in the B.C. Railway belt, that the Department of the Interior has decided in future that if the first instalment of the purchase price is not paid before the expiry of the period allowed an applicant when an application is accepted by the department, his right under the application will be held to have absolutely lapsed.

When payments have been made on account the rule will be on and after April 1st next, that if the payments are not made on the date fixed by the terms of sale, the rights of the purchasers will be forfeited. If a purchaser does not wish to complete the payment on the whole of the tract covered by his application, and he so notifies the department before the 1st of April next, he may be permitted to apply the amount which he has paid on the whole tract to a portion thereof, in such a way that his amount may complete the purchase of such lesser portion of the original tract.

It is reported that the well known railway magnate, Mr. D.C. Corbin, and others, have recently completed the purchase of 17 square miles of coal lands in the Crow's Nest area, some 60 miles east of Fernie, and adjoining the C.P.R. coal lands.

In his annual report for 1905, J. W. Harrison, broker, of San Francisco, reports the consumption of coal during this period in that market as having been 219,182 tons less than that of the preceding year. The report states that this shrinkage must not be taken as an indication that our fuel requirements have been at all less than in 1904. The apparent diminished quantity of coal fuel has been much more than made good by an output this year of fully three million barrels of fuel oil in excess of last year. The quantity of coal shipped here from British Columbia is in excess of last year shipments, whereas the Australian amount has shrunk fully 40 per cent. A new feature has recently developed itself in colonial deliveries being made here by steamers, there are several already chartered which have yet to arrive, with freight at about 16 shillings per ton, and with the duty of 67 cents per ton, the importers receive a very small compensation for coal; less than one-half the amount demanded for British Columbia coal at port of shipment.

The quotations of coal of all grades have ruled very uniformly throughout the year. The prices of steam grades have favored

buyers having fuel oil for a close competitor. The labor disturbances in British Columbia, which lasted for about six months this year, served to diminish the importations from Nanaimo section, and helped to increase the colonial importations, both as to quantity and price. Favorable terms were reached in November last, and work has been recommenced, and is now running harmoniously. About 80 per cent. of the coal trade is under the control and supervision of one firm locally. This is found to work with advantage to the buyers, and the sellers as the material can be handled so much more economically, and prices are sustained more uniformly. There are six steamers now being utilized by the firm transporting coal from British Columbia only. The last deliveries here of the six steamers amounted to over 24,000 tons, partially for steam purposes, and partially domestic grades.

The following comparative table shows the origin and tonnage of coal delivered in San Francisco during the past three years:—

	1903 Tons	1904 Tons	1905 Tons
British Columbia	289,890	335,137	348,515
Australia	276,186	148,409	85,031
English and Welsh	61,580	64,664	65,087
Scotch	3,495	1,666	None
Eastern (Cumberland and Anthracite)	13,262	29,055	11,663
Seattle (Washington)	127,819	139,063	84,965
Tacoma (Washington)	256,826	182,313	81,480
Mount Diablo, Coos Bay and Tesla	84,277	96,520	114,930
Japan, and Rocky Mountain by rail	102,219	54,245	40,219
Total	1,215,554	1,051,072	831,890

REPORTS AND MEETINGS.

LE ROI No. 2, LIMITED.—At a meeting of this company, held on the 15th of January, a report was submitted showing a balance to credit of profit and loss account of £29,810, after writing off the sum of £13,911 against mine development and £3,924 as depreciation on machinery and plant, buildings, etc. There was brought forward from the previous year the sum of £28,690, and after paying a final dividend for 1904 of 2s. per share there remained the sum of £16,090, which with the present balance of £29,810, gives a total of £45,901 available for distribution. Out of this a dividend of 1s. per share was paid on the 7th of October, absorbing £6,300. The directors now recommend a final distribution for 1905 of 3s. per share, leaving £20,701 to be carried forward. Messrs. Hill and Stewart report that during the past year the development of the mine has been vigorously pushed with highly satisfactory results, 12,237 tons were shipped to the smelter, and 10,678 tons to the concentrator. The mining expenses for the year, including diamond drilling, show an expenditure of \$4.22 per ton as compared with \$4.45 the previous year, although the tonnage dealt with has been less. The company has taken advantage of an opportunity that occurred to acquire various claims in the Rossland and Ymir districts, but has relinquished the option over the Vernon-Thompson group. Mr. Couldrey, who occupied the post of mine manager during the years 1903-4, has now returned to Rossland and taken charge of the property.

DENORO MINES, LIMITED, (Rossland).—Mr. Smith Curtis, managing director, has issued the following circular to shareholders:—

Since the last annual meeting, mostly development work has been carried on at the Oro Denoro mine. Sufficient ore has been taken out to meet the expense of mining, etc., so that the financial position of the company continues to be sound. The work of exploration carried on at various places on the property has shown that there is a reasonable certainty of a large tonnage of ore of at least as good grade as that being shipped by the Big Boundary Copper Mines to smelters operated in conjunction with such mines. Were there a Custom Smelter buying such ores the Oro Denoro could maintain a large output. As it is now, it is only ores of special quality that the smelters will take from the Oro Denoro.

A large body of ore was last summer and fall stripped of a deep layer of earth so as to permit its being quarried. This ore lies on the hillside between the two railway lines crossing the property and was ready for mining early in November but the Great Northern Railway failed to observe its contract with your company and complete a shipping siding until a few days ago when the siding was at last finished and since then 800 tons have been sent to the Granby smelter and other shipments are under way.

It is too soon to tell how this ore body will turn out in values,

but it is believed to be payable at the rates quoted by the smelter. If so regular shipments will be made from it.

Two months ago arrangements were made to acquire a half interest in the Hungry Man mine situate three and one-half miles from Slocan Junction, a station on the C.P.R. branch line between Nelson and Castlegar. One-fourth of this mine has been bought and paid for. The development work to date has been fully up to expectations and a payable ore body has been followed down 33 feet. A steam hoist and pump have been installed and will enable work to be done more cheaply and expeditiously. The ore is pyrrhotite carrying an average of about \$20 in gold. As this interest at the present time seems likely to become a valuable asset of your company, the annual meeting will not be held until some time in February when it will be possible to give more certain information about it.

SKYLARK DEVELOPING COMPANY, (Boundary District).—The annual meeting of this company was held in Phoenix, during January, the directors being re-elected as follows: The president, Mr. A. B. W. Hodges, vice-president, Mr. R. B. Bucher, M.D.; directors, Messrs. H. A. Wright, C. D. Hunter, W. S. Macy, Mr. A. B. Hood was re-elected secretary-treasurer, and Mr. O. B. Smith, junior manager. The report of the manager, for the year, was of a favourable character. The development work done comprised 1,071 feet, and 535½ tons of ore were mined and shipped to the Granby and Nelson smelters. At the 150 ft. level the ore body was again found to be faulted, but by cross-cutting to the east a very short distance, the vein was found again in place. The difficulty of determining the amount of ore now in sight is pointed out in the report. An estimate of 490 tons of high grade ore is presented as a very conservative calculation.

MINING NOTES.

NOVA SCOTIA.

A very remarkable showing was made during the month of December by the Dominion Iron & Steel Company, all previous records in every department having been surpassed, and a new record established, particularly in the output of wire rod.

The total production of pig iron last year was 162,000 tons, of the open hearth steel furnaces 173,500 tons, and of the rolling mills 47,000 tons. The steel rail mill turned out from the time it was first operated in June 44,000 tons. These were all 80-pound rails of uniformly good quality and practically all were delivered against contracts. Shipments were made under rigid inspection to the leading railroads of the Dominion and contracts are now in hand which will absorb the output of the mill for some months. The monthly production gradually increased until the end of the year, December having nearly 10,000 tons to its credit. This is not the measure of the mill's capacity, over 600 tons having been rolled on a single day and on several occasions it was proved that it is possible to roll 1,000 tons a day.

It is believed that upon the return of the President, Mr. Plummer, from England, the company will be re-organized and placed on a better financial footing.

The company is now confronted with the following charges in round figures:—

First mortgage bonds	\$390,000
Second mortgage bonds	150,000
Sinking funds, first mortgage	55,000
Sinking fund, second mortgage	250,000

Total

\$845,000

The preferred dividend requires \$350,000, making a total of \$1,195,000 of obligations ahead of the common stock. The company must thus earn \$100,000 a month from operation to pay interest, sinking fund and preferred dividend requirements. The accumulated dividends on the preferred stock including the April dividend will amount to \$21 per share, or \$1,050,000. There is also the floating debt to be taken into consideration. The general understanding is that under the re-organization plan the second mortgage bonds will be retired by the issue of another security, the preferred stockholders will be asked to agree to having their shares put on an 8% basis, thus receiving back dividends at the rate of 1% per annum. With the retirement of the second mortgage bonds and the removal of the \$250,000 required for the sinking fund for that issue, the increased production possible, the excellent business in prospect, a brighter day should be dawning for the long suffering holders of Dominion Iron & Steel common, and the shares have even now started to reflect the good news which is coming from the property.

Shipments from the Dominion Steel Company's works, during January, aggregated approximately 17,000 tons.

QUEBEC.

In an article headed "Exit the Anglo Canadian" the Buckingham Press comments in the following amusing fashion:—

"There was not a fire at the premises of the Anglo-Canadian Graphite Syndicate, Limited, recently, but some people say Sparks. The sale in connection with the company then took place, and the movables were disposed of. The result of the sale is not very encouraging for the creditors. The liabilities foot up something like \$8,000.00 (eight thousand dollars) and the proceeds of the sale, gross we mean, come to about \$750.00 (seven hundred and fifty small dollars). Out of this sum will come the law costs and advertising, and the fees of the permanent liquidator. Less than 10 per cent. of the liabilities has been realized at this sale, 90 per cent. of which will go to satisfy privileged claims unless we are greatly mistaken. Over 600 cords of mixed wood went for a lump sum equivalent to 25 cents per cord. Four tons of steel rails with fish plates and bolts went for the sum of 8 dollars. One steam drill brought \$70, another \$5. There was a slight hope until the sale came off that operations would be resumed here by a new company of which Messrs. W. E. Duncan and Darcy McMahon were to be managing directors. But though Mr. Duncan was at the sale he did not purchase anything. The buying of the wood by him would have afforded ground for the assumption that operations would be resumed, but as it appears to-day the Carbondale business seems as dead as the proverbial door nail, snuffed out like a tallow candle. But perhaps McMahon and Duncan have something up their sleeves, not of the hair raising kind, but something all wood and a yard wide, don't you know? We hope so any way.

There is not much hope of the Weart mill resuming operations. If the International Company had really intended to re-open this mine it is quite likely the 600 odd cords of wood disposed of would not have gone for the price it did, but as a distinguished friend of ours says, "You can't mostly always generally sometimes tell."

ONTARIO.

The Big Master mine, after running, has again been obliged to close down, the recent clean-ups apparently having not been sufficient to more than defray expenses. The statements that have recently appeared regarding the value of the clean-ups made were, moreover, doubtless exaggerated.

Five hundred and fifty oil leases in South Essex were filed in the county registrar's office during the year. The value of these leases is given as \$1,318,179.00.

The concrete foundations for the Atikokan Ore Company's blast furnaces, to be erected at Port Arthur, have been completed and contracts for steel structural work and machinery have been let, the work being divided into fourteen contracts. The Canada Foundry Company, of Toronto, has secured \$200,000 worth of the work; Canada Bridge Co. \$100,000 and Caledonia Iron Works, Montreal, \$20,000. The remainder of the contracts went to United States firms, and were for machinery not made in Canada. If contractors finish their work on time the company will start furnaces going next August. The mine at Atikokan is being equipped with the best machinery obtainable and the shipping of ore therefrom will begin as soon as navigation is open. A railway six miles long from the Canadian Northern main line to the mine will be constructed at once. The authorized capital stock of this company is \$2,000,000.

A local paper publishes the following interesting note, regarding the alleged blanketing of claims in the Cobalt district:—

A sensational move by the Attorney General, Mr. Foy, to open up a large area of the Cobalt district, which it is claimed has been illegally "blanketed," was inaugurated on Saturday when Wm. Pinkerton, of Pinkerton, Clute & Co., issued the first instalment of writs on a wholesale scale. By noon 50 writs were issued at Osgoode Hall, and by Monday morning 100 more were issued. It is asserted that fully half of the Cobalt district is affected by the action taken and that the property could be easily sold to-day for \$10,000,000. The action is the result of representations made to the Government by miners and prospectors concerning holdings of Temiskaming and Hudson Bay Mining Co., Ltd., a company organized and incorporated during the final months of the Ross government. Under its charter it was empowered to locate 640 acres of land for purposes of development. It is alleged that not only was this allotment taken up, but that 11 men who constituted original shareholders also took up all claims possible, and that each then made a declaration of trust handing over these claims to the company and thus making a breach of the mining laws.

The Lake Superior Corporation's steel rail mill is now running at full capacity, there being a large number of orders ahead. It is stated that possibly this year arrangements will be made for the construction of a large coke plant and the installation of open-hearth furnaces.

BRITISH COLUMBIA.

NELSON.—While some inconvenience has resulted from the recent fire at the Ymir mine, operations both at the mine and mill have been carried on uninterruptedly. At the mine development is under way to the west of the main shaft on the 500, 600,

700 and 1,000 ft. levels, and it is reported that important new discoveries of ore are being made.

A new furnace described as the Blanchard, after its Seattle inventor, has been installed at the Pilot Bay smelter, the preliminary experiments on Blue Bell ore having given entire satisfaction.

It is expected that the new mill under construction at the La Plata mines will be in readiness to commence operations within the next two or three months. The mine is meanwhile shipping ore regularly to the Hall mine smelter, at the rate of about 10 carloads a month.

EAST KOOTENAY.—The St. Eugene Consolidated Mining Company, Limited, paid, during the month, a seventh dividend of 2 per cent. This company has now paid to date, in the form of dividends, \$560,000.00. The mine and concentrating mill are now in active operation. About 90 tons of concentrates a day are being sent to the Canadian Smelting Works at Trail.

CARIBOO.—In an interview with the *Victoria Times* Mr. H. Jones, M.P.P., Cariboo District, is reported to have stated that prospects at the present in that district are extremely encouraging, and that there is a likelihood of gradually increased activity in and about the Cariboo mines during the coming season. Hitherto the work done has been largely of a prospecting nature, but the big companies, after sinking to the necessary depths, are striking out for the deep channels where heavy deposits of gold are believed to exist. Already in some cases these tunnels or drifts extend underneath the Willow river, through a stratum of deposit about 100 feet thick between the present and the ancient bed of the river. The nature and extent of the preliminary work may be gathered from the fact that the minimum depth of shaft required for workings of this kind is 100 feet. There are at present about seven big companies working, in addition to numerous prospecting ventures, hydraulic concerns and individual diggers, and the quantity of gold taken out, chiefly by the latter, amounted to some \$350,000 in value during the past season. This return would have been largely increased but for the serious shortage of water consequent upon an exceptionally dry season.

It is reported that better pay has been struck at the Cariboo Consolidated *La Fontaine* mine, gravel running 9 oz. and upwards to the sett.

BOUNDARY.—The second furnace of the Dominion Copper Company's smelter at Boundary Falls was blown in during the month. Shipments from this company's mines have also been considerably increased.

The Boundary Iron Works, Limited has declared a first dividend of 5 per cent. payable on the 1st of March. It is stated that the business of this foundry has grown enormously during the last few months.

The strike of smelter employees of the B.C. Copper Company and the Dominion Copper Company, at the beginning of January was, fortunately, short lived, and as the result of conferences between the officials and the men the matter in dispute was amicably arranged on the basis of an 8 hour day. The men had asked to be paid the same rate for an 8 hour day as for one of 12 hours. However a new schedule was arrived at, by which the coke wheelers and charge wheelers are to receive \$2.70 a day and tappers and pot dumpers \$3.00.

SLOCAN.—The *Kaslo Kootenian* remarks editorially that much adverse comment has been occasioned recently anent the excessive freight charges on zinc ores between Sandon and Kaslo. Some of the shippers maintain that hitherto the rate has been only \$1 per ton to Kaslo and are much incensed over the new rate, claiming that the Great Northern in levying such charges are attempting to divert the ore to the United States smelters for the purpose of securing the long haul over their own lines. On the other hand the local railroad people deny this and further maintain that there never was a tariff rate of \$1 per ton from Sandon to Kaslo. The rates have always been the same—\$2.50 per ton—between Sandon and Nelson and all intermediate points. Mr. H. M. Adams, of the Freight Department staff of the Great Northern, meanwhile has stated that rates on ore on the K. & S. Road have never, to his knowledge, been advanced. The present rate of \$2.50 per ton in carload lots to Pilot Bay and Nelson being the lowest rate that has ever been in effect.

ROSSLAND.—A suitable plant has been purchased for use in operating the Copper Valley mine, situated on Big Sheep Creek, in the vicinity of Velvet-Portland. It is proposed to actively develop the property. It is reported by the *Rossland Miner* that the St. Paul mine, one of the early discoveries in the district and operated by a company, has been purchased by Mr. W. R. Brock, of Toronto, with the possible intention of re-organizing the original company and resuming work. The St. Paul claim is situated on the northern slope of Deer Park Mountain, immediately west of the White Bear.

Notice is given in the *British Columbia Gazette* of the incorporation of the White Bear Mining Co., Ltd., with a capital of

one million dollars in shares of 10 cents each. The company is specially limited under section 56 of the companies act. The object of incorporation is to take over the property and business of the White Bear mine in this city and to acquire all the property and rights necessary to the operation thereof.

THE COAST.—The Government Agent at Texada Island reports that the Marble Bay Company last year shipped 12,000 tons of ore. The mine has been developed to a depth of 671 feet, the shaft having been deepened at 100 feet, in addition to which 340 feet of drifting was done and 200 feet of other development work. The company reports that the gold values in the ore have been maintained, and that the copper values have somewhat increased.

Operations were started at the Crofton smelter on the 4th of January, and a shipment of blister copper has already been made to New Jersey. The briquetting plant has been installed and the works are now in full running order and treating ore, not only from the company's own property at Howe Sound, but from Prince of Wales Island, and from Mullen, Idaho.

YUKON.

Dredging possibilities on the Hootalinqua have lately been attracting some attention, and it is learned that Boston capital has become interested in the exploitation of the field.

The *Yukon World*, in a recent article, refers to the success achieved by the individual miner on Barker Creek, situated 27 miles before Stewart Crossing. The creek, which has only recently been exploited, is 35 miles long, pay having been found 15 miles from the mouth. On the discovery claim the width of the stream is from 500 to 1,500 feet. It is stated that at present 25 men are working claims here and in some cases are earning from \$8.00 to \$10.00 a day. The ground is shallow, being from 14 to 16 feet deep, the gravel having a brownish color, similar to that given by iron stain. The benches in the vicinity are said to be most promising.

MINING MEN AND AFFAIRS.

Mr. S. F. Parrish, formerly manager of the Le Roi mine at Rossland, is now residing at La Jolla, California, where he has assumed the management of an important property.

Mr. John Y. Cole, of Rossland, who for the past 12 years has been engaged in mining in different Kootenay districts, has left British Columbia, and proposes establishing himself at Cobalt, Ont.

Mr. J. B. Tyrrell, the well known mining engineer of Dawson, Y.T., is spending the winter months in Ottawa, his address there being 266 McLaren Street.

A short but useful course on mining instruction has recently been provided by the University of the State of Washington, Seattle, lasting three months. The studies include geology, mineralogy, assaying, chemistry, mining and milling, and the mining laws of the United States, British Columbia and Alaska. No charge is made for tuition, except in the assaying and chemistry course.

Mr. S. S. Fowler, of Nelson, accompanied by Mrs. Fowler, is spending the winter months in California.

Mr. Paul S. Couldrey, manager of the Le Roi No. 2, recently at the request of the company examined the property of the Velvet-Portland Mines, Ltd., preliminary, it is conjectured, to the resumption of operations at these mines.

The CANADIAN MINING REVIEW has been informed by the secretary of the Exhibition branch of the Department of Agriculture that it has been awarded a diploma of the Gold Medal class for its exhibit at the St. Louis World's Fair, 1904.

Mr. M. Gintzberger, manager of the Monitor and Ajax Fraction mines at McGuigan, has had the misfortune to break a leg. We learn, however, that he is rapidly recovering from the accident.

We regret to record the death, which occurred recently, of Mr. E. J. Thain, who for some time past has acted as Government Mining Recorder at Atlin.

Dr. H. A. Young, M.P.P. for the Atlin District, in a recent interview stated that while a shortage of water last year necessarily reduced the production of the district, nevertheless thinks the yield will probably aggregate \$600,000.00. He furthermore expressed the opinion that the development of the Windy Arm mines will have the beneficial effect of attracting more attention to mining in the northern territory. Dr. Young further stated that individual miners are still doing well in Atlin, the past season having been an exceptionally good one, so far as this class was concerned. At the present time about 300 men are engaged in drifting work, and the clean-ups will take place in the spring.

Mr. J. Obalski is to be congratulated on having been appointed Director of Mines for the Province of Quebec, and also Superintendent of Mines, with a corresponding increase of salary.

Mr. James Crease, manager of a gold mine at Mount Uniacke, N.S., was very near the victim of a murderous assault last month,

having been shot at on his way to the property. Shortly before Mr. Crease had received anonymous letters warning him to leave the neighborhood or suffer the consequences, and notices had been posted in the district threatening the employees at this property to cease work. The matter is being investigated by the Nova Scotian authorities.

Mr. G. C. Bateman, who last year graduated from the Kingston School of Mining, has received an excellent appointment at Copper Cliff.

Mr. R. W. Brigstocke, Manager of the Drummond Mines, Ltd., Haileybury, was married last month to Miss Ioraine Leslie, of Kingston.

Mr. J. C. Drewry, one of the directors of the St. Eugene, and managing director of the Canadian Gold Fields syndicate, spent some days in Montreal last month. He speaks very hopefully of the immediate future of mining in British Columbia.

Mr. G. H. Duggan has been appointed second vice-president of the Dominion Coal Company.

We extend most hearty congratulations to Dr. F. D. Adams, Logan Professor of Geology, McGill University, who, in recognition of his notable services, established in connection with the science he represents, has been awarded by the Geological Society of London, the Lyell medal. This medal was also awarded in 1881 to Dr. Adams' distinguished predecessor, Sir Wm. Dawson.

We have received a communication from the Secretary of the Iron & Steel Institute, 28 Victoria Street, London, England, stating that a research scholarship or scholarships, of such value as may appear expedient to the council of the institute from time to time founded by Mr. Andrew Carnegie (Past-President), who has presented to the Iron and Steel Institute eighty-nine one-thousand dollar 5 per cent. debenture bonds for the purpose, will be awarded annually, irrespective of sex or nationality, on the recommendation of the council of the institute. Candidates who must be under thirty-five years of age, must apply on a special form before the end of February to the secretary of the institute.

The object of this scheme of scholarships is not to facilitate ordinary collegiate studies, but to enable students, who have passed through a college curriculum or have been trained in industrial establishments to conduct researches in the metallurgy of iron and steel and allied subjects, with the view of aiding its advance or its application to industry. There is no restriction as to the place of research which may be selected, whether university, technical school, or works, provided it be properly equipped for the prosecution of metallurgical investigations.

The appointment to a scholarship shall be for one year, but the council may at their discretion renew the scholarship for a further period instead of proceeding to a new election. The results of the research shall be communicated to the Iron and Steel Institute in the form of a paper to be submitted to the annual general meeting of members, and if the council consider the paper to be of sufficient merit, the Andrew Carnegie gold medal shall be awarded to its author. Should the paper in any year not be of sufficient merit, the medal will not be awarded in that year.

COMPANY NOTES.

BRITISH COLUMBIA COPPER.—The annual general meeting of this company will be held in Charleston, W. Va., on Feb. 13th. The books were closed on Jan. 23rd, and will be re-opened on Feb. 17th.

TYEE COPPER COMPANY.—During December the smelter ran 11 days and treated 2,035 tons of Tyee ore giving a return after deduction of freight and refining charges, of \$33,460.10.

CROW'S NEST PASS COAL.—It is rumored that the directors of this company are contemplating proposing to the shareholders at the annual meeting next month the issue of bonds bearing interest of 5% in connection with a reorganization plan. It is not clear why this should be necessary.

LE ROI.—Shipments for last month amounted to 6925 tons, containing 2772 ounces of gold, 5300 ounces of silver, 205,700 pounds of copper. Estimated profit on this ore, after deducting cost of mining, smelting realization and depreciation, \$32,500. Expenditure on development work during the month, \$8,000.

MINING CORPORATIONS.

ONTARIO.

New York and Ontario Mining Company, Limited.—Capital \$40,000.00, in shares of \$100.00 each. Head Office, Toronto. Provisional Directors, Messrs. Geo. Reginald Geary, Fitzgerald Douglas Byers and Oscar Frederick Taylor.

The Dwyer Mining Company, Ltd.—Capital \$100,000.00, in shares of \$5.00 each. Head Office, Toro. Provisional

Directors, Messrs. John Brush LeRoy, Daniel Robert Dwyer and John Russell Humphreys.

Vermilion River Iron Ore Company, Limited.—Capital, \$80,000.00, in shares of \$1.00 each. Head Office, Toronto. Provisional Directors, Messrs. Frank Denton, John Walter McDonald and Ella A. Francis.

Wendigo Progressive Mining & Development Company, Ltd.—Capital, \$40,000.00, in shares of \$1.00 each. Head Office, New Liskeard, Ont. Provisional Directors, Messrs. John Cox, Samuel Drew Eplett, Geo. Wm. Slade, John Wesley Foreman and John McFarlane.

Dymond Development Company, Ltd.—Capital, \$250,000, in shares of \$100.00 each. Head Office, Ottawa. Provisional Directors, Messrs. Chas. Wilson Farran Gorrell, Adam Tozeland Shillington, Bion Joseph Arnold, Wayland Lloyd Arnold and Ralph Glenroy Arnold.

Northern Ontario Copper Company, Ltd.—Capital, \$500,000.00 in shares of \$1.00 each. Head Office, Sault Ste. Marie. Provisional Directors, Messrs. John Angus Montague, Ozias Byron Jury, Uriah McFadden, Wimmiam Edwin Gimby and Arthur Cyril Boyce.

Croesus Mining Company, Limited.—Capital \$500,000.00, in shares of \$100.00 each. Head Office, Ottawa. Provisional Directors, Messrs. Shirley Ogilvie, Douglas L. McGibbon and Travers Lewis.

Clarks Standard Developing Co., Limited.—Capital \$40,000.00, in shares of \$1.00 each. Head Office, New Liskeard. Provisional Directors, Messrs. John Jeffery Grills, Thos. Clark, Robert B. Herron, William Votier Cragg and James Leitch Brown.

Canadian Cobalt and Silver Mining Company, Limited.—Capital, \$250,000.00, in shares of \$1.00 each. Head Office, Ottawa. Provisional Directors, Messrs. Thos. Birkett, Alphonse Antoine Taillon, Thomas Lindsay, Herman Humphrey Lang, William Drummond Hogg, Wm. Frederick Powell, Douglas Macnair and Robert Taylor Shillington.

Abitibi Mining & Developing Company, Ltd.—Capital \$100,000.00, in shares of \$1.00 each. Head Office, Finch, Ont. Provisional Directors, Eathen Henry Marcellus, John McLaughlin, Jno. J. McMillan, James Currie, Colin Smith Nesbitt, Herbert Eardley Bingham, Duncan Alexander McNaughton.

The Terrill Cobalt Mining Co., Limited.—Capital \$100,000.00, in shares of \$1.00 each. Head Office, Sault Ste. Marie. Provisional Directors, William Edwin Gimby, Geo. Woolrich, David Irvine Millar, Henry H. Taylor, Wesley Burns Moorehouse, Alexander McIntyre, Frederick Rogers, Abraham Geo. Terrill and Robert Henry Schultz.

Empire Construction Company, Limited.—Capital \$1,000,000.00, in shares of \$100.00 each. Head Office, Montreal. Provisional Directors, Vicomte Louis Charliers de Buisseret, gentleman; Eugene Fichet, contractor; Baron Constant Goffinet, minister plenipotentiary; Louis Goffin, engineer; Louis Grenier, engineer; Gerard Macquet, engineer; Comte John d'Oultremont, (Grand Marechal de la Cour), Armand Rouffart engineer; Edmond Rouffart, doctor of medicine, all of Brussels, Belgium, except Louis Grenier, who resides at Ghent, Belgium, and Louis Charliers de Buisseret, who resides at Senefle, Belgium; James B. Tudhope, Orillia, Ont.; Henry W. Fleury, Aurora, Ont.; Paul Galibert, merchant, and Thomas Gauthier, accountant, both of Montreal.

Canadian Consolidated Mines, Limited.—Capital \$5,500,000.00, in shares of \$100.00 each. Head Office, Toronto. Provisional Directors, Messrs. Henry Smith Osler, barrister-at-law; William Beardsley Raymond, barrister-at-law, Frank Ford, barrister-at-law; Geo. Chas. Loveys Loveys, accountant, William Wellington Livingston, student-at-law; James Miller Ewing, accountant, and Britton Osler, solicitor, all of Toronto, Ont.

The Abitibi Mining Company, Ltd.—Capital, \$10,000.00, in shares of \$100.00 each. Head Office, Montreal.

Temagami Silver Mining Company, Ltd.—Capital \$150,000.00, in shares of \$1.00 each. Head Office, Sturgeon Falls, Ont. Provisional Directors, Messrs. Geo. Gordon, Jesse Bradford, Alex. Burton Gordon, Thos. Urquhart, Jeremiah Daniel Cockburn, Chauncey Thos. Kirby and Geo. Phillip Cockburn.

BRITISH COLUMBIA.

Crescent Mines, Ltd.—Capital, \$1,000,000.00 in shares of \$1.00 each.

White Bear Mining Company, Limited.—Capital, \$1,000,000.00, in shares of 10 cents each.

The Norma Mines, Limited.—Capital \$300,000.00, in shares of \$1.00 each.

NOVA SCOTIA MINING INTELLIGENCE.

(FROM OUR OWN CORRESPONDENT.)

During the month of January 385 gold mining areas were taken up under prospecting license in the different districts,

the larger quantity being areas that had expired and had been re-applied for.

The following is a statement of the numbers of areas applied for and district:—

	Areas
Oldham	48
Meteghan	30
Cow Bay	6
Chezzettecook	16
Renfrew	9
Montague	48
Antrim	6
Millers Lake	22
Stormont	13
Fifteen Mile Stream	89
Scrappy Lake	11
Malaga Barrrens	6
Lochaber	39
Wagamatkook	14
Whiteburn	2
Gold River	12
Beaver Dam	10
Harrigan Cove	4
Total	385

The latest mill returns to hand, give tonnage and yield as follows.—Frederick Taylor mill, Oldham, during Oct., Nov. and Dec., 1905 crushed 531 tons, which yielded 547 oz. 0 dwt. 0 grs.

At the Philadelphia mill, North Brookfield, 350 tons crushed in November yielded 142 oz. 15 dwt. 0 grs. and in December 4 tons crushed yielded 75 oz. 15 dwt. 0 grs. gold.

In the Stormont district the McCawley mill crushed 397 tons during Oct., Nov., and Dec. and the yield of gold therefrom was 370 oz. 10 dwt. 0 grs. and in same district 392 tons were crushed at the MacKeen mill and yielded 165 oz. 18 dwt. 20 grs. gold.

At the J. A. Crease mill Mount Uniacke 35 tons were crushed during Dec. which yielded 71 oz. 5 dwt. 0 grs

LAST YEAR'S PRODUCTION OF PIG IRON.

During the year 1905 a considerable advance was made in iron and steel output in nearly all the producing countries. This is shown by the following comparative table giving the production of pig iron in the respective countries in thousands of tons:—

	1905	1904
United States	23,000	16,497
Germany	11,000	10,058
Great Britain	9,500	8,563
Belgium	1,400	1,283
France	3,200	3,000
Russia	3,500	2,978
Austria Hungary	1,500	1,480
Sweden	600	529
Canada	420	295
Other countries	600	500
Totals	54,720	45,183

It is probable that this is the greatest advance of pig-iron output hitherto attained in any one year.

MINING SHARE MARKET.

The market for mining shares has been more active during the month than for a long time past.

The consolidation of the Centre Star and other properties in British Columbia, has been favorably received, and all the floating stock of it and the St. Eugene has been quietly absorbed.

The Canadian Gold Fields Syndicate is firm on the satisfactory reports presented at the annual meeting. There is a considerable demand for many of the low-priced Rossland properties, on the belief that the smelter charges in the future will be so reduced as to enable many of the properties that are now closed down, to produce ore at a profit.

In the Industrials there has been a fair amount of business done and prices are buoyant on the increased earnings of the various companies, due to the improved business conditions.

The following list shows the quotations for the week ending

February 5th, as supplied to the Review by Robert Meredith & Co., 57 St. Francois Xavier St., Montreal—
Par value

of shares.	Asked.	Bid.
.10 Canadian Gold Fields Syndicate	.06	.05½
5.00 Cariboo Hydraulic	—	—
1.00 Centre Star	.40	.35
1.00 Deer Trail Consolidated	.02	—
1.00 Giant	.02½	—
10.00 Granby Consolidated	10.25	10.00
10.00 Montreal and Boston	½	¾
1.00 North Star	—	.04½
1.00 Payne	.02	—
1.00 Rambler Cariboo	.35	—
1.00 Monte Christo	.03½	.02½
1.00 St. Eugene	.68	.65
1.00 White Bear	.02½	—
100.00 Nova Scotia Steel (common)	.73	.72
100.00 Nova Scotia Steel (preferred)	122.00	118.00
100.00 Dominion Coal (common)	.81½	.81½
100.00 Dominion Coal (preferred)	122.00½	120.00
100.00 Dominion Iron and Steel (common)	.32	.31
100.00 Dominion Iron and Steel (preferred)	.79½	.78½
— Dominion Iron and Steel (bonds)	.85	.84

INDUSTRIAL NOTES.

Bulletin No. 10 is a very handsome descriptive pamphlet, printed in two colors, and issued by the Jeffrey Mfg. Company, Columbus, Ohio. It contains upwards of 60 pages of illustrated matter dealing with the well known Jeffrey electric mine locomotives, and will well repay perusal.

The David Maydole Hammer Company, Norwich, N.Y. sent us an illustrated catalogue describing hammers manufactured by them, which now comprise 343 styles, sizes and finishes.

The Allis-Chalmers-Bullock, Ltd. are distributing among their clients and others, a very handsomely printed monthly calendar, in gold and colors. These cards are not only useful but ornamental, and make an acceptable gift.

The Abner Doble Company, represented in Canada by the John McDougall Iron Works Company, Ltd., in Montreal, send us a copy of Bulletin No. 7, devoted to the Doble Tangential Water Wheel. In addition to the usual information, this catalogue contains data sheet for estimates, which should greatly facilitate ordering.

B. Greening Wire Company have just issued an interesting pamphlet on Wire Bonding for Concrete Construction. This is a subject in which many of our readers are interested, and they will therefore be glad to have the pamphlet in question, which very fully covers the subject.

Extensive additions to the works of the Canadian Rand Drill Company at Sherbrooke Que., will shortly be undertaken. A new foundry, it is understood, is among the improvements to be carried through.

The Sullivan Machinery Company are good enough to send us the following cutting from the Cripple Creek Times, which may be of interest to some of our readers:—

An interesting feature of mining in the Cripple Creek district, and an item which is as closely watched by the operator as any other, is the cost of making air per drill shift, upon which largely depends the possibilities of economical operation. The wide range in this one respect is shown by the fact that in some instances the cost is as high as \$3 per drill shift, while in others the same results are obtained at a cost of 53 cents. This great difference is due to the class of machinery used and the care and intelligence with which it is operated. Of the different records obtained from mine operators the following seems to show the greatest economy:

Mr. John Sharp, the well known lessee who is operating the Morning Glory of the Work and the Colorado Works of the Cripple Creek Consolidated Company, furnished data covering a period from September 20, 1904, to January 17, 1905 during which time 1,367 drill shifts were operated. As shown by his books, during that time the coal bills amounted to \$1,183.17. The greatest number of shifts worked in one month was in October when 492 were employed.

The rock hoisted amounted to 7,500 tons during the months of October, November and December, and the coal bills for hoisting amounted to \$450, leaving the total coal bill for running the air compressor \$733.17, or 53.7 cents per drill shift.

It is doubted if this record can be duplicated in the district. In speaking of his accomplishment in economical operation Mr. Sharp said: "I think that my record for making air per drill shift is about as low as it can be made. My cost was 53.7 cents per drill shift for coal. The machine used was a straight-line compressor with simple steam and compound air cylinders, and was built by the Sullivan Machinery Company of Chicago. It is supposed to operate only ten drills, but often exceeded the

rated capacity. In my opinion it is as economical a compressor as can be constructed, and certainly the tests I gave the machine under all conditions, are sufficient to demonstrate this fact."

The Sullivan Machinery Company of Chicago, reports the appointment of Mr. H. T. Walsh, as manager for the Pacific Coast, with headquarters with the well-known firm of Henshaw, Bulkley & Co., at San Francisco. Mr. Walsh has had an extended experience with mining equipment having represented the Sullivan Machinery Co. in the Rocky mountain region for a number of years. Henshaw, Bulkley & Co. who have been for a long time the agents of the Sullivan Machinery Co. will continue to carry a stock of Sullivan rock drills and compressors.

The Golden Key Mining Co., Hillside, Ariz., is installing a power plant to operate its machinery. Contract has been closed for two of the well-known "Hornsby-Akroyd" oil engines, 16 horse power each, built by the De La Vergne Machine Company of New York.

The American Steel Dredge Works, Logansport, Indiana, which was organized by Messrs. James P. Karr and John D. Rauch; now have their complete plant in operation.

An important order recently secured by the Canadian Westinghouse Company was obtained from the Vancouver Power Company, of Vancouver, B.C. This order included a 1500 H.P., 2200 volt revolving field engine type generator, which will be direct connected to a Pelton water wheel. This is a duplicate of the generators now in operation in the power plant of this company and will operate in multiple therewith. The order includes switch boards, air blast transformers of 550 K.W. capacity. There is also included in the order a 1000 K.W. 60 cycle rotary converter to operate 550 volts. This converter will furnish power for railway work and will be controlled direct from the switchboard.

A conspicuous departure in the lighting of canals is that of the Welland canal near St. Catharine, Ontario. Over 600 A.C. series arc lamps have been provided by the Canadian Westinghouse Company and these have been in operation for the past few months and have given splendid service. This installation as a whole redounds great credit to the Ontario government, as well as the consulting engineer, Mr. R. J. Parker, under whose direction the complete plant was installed.

There is every indication of the reawakening of the mining industry in the northwestern part of Ontario. The Northern Development Co. for example, which has been doing hard work for several years in the Rainy River district is now preparing to operate on an extensive scale, and recently purchased from Allis-Chalmers-Bullock, Limited, Montreal a complete mining plant including boilers, air compressors, rock drills, hoisting engine, pump and a large quantity of miscellaneous mining equipment.

MINING AND METALLURGICAL PATENTS.

(Specially reported for the CANADIAN MINING REVIEW).

806,173—Electric Furnace. Romaine M. Meyers, Fruitvale, Cal.

An electric furnace having a plurality of pyro-electrolytic bars within a heat resisting shell, means of protecting the substance to be heated and the said bars during the insertion and withdrawal of said substance, consisting of the heat-resisting rods arranged in parallel with said bars, between said bars and the space occupied by said substance.

805,414—Metal Separator for Ore-Concentrating Plants. Henry C. Krause, Point Mills, Michigan.

The combination of a hopper having a funnel-shaped partition which terminates at the bottom in a contracted discharge-opening between the top and bottom of the hopper and forms with the lower part of the hopper a receptacle for metal and heavy concentrates passing through said discharge-opening when the opening at the lower end of the hopper is closed, and a trap connected with the lower part of said hopper and provided at its upper and lower ends with valves and a water-supply connection leading into said hopper between said partition and the upper valves.

806,621—Copper Refining Furnace. Ralph Baggaley, Pittsburg, Pa.

The combination of thick metal walls built up of comparatively narrow segments, a relatively thin refractory lining, a solid removable metal top, of sufficient thickness to withstand and to conserve the internal heat, means for supplying auxiliary heat above the level of the bath, means for introducing precreated hydrocarbon gas below the level of the bath, means for regulating the escape of hot gases, and means for tipping the vessel either to receive or to pour the charge.

- 807,973—Process of Obtaining Marketable Electrolytic Deposits. Pierre Steenlet, Brussels, Belgium, assignor to Marcel Perrew Lloyd, Brussels, Belgium.
A process which consists in charging the diaphragm with an organic substance, treating said organic substance to render it insoluble interposing the thus-charged diaphragm between a metallic-anode and the cathode and the corresponding portions of an electrolyte containing a metal, and causing an electric current to flow from the anode to the cathode through the thus-charged diaphragm and form a metallic deposit on the cathode.
- 806,121—Zinc Furnace. Emile Dor-Dellatre, Budel, Netherlands.
In a gas-heated zinc furnace, the combination with a furnace-chamber, of air and gas channels adapted to communicate with the chamber through a common passage, adjustable means for regulating the admission of air and gas to said common passage, and means within the chamber in alinement with said passage to deflect laterally the currents entering the chamber through said passage.
- 807,271—Process of Extracting Metals from their Sulfids. Antonine H. Imbert, Grand-Montrouge, France.
The process for extracting from its sulfid, a metal having less affinity for sulfur than is possessed by copper, consisting in mixing the sulfid of such metal with the amount of copper only sufficient to combine with the whole of the sulfur, in heating this mixture to a temperature suitable for the reaction for forming copper sulfid and liberating the other metal, and collecting this liberated metal and the copper sulfid separately.
- 807,016—Conveyor. Joseph H. Burns, Cleveland, Ohio.
A conveyor comprising two parallel chains arranged side by side and a suitable distance apart laterally and aprons spaced longitudinally of the chains and attached at their forward ends only and removably to the chains, which aprons are detached by pressing the chains toward each other at the forward ends of the aprons.
- 806,774—Process of Treating Ores. Horace F. Brown, Oakland, Cal.
A process which consists in reducing the same while in atmospheric suspension and during such suspension causing the reduced particles to agglomerate into clinker, the bodning of the ore being caused by the resultant spongy condition thereof.
- 807,071—Gas Producer. Bruno Graupe, Colgnoe, Deutz, Germany.
In a gas producer with top and bottom combustion zones and intermediate means for the withdrawal of the gas, a substantially vertical grating composed of vertically-extending grate-bars forming part of the producer-walls through which the gases are led off.
- 806,894—Calcining Furnace—George N. Jepson, Worcester, Mass.
A down-draft calcining-furnace comprising a heating-chamber, a fire-box, flues connecting the fire-box with the upper portion of said chamber and flues at the lower portion of said chamber for carrying away the products of combustion, a series of tubes within said chamber and extending through the walls thereof, and collars fitted within the walls of said chamber and loosely surrounding said tubes whereby the tubes are permitted to expand longitudinally.
- 807,594—Gas Producer. William H. Bradley, Bellevue, Pa., assignor of one-fourth to Alexander Gilliland and one-fourth to William C. Bradley, Bellevue, Pa. and one-eighth to Sara L. Bradley and one-eighth to Mrs. M. B. Webster, St. Louis, Mo.
A gas-producer having a water-trough, a cross-inclined wall and a wind-pipe above said wall and transverse thereto, said wind-pipe having clearance-spaces on both sides thereof for the removal of ashes.
- 807,661—Ore Concentrator. Walter S. Craven and George W. Craven, Butte, Mont.
An ore concentrator having an inclined feed-table, means whereby water is supplied thereto in only sufficient quantity to insure the flow of ore and to flow with the latter, a trough at and extending beyond the lower end of the table, the edge of the trough farthest from the table on the same plane as the table, and the edge of the other side under and separate from the lower edge of the table, a partition extending from the table to near the bottom of the trough, and means for agitating the material in the trough.
- 806,103—Conveyor. Paul Burchardt, Kramfors, Sweden.
The combination with a chute, having a bottom and longitudinal ribs located within said chute and near the bottom thereof, of a belt consisting of a plurality of flat sheet-metal plates hinged together, said belt being movable longitudinally within said chute and bearing on said longitudinal ribs.
- 807,118—Apparatus for Drawing Coke-ovens. Isaac C. Kelly, Scottsdale, Pa.
The combination of tongs constructed to grasp the coke and hold the same, a carrier for said tongs arranged to alternately project the same into and draw the same out of the oven, and automatically operating mechanism for opening and closing said tongs.
- 807,501—Process of Concentrating Ores. Alfred Schwarz, New York, N.Y., assignor to Schwarz Ore Treating Company, Phoenix, Ariz., a corporation of Arizona.
A method which consists in subjecting a non-sulfid ore to the action of a soluble sulfid to convert the mineral into a sulfid, then treating the mass with a hydrocarbon and finally separating the hydrocarbon with the entrapped metallic constituents of the ore from the tailings.
- 808,293—Roasting Furnace. Frank E. Marcy, Chicago, Ill.
In a furnace, a hollow rabble-shaft, a pipe having an inlet branch confined within the shaft for conveying a cooling medium through the shaft in one direction, and a return branch within the shaft coupled to, or forming a continuation of said inlet branch, for conveying the cooling medium in the opposite direction.
- 808,488—Combined Apparatus for Grinding or Crushing, Washing and Separating Ores. Reginald Stanley, Nuneaton, England.
An apparatus for treatment of ores, comprising rolls between which the material is reduced to a coarsely-ground condition, finishing-rolls adapted to allow only a thin layer of material to pass between them, a traveling belt of gauze underneath the finishing-roll to catch the material falling therefrom, means of any kind for forcing the crushed material through the gauze into a trough below the same, means for redistributing the material that cannot pass through the gauze to the finishing-rolls for regrinding.
- 808,141—Method of Making Lead Hydrate. George D. Coleman, Boston, Mass.
A method of continuously making lead hydrate which consists in introducing comminuted metallic lead, water and a limited quantity of an oxidizing reagent into a closed vessel, subjecting the contents to attrition and mixing and continuously drawing off the product with some of the water.
- 808,361—Process of Roasting Ores. Herbert Haas, San Francisco, Cal.
A process which consists of bringing them to a point of ignition, and supplying a light blast of air evenly distributed throughout the whole mass for the purpose of maintaining combustion thereof, and creating a sintered agglomeration, said blast being sufficiently light, and being continued for a sufficient time, to drive off and oxidize only the more easily-separable molecules of sulfur, or other metalloids, maintaining the heat below the smelting-point, and then increasing the blast to separate from the residue the less easily separable molecules of sulfur, continuing to increase the blast as required for the complete separation of the sulfur and then decreasing the blast in proportion to the amount of air decreasingly required to combine with the residual sulfur or other metalloids.
- 808,741—Coke Handling Apparatus. George G. Fryer, Syracuse, N.Y.
The combination in a coke-handling apparatus with a coke-oven; of a device for discharging the body of coke from the oven, and a platform for receiving the body of coke, said platform being movable on an axis arranged in a plane at an angle to the path of the body of coke during the passage of said coke through the ovens.
- 808,754—Method of Applying Heat for the Treatment of Ores and Metalliferous Sands. William J. Jackson, San Francisco, Cal.
A method which consists in adding to said ores or metalliferous sands a suitable exothermic material capable of developing heat when the aqueous solution of the extracting reagent is applied thereto.

809,085—Electrolytic Apparatus. Henry S. Blackmore, Mount Vernon, N.Y.

An apparatus comprising an electrolytic vessel having a means for producing a heavy and light metal alloy by the electrolysis of the light-metal compounds, in combination with means for displacing the heavy and light metal alloy by gravity, means for associating the heavy and light metal alloy with a metal hydroxid, means for removing the light-metal oxid thus produced, means for converting the light-metal oxid into light-metal hydroxid, and means for returning a portion of the light-metal hydroxid to the chamber containing the heavy and light metal alloy.

808,798—Apparatus for the Agitation of Solutions used in Electrodeposition of Metals. William C. Wood and Bertie Oaksford, London, England, assignor to W. Canning & Co., Birmingham, England.

In an apparatus for the electrodeposition of metals, the combination with the tank for containing the electrolyte of a trough arranged within the same, the said trough having within it a plunger designed for drawing the electrolyte into the trough and ejecting it therefrom.

808,618—Method of Converting Matte. Charles M. Allen, Lolo Mont., assignor to Ralph Baggaley, Pittsburg, Pa.

A method which consists in bessemerizing it in a vessel having a non-silicious interior, and thereafter transferring it into an acid-lined vessel and bessemerizing it.

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Mining concessions are divided into three classes:—

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

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

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

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

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

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

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

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

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

(b) Licenses may be obtained from the Commissioner on the following terms:—Application for an exploration and prospecting license, if the mine is on private land, \$2 for every 100 acres or fraction of 100; if the mine is on Crown lands (1) in surveyed 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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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 1903 was much beyond that of any previous year, and large developments in these industries are now going on.

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

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

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific Railway runs through the entire mineral belt.

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

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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 transfer, 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 lands 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 condition 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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HALIFAX, NOVA SCOTIA.



DOMINION OF CANADA

SYNOPSIS OF CANADIAN NORTH-WEST MINING REGULATIONS.

COAL—Coal lands may be purchased at \$10 per acre for soft coal and \$20 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at the rate of 10 cents per ton of 2,000 pounds shall be collected on the gross output.

QUARTZ—A free miner's certificate is granted upon payment in advance of \$7.50 per annum for an individual, and from \$50 to \$100 per annum for a company, according to capital.

A free miner having discovered mineral in place, may locate a claim 1,500 feet x 1,500 feet.

The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year, or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey, made, and upon complying with other requirements, purchase the land at \$1 an acre.

The patent provides for the payment of a royalty of 2½ per cent. on the sales.

Placer mining claims generally are 100 feet square ; entry fee \$5, renewable yearly.

A free miner may obtain two leases to dredge for gold of five miles each for a term of twenty years, renewable at the discretion of the Minister of the Interior.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles. Rental \$10 per annum for each mile of river leased. Royalty at the rate of 2½ per cent. collected on the output after it exceeds \$10,000

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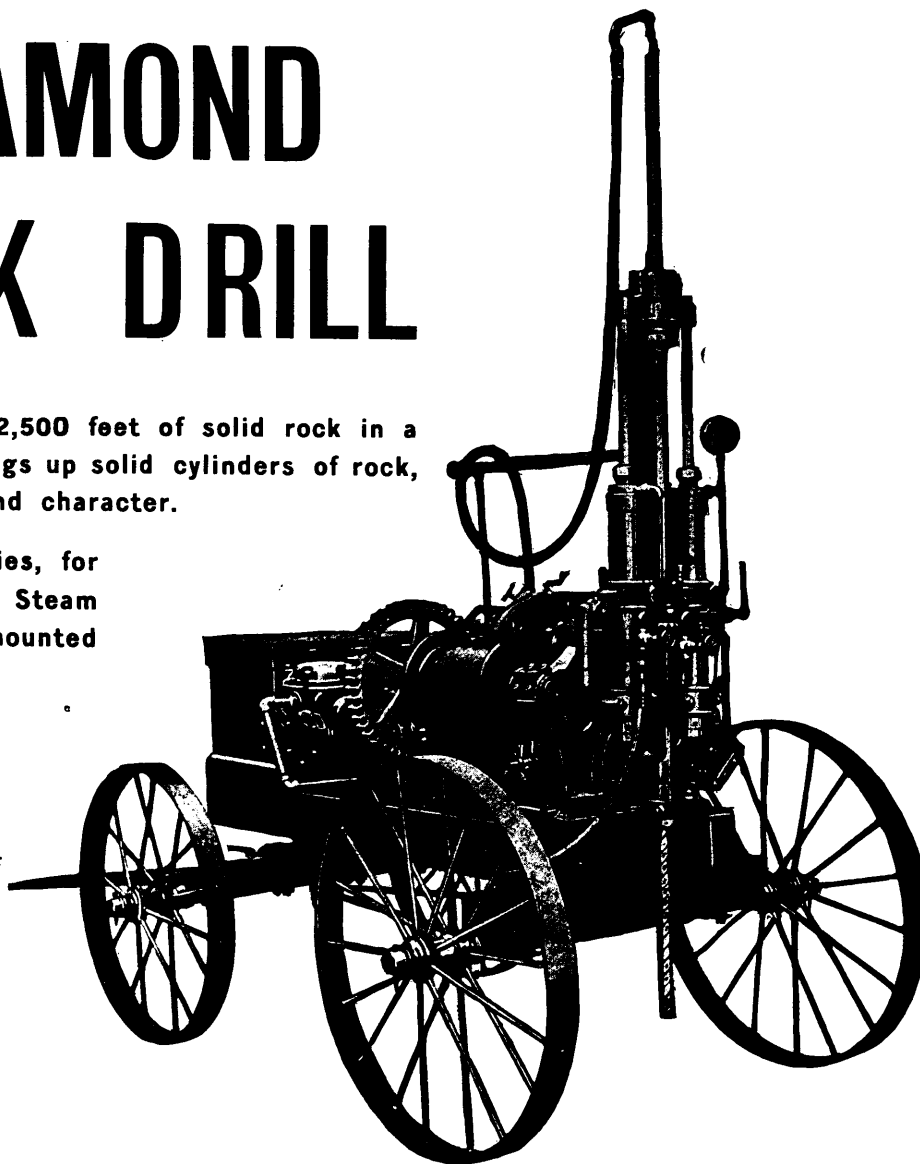
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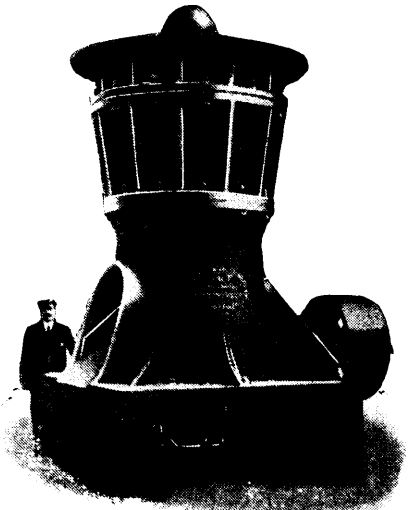
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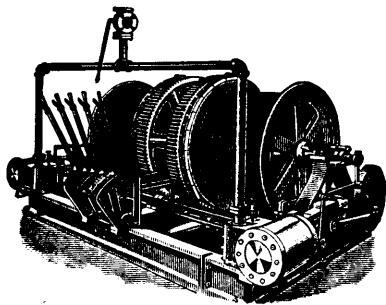
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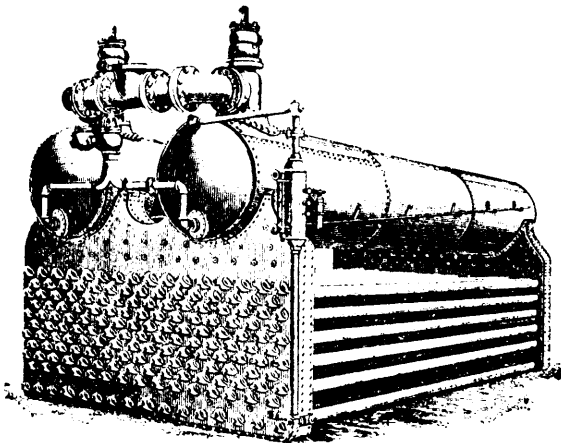


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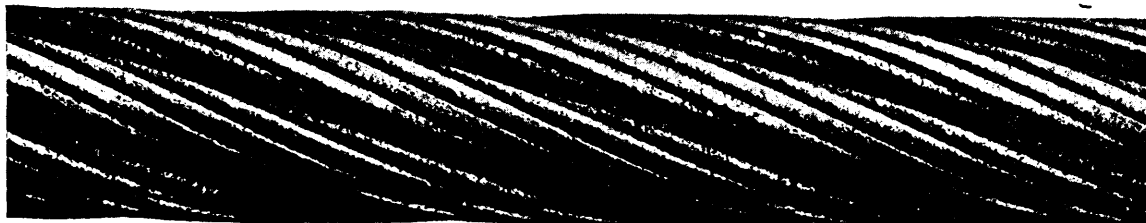


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