Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- [X] Coloured covers/ Couverture de couleur
- [ ] Covers damaged/ Couverture endommagée
- [ ] Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- [ ] Cover title missing/ Le titre de couverture manque
- [ ] Coloured maps/ Cartes géographiques en couleur
- [ ] Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- [✓] Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- [✓] Bound with other material/ Relié avec d'autres documents
- [✓] Tight binding may cause shadows or distortion along interior margin/ La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure
- [ ] Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/ Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.
- [ ] Additional comments:/ Commentaires supplémentaires:

- [ ] Coloured pages/ Pages de couleur
- [ ] Pages damaged/ Pages endommagées
- [ ] Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- [✓] Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- [ ] Pages detached/ Pages détachées
- [✓] Showthrough/ Transparence
- [ ] Quality of print varies/ Qualité inégale de l'impression
- [✓] Continuous pagination/ Pagination continue
- [ ] Includes index(es)/ Comprend un (des) index

  Title on header taken from:/ Le titre de l'en-tête provient:
- [ ] Title page of issue/ Page de titre de la livraison
- [ ] Caption of issue/ Titre de départ de la livraison
- [ ] Masthead/ Générique (périodiques) de la livraison

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
										✓	

EIGHTEENTH YEAR OF PUBLICATION.

The Canadian Mining Review

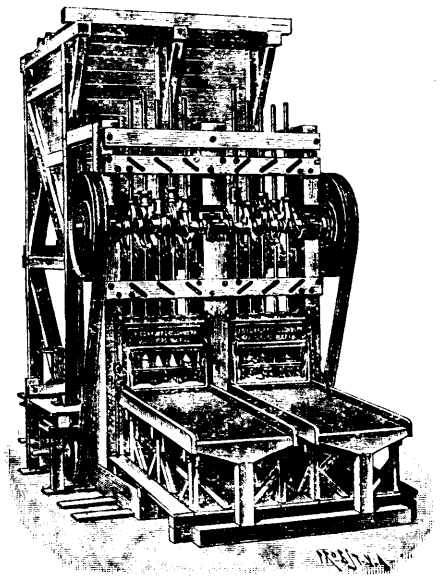
Established 1882

Vol. XIX—No. V. OTTAWA, MAY 31st, 1900. Vol. XIX--No. V.

FRIED. KRUPP GRUSONWERK

Magdeburg-Buckau (Germany)

MINING MACHINERY



ORE CRUSHING:

Stone Breakers of specially strong construction, **Roller Mills, Chilian Mills.**

BALL MILLS

for dry and wet crushing, more than 1,800 at work.

STAMP BATTERIES

Shoes and Dies of Krupp's Special Steel.

AMALGAMATION:

Amalgamation Tables and Pans, Larslo's Gold Amalgamators, Settlers, etc.

SEPARATION and CONCENTRATION:

Separators, Exhaustors, Hydraulic Classifiers, Percussion Tables, Jiggers, Rotating Round Tables.

LEACHING PLANT.

Complete Gold Ore Dressing Plant

a. For treating by the Wet Method with Stamp Batteries, Amalgamation and Concentration.
b. For Dry Crushing by Ball Mills Dust Extraction, and Leaching.

COAL WASHING PLANT

Large Testing Station for Crushing and Dressing Ores at the Works.

Agents:

For **Canada**: JAS. W. PYKE & Co., 35 St. Francois Xaxier Street, MONTREAL.
For the **United States**: THOS. PROSSER & SON, 15 Gold Street, NEW YORK.
For **Mexico**: PABLO BERGNER, Apartado 549, MEXICO.
For **South Africa**: UNITED ENGINEERING CO., Ltd., P.O. Box 1082, JOHANNESBURG, S.A.R.

WIRE ROPE

GEO. CRADOCK & CO.

WAKEFIELD, ENGLAND.

Original Manufacturers and Introducers of **Lang's Patent.**

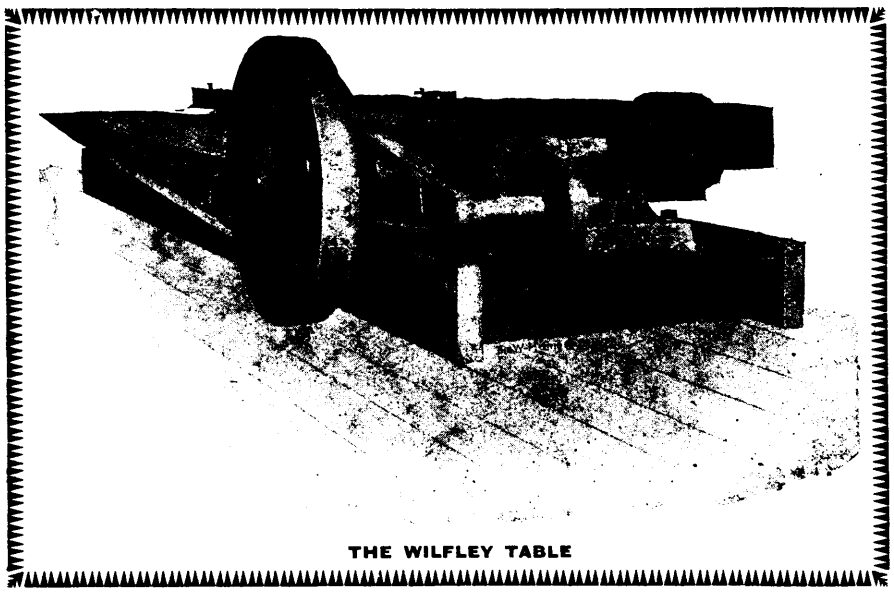
WINN & HOLLAND - - Montreal

Sole Agents for Canada.

THE WM. HAMILTON MANUFACTURING CO. LIMITED

ENGINEERS AND CONTRACTORS

PETERBOROUGH NELSON VANCOUVER



THE WILFLEY TABLE

We are...

Sole Agents and Manufacturers in Canada for this Table.

Infringers will be prosecuted

We contract for the Design and Construction of Complete Stamp Mills, Concentration, Chlorination, Cyanide and Smelter Equipmnnts.

18th YEAR OF PUBLICATION.

The Canadian Mining Review

Established 1882

THE OLDEST AND ONLY OFFICIAL MINING AND ENGINEERING JOURNAL PUBLISHED IN THE DOMINION OF CANADA.

B. T. A. BELL, Editor and Proprietor.
Secretary, Canadian Mining Institute, etc.

Published Monthly.

OFFICES {Slater Building, Ottawa; Windsor Hotel, Montreal.

VOL. XIX., No. 5. MAY, 1900. VOL. XIX., No. 5.

The Ontario Mines Act.

The Bill to amend the *Mines Act* of the Province of Ontario, upon which some comments were made in the April number of the REVIEW, was passed by the Legislature of that Province on the 27th of that month, after certain alterations of the text originally proposed by the Commissioner of Crown Lands for the Province. We deem it only fair to note the more important of these alterations, since they effect, to some extent, the criticisms editorially expressed in our former article.

1 The chief changes deserving mention are in Section 7, in which the contribution exacted from miners at a given rate per ton of gross product of ore has been changed in name from a "tax" to a "license-fee," (a distinction without a practical difference) and the special "taxes" of 50 cents per ton on iron ores; $5.00 per ton (or $15.00 per ton of metal contents if partly treated or reduced) on zinc ores; $2.00 per ton (or $25.00 per ton of metal contents if partly treated or reduced) on copper ores; and the general tax on "all other ores or minerals," at a rate to be fixed from time to time by Order-in-Council, not exceeding 5 per cent. of the selling price, have been struck out. What remains is: the "license-fee" of $10.00 per ton (or $60.00 per ton if partly treated or reduced) on ores of nickel; and $7.00 per ton (or $50.00 per ton if partly treated or reduced) on ores of copper and nickel.

For their escape from the special burdens proposed in the original Bill, but eliminated from it before its passage, the industries affected may well be grateful; but the miners of the ores of nickel, or of nickel and copper, will find little reason to give thanks; for, whereas the Bill as introduced taxed such ores, if partly treated or reduced, at certain high rates per ton *of metal contents*, (The words we italicize have been dropped from the Act as passed) and consequently the tax or "license-fee" which it imposes is laid on the ton of ore, not of metal produced. This, so far as it has any force, is a simple prohibition of all domestic metallurgical treatment; but Section 10 authorises the Lieutenant-Governor to remit the whole, or any part of the amount thus exacted—and this section covers, moreover, all ores smelted in the Province, not merely those of nickel and copper.

2. Section 14 of the original Bill, providing that all patents or leases of mining lands shall contain an express condition, requiring all ores of nickel or copper mined therefrom to be completely reduced in the Dominion of Canada to forms suitable for use in the arts without further treatment—on penalty of the forfeiture of the grant or lease—has been wisely dropped.

The Act as thus amended and passed retains two general characteristics, which we regard as unjust and unwise; namely, it lays upon the mining industry special taxes, not borne by other industries; and it leaves the enforcement of these special taxes, as well as their amount, to the Government. By Section 13, a proclamation of the Lieutenant-Governor-in-Council is necessary to make affective any of the Sections 4 to 12, inclusive. Since sections 1, 2 and 3 take effect without this condition, and thus repeal Sections 3, 4, 5 and 6 of the former *Mines Act*, and also abolish royalties and rescind reservations. The present Act appears to leave no law whatever as to these important particulars, until the Lieutenant-Governor-in-Council shall promulgate one by proclamation, and, in substance, it seems to authorise the Government to fix the rate of special taxation ("license-fees") at anywhere from zero to the amounts stated in the Act, which thus serve only as *maxima*.

But Sections 4 and 5 of the *Mines Act*, which are repealed by this Act, provided for royalties on all kinds of ores and minerals; and Section 7 of the Bill, which we criticised last month, similarly included all ores and minerals. The Act as passed, however, mentions only ores of nickel and ores of copper and nickel. We do not find in it any grant of authority to the Government to fix any rates whatever for iron ore, copper ore, zinc ore, or other ores and materials. The repeal of the provisions formerly covering these items, and the failure to mention them in the new Act, looks like an unintentional remission of all taxes and fees (except the $10.00 preliminary license fee) to these industries.

The net result seems to be an amusing confusion, out of which even the Government cannot bring order. Even the purpose of the Act, which was not wise, is defeated by the blunders of its framers and amenders. Of course there will have to be further amendment—which is, in itself, an evil.

But, supposing that all this should be done, so that the Act could do what it seems to have been intended to do—namely, fix a maximum tax for each mining industry, and authorize the Lieutenant-Governor-in-Council to reduce the said tax whenever he thinks best to do so, we must still declare that the effect of such legislation would be to discourage mining in Ontario, and especially such mining as involves large investment of capital. Uncertainty is the great hindrance to investments in mining. Nothing is so hopelessly gone as the money spent in the unsuccessful development of mineral property. The holes in the ground which represent a heavy expenditure cannot be taken away, or sold as "scrap" or otherwise utilized. The experiment of mining is always one in which total loss is risked, and the large profits which are sometimes realized do not make this industry, as a whole, exceptionally remunerative. It is the constant endeavour of mining engineers, scientific investigators and inventors to reduce the uncertainties involved in mining, so as to make it more and more "a legitimate business," and this endeavour is, more or less, thwarted by any legislature which treats

mining as if it could bear extra taxation, laid, not upon the profits, but upon its gross product. But whatever a legislature may, wisely or unwisely, do in that direction, it surely should not introduce further uncertainty by making its revenue requirements variable according to the opinion of an executive officer. It is not fair to the Government that he should be practically obliged to legislate; and it is not fair to the citizen that he should be unable to estimate the risks and burdens of an enterprise in advance, because they may be determined and re-determined at any time by individuals temporarily holding executive power.

Finally, while this Act leaves too much to the Government in the way of fundamental and general decisions, it leaves too little in the way of adminstrative details. The police regulation of mining, with respect to the safety of workmen, the protection of neighboring mines and the welfare of the community, is a matter which, for two chief reasons, had better be left to the discretion of local officers.

The first of these reasons is, that a detailed code of rules, enacted for all kinds of mines in all parts of a large territory, can never be the best for each individual case. Moreover, the chances are, that a legislature, trying its 'prentice hand on such a job, will botch it somewhere. The proposed code is likely to have been drafted by some one person, whose experience in active mining has been, to put it mildly, meagre. Then it is likely to be amended by insertions and omissions, and made without due regard to their collateral effects upon other localities or classes of mines, suggested by local interest or practice, and the result is seldom satisfactory for any special department, still less for all departments, of the industry at which it is aimed.

The second reason for not enacting such general codes of regulation is, that they supersede the common law, which is, by reason of its slow growth and gradual adjustment to the permanent principles of equity, very likely, to be a better protection, both for individuals and for the community, than any general legislative code. For instance, in a suit brought against a mining company for damages to life or property, literal compliance, with a certain statutory provision, might be a complete legal defence when, under the common law, further inquiry would have been permitted to show essential neglect by the company of precautions which, though not properly to be enforced in all cases, were really required in *that* case.

A partial parallel to this proposition is furnished by the practice of many business men, who prefer not to execute formal and detailed written agreements, but rather to exchange simple letters, expressing in general terms, on one side the proposition made, and on the other side its acceptance, and leaving all questions arising under the contract thus created to be determined (in case of disagreement) according to the common law, and its recognition of trade-usages.

But if written regulations are to supersede (and we do not mean to deny that, to some extent—the smaller, the better—it may be necessary that they should supersede) the general, and elastically applicable, principles of the common law, in the regulation of mining operations, they should be themselves elastic. It is inherently absurd to require of a mining operator, under one set of physical, geographical, and commercial conditions, the precautions which might fairly be required under another set. The proper authority to settle this matter, and to vary the decision of it, in details, from time to time, is the administrative officer, clothed with the general power of the executive.

In short, we think that a really wise mining law for the Province of Ontario, should tax that industry on its profits only, or at least, very lightly on its gross product; should *not* leave the enforcement or the rate of such taxation to the discretion of any officer: and *should* leave to administrative discretion the regulation in detail of mining operations. In these particulars, the Act under consideration, pursues a policy diametrically wrong, and calculated to discourage an industry which, perhaps beyond all others, cannot bear discouragement.

The Ontario Mines Act: Its Unconstitutionality.

In the preceding article we have pointed out some of the objections to the Act as a piece of practical legislation. There is the additional objection that there are strong grounds for believing it to be unconstitutional.

The British North America Act maps out the whole field of legislative action in Canada, assigning to the Provinces certain matters of a local or private nature enumerated in Section 92, and to the Dominion all other matters.

In addition to this residuary power given to the Dominion, Section 91 of the Act enumerates "for greater certainty," a number of matters which are assigned exclusively to the Dominion, and provides that any matter coming within the class of subjects enumerated in Section 91 shall not be deemed to come within the class of matters of a local or private nature assigned to the provinces Readers of the REVIEW need not be reminded that it is the duty of the Courts to declare invalid any provincial Act that encroaches upon the Dominion jurisdiction, and that that duty has been performed in a large number of cases.

One of the most important of the powers given to the Dominion exclusively is that to regulate Trade and Commerce. This power has been discussed in, perhaps, the majority of the cases in which the Courts have been called upon to determine questions as to the validity of Provincial Statutes, and many Acts have been declared *ultra vires* because they interfered with its exercise.

The taxation clauses of the Act now under discussion would, we believe, share the same fate. Section 7 requires every person carrying on the business of mining in Ontario to pay what the Section describes as a "license fee" upon the gross quantity of the ores or minerals mined, raised or won during the preceding year from any mine worked by him. The "rates" of the license are for ores of nickel, $10.00 per ton, or $60.00 per ton if partly treated or reduced; for ores of copper and nickel combined $7.00 per ton, or $50 00 per ton if partly treated or reduced. Power is given to the Lieutenant-Governor to substitute lower rates by proclamation, and Section 10 provides that where ores, etc., ... treatment, the fees may be remittted or refunded. Section 13 gives power also to remit or refund the fees if the ores are refined in the United Kingdom or any British Colony or Dependency. If this Act can be supported it is because it is authorised by one of three subsections of Section 92 of the British North America Act: Subsection 2, which gives the power to impose direct taxation within the Province in order to the raising of a revenue for Provincial purposes. Subsection 9, which authorises the making of laws as to "shop, saloon, tavern, auctioneer, and other licenses in order to the raising of a revenue for Provincial, Local, or Municipal purposes, or Subsection 13, which gives jurisdiction over "property and civil rights" in the Province.

Now, as above pointed out, the Provincial powers of legislation are only those expressly conferred by the British North America Act, and no Provincial Statute is valid which does not fulfil two conditions: (1) It must fall within one of the classes described in Section 92, and (2) It must not fall within any of the classes described in Section 91. The first condition must be fulfilled strictly. Now let us ask, which of the three subsections of Section 92 set out above, can be said to authorize this legislation. Surely not Subsection 2. This may be "*direct taxation within the Province*," but it is not imposed "*in order to the raising of a revenue for Provincial purposes.*" Its object clearly is to compel miners to refine their ore in Canada. This is apparent on the face of the Act. No sane person desiring to raise a revenue by a tax on ores or minerals, would fix the rate at 130%, or provide a means of escaping the tax altogether. The contention that the Act is authorized by Subsection 2 need not be further discussed. What then

MR. WILBUR L. LIBBEY,
Elected President of the Mining Society of Nova Scotia

MR. N. McMILLAN,
Manager, Mikado Gold Mining Co.

MR. S. S. FOWLER, S.B., M.E.,
Elected President Canadian Mining Institute

of Subsection 9. In the first place, although the Mines Act describes the payment as a "license fee," it is very doubtful if the Courts would hold it to be such. But assuming it to be a license fee, what we have said in speaking of Subsection 2 applies: It is not *for the raising of a revenue for Provincial, Local, or Municipal purposes.* It is for compelling mine owners to have their ores refined in Canada. This objection is so obvious that no authority need be cited in support of it, but we may mention the case of *re* Mee Wah, referred to in 2 British Columbia reports, at page 271, where the late Chief Justice Sir M. Begbie, decided that an enormous tax imposed by the British Columbia Legislature on Chinese wash houses was void, because it seemed clearly to have been imposed *not for the purpose of raising a revenue but in order to extinguish a trade.*

The only point left to consider is whether the Act is authorized by Subsection 13 of the British North America Act. Is it a law in relation to "property and civil rights in the Province." If so, does it also relate to any matter coming within the classes of subjects assigned by the British North America Act to the Dominion? The first question is difficult to answer and it is unnecessary to consider the abstract question, for the two questions must be considered together the words "property and civil rights" being understood as meaning "property and civil rights" in so far as it "is possible to legislate with regard to them without encroaching upon the field of Dominion Legislative authority." To take an example from a case decided by the Imperial Privy Council last year. In 1890 the Legislature of British Columbia, by "The Coal Mines Regulation Act, 1890," enacted that no boy under the age of 12 years, and no woman or girl of any age, and no Chinaman shall be employed in . . . any mine . . . below ground." This legislation would obviously have been authorised by Subsection 13 of Section 92, had that Section stood alone. But by Section 91, the power to legislate concerning "naturalization" and "aliens" is conferred upon the Dominion Parliament, and the Privy Council had no hesitation in deciding, to quote the language of Lord Watson, that "The whole pith or substance of the enactments . . . in so far as objected to . . . consists in establishing a statutory prohibition which affects aliens or naturalized subjects, and therefore encroaches upon the exclusive authority of the Parliament of Canada." Now adapting to this case the reasoning of the Privy Council, is it not plain that to enact that all nickel mined in Ontario must be manufactured in Canada, is to interfere most seriously with "Trade and Commerce." The latter words do not need any definition. It is clear that nickel mining and the dealing in the products of the mine is either a "trade" or a branch of "commerce," and to say that ores must be manufactured in Canada, is to "regulate" the trade.

The question to be decided here is not at all like that lately before the Court of Appeal, in the Michigan lumberman's case *Smylie v. The Queen*, in which the Court held that the Province was within its rights in making timber licenses subject to the manufacturing clause. The question in that case, to use the language of Mr. Justice MacLennan, was "simply whether the Province can sell its timber, which it is free to sell or not to sell at all, subject to a condition that it shall be manufactured within any prescribed area." This is, obviously, not at all like the question whether the Province can, under the guise of exercising its licensing powers, say that the owner of an important article of commerce shall not export that article in a crude state.

NATIONAL NICKEL CO.—Those who imagine we control the nickel resources of America should read the advertisement of this company in the New York *Times*. On its property in Churchill Co., Nevada, it claims to have $17,000,000 worth of nickel ore exposed.

Mine Examinations.

There is no function of the mining engineer which exacts so large a measure of knowledge and sound judgment as that of pronouncing upon the value of a mine. It imposes the heaviest responsibilities that can be put upon the engineer, since upon his decision the investment of large sums will be made by men who are forced from lack of knowledge to accept his verdict as final. Clearly this is not a work for the young mining engineer, nor for the so-called "practical miner." No man who lacks a thorough technical training as an engineer and metallurgist, and who has added to this a long and varied practical experience in the management of mines, and in the erection and operation of milling and metallurgical plants, should presume to offer his services for consulting work. To do so without this broad experience is an injustice to himself and to his patrons; to himself first, because he is certain sooner or later to make disastrous, costly errors which will ruin his future chances, and to his patrons because he is involving them in great risk and is accepting fees paid for a quality of judgment that he cannot possibly possess. A man may be thoroughly experienced in mining work, he may have won a well-deserved reputation as a mill-man, or as a smelter, he may be a good geologist, or he may have given satisfaction as a manager of large mining operations, and still be unfitted to undertake the peculiar responsibilities of mine examination It is not necessarily the best miner, nor the best metallurgist, nor the best mine manager, who can best perform this duty. It is he who combines sound, broad experience in all these departments, and who has in addition a strong and well-trained financial judgment, who will prove safest.

The weakness of the average man who reports upon mines is clearly demonstrated by the character of the reports submitted. It is putting it mildly to say that most of these are childish documents, which when sifted yield nothing that is conclusive and substantial. A well known corporation lawyer is reported to have said that he had never read but one mining engineer's report that answered the questions that would come to the mind of an ordinary business man, and that one was written by a knave who lied from beginning to end. Of course this is an exaggeration, for there are plenty of capable men in the profession who know what is required of them, and who work out their provisional balance sheet with such accuracy that under competent management the results forecast can be realized, but incidentally it offers a sad reflection upon the hosts of business men who have plunged into mining ventures without asking the questions to which no possible answer could have been given from the reports which lured them into investing. The fault with regard to reporting on mines lies, in the last analysis, with the investors and not with the mining engineer. The inexorable law of supply and demand rules here as elsewhere in our economic system. So long as men are willing to accept opinions instead of carefully determined facts in regard to a mining proposition; so long as they do not demand as full a statement of figures and conditions as they would require if they were projecting a manufacturing enterprise; and so long as they insist upon having cheap men, just so long will the flock of incompetents and charlatans feed upon them. There is nothing that so retards the mining industry, and that operates so potently to keep out new investors and fresh accessions of capital, as the evil reputation it has acquired from the insanity of men who throw the accumulated business experience of a lifetime to the winds as soon as they touch a mine. We do not need to tell mining engineers what to do to protect their clients, but we do need to educate the general public to understand what the functions of an engineer are, and to cause it to realize that success in mining does not depend upon luck, but upon good judgment and knowledge of the business

It is with this in view that we presume to suggest to prospective investors what questions the reports submitted to them should answer.

We offer only bare headings, which in a proper report would be enlarged upon in great detail.

1 The kind of deposit. 2. The character of the deposit, involving an outline of the geological relations of the ore body, its structure, peculiarities and position. 3. The topography of the claim, and the relation of the deposit thereto. 4. The dimensions of the deposit, known depth and surface extension, and "ore in sight," *i.e.*, blocked out by exploratory workings so that three sides of each block are accessible for measurement and sampling. 5. The character of the ore, involving its value, mineralogical composition, in some cases its chemical composition, and the treatment necessary to prepare from it a marketable product. 6. The mine,—kind, extent and stability of workings, drainage and ventilation, and the workings necessary in the near future. 7. Power available, its kind and cost. 8. Site for mill or metallurgical works,—distance from the mine, conditions affecting transporation from the mine, topography of the site, availability of fuel and water (with costs), and the area and topography of the dumping ground available. 9. Materials of construction in the vicinity of the mine and works, quantity and costs. 10. Means and costs of transportation to and from the nearest shipping point by water or rail. 11. Labor available, nationality, skill, and costs. 12. Climate, temperature, precipitation, drainage, floods and droughts 13. Sources of supplies, and costs of living. 14. Relative positions, geographically and geologically considered, of neighboring mines to the property under examination. 15. Results of past working, if any, of the mine, in exhaustive detail if possible. 16. Estimation, with full details, showing how the result was reached, of the amount of capital which may safely be invested in the property as it stands at the time of examination. Throughout the report measured quantities should be given in detail, so that full *data* exist in it whereby another engineer might check up against the deductions arrived at by the examining engineer, and test the accuracy of his conclusions, assuming that the *data* given are reliable. If investors will insist upon a full statement upon all the points given above, we are sure that there will be fewer disappointed stockholders in future, and that the charlatan will cease to flourish in the guise of a mining engineer.

Our Trade in Mining Machinery.

Notwithstanding the substantial and very marked increase in the output of home manufactures of mining, milling and smelting machinery, the remarkable growth of the mineral industries of the country is very well exemplified in the steadily increasing trade our mines are building up with other countries. During the fiscal year ended 30th June, 1899, our mines imported, free of duty, machinery of a value of $299,800, as against $207,737 imported in 1898, and $128,780 brought in in 1897. Of the free entries the United States provided $283,481; Great Britain, $16,308; and Germany, $11 00. Ontario took $142,216; Quebec, $26,621; Nova Scotia, $24,243; New Brunswick, $212.00; Manitoba, $1,080; British Columbia, $88,911; North-West Territories, $10,926; and the Yukon, $5,591. These figures, however, give but an approximate idea of the importance of our mining industry to the trade of the the country, for we find in the *Trade and Navigation* returns numerous entries of machinery and supplies which are not classified in the tariff items relating to mining. Here are a few culled at random from the statistics published by the Customs Department, for the year ended 30th June last:—Diamond drills (not including motive power which is dutiable) $9,692; stamp mills, $33,780; copper plates, $148,594; chrome steel shoes and dies (from United States), $16,741; wire rope, $416,158; explosives (giant powder, nitro, &c.), $443,829; blasting powder, $133,729; cyanide, $15,728. As in former years the bulk of this trade has been done with the United States, but there is no reason whatever, particularly now that the preferential tariff has been materially increased in their favor, that our British mauufacturers, with a little more push and enterprise, should not get a larger share of this business.

Stoping with Machine Drills.

A recent paper bearing this title, written by B. L. Thane, appeared in the Transactions of the American Institute of Mining Engineers, calling attention to the greater economy of power drilling over hand work in stoping. In Canada the majority of the stoping is done with machines, while the reverse is the case in the United States, a fact which is perhaps not generally known in this country. In spite of this the costs of mining are generally higher here than there, a result due to the difference in skill of the workmen. There have been cases in Canada where miners from Colorado and Utah, working by single-hand drilling have advanced drifts more rapidly than Canadian miners using machine drills in other parts of the same mine in exactly similar rock. This means that the western miners not only were very expert drillers, but that they were so much better trained in the art of blasting that the total length of holes drilled per unit volume of rock broken was in their case less, which shows that our Canadian miners have something to learn regarding the proper location of shot holes. That our mining costs are so high in mines using power drills in stopes shows again the need of more efficient training of the common miner in the principles and practice of economical setting of shot holes. In the North Star mine in California, where with hand stoping the mining costs had been brought below 75 cents per ton of ore lifted, machine drills have been introduced to reduce expenses. A similar change has been made in the Utica mine. Mr. Thane reports that in his own work in Alaska, two men using an Ingersoll-Sergeant "Baby drill" put in regularly 40 feet of hole a day in hard quartz, full of slips and seams. This was done between the hours of 9 a.m. and 4.30 p.m., leaving still sufficient time during the shift for the same miners to do all their own timbering, to build their own chutes and ladderways, to shovel away the broken rock, and to keep the place in ship-shape order. He does not mention the system of breaking adopted, but it is presumable that he was breaking to benches. It is curious that this system has not been employed in any of the mines in Central and Eastern Canada. It admits of the most economical use of dynamite, and keeps the mine in better condition. It is a system which was so early evolved in mining practice on account of its manifest advantages, that it is difficult to account for the fact that in a mining region of large extent the true art of stoping should have been practically lost. It emphasizes again the need of creating a body of properly trained mine foremen, which can be accomplished by requiring them to take out a license, to be issued after suitable demonstration of fitness.

Hints to Investors.

Do not be guided by the prospectus which consists of a string of eloquently worded inanities. Do not believe the report of the expert which is usually attached to the prospectus, unless it is that of a man well known of admittedly honest character, or in the case of a stranger, unless the said report will bear the careful scrutiny of yourself and of such of your friends as may be experienced in mining.

Do not judge the capacity of the directors for conducting such an important concern as a gold mine by their titles. The names looked for should be those of well-known business or commercial men in London or elsewhere; of directors in successful mines; of mining engineers, or the partners of well-known mining houses; aud most of all, the real magnates in the mining world who will take care that their names shall not be mixed up in a directorial capacity with any company likely to be a failure.

Do not for a moment consider the advisability of taking shares in a mine which is not provided from the start with sufficient working capital. The smallest amount of working capital asked for must be £30,000 in the case of a speculative venture, and £50,000 when any-

thing specific or definite is undertaken such as sinking a deep level shaft, or driving a tunnel to locate the continuation of any reef. This sum must be in cash not in the shape of half cash, half reserved shares. It must be clearly understood that no mine can be developed and equipped on a sound scale for £50,000. This sum is to be devoted to development only. If results are favorable a further large amount still remains to be provided by the shareholders.

Do not favorably consider a scheme in which the vendors propose to annex 60 or 80 per cent. of the shares. As a rule the unproved ground which is usually floated as a mine has only cost the vendors the price of pegging out and surveying or at most £1,000. If the company in which you have applied for shares goes to allotment, make it your business to find out how much of the working capital stipulated for has actually been subscribed.

Do not in the early days of the mine's existence, believe what newspapers or printed circulars say as to its success. It takes many months to prove a mine.

Do not, assuming that all the vendor shares are *pooled*, and that the market is being worked by one man, believe in the genuineness of tape, or Stock Exchange quotations.

Finally, and most important of all:—Be satisfied with a reasonable or even a small profit. When you decide to sell do not give your brokers a limit, slightly above that at which the shares then stand, but sell immediately and right out.

Thus should the novice, or the speculator who has no accurate sources of information conduct his gold-mining operations, at least when dealing with new and unproved mines. If everyone were to follow the rules laid down above, only about 20 per cent. of the mines now floated would have proceeded to allotment. Even then, of course, the speculator could not assure himself against loss but he would greatly minimise the risk, and at the same time would have the satisfaction of dealing with the business in a common-sense and perhaps profitable manner. —Curle's *Gold Mines of the World.*

The Canadian Press and Mining.

The unreliability of our newspapers in all matters appertaining to mining is notorious, and has done not a little towards retarding the development of legitimate mining enterprise in Canada. Mr. J. H. Curle, an eminent British Mining Engineeer, who visited British Columbia in 1898, makes the following pertinent remarks on this subject in his recently issued volume "The Gold Mines of the World":—

"On the head of all this, a great deal of harm is done to the best interes's of British Columbia by the local press, and incidentally by those financial papers in England which diffuse information derived from the same sources. Day by day an astonishing mass of crude, irresponsible gossip, and a great quantity of lies, appear under the guise of accurate mining intelligence. Anybody with a special purpose to serve can in the shape of an interview, have his views on any given mine printed by the column, while an honest critic, venturing an unfavorable opinion, is fiercely denounced both by the press and the public. The local papers devoted entirely to mining are quite devoid of criticism which in British Columbia is now a lost art. All of this forms one feature of the American-Canadian mining method; it soon tires and disgusts the English critic or reader and is likely in the long run to add considerably to the barrier which seems destined to divert British capital still more from the country."

Unfortunately, as we have frequently pointed out, these strictures are not alone applicable to British Columbia. They may be applied with equal truth to the mining information which appears from day to day in such papers as the Toronto *Globe*, *Mail*, *World*, the Montreal *Star* and other prominent dailies. Surely it is time the publishers of these otherwise reputable journals put a curb upon the mining broker, the company promoter, and particularly on that species which flourishes so abundantly throughout he country the half educated mining expert. Much of the foolish investment that has recently been so notorious in Canada would have been avoided, or at all events greatly lessened, if the editors of our newspapers had taken pains to place their mining columns in the hands of reliable and well informed persons.

ONTARIO NOTE AND COMMENT.

The discovery of gold at the Richardson mine, Deloro, many years ago led to many hopes which were doomed to disappointment, but Hastings county at length bids fair to make good its claim to be a *bona fide* gold field. A feature of the district is the mispickel ores, which for a long time withstood all attempts at profitable treatment. The Deloro mine of the Canadian Gold Fields, Limited, and the Belmont mine the property of the Cordova Exploration Company, Limited, have for some years been steadily producing bullion from arsenical ore, and last month a second mill at Deloro began crushing the same kind of rock. The Atlas Arsenical Company is owner of the plant, which is situated on the well known "Gatting five acres," and is fitted up with ten stamps and the most modern machinery. It is the intention of the company to add a cyanide plant to treat the concentrates, and also, works for recovering the arsenic. Two main shafts have been sunk on the property, and 200 or 300 feet of drifting done on the first levels. Mr. W. A. Hungerford is manager, and Mr. G. M. Spotswood, M.E., is in charge of the assaying and concentrating departments The arsenic plant at the Canadian Goldfields, Deloro mine, has been in successful operation for some months.

On lot 14 in the 14th concession of Huntingdon township, about a mile from the village of Madoc, Mr. J. A. Harrison, has located a large deposit of fine white and gray talc. About 200 tons have been shipped to Newark, N.J., and the material has proven of first rate quality. A. A. Robbins of New York, is interested in the property, and proposes to erect a mill at Oswego, N.Y., for its treatment. The intention is to install suitable hoisting and other machinery and to work the mine on an extensive scale. About 6,000 tons are to be taken out during the present year. Talc is largely used in paper-making, and the industry at Gouverneur, N.Y., is an important one

The old Bruce copper mines are being overhauled by the Lake Huron Copper Syndicate, the present owners. At the deepest point in the mine in Bray's shaft, 430 feet, the vein is 18 feet wide, and averages 4 per cent. copper for the entire width. Other points in the bottom of of the mine are also showing up well.

The notable developments in the iron industry of Canada at present in progress are causing some uneasiness to our American neighbors. Our contemporary, *The Iron Age*, of New York, in a recent issue recounts the enterprises under way at Sydney, C.B., Hamilton and Sault Ste. Marie, Ont., enterprises which it says would be considered large even in the United States, and concludes by remarking that if these projects be pushed to a successful conclusion "Canada will no longer figure among 'other countries' in the world's list of iron and steel producers, but will take its place ahead of Sweden and perhaps of Belgium. This is, of course, not a pleasant subject for the contemplation of American manufacturers. It would be much more satisfactory to be without serious competition on this side the Atlantic."

The fact is that for a number of years past the iron and steel used in Canada have been imported very largely from the United States, and

naturally the iron masters south of the line view with equanimity the prospect of losing one of their best customers. They may consider themselves lucky if the Canadian movement does not go still further and furnish them with competition in neutral markets or even in their own. Proximity of ore and coal and water carriage to market are advantages which will make the Sydney furnaces formidable competitors indeed, for the trade of New England and the Eastern States; while the abundant supplies of good hematite ore recently uncovered at Michipicoten and lake freights will put the Ontario plants on fairly even terms with Cleveland and Pittsburg smelters. Coke of course must be imported, but the duty and Provincial bounty on pig iron counterbalance coke freights, at any rate for the purpsse of smelting for home use. The growing time is visible from afar as well as at home.

We are indebted to the Bureau of Mines for the complete statistics of the mineral output of Ontario during the year 1899:

Product.	Quantity.	Value.	Employees.	Wages.
Building stone, rubble, etc.	.....	$1,041 350	1,824	$535,000
Cement, natural rock, bbls	139,487	117,039	510	163,288
" Portland "	222,550	44,227		
Lime, bush.	4,342,500	535,000	990	200,400
Drain tile, No.	21,027,400	240,246	3,416	630,480
Common brick, "	233,898,000	1,313,750		
Pressed brick & terracotta, "	10,808,000	105,000	186	59,068
Paving brick, "	5,300,000	42,550		
Sewer pipe	.....	138,356	85	30,351
Pottery	.....	101,000	123	39,250
Petroleum, Imp. gals.	23,615,967	.....	.....	.....
Illuminating oil, "	11,697,910	1,059,485		
Lubricating oil, "	2,087,475	189,294		
Benzine and naphtha, "	1,394.530	148,963	491	214,171
Gas & fuel oils & tar, "	5,410,915	213,544		
Paraffin, wax and candles, lbs.	2,792,766	136,066		
Natural gas	.....	440,904	95	40,149
Carbide of calcium, tons.	1,064	74,680	48	23,828
Salt. "	56,375	317,412	261	80,021
Gypsum and products of, "	1,200	16,512	25	9,500
Talc, tons	100	500	3	135
Graphite, "	1,220	16,179	20	8,000
Mica, "	266	38,000	81	24,565
Zinc. "	1,200	24,000	63	13,636
Iron ore, "	16,911	30,951	87	16,463
Pig iron	64,749	808,157	200	79,869
Nickel, "	2,872	526,103	839	443,879
Copper, "	2,834	176,237		
Gold, oz.	37,450	419,328	587	278,094
Silver, "	105,467	65,575	40	29,000
Arsenic, lbs.	113,937	4,842	5	2,250
Totals.	$8 785,231	$8,785,231	9,979	$2,921,397

In 1898 the total output had a value $7,235,877, the number of employees was 7,495, and the amount of wages paid out was $2,464,239. The increase in 1899 as compared with 1898, was therefore, 21 per cent in value, 33 per cent. in number of employees, and 18 per cent. in wages paid. The showing is an encouraging one.

An Order in Council has been passed by the Ontario Government forfeiting the charter of the Vermilion Mining Company on the ground of non user This company was connected with or owned by the Canadian Copper Company, and held a considerable area of nickel lands in the Sudbury district, mostly in the township of Denison. These lands will revert to the Crown if the forfeiture becomes absolute. The company, however, is allowed six months in which to show cause why the order should not take effect.

A petition is being prepared by the Ontario Mining Protective Association to have the Ontario Mines Act disallowed by the Dominion Government.

CORRESPONDENCE.

Mill Sampling.

SIR,—In the last issue of your paper I have noticed a paper read before the Chemical and Metallurgical Society of South Africa on sampling ore sent to mill. I do not see that the author mentions sampling from battery after crushing, before the pulp reaches the tables.

Having had considerable experience in several parts of the world in amalgamation, including the Transvaal, I have found that the greatest accuracy is obtained if one litre of the pulp is taken outside of the mortar boxes every hour. If inside amalgamation is carried on the battery manager will be able to take an average of the percentage after one to three months' run and add the difference.

By this way of sampling one can daily know what amount of gold one may expect without having to wait until the clean-up. I have used this system for years and I have never failed to get within 2 per cent. of the assay value of the ore sent to mill which is generally over than under.

By this system there is a general check on amalgamation and also the tailings treated by cyanide or running to waste.

Several gentlemen to whom I have mentioned this system have adopted it and speak very highly of the system.

Yours faithfully,

F. CARDELL PENGELLY.

RAT PORTAGE, 7th May, 1900.

The Richardson Gold Mine, Nova Scotia.

SIR,—The Richardson mine is situated on the "crop out" of a regular fold of what is known as the Upper Seal Harbor Anticline, Guysboro Co., N.S., the apex or turn of which, dipping down at about an angle of 45 degrees to the east, its north leg or arm running away about north-west with a north dip of about 60 degrees, and its south one running about due west with a south dip of about 60 degrees. The ore-bed is well defined between two walls and varies in thickness from 15 to 20 feet at and around the apex to a distance of about 200 feet on either side of centre, when the legs decrease in width, varying from 6 to 10 feet. The whole of this body of ore contains values and is all crushed. During the past 3½ years, under the present management, we have mined and crushed upwards of 84,000 tons, out of which we have obtained upwards of 10,000 ozs. of smelted gold (assay value $19.40 per oz.), which means about 2 dwt. 10 gr. per ton.

But during the last three months our ore has increased very much in value, so that now we are obtaining upwards of 4 dwt. per ton, and from present appearances of the ore-bed the future prospect of the mine is very good.

Our present workings are down to the depth of about 500 feet from the surface on the incline of apex, extending west on the north arm about 700 feet and on the south about 300 feet. The ore is raised from the mine in self-dumping skips from two shafts. One, the main one, is situated on the incline of the apex or turn, and the other from the north arm both dumping their loads on the one landing or deck-head, where a Blake rock-breaker is situated which crushes the ore ready for the mill and drops it into a hopper under which the cars come which carry it away on a tramway on the top of the mill, when it is dumped into bins and fed into the eight batteries by automatic feeders. And in these batteries and on the copper plates attached we try hard to save all the values possible by amalgamation and then allow the pulp to run over Wilfley tables, where we catch up the concentrates. These amount to about 2 per cent. of the ore crushed and are worth about

$30.00 per ton We do not propose to increase the number of our stamps very soon, but intend doing something to save the values in our refractory ores; and we are also preparing to put in an air compressor to supply our drills and pumps with air which we have been running by steam.

A. B. Cox.

Isaac's Harbor, 21st April, 1900.

A Combined Exhaust and Blast Fan in Colliery Ventilator.

By Mr. F. T. Peacock, Montreal.

(Read before the Mining Society of Nova Scotia.)

The advantages of so constructing a Colliery Ventilating Fan, so that it can be readily and quickly "reversed," viz., transformed from an Exhaust into a Force Fan, and vice versa, are considered of great importance by mine managers of some localities. The advantages claimed for this type of Fan are as follows:

First—It can be operated as an Exhaust Ventilating Fan during the summer months. In this operation the Fan draws, or exhausts the warm, foul, air from the mine workings to the surface, through an air shaft causing cool fresh air from the surface to rush down the coal and man hoisting shafts or slopes to take its place.

During the winter months, it can be operated as a Blast or Force Fan. In this operation the air is forced down the air shaft to the mine and in its passage through the underground workings, the temperature of the air is gradually increased until, by the time it arrives at the hoisting shafts, it is quite warm. This warm air ascending the coal and man hoisting shafts or slopes to the surface, prevents ice forming on the guides and the consequent jamming of the cages. It also adds considerably to the comfort of men entering and leaving the mine.

Second—In the event of accident or fire, it is of the greatest importance, that the Fan should be capable of being "reversed"; the advantages in such cases being often very considerable, sufficient perhaps to save the lives of miners, and the mine itself from damage.

When we speak of reversing the Fan, we do not mean reversing the direction of rotation of the Fan and engines, but reversing the currents of air.

This is accomplished with several Fans, at the Dominion Coal Company's mines, Glace Bay, Cape Breton, in the following manner:—

The casing is so made that it can be readily revolved on the Fan axis.

When acting as an Exhaust Fan, the chimney or outlet is set pointing vertically upwards, and the air is drawn from the air shaft to the central openings on each side of the Fan, through temporary wood, or sheet iron boxes, and is then expelled upwards through the chimney or outlet to the atmosphere.

When it is desired to operate as a Blast or Force Fan, the casing is revolved around the Fan shaft as an axis, the chimney or outlet being made to point vertically downward and into the air shaft from the mine. The temporary wood or sheet iron boxes are now removed and the fresh air enters through the central openings on each side of the Fan, which are now open to the atmosphere, and is forced down the air shaft to the underground workings of the mine. This is called reversing the Fan, and of course the direction of the currents of air are reversed, the direction of rotation of the Fan remaining unchanged.

An open wooden box is generally built around the Fan for protection and to facilitate the changes from exhaust to blast being made.

This method of reversing the Fan, while it answers well enough for small Fans, with comparitively light casings, is of course not practicable in the case of large Fans, with heavy steel or brick casing and chambers, as these are necessarily too heavy to support on the Fan shafts and too unwieldly to be readily moved, even if built of steel or wood.

The accompanying diagram shows the method, Messrs. Walker Brothers, Wigan, England, have employed with very satisfactory results on a number of their "Indistructible" Colliery Ventilating Fans provided with their Patent Anti-Vibration Shutter.

The Fan chamber is shown built of brick throughout, though the Fan casing may be built of steel and in some cases is built of wood, though a wood casing is not desirable.

A series of hinged swing doors marked A, B 1 and B 2 are built in the chamber or casing as shown by the diagram. On each side of the Fan chamber and opposite the air inlets, air chambers are built, extending from the ground, up to the top of chimney.

When it is desirable to operate the Fan exhaust, the air chambers on each side of the Fan, are sealed from the atmosphere by closing up the top openings, C 1 and C 2, the swing door A and the swing doors B 1 and B 2, remaining as shown in thick full lines on the diagram.

It is then readily seen that the air will be drawn from the underground workings of the mine, up the air shaft to central circular air inlets on each side of Fan and delivered up through the chimney to the atmosphere.

When it is desirable to operate as a Blast or Force Fan, the top openings C 1 and C 2 in each air chamber, are opened to the atmosphere, the swing door A and the swing door B 1 and B 2 are swung round to positions shown in thin dotted lines on the diagram. The fresh air is now drawn in from the atmosphere to the chambers, through the top openings C 1 and C 2, and through the central circular air inlets on each side of Fan, and is then delivered down the air shaft through the underground workings of the mine and up the coal and man hoisting shafts or slopes.

The arrows marked *Ex.* show the currents of air when being operated as an exhaust Fan. The arrows marked *Bl.* show the currents of air when being operated as a blast or force Fan.

It will be noticed that the Fan can, by this method be readily and quickly reversed, by simply opening and closing swing doors and the opening or closing of top openings C 1 and C 2 in air chambers.

The change it will be noticed can be made in a very short time and providing the swing doors are kept tight and properly sealed one air passage from another, it appears quite reasonable to assume that the efficiency of the Fan is not materially affected, when the casing is built for combined exhaust and blast Fan as is shown by the diagram.

Notes on Non-Caking Nova Scotia Coals.

By F. H. Mason, F.C.S., Halifax.

(Paper read before the Mining Society of Nova Scotia.)

I have recently made a number of analyses of Nova Scotia coals, which have shown only feebly caking properties, and it has struck me as a curious coincidence that these coals invariably show a considerably larger percentage of hygroscopic water than the caking varieties of Nova Scotia coals. And it occurred to me that this fact might possibly be the means of starting an interesting discussion amongst our coal mining members.

The reason why that one coal of approximately the same chemical analysis will cake and the other will not has always been a vexed question with metallurgists, and has never I believe been satisfactory solved. Dr. Percy in his excellent work on metallurgy has dealt with the subject at considerable length, and has given a number of analyses of British and foreign caking and non-caking coals, but unfortunately in the majority of cases he has given the ultimate analyses, in which the water appears as oxygen and hydrogen and it cannot be distinguished from other substances which those elements together with carbon and nitrogen make in coal. However, in those cases where the water is given separately I find that the British caking

coals contain from 1.35 per cent. water to 3.5 per cent. H_2O, while the British non-caking coal contains from 3.23 per cent. water to 11.29 per cent. water. There are, however, four exceptions given amongst the non-caking coals having an average of about 0.75 per cent. of water, however, from the analyses of these four coals they appear to me to come more under the head of anthracites than bituminous coals; they are the coals used at Dowlais Smelting Works, and perhaps, some one can enlighten me on this point.

Of the foreign coals only those from Hungary have the moisture given. Five samples of caking coal from there contained from 1.04 to 1.57 per cent. of moisture. While four samples of non-caking coal contained from 2.66 to 7.20.

It is the exception of our Nova Scotia coking coals to contain as much as 3 per cent. of hygroscopic water, while the non-coking coals I refer to contain from 5 to 7.5 per cent.

That the presence of water itself has nothing to do with the non-caking properties of the coal I have demonstrated by first carefully drying it at 100° c. and then attempting to cake it—without success; but it has occurred to me, that the removal of the water which is the first thing to come away on heating, leaves the coal in a porous state, and thus facilitates the rapid evolution of those hydro-carbons, in a gaseous form, which if retarded would liquify and thus form the cementing material of the coke.

To test this theory I tried heating some of the coal in Faraday tubes where they were subjected to the pressure of the gases they evolved and succeeded in getting a very fairly coherent coke. I also found that while under ordinary conditions they only gave a firitted coke, by subjecting them at once to intense heat in a platinum crucible a light puffy coke was obtained. In the passage of woody tissue which has no caking properties into anthracite, which is also non-caking, there appears to be a stage at which coals have caking properties. From a study of the ultimate analysis of a number of coals, I find that the oxygen appears to be the governing element; that the oxygen in caking coals ranges from 5 to 10 per cent. and in non-caking coals above 10 per cent. as they approach lignites, or below five per cent. as they approach anthracite. I find, however, one startling exception, namely, a coal from Saint-Girons which has 17.53 per cent. of oxygen, and which is described as giving a brilliant coke of a semi-metallic lustre. The particles are said to become rounded and stick together pretty firmly.

THE ONTARIO MINES ACT.

Confiscates Vested Rights Without Compensation—A Menace to the Investment of Capital—Its Effect upon the Nickel Industry—Mr. Clergue answered, and His Ignorance of Metallurgy Exposed.

A large meeting of mine owners and mining men was held in Private Bills' Committee Room, Parliament Buildings, Toronto, on Wednesday evening, 25th April, for the purpose of discussing the new Mines Act. Mr. J. R. Gordon, C.E., of Sudbury, presided.

The outcome of this meeting was the organisation of The Ontario Mining Protective Association, which was completed on the following day.

Mr. R. R. GAMEY (of Sudbury) who was the first speaker, spoke strongly against the Bill as an injustice to those who had invested their money in the nickel industry of Ontario. Such taxation as that proposed was unfair and unwise. Everyone in Ontario desired to see nickel refining done in the Province, and he, for one, was in favour of encouraging industries of this character with a bonus, as was done in the pig iron and silver lead smelting. The nickel copper mattes produced in Ontario were equally deserving consideration for a bounty. It was a great mistake to say that we were exporting a crude product. These mattes involve a process of manufacture more skilful and more expensive than the production of pig iron. Why encourage the one and tax the other? Mr. Clergue, he understood, did not propose to make metallic nickel and copper at his works at Sault Ste. Marie. He had a process, and he (Mr. Gamey) sincerely hoped it would turn out a success, for manufacturing ferro-nickel steel. If his process was a success it would undoubtedly mean much for Canada, but so far it had not been demonstrated beyond the stage of laboratory experiment. Mr. Clergue was not at the present time in the market as a purchaser of Canadian nickel ores or mattes. The Hoepfner people at Hamilton were in much the same position. He hoped both companies would succeed, but even if they did why should our mining companies be compelled to sell their mattes to them? Why should our mining companies be debarred from selling their product on the most advantageous terms in the open market? Until it was demonstrated that nickel refining could be successfully carried on in Canada it was folly to place any restrictions upon the miner. The law proposed was a confiscation of vested rights. It was a bogey to the investment of capital in Ontario and would seriously cripple, if not destroy, the nickel mining industry of the Province.

Mr. F. H. CLERGUE (of Sault Ste. Marie) said Mr. Gamey seemed to imply that the legislation before the House had been instigated or encouraged by him (Mr. Clergue. He denied this, and then continued: "It is true we are building a refinery. But this legislation was neither instigated nor promoted by us, not by me, not by anyone connected with my company. We have not suggested in any way to the Government to impose an export tax or a tax of any nature. The fact is that our situation at Sault Ste. Marie is just this—that if the people of Canada rely upon refining the material in a foreign country our refining will be done on the American side, not on the Canadian side. We are building on the Canadian side a nickel steel producing works, we are building a refinery for the reduction and refining of copper ore, nickel ore, and copper-nickel ores. If Ontario continues to allow the free export of unrefined nickel, we are building upon the American side a duplicate of our Canadian works, where we will carry on our business for the American market. It will not be done on the Canadian side. That is a plain business statement, which we are willing to publish. I make the statement, not in any spirit of antagonism to Sudbury, but in the plainest and most friendly way, because I perceive that Sudbury should and will sustain great mining interests. I believe that Sudbury can produce enough ore to operate our refineries. And in this connection I must disagree from the gentleman who has preceded me. He said that the Canadian Copper Company had to go outside the Province to carry on its refining. I say that the Canadian Copper Company was simply misguided in attempting to refine ore outside the Province of Ontario.

"I believe that the gentlemen who have invested so much capital in Sudbury would not continue to refine their ore abroad if they thought it could be profitably refined in Canada. But, sir, I am conscientiously impressed with the belief that they can do so successfully. I say that their belief is mistaken. And I say that the Ontario Government is now taking a proper measure to bring them to a realising sense of what the refining business is today. I have had put into my hand today a pamphlet, from which I propose to read some extracts. Its statements concern this industry. It has been published by the Canadian Copper Company under the title—'The Practical Side of the Export Duty Agitation.' Now, sir, I propose to answer some of the statements published in this pamphlet. I say that in a practical and technical sense these statements are not correct. The first statement is that in 1899 the Canadian Copper Company, by its shipments of ore to New York, suffered a loss of three per cent on its capital, and the question is propounded: Would the company suffer such a loss if the refining of the ore was commercially profitable in Canada?

"Well, Sir, refining was not commercially practical in Canada until some one attempted it. The Canadian Copper Company have not themselves gone far enough. If they had gone as far as we have they would have come to a different conclusion. Then, the second statement is that in the Orford process of refining crude alkali is necessary, which cannot be procured at the same price in Sudbury as in New York. But, Sir, this necessary chemical can be had cheaper in Detroit, Cleveland or Syracuse than in New York, and can be laid down at any point on the Georgian Bay cheaper than it can be procured in New York.

"In the third place the statement is made that there is not ore enough at Sudbury. I answer that by saying that there is ore enough in the Sudbury district to supply a dozen refineries as large as the Orford Copper Company's. Again, it is said that coal cannot be procured as cheaply. I also deny tha Coal is as cheap on the lake shore as in New York. A word with regard to the supply of copper ore: Dr. Hatch, the eminent English metallurgist, was sent out to examine the abandoned Bruce mines, an option upon which had been taken by an English syndicate. He invited me to come down, and the opinion he sent to England was that a thousand tons of 6 per cent. ore could be mined daily for an indefinite number of years out of those abandoned Bruce mines. We at Sault Ste. Marie have also been looking around, and we know that we can produce 1,000 tons daily of the ores already uncovered by our investigations. Finally, there is the statement concerning the United States tariff of $20 per ton on refined nickel. Now, sir, I think I can guarantee that if the Canadian Copper Company will join me, if the Orford Copper Company will join me, I can go down to Washington and have them take off that duty inside of a week. They cannot in the United States provide themselves with nickel unless they come to Canada for their supply. What with the great armaments, which have brought the price of nickel up from 35 cents to 50 cents per lb. in a few years; with the American, British and German naval programs calling for nickel-steel armor-plate, they know what it means when we have up there in Algoma the greatest mining district in the world.

"Whether this legislation passes or not, I believe that 50,000 men will be engaged in this industry up there within the next 10 years. I consider it only a question of time. This legislation would make the development of business quicker. There is also a statement in the pamphlet with regard to the Vivians. I am well acquainted with that matter, and can give the correct version of it. Furthermore, it is said that Dr. Mond's process is impossible in Canada, as it would cost $2,000,000. It would not cost 2 cents if Dr. Mond did not come here and apply it himself within two years. Then it is said that sulpuric acid would cost $35 per ton. I assert that Canadian copper will make sulphuric acid that will cost less than $5 per ton. I can also assert that the Canadian Copper Company have opened communications with our consulting engineer, and have requested our process for procuring sulphuric acid. I presume that the policy of the Government is to prevent the refining work going to the American side. We are practically indifferent as to whether the legislation passes passes or not."

MR. B. T. A. BELL (Ottawa) on being called upon said:—I had no intention of coming here to-night to make a speech, indeed, until a few minutes ago I was in entire ignorance that such a meeting was being held. I have listened with close attention to the glowing promises and the rosy picture of the industries which Mr. Clergue has under contemplation at the Sault, and while I may be somewhat

skeptical upon the point, I sincerely wish he may succeed in carrying to a successful issue the very large industrial problems he has on hand. On the subject of this remarkable legislation, my views are very well known. I am opposed to it because I firmly believe it to be unconstitutional; because it is an invasion of vested rights; because it is a menace to capital at a period in the history of mining enterprise in this Province when capital is urgently required for the exploitation of our mineral wealth. No one is going to be so foolish as to invest a penny in Ontario with such legislation as this hanging over them. This new Mine's Bill serves no good purpose. It may indeed facilitate the exploitation of these concerns which Mr. Patterson, Mr. Hoepner, and Mr. Clergue are promoting with so much zeal and with such a brisk flourish of trumpets, but in doing so it strikes a fatal blow at a fundamental industry—the industry of ore production, without which these refining and other allied industries are impossible. The advantage of diversified industries is a familiar argument to the protectionist; but its force is smallest when the additional industries promoted by protection are indissolubly connected with those already unprotected. If mining falls off, smelting and refining declines proportionately. If mining ceases, smelting and refining die—and there is nothing quite so dead as the corpse, the tombstone of which is an abandoned smelting plant.

We earnestly desire to see nickel and copper refineries established in Ontario, but they can only be successful by growth along natural lines. They are not to be forced upon us by drastic and ill considered legislation of this character. At a period when our position in the nickel market is very seriously threatened by competition from New Caledonia, Norway, and other countries, an embargo upon the export of our copper-nickel mattes will be fatal. The agitation which has made such injurious legislation possible is largely the outcome of malicious intrigue, and the persistent misrepresentation of an individual who openly professes undying hostility to the Canadian Copper Company. To Mr. S. J. Ritchie, an alien, more than to any other individual or circumstance, have we mining men in Ontario to thank for the entirely erroneous impressions which have been created in the public mind and in the mind of our legislators, as to the extent and value and importance of our nickel resources. It was this individual, I cannot call him a gentleman, who, in 1890, while endeavoring to secure from the Dominion Government a substantial bonus of something like a million and a half dollars for the Central Ontario Railway, together with a Government Guarantee of three per cent. on a capital of $5,000,000, which he was endeavoring to raise for a visionary nickel-steel plant, promoted that remarkable imposition upon public credulity—the notorious report on the nickel resources of Sudbury by Messrs. Folger and Buckingham, two so-called experts of the United States Government—a report which I need not say has been the laughing stock of every professional mining engineer who has ever seen it. That report was printed and circulated broadcast throughout Canada. It created, and was calculated to create, the impression that our nickel resources were unbounded and of fabulous wealth. Messrs. Folger and Buckingham published a statement over their own signature, that there were no less than 650,000,000 tons of nickel ore *in sight* at that time on the property of the Canadian Copper Company alone, 2,500,000 tons above ground on the property of the Dominion Mineral Company, and 240,000 tons in sight on the Murray Mine of the Vivians' of Swansea.

On the stump, in the lobbies of the Legislature, at Board of Trade meetings, in the columns of the press, at Ottawa, Trenton, Toronto, Hamilton, this glib-tongued Yankee has pursued a policy of exaggeration and misrepresentation unceasingly.

All this nonsensical talk has done its work. It has created an entirely false impression in the public mind regarding the actual position of our nickel industry. There is abundant and indisputable evidence to show that far from having a monopoly in the nickel supply, our position in the market is already seriously jeopardised by competition from New Caledonia and Norway. We are not, and never have been a controlling factor in the nickel market. No later than last month we find Mr. Whittaker Wright telling the shareholders of the Nickel Corporation in London, that before the year was out his company, which is working a very large property in New Caledonia, would control the entire nickel market of the world. Mr. Joseph Wharton, a smelting man of standing, had reported officially to the United States Government in a monograph published in 1897, as follows:—"It is conceivable that the intimations of an export duty upon nickel ore and matte, which from time to time appear in Canadian journals, may some day be realized and cause serious search to be made in this country (the United States) for the deposits of nickel ore, which doubtless exist, and of which the now dormant Gap mine is an instance. Such an export duty would, no doubt, direct attention afresh *to the great deposits of uickeliferous pyrrhotite in Norway and Sweden*, which have been for many years neglected. Barring such a contingency the Sudbury region seems destined to remain for a long time one of the two chief sources of nickel of the world. The *on'y rival to meet it in equal terms being the Island of New Caledonia with its unlimited resources of nickel silicate*, only a part of which are controlled by the French company *Le Nickel.*" That was in 1897. Since then considerable development has taken place in nickel mining in Norway. The Orford Copper Company was opening up in that country a mine of great promise and important shipments were being made from it to-day to the works of the company at New York. Mr. Robert Thompson, President of the Orford Company, had informed me that beyond the temporary inconvenience caused by the cancellation of his company's contracts with the Canadian Copper Company, his works would go on just as if Canada did not exist at all. After a month or two they would get along very well without a pound of Canadian nickel ore.

The statements of these eminent authorities are worthy of consideration, clearly indicating as they do the danger that threatens our nickel mining and smelting industries, if this ill advised agitation should result in an export duty, or any other form of taxation being placed upon this mineral. Aside from these features, the new law is unjust because it singles out for taxation a particular industry—and the most laborious and precarious of all the productive industries. I do not mean to say that mining skillfully conducted may not be largely profitable; but it would be folly to deny that it presents peculiar risks, and that the profits of fortunate and well managed enterprises are offset in the calculation of general results by the cost of much fruitless exploration and many deserved and undeserved failures. The stimulus to industry in this field is the hope of exceptional good fortune. This it is that keeps prospectors at work, and commands a perpetual supply of capital for experiments and developments. Consequently, mining less than any other industry can bear a burden laid equally upon the successful and the unsuccessful, yet this law not only selects mining for special taxation, but practically discriminates against the unfortunate by taxing gross products instead of profits or dividends. The mining industry of Ontario is not one that is making such profits on the average that it can bear to be taxed. It has accumulated no gains by the fostering hand of Government through a protective tariff and owes no acknowledgement for favors received. On the contrary, the privileges given by the Government to manufacturers have operated to a very large extent adversely to the mining interest, increasing their expenses in many directions without the least compensatory returns. If any single branch of industry is to be selected to bear a special burden of taxation let it be that which has been most fostered at the expense of the community. Let not the axe fall upon the one, almost sole manly industry of Canada that is struggling unaided to its feet and asks no privilege but "a fair field and no favors." If any tax is to be levied it should be placed upon the mineral in lands the Province held in idleness by speculators. Let industry be free from taxation, but let monoply, idleness and special privilege be made to pay richly for their usurpation of natural opportunites which ought to be ever fully avilable to all willing workers.

Mr. EUGENE COSTE, M.E. (Toronto)—I only wish to present a few remarks on this very important question, and they are remarks of one disinterested in so far as he has no material interest at stake at the present time in the Copper and Nickel Region of Ontario, but of one nevertheless very much interested in a general way in seeing that onr mining industries are fostered and made to prosper from one end of Ontario to the other, being as I am a Mining Engineer, and having been in the mining business all my lifetime. I will make my remarks as brief as possible.

If it is so easy, as Mr. Clergue has just asserted to us, to refine the copper-nickel ores of the Sudbury District in a commercially successful way in Ontario, if we can get the coal as cheap as he says (though we have to get it from the U.S. and pay a heavy duty on it) the salt cakes and other necessary chemicals as cheap as he says, if we can get also the ores of nickel and copper so readily and abundantly, from hundreds of mines, some of which, he asserts, can produce, like the old Bruce mine, 1,000 tons a day), then why in the name of common sense is it necessary for the Government of Ontario to bring in sueh a drastic measure as this bill? Why is it necessary for them to pass such a law in the Legislature, the only purpose of which is to hold a powerful club over the heads of the miners of these nickel and copper ores to compel them to do this refining in Ontario, which Mr. Clergue has just told us is such an easy matter to accomplish. Therefore, I say Mr. Clergue's arguments are the very best arguments against this Bill, since they show that this most extraordinarily heavy taxation to compel this refining is entirely unnecessary. And Mr. Ritchie also says the same thing as to the feasibility of this refining in Ontario, and he says more, namely, that he has his pockets full of patents as to new and old refining processes, and, therefore, that there is absolutely nothing in the way. Then why not let things take their own natural course, which natural course, from what Mr. Clergue has just told us, is now bringing about the creation of his nickel refinery at Sault Ste. Marie whether this Bill passes or not? Then why not at once drop a Bill which imposes a tax so heavy that it amounts to confiscation of what is at present our most important mining industry in the Province. The following statistics from the Official Report of the Bureau of Mines, 1899, show that in 1898 there were one hundred and twenty-one thousand nine hundred and twenty-four (121,924) tons of nickel and copper ores smelted, and 21,101 tons of matte made, that the value of this matte was $782,300, that the wages paid for labour were $315,501, and that the number of workmen employed were 637. These are the statistics of a very important industry. Now this Bill imposes a tax of $50.00 per ton of matte, amounting therefore on the whole of this industry to $1,055,050 per year. Would not that be confiscation of the worst kind to tax an industry every year by an amount much greater than the total value of the products of that industry—the tax being, I repeat, $1,055,050 (on the official figures for 1898) and the total value of the matte $782,300, or $272,750 less than the tax? No sane man can hardly credit that we have in Ontario a Government proposing such a monstrous tax as that on an existing prosperous industry, and what is still worse, that the members of the Legislature are ready to pass this Bill, to their everlasting shame. No wonder that we hear that capital will henceforth be frightened away from investing in Ontario mines! Fortunately the Ontario Government have recovered a part of their senses in amending this Bill, and taking this tax off from every other ore, or mineral, but the nickel and copper ores. And that of itself shows that they know it is wrong, and if it is wrong to thus tax other minerals, as they first intended in this Bill, why is it not wrong also to thus kill and confiscate the present nickel and copper ore industry? Refine in Canada, the Government says, and then we will condescend to remit this tax to you, or not to collect it from you. Supposing that under this abominable lash (which a Czar or even a Kruger would not threaten one with) we do refine in Canada, and supposing that after spending very large sums to put up these refineries we make a commercial failure of it; is the Government prepared to refund these large sums and indemnify us for the destruction of our present prosperous industry? An absolute guarantee, or pledge, of this kind would be the only thing that might justify a Government for proposing such a high-handed measure. Is this pledge given? Then, again, what business or right has the Legislature of Ontario to impose a tax which, being remitted to those refining in Canada, amounts to nothing else but an export tax. Every schoolboy knows that it is not the province of the Legislature of Ontario to meddle in matters of trade and commerce and impose import or export duties. Therefore, from every point of view this Bill is not only abominable, but it is also farcical, and if it is passed it will certainly be to the everlasting shame of this Government and of this Legislature.

MR. W. H. HOLLAND, Whitefish (representing Dr. Ludwig Mond):—I have listened with a great deal of interest to the remarks made by my friend Mr. Ritchie, also to those made by Mr. Clergue, the "Wizard of the North," as we are now getting used to hearing him called. Mr. Clergue tells us that he thinks the Canadian Copper Co. has been pursuing a misguided policy in not refining in Canada. While I do not wish to pose as an apologist for the Canadian Copper Co., I must say that it has generally been my experience that a company composed of such shrewd business men as compose the Canadian Copper Co., generally know the conditions under which they are working better than outsiders.

We have also heard a great deal this evening about our duties as Canadians to our own country. As an Englishman who has resided in Canada nearly twelve years, and representing an English company, I must say that I think our patriotic feelings must have run down very low when we can sit and listen to a lecture on patriotism, and our duty to our country from two American citizens. Patriotism is a very good thing, but it is a great mistake to allow it to run away with our business common-sense. We have heard a great deal about the Canadian monopoly of nickel, but, gentlemen, there is absolutely no truth in that statement. I sincerely wish there was. The fact of the matter is, that the Canadian nickel producers have to meet strong competition, and the whole question hinges upon this point. It is purely and simply a commercial question. To meet this competition each refinery must be established wherever the conditions for refining are the most favorable, and while one refinery may be successful here, it does not follow that every refining process is suitable for use in this country, and even if it was satisfactorily demonstrated that one refinery was successful in this country, it would be very unfair to say to all of them, you must come here whether the conditions are favorable or not. Speaking for Dr. Mond's process he does not say that the refining cannot be done in this country, but simply that it can be done more cheaply in England, and with the competition we have to meet this is the all important point. By refining in England he is able to cope with the competition, in fact, expects to be more than able to do this, and so gain a larger share of the world's markets for Canadian ores and mattes. This is the true patriot-

OFFICERS & COUNCIL
CANADIAN MINING INSTITUTE.
1900-1901.

THE MORTIMER CO., OTTAWA.

ism. I have pointed out the reasons this statement is based on on many occasions. (1) We have the cost of sulphuric acid. This is very much higher in Canada and the United States than it is in England; but we are told by Mr. Clergue that we can manufacture it more cheaply ourselves. This is the first time I have ever heard of cheap sulphuric acid being made from pyrrhotite ores such as ours are. (2) We have the cost of coal. (3) The absence of highly skilled labor, and finally the finished product itself, the market for which is chiefly European. The products of the Mond Process are sulphate of copper and metallic nickel. For every 100 lbs. of Bessemer matte we ship from Sudbury, we produce, roughly speaking, 200 lbs. of marketable product. For instance, if we had a matte containing 40 per cent. of copper, and 40 per cent. of nickel, and 20 per cent. of waste material. The 40 lbs. of copper would make 160 lbs. of copper sulphate, and adding 40 lbs. of metallic nickel, gives us 200 lbs. of marketable products, and in addition to the extra weight, the class of freight is changed and the rates become prohibitive. The amount of labour employed in this refining process is very small as compared with the number of men employed in mining, roasting, smelting, and bessemerizing the ores. I say gentlemen that we are to day manufacturing our raw products in Ontario, refining them if you like, and there is no parallel between the lumber and pulp and the nickel industry as the former were before the passing of compulsory legislation, for even now the ores undergo far more treatment than the timber does. Why not be logical and compel the manufacture of pulp into paper, that is to say in the words of the Mines Act, "A product that can be used in the arts without further treatment?" If the nickel producers were shipping ore out of the country there might be some justification for the cry of the raw materials of Ontario for Ontario. But where we are shipping a semi-manufactured product there is absolutely no reason for it. Where would such a policy land us? Apply this to all industries and what would be the result? I am positive that if these taxes were imposed, there would be nothing for the Canadian Copper Co. and others working in the district to do but to shut off all work. This would be disastrous, for in addition to throwing men out of employment, it would lose for us the position we now occupy in the nickel market, which position would be difficult to regain.

There is also another side to this question. A measure of the nature now before the Ontario Legislature is practically a confiscation of the mine owner's rights, and it is for this Legislature to cause it to be said for the first time in British history of modern times that a man's title to his property is not secure, although this has been one of our proudest boasts. This cannot have other than a bad effect on capitalists. We hear about the necessity and desirability of inducing capital to come in and develop our resources, and sometimes great concessions are made to obtain this end, and yet this Bill, if it ever accomplishes anything, will most certainly act as a bugbear to the capitalist and be an incubus on the efforts of one to interest capital, not only in copper-nickel lands, but in every kind of mining ventures in Ontario. I must ask, why should special legislation be passed for any set of capitalists? Why not accord all fair and equitable treatment? Certain gentlemen, interested one way or another, are clamoring for this legislation, and why? So they can profit by the injury done to others. On the other hand, we are asking for no favors, neither bonuses, land grants, (and we have to build a few miles of railway too) nor special legislation, simply asking to be accorded fair play and not to be hampered or crippled in any manner. Why should the present existing industries be crippled for the benefit of something speculative and prospective, and which only exists in the imagination of romancists and company promoters? If we are pursuing a misguided policy in refining outside of Canada, then our friends who tell us this and who say they are going to do something more sensible will profit by it, so they should not require any special legislation for their especial benefit.

In conclusion, I may remark, we hear a great deal about the resources of New Ontario. If the half told be true, New Ontario will develop itself without any legislation of this kind, which will not develop, but will simply retard development. Again I say, give us a free hand and fair play, and New Ontario will develop itself, and surely those working there asking no favors should be shown as much consideration as the bonus and bounty hunters and other parties interested in the passing of this legislation.

Major R. G. LECKIE (Sudbury)—Before Mr. Clergue leaves, I should like to make some remarks regarding the statements that he has just made.

In referring to the production of ferro-nickel, he stated that no one so far had attempted it. On this point he is not correctly informed, because about fifteen years ago, when some attention was directed to the economical treatment of the great masses of nickeliferous pyrrhotite, near St. Stephens, N.B., it was suggested both by Mr Eustis, President of Eustis Mining Company, and Col. Thompson of the Orford Company, that after a thorough desulphurisation, the ore might be treated in the blast furnace, for the production of nickeliferous pig, direct. Some experiments were made, but the results were unsatisfactory. The process, like that of Mr. Clergue's is still in the experimental stage, and so far as commercial success is concerned, both are likely to remain there.

The manufacture of sulphuric acid from these ores is also claimed as a success, and Mr Clergue has referred to the Nichols Chemical Company as endorsing it. I know that a vast amount of money has been spent in different parts of the world in trying to make a commercial success of the manufacture of sulphuric acid from pyrrhotite, and I have in my possession, a letter from the Nichols Chemical Company, the same to which Mr. Clergue refers, advising me not to spend time or money in trying to make sulphuric acid from such ore, as they themselves and many others with unlimited capital and the best technical skill, had found it to be unprofitable. By way of supporting his statement, Mr. Clergue has stated that large quantities of ore are imported into Great Britain, specially for the manufacture of sulphuric acid. This is a misleading statement, because either he does not understand, or has failed to explain that the Spanish ores imported for that purpose are of an entirely different character from the ores which he proposes to deal with from the Sudbury district. From Spain and Portugal from 700,000 to 800,000 tons of pyrites (bi-sulphide of iron) are imported annually; the average contents of the ore being about 50 per cent. sulphur, 3 per cent. copper, with some gold and silver all of these being utilized, including the iron residue. On the other hand, the Sudbury ores being a mono-sulphide of iron, average only from 20 to 30 per cent. sulphur, with varying quantities of nickel and copper which are difficult and costly to treat.

Mr. Clergue has proceeded to criticise and condemn the management and policy of the Canadian Copper Company. After he has had twelve month's practical experience in the treatment of our nickel-copper ores, he will be possessed of knowledge enough to change his tone. The officers of that company are men of business ability and technical skill. They manage their affairs in the best interests of their shareholders and do not interfere with the business of other concerns, although some are painfully open to criticism. They limit their statements to facts.

Mr. Clergue has also favoured us with a disquisition upon the refining process of the Orford Copper Company, but before doing so it would have been proper for him to have possessed himself of some accurate information on the matter. Speaking of the fluid employed, he confounds two commercially different articles, and therefore, his assertion that it can be obtained as cheaply at Sault Ste. Marie as in New York, is the result of his misapprehension. The comparative cost of fuel in the one place and the other may be the result, similarly of lack of accurate information. He makes reference also to the output or capabilities of the Orford Company's works. Of these he knows but little, and that little inaccurately. The Orford Company in addition to matte purchased in Canada, receives ores and matte from New Caledonia, Norway, Washington State and other localities, and it is found that such a mixture in refining is highly beneficial The works are quite capable of supplying the demands of both the United States and Europe, both as to quantity and quality. Mr. Clergue has been working at his nickel process for a couple of years, and so far, he has not yet produced a ton of refined nickel nor its alloys in a merchantable shape. When he has reached this point it may be in order for him to criticise the work of others.

To talk of producing 1,000 tons a day of ferro-nickel or nickel steel requires some stretch of the imagination, assuming it to carry 3 per cent. nickel, then it would be necessary to smelt 1,500 tons of nickel ore, free from sulphur and copper, besides 1,000 tons of 50 per cent. iron ore. All the nickel mines now opened in Canada, could not produce half of this quantity. But how is the product to be utilised? Steel rails? It is not yet determined whether the nickel-steel rail possesses any advantage over the carbon-steel rail and the price would be prohibitory. Mr. Clergue has referred to its use in ship-building. This is quite an old story. Fully ten years ago, when my friend Mr. James Reilly read his paper on the nature and qualities of nickel-steel before the Iron and Steel Institute of Great Britain, it excited the greatest interest. Sanguine expectations were formed of its advantages for ship-building and although Mr. Reilly was manager of the largest steel works in Scotland, situated in the greatest centre of ship building in the world, their efforts to introduce it have been unavailing and no nickel-steel ship has yet been set set afloat. Where Glasgow steel makers and Clyde ship-builders have failed to succeed, there can be little hope for these unborn industries in Canada. To talk therefore of 1,000 tons a day of ferro-nickel or nickel-steel, 1,000 tons of copper ore a day from Mr. Clergue's copper prospects, and 1,006 tons of 6 per cent. copper ore a day from the abandoned Bruce mines and such like, are literally "figures of speech" born of his own chronic hyberbolism.

Having dealt in some measure with the technical points of Mr. Clergue's speech I may ask, with my friend Mr. Gamey, why, if the processes of the Soo Company and Hamilton promoters are so thorough, so comprehensive and economical, should they demand the Government to enforce a policy at once discreditable to itself and ruinous to the mining industries of Ontario. It is also notable that the only two men in this room who advocate this un-British policy have told us this evening that they are foreigners and aliens. They have come here to make money and it matters not to them if Ontario and Canada bring discredit and ridicule upon themselves. Mr. Clergue goes further and threatens to erect his furnaces, which are still "castles in air" on the Michigan side, if this iniquitous Mining Bill is not made law. This is a bluff which may have some effect in his own locality, where sycophants are looking for favours, and railway contractors for profitable jobs, but it cannot influence the independent mining men of Ontario. Rather than submit to threats and intimidation coming from such a quarter, in speaking my own mind, I feel that I am but voicing the loyal and true sentiment of every Canadian in this room, that I should prefer to see Mr. Clergue carry out his threat, pack his carpet bag and firebricks and re-migrate to the other side of the noble river.

The meeting adjourned at eleven o'clock.

GASPE OIL FIELDS.

Interesting Statements Presented at a Meeting of the Canada Petroleum Co., Limited.

The following statements of the work going on at the Gaspe Oil Field, will be read with interest by those who are skeptical of the oil resources of the Gaspe District, Que. :—

The Chairman having explained the formal character of the meeting, said that Mr. Bagnall would present an interesting report. The directors had thought it wise to obtain an independent opinion from an expert in oil wells, and accordingly Mr. A. B. Walker, of Gaspé, had furnished them with his views with regard to their property. Mr. Walker said that 31 wells had been drilled and two more were being drilled. Nearly all the wells visited by him showed such indications that he was of opinion that if the Gaspé Oilfield was handled in a practical way it would develop into a paying and successful property. He had advised drilling on a number of new wells.

Mr. Walter G. Bagnall, J.P. (managing director of the company), who has recently visited Canada, then gave his report of the properties as follows:—I visited your properties on June 5th, and was accompanied by Mr. William Lees, of Manchester, a director of the Bagnall Oil Company and of the Mercantile Bank of Lancashire. I also cabled one of our representatives to secure an oil expert from the Pennsylvania Oilfields. We engaged Mr. A. B. Walker, principal of one of the first companies to successfully operate the Bradford Oilfield. Mr. Walker has since then drilled and sunk wells in most of the oilfields of the United States, and is connected with oil properties in West Virginia, Ohio, and Indiana. He was Sheriff of McKeen county, the county whose principal town is Bradford, Pennsylvania, for three years, vacating that office last year. From many independent quarters I was assured, and I am myself thoroughly convinced, that it would be impossible to secure a more reliable oil expert than the one whom we engaged. We made several surveys of the properties to verify the statements made by the vendors at the time this company was formed. We unanimously agreed that the said statements were more than justified. We found oil continuously on lands extending between 24 and 25 miles. Most of the wells had produced considerable quantities of oil, and hundreds of barrels of oil were lying about. We consider that at least 2,000 barrels had been lost from wells Nos. 11 and 27 before the same were controlled. Well No. 11 is now plugged down; but the oil and gas forces itself through the 2 ft. pine plug. Well No. 27 is now arranged for pumping, and we saw pumped between 300 and 400 barrels. We are decisively of opinion that the property will prove a successful oil-producing country, and that we shall have ready for export a cargo of refined petroleum products within the next nine months. Being thoroughly satisfied that the oil was of excellent quality, and that it was there in large quantities, we at once arranged that pipe-lines should be laid and the refineries erected. I applied to the municipalities for powers to lay the pipe-lines from our properties through the settled districts to the harbour at Gaspé. The powers were granted free of charge, and the pipe-line will be complete within the next three

months. To facilitate quick erection and exploitation I connected the producing districts by telephone with the Gaspé offices, the resident manager's house, and the cable and telegraph offices. We also have contracted for the refineries to be erected at Gaspe, and the same should be delivered there within seven weeks, and the erection completed within three months. We commenced four new wells immediately surrounding well No. 27, and the directors have been recommended to drill four wells around No. 11; also that sites should be selected and the foundations laid for 20 additional wells along the oil-bearing line between wells Nos. 11 and 27. This is to enable the erection of derricks and the drilling of wells to be continued during the winter months.

We have given the transport of the oil from the wells to the refineries very careful consideration, because after an oilfield is proved to be a successful oil-producing country, the transporting and manipulating of the oil is a most important factor in making the field a financial success. We shall be able to bring our oil from the wells through the pipe-lines to the refineries and tankages, and ship the same from the port at Gaspé, at a cost, including the refining of the product, of less than three-eigats of 1d. per gallon. We have been most successful in placing our contracts on very favourable terms, and, despite the fact that the iron, steel and pipe markets have advanced during the past three months, over 100 per cent., the total cost will not exceed 50 per cent of the amount we had originally decided must be spent upon these erections. We were so convinced that this oilfield has a successful future that we approached the Canadian Government to secure assistance to bring the property in direct communication with the Canadian railway system, and I interviewed Sir Wilfred Laurier and the responsible Ministers of the Dominion Government with the object of securing their help. I am pleased to say the Government substantially supported our request, and they have voted this session subsidies for the construction of the railway from Gaspé to Paspebiac. This railway will pass through the oil properties and will give an outlet for our products to all parts of Canada and the United States. The Government have also decided this session to erect wharves and harbour facilities at Paspebiac, the ocean port of the Atlantic and Lake Superior Railway Company. This railway company possessed the line that connects our oil properties and the proposed new railway with the Intercolonial and Grand Trunk Railways, and the control of it would be beneficial for the successful development of the oilfields. It is being reorganised under the control of an English majority of a new board of directors, and I am glad to say that this reorganisation scheme has already met with such approval in England, since my return, that I am able to announce the survey through the oil property has been made by competent engineers. The contract for the construction has been let; steam excavators and plant are upon the land, and men are being engaged to construct the line. I believe 20 miles of the section from Gaspe can be constructed this year, and the connection with Paspebiac completed within 12 months. I am convinced the future of our company will be a successful one, and I hope to return to Canada in October next to personally superintend the first shipment of refined petroleum products from Gaspé. I am glad to know that so many Lancashire men are supporters of this company, because throughout the whole of Canada I noticed the present prosperity of the Dominion has been steadily advanced by the business capability, commercial organisation, and judicious expenditure of capital possessed by companies directly connected with Manchester and its Ship Canal. I firmly believe the developments of the Canada Petroleum Company and the construction of the proposed railway through the valuable wood-pulp districts of Gaspesia, will further develop profitable enterprises, increase the prosperity of the Dominion, and unite closer the Mother County with her nearest colonial possession.

The Chairman referred with satisfaction to the report presented by Mr. Bagnall, and said that it held out to them the prospect of a reasonable dividend. They would only have to wait a few months before they had some oil up the Ship Canal. At the present time their greatest profit would be in selling oil in Canada. Most of the oil sold there came from the United States oilfields, and there was a duty of of 5 cents in their favour. All they could do now was to wait patiently for the development of the property.

Mr. Bagnall, replying to a question as to why the oil could not be brought immediately to Manchester, said that the price in Canada would give them a profit two or three times greater than they would make by exporting to England. They would, however, be able to compete in Manchester when the time arrived, and would be able to deliver oil at a pound a ton less than any other company in the world.

THE MIKADO.

DECLARES A DIVIDEND OF 5 PER CENT.

The following is excerpted from the directors report presented to the shareholders on the 27th ult.:—Since the last General Meeting, and more especially since May, 1899, when the new managers took charge, great progress has been made, and extensive developments have been carried out on the property.

The Mine (No. 1 vein) has been opened up to a depth of over 300 feet, and a large body of good payable ore has been developed ready for stoping, as will be seen from the Manager's report, which it is hoped every shareholder will carefully read.

No. 1 Vein only is being worked at present, as there is more than sufficient pay ore there quite handy, for the mill to keep the 20 stamps going for many years. The Managers claim that in the portion of the vein south of the shaft, there are 1,230,000 tons of ore, and there must be almost an equal tonnage under the lake to the north of the shaft, which can be easily and profitably worked, commencing at a depth of 300 feet.

On No. 2 Vein considerable exploration work has been done, the shaft is down 190 feet, and a considerable distance has been driven at that level with satisfactory results. Some of the richest ore ever found in the district has been met with in this vein. It may be desirable later on to turn this portion of the property into a separate Company.

Exploratory work on other parts of the property has produced encouraging results.

It may be pointed out that, owing to the very small amount of working capital originally provided, the bulk of the cost of developments, exploratory work, buildings, machinery, etc., has been paid out of the gold produced from the mine. Had there been sufficient working capital to have paid for these items in the first instance, the mine would have been paying handsome dividends long ere this.

Since the crushing commenced, 27,378 tons have been treated, producing 14,334 ounces of gold, besides 5,771 lbs. recovered from 7,457 tons of tailings.

It will be interesting to note the marked improvement in the monthly returns and in the ore values since the new Managers took charge, as seen by the result of the last 12 months work.

1899	Crushed Tons of 2,240 lbs.	Yielding Ozs. of Gold.	From Cyanide.	Estimated Profit.
April	893	334	£275	.....
May	982	313	280	.....
June	759	288	611	....
July	982	372	267	....
August	982	451	460	.....
September	982	557	475	£1,000
October	982	657	353	1,050
November	848	658	270	1,000
December	848	691	465	1,300
1900				
January	982	655	547	1,700
February	893	621	320	1,500
March	1027	697	395	1,500

From the explorations made on the property and developments in the mine extending to thousands of feet of driving, sinking, cross-cutting, etc., the Board have no longer any doubt about its great and permanent value, and that the prospects for the future are most satisfactory, as, besides the other valuable portions of the property you have a proved and well-equipped mine.

In the opinion of the Board, the time has almost arrived for the shareholders to consider the advisability of working the mine on a much larger scale. There is no doubt that if the output were double a profit of £3,000 to £4,000 per month might be earned as, with 20 or 30 additional stamps, the surface expenses would not be materially increased.

To carry out this, it will be necessary to rearrange the Capital of the Company, and fix it at a sum more in keeping with the value of the property, and further working Capital would have to be provided to carry out the necessary additions.

The directors wish to put on record their unqualified satisfaction with the manner the new Managers and Local Director have carried on the work since they took office, more especially as they had great difficulties to contend with owing to the chaotic state the property was left in by the previous Manager.

A dividend of 5 per cent., free of Income Tax, on the paid-up Capital, is recommended to be paid.

THE PAYNE.

OFFICIAL REPORT OF THE FIRST ANNUAL MEETING OF SHAREHOLDERS.

The first annual meeting of the shareholders of the Payne Consolidated Mining Company, Limited, was held at the office of the company, Montreal Street Railway Chambers, on Tuesday the 8th day of May, 1900, at 12.30 p.m.

Present—Colonel F. C. Henshaw, President (in the Chair), Hon. L. J. Forget, Messrs. James Ross, W. G. Ross, Wm. Hansom, C. J. McCuaig, A. D. Porcheron, Wm. Strachan, A. W. Stevenson, G. A. Greene, T. B. Brown. R. Forget, and about twenty others.

The notice calling the annual meeting was read.

Minutes of the shareholders meeting of May 22nd, and June 26th, 1899, were taken as read and signed.

The Auditor's report for the year ending March 31st, 1900, was read.

The President on moving the adoption of the annual report, seconded by Hon. L. J. Forget, stated that the same was now open for discussion, and the following questions were asked:—

What does 90 ounces silver and 45 per cent. lead mean? Also that the Manager's report states that "The future of the mine depends largely on what will be found in number 8." And when will dividends be resumed? To which the President replied that 90 ounces silver and 45 per cent. lead meant about $42.00 per ton, and in regard to the 800 foot level the President stated that our Manager, Mr. Hand, expressed the utmost confidence of finding the ore in that tunnel, and that in the event of finding it, it would add very greatly to the value of the mine.

In regard to dividends the President stated that as yet this had not been discussed by the Directors, but that personally he hoped that they would be resumed about July. And on the question being asked if they were to be resumed on the old basis? The President replied that at present he was not prepared to answer that question.

The question was asked if it was correct that the old company had paid dividends to the amount of 20 per cent. of the old capital? To which the President replied, that he was not in a position to answer.

A shareholder stated that when the company suspended the payment of dividends last fall, it was generally understood that the company had still quite a large cash balance on hand. To which the President replied, that this was an active asset, and that the Directors are of the opinion that the same should be expended only on account of capital, and not for the payment of dividends.

The question was also asked, what quantity of ore was in sight and blocked out in the mine? And in reply it was stated that the net value of ore in sight according to Mr. Bernard McDonald's report at the time the property was taken over was about $900,000.00, and that according to Mr. Hand's report there was fully as much ore in sight at the present time.

On further discussion the report was adopted.

Messrs. A. D. Porcheron, and Wm. Strachan, were requested to act as scrutineeers.

On motion of Mr. A. W. Stevenson, one ballot was cast for the re-election of the old Board of Directors. The scrutineers reported that the Board of old Directors had been re-elected.

Mr. A. Stewart, was elected Auditor for the ensuing year. The financial statement for the ten months ended 31st March, 1900, shows:—

FINANCIAL STATEMENT.

For Ten Months ending 31st March, 1900.

ASSETS.

Mines, Mineral claims and assets	$2,595,050 85	
Permanent equipment	14,525 24	
Office furniture	602 52	
Mine supplies and stores on hand, as per inventory	717 27	
Accounts receivable	29,029 96	
Cash on hand and in Banks	12,357 67	
		$2,652,283 51

LIABILITIES.

Capital stock	$3,000,000 00	
Less in treasury	400,000 00	
		$2,600,000 00
Accounts payable		17,521 41
Profit and loss		34,762 10
		$2,652,283 51

PROFIT AND LOSS.

Dr.

To Cost of mining and developing	$57,835 69	
" Freight and treatment	48,151 37	
" Duty	1,700 11	
" Tools and appliances, &c.	469 27	
" Organization expenses	5,824 66	
" Boarding house expense	2,119 68	
" General expenses	4,407 47	
" Montreal office expenses	1,642 36	
" Directors' compensation	4,000 00	
		$126,150 61
" Dividends 1 to 4		$104,000 00
" Balance		34,762 10
		$264,912 71

Cr.

Proceeds of ore sales	$260,660 96
Miscellaneous receipts	4,251 75
	$264,912 71

YMIR MILL.

INTERESTING FIGURES FOR THE FIRST YEAR'S RUN OF CANADA'S LARGEST BATTERY.

The following excerpt, giving, as it does, some interesting figures of values and costs of the first year's run of the 40 stamp battery, recently increased to 80 stamps, at Ymir, B.C., are taken from Mr. S. S. Fowler's report to the shareholders of the Ymir Mine, Limited :—

The 40 stamp milling plant provided by arrangement with the London and British Columbia Goldfields, Limited, was begun in August, 1898, and practically completed in February last. On the 1st March the plant was turned over to the Ymir Company, but the extreme severity of the weather and the very small volume of water made it impossible to do any crushing until near the end of the month.

Briefly described, the plant comprises :—1 No. 3 Gates crusher of a capacity of about 20 tons per hour; 8 challenge feeders; 40 850-lb. stamps; 8 amalgamating plates, 56-in. by 12 ft.; 12, 6 ft. Frue vanners; 1, 54-in. by 14 ft. tubular boiler for heating, &c.; 1, 125 light, 16 c. p. dynamo. The power system embraces a flume 18 in. by 20-in. by 1,400 ft. in length, from which the water passes by 900 ft. of spiral riveted pipe to 1, 24-in. Pelton motor, under 320 ft. head, to drive the crusher; 1, 6 ft. Pelton wheel, under 430 ft. head, to drive the stamps and vanners, and 1, 12-in. Pelton motor to drive dynamo.

The ore house is connected with ore bins at the mouth of No. 3 level by a Hallidie ropeway, about 2,100 ft, in length. The capacity of the mill has been about 100 tons in 24 hours, with 40 to 50 mesh screens.

Beside the mill plant, there have been built an office, assay office, superintendent's house and commodious quarters for the men.

Mill Operations.—As above stated these began only toward the end of March. At that time the volume of water was only one-third of what it had been a year earlier, and it did not increase sufficiently to enable us to drop the whole 40 stamps until the 16th of April. Since that time there has been more than enough water for all purposes—with a two or three days exception early in October. During the season we suffered a number of annoying accidents, which, in the aggregate, caused much delay, and aside from these, a change in the power transmission system, from wire rope to belting, and the fracturing of a ten ft. sheave because of the breaking of the wire ropes, caused a shut down of seven weeks beginning 26th July. Since starting up again about the middle of September, nothing of an extraordinary nature happened to delay our operations until near the close of the year, when an accumulation of small particles of ice caused the flume to overflow, with the result that a considerable section was undermined, and the stamps hung up for three days.

The duty of the mill has been as follows :—

Running of time for 40 stamps.		Tons Crushed.
March,	2 days 13 hours	250
April,	16 " 6 "	1,700
May,	17 " 4 "	1,450
June,	21 " 14 "	2,107
July,	21 "	
August,	Nil.	Nil.
September,	14 days 18 hours	1,550
October	27 "	2,790
November,	29 " 5 "	2,943
December,	23 "	2,348
Total	172 days 12 hours	17,137

Average crushing, 99⅓ tons per 24 hours.

The record of the last three months shows much improvement, and as we have made several changes in details, and taken precautions to prevent the recurrence of most of the minor annoyances, it may be expected that the second year of our operations will show much greater mechanical efficiency.

Duplication of Stamps.—Under instructions from London based on our reports, we prepared plans for duplicating the milling capacity, and began work of excavation early in October. The north extension to present battery room and vanner room are now inclosed and we shall soon begin the erection of machinery. At the south end of the present building we have built an extension to accommodate three 80 h. p. boilers; one 175 h.p. high speed engine, and a ten drill air compressor. The boilers and compressor have yet to arrive, but all the mill machinery is now on the ground. No material changes in the ore house will be made, the breaker having sufficient capacity, but we have ordered new ropes and buckets for our tramway, commensurate with the demands which will be made on the tram when the 80 stamps are dropping. A new 400-light dynomo is being put in place, and hereafter the mine and all buildings will be lighted thereby.

PRODUCT AND INCOME.

Old Dumps			5,061 tons.
Stoped-Carbonate	273 tons.		
Galena	112 "		
Milling	12,725 "	13,110 "	
		18,171 "	
Ore milled	17,137 "		
Ore smelted	385 "		
		17,522 "	
Ore on hand 1st January (milling)		549 "	

Crude Ore.

	Ozs. Gold.	Ozs. Silver.	Per cent. Lead.
Average assay	4.251	25.05	35.2
	Return $35,808.89		

Milling Ore.

	Ozs. Gold.	Ozs. Silver.	Per cent. Lead.
Average assay recovered	0.3965	.893	1.11
	Return $142,356 93		

of which $117,259 84 was derived from 9,983.36 ozs. ore bullion, .561 fine in gold, and .387 fine in silver, and $25,097.09 from 1,026 tons of concentrate of average assays 1.173 gold, 11.16 ozs silver, and 18.01 per cent. lead.

Distribution of gold and silver per ton of mill stuff is :—

	Ozs. Gold.	Ozs. Silver.	Per cent. Lead.
In bullion	.3263	.225	..
In concentrate	.0702	.668	1.114
Total	.3965	.893	1.114

TOTAL METAL MARKETED.

	Ozs. Gold.	Ozs. Silver.	Lbs. Lead.
In bullion	5591.297	3861.89	.....
In concentrate	1202.983	11448.96	381918.8
In crude	1637.711	9657.18	270917.5
Totals	8431.991	24968.03	652836.3

Based on total tonnage (17522) of crude and milling ore treated, the average assays are :—Gold, .4812 oz.; Silver, 1.425 oz.; Lead, 1.863 per cent.; and the average gross income per ton is $10.168 per ton, and of the total income ($178,165.82) the follow amounts and per centages are derived per ton treated :—

	Amount.	Per Cent.
From Bullion	$6.692	65.8
" Concentrate	1.432	14.1
" Crude ore	2.044	20.1
Total	$10.168	100.0

SUMMARY OF OPERATING COSTS.

Mine—

	Labour.	Other charges.	Totals.
Stoping	$15,401.15	$2,411.14	$17,902.29
Repairs	464.75	126.06	590.81
Surface work	890.37	.....	890.37
			$19,383 47

Tons stoped and treated, 12,087. Cost per ton, $1.6037.

Old Dumps—

	Labour.	Other charges.	Totals.
	$3,224.11	$267.54	$3,491.65

Tons handled, 5,061. Cost per ton, 0.6899.

Tramway—

	Labour.	Other charges.	Totals.
Operating	$2,114.84	$518.21	$2,633.05
Repairs	268.05	59.41	327.46
			$2,960.51

Tons trammed, 17,137. Cost per ton, $0.1727.

Mill—

	Labour.	Other charges.	Totals.
Operating	$6,837.52	$3,166.38	$10,003.90
Repairs	1,391.64	900.28	2,291.92
Preliminary expenses.	.....	772.54	772.54
			$13,068.36

Tons milled, 17,137. Cost per ton, $0.7627.

Transport –

Bullion expressage $221.10. Ozs. shipped 9,9883. Cost per oz. $0.0221.

Concentrate—

	Labour.	Other charges.	Totals.
Sacking and shipping.	$724 63	$2,558.29	$3,282 92

Tons shipped, 1,026. Cost per ton, $3.1997.

Crude Ore—

	Labour.	Other charges.	Totals.
Sacking and shipping.	$502.98	$870.43	$1,373.41

Tons shipped, 385. Cost per ton $3.5673.

Assaying	$1,193.52
Salaries	5,104.30
Office and travel	2,459.27
Taxes and insurance	2,168.08
Legal expenses	649.81
General and other contingent	2,856.57
	$14,431.55

Tons, 17,522. Cost per ton, $0.8237.

GRANBY SMELTING.

NEW SMELTING PLANT AT GRAND FORKS, B.C.

The following is excerpted from the report of Superintendent A. B. W. Hodges, and submitted at the meeting of the shareholders this month :—

As per your request of January 18th, I herewith submit my report of the construction of the smelter during the time I have been with you, and ending on December 31st, 1899. My connection with your company began April 1st, 1899, and during the first part of April I made a trip with you through the different smelters of the Kootenay country, namely those at Northport and Trail, where they treat ores similar to those found in the Boundary country; we then looked for the most suitable place to establish a smelter, and visited the following places with that end in view: Cascade, Grand Forks, Carson, Midway, and Greenwood, and after looking over these sites, and making careful surveys and figures, we decided that Grand Forks offered the cheapest and best place to smelt the ores which where coming from the mines owned and controlled by this company. The main argument in favor of Grand Forks was its water power; the power required to smelt 400 or 500 tons per day is about 400 h.p. In this country generating h.p. by steam with coal as fuel, has been found to cost about $125.00 per h.p. per year, which would with 400 h.p., mean an expenditure of $50,000 per year. Another method to get h p. in this place would be to buy electrical h.p., furnished by the Bonnington Falls Electrical Company, this would be brought over the mountains and delivered to us at a probable cost of $55 00 per h.p. per year, or $22,000 per year for a 400 h.p. The cost of water power which we are developing, would be of course the interest on the investment, and one or two thousand dollars per year for repairs and maintenance, and if the installation of such plant would cost somewhere about $90,000, it would be seen that the h.p. would cost the company between $15.00 and $20.00 per h.p. on 400 h.p., or a saving of $14.000 per year on the same, provided the interest on the investment should all be charged to the smelter, but such is not the case, as we will have an income of $10,000 per year for furnishing 200 h.p. to the City of Grand Forks, thus disposing of 600 h.p. only. When the smelter increases its capacity, which it will no donbt do in a year or two, it will use 800 h.p., which can be developed with $7,000 or $8,000 additional expense, simply for water wheels and generators, as the flume is built large enough to give 1,200 h.p., at the minimum, thus it will be seen that not only does the smelter get its h.p. at exceedingly low rates, but the investment will also bring in large returns from utside. With the above facts in view, you will see why we located the smelter at Grand Forks.

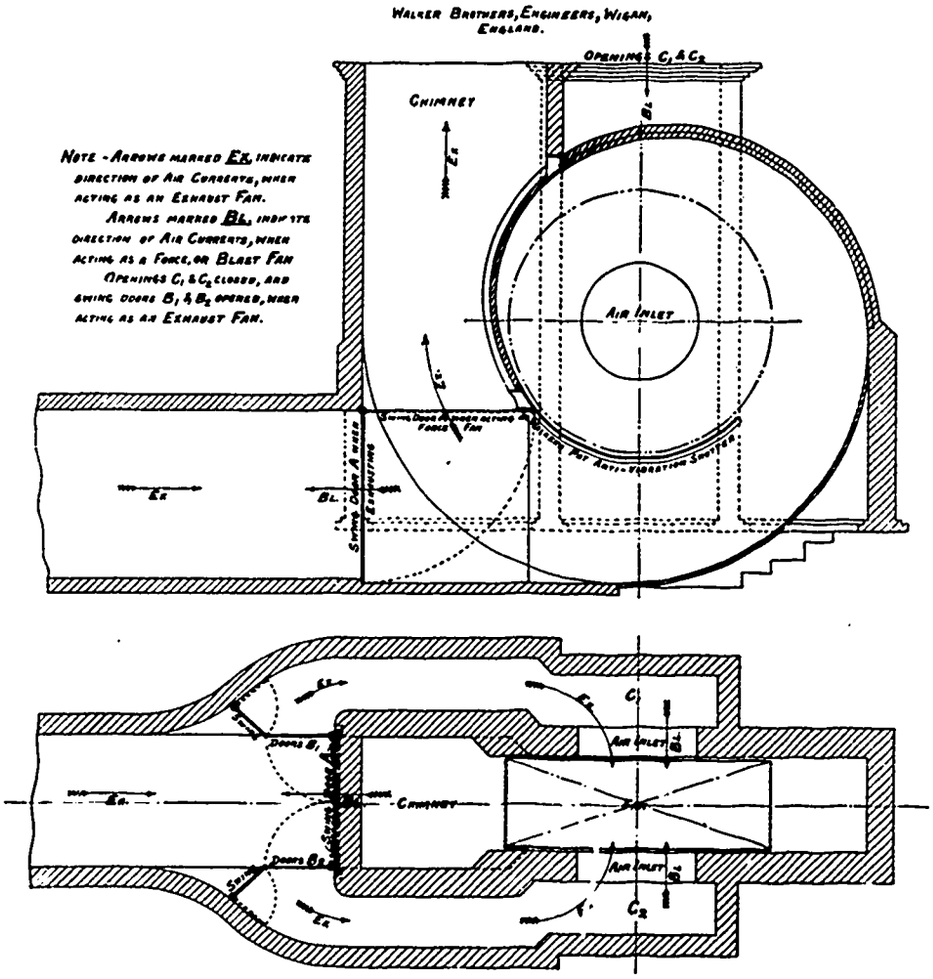
During the month of April, 1899, I visited the mines of the company and took samples of the ore bodies in the Knob Hill and Ironsides, with a view of determining *their values, and also their adaptability to smelting, and found them to be* admirably adapted to smelting on account of their composition, not only in their contents of gold and copper, but in their contents of iron, silica and lime, as in order to smelt this, iron-ore and lime-stone must be bought, or an ore containing iron and lime-stone, for in smelting ores this iron and lime-stone has to be used as a flux, and it displaces that much ore in the furnace and increases the cost of ore in the same proportion as it is displaced. For instance, if 300 tons of ore and iron ore and lime-stone were smelted in a day, at a total cost of $1,200, it would mean $4.00 per ton for all materials, and if one half of this 300 tons was ore, it would mean a smelting cost of $8.00 per ton for the ore; now if the ore itself had sufficient iron and lime to flux itself, it would cost $4.00 per ton, simply because there was twice as much ore smelted in a day. I found from my samples taken from the mines, that the ores contained sufficient lime to make a self-fluxing proposition, which will materially lessen the cost of smelting.

The ores carry from one ounce down to .02 of an ounce in gold, and from one to two ounces in silver. As to the probable cost of smelting these ores, we can only give approximate results; we know, however, that the Le Roi Smelter at Northport, Wash., treat ores at from $4.00 to $8.00 per ton, excluding, of course, deductions for metals which they may carry; it is therefore safe to say that with our good fluxing ores, cheap h.p., etc, we ought at least to do as well as this, and we hope to do better.

About the middle of May, I went to Chicago, and presented my specifications to two of the leading makers of smelting machinery in the United States, viz.: The Gates Iron Works of Chicago, Ill., and the E. P. Ellis Co., of Milwaukee. I spent a month with these two firms drawing and planning the buildings, and the arrangement of machinery, and looking up the different classes of machinery they had to sell. The bid of the Gates Iron Works was somewhat lower than the E. P. Ellis Co., and they were given the contract, which amounted to about $26,000 total. The most of this smelter machinery is admitted to the country duty free, such as automatic samplers, blowers, smelting furnaces, etc., but we had some duty to pay on pulleys,

A COMBINED EXHAUST & BLAST VENTILATING FAN

WALKER BROTHERS, ENGINEERS, WIGAN, ENGLAND.



shafting, crushers, etc. About the latter end of June, I returned to Grand Forks and commenced the clearing of the land and grading of the smelter site, and also the grading of the flume. We had quite a little trouble in finding where to get the brick and the proper clay to make them from, but we got a fairly good rough brick. The next thing was to start to cut and saw timber for the smelter proper, and also for the flume and dam, and we got a saw-mill to begin operations on this sometime in July, and up to January 27th, 1900, we had used about a million feet, and will probably use about 700,000 feet more before we are through. In the construction of the smelter proper a little more than a million feet were used, the rest going to the flume and dam. We were fortunate enough to purchase about 700,0 0 feet of small lumber, which was cut for some time and reasonably dry. This we used in making the sides of all our buildings, and we also purchased a small second-hand planing-mill, and installed it as part of our works, in order to get out the window-frames, doors, and everything connected with our office building, dwelling, and assay office, and we have been running this planing-mill steadily ever since last July. I also installed a small machine shop last August, in order to be prepared to make bolts, nuts, cut and thread our pipe, and to repair any machinery that may break down, as there was nothing of that kind in the country, and we had to be prepared to repair our own machinery to prevent the delay of waiting to have repairs done hundreds of miles away. This machine shop is also intended to make all heavy repairs for our mines, build ore cars, cages, etc. It cost, in Chicago, $3,000, and is very complete for a smelter machine shop. The works, as you know, are on the North Forks of the Kettle River, and will be on a spur from the main line of the Columbia and Western Railway, about 2.7 miles long and having a very easy grade. The spur leaves the main line at the north end of the town site of Columbia.

The power-house is within 1,000 feet of the smelter building and about 100 feet below them. There is ample room at the smelter site proper for as large a plant as the company will ever care to put up, and there is ample dumping room for years to come. The main power with which the blowers, sampling work, etc., will be driven is to be given by a duplicate set of 16-inch turbine water wheels, operating under an effective head of 45 feet. This will develop 240 h.p. net. These are mounted in pairs on horizontal shafts and are cased in a steel flume mounted on beams. These wheels are connected with the flume by a steel intake pipe, 4 ft. 6 in. in diameter, and discharging into a single draft tube, 10 ft. long, set at 45 downward inclination.

The wheel used is the New American, made by the Dayton Globe Iron Works. One of the great advantages of this wheel is that it works at its greatest efficiency when the gates are three-quarters open. These two pairs of turbines are each directly connected with one Westinghouse rotating arm alternating-current generator, having a capacity of 180 kilowatts, 250 volts, the full load efficiency being 93.3 p.c.

During the day all will be in use, running at three-quarters capacity, but they are so arranged that one battery will run the works, during the night, hence giving an opportunity to overhaul one battery. By this arrangement they are practically equal to duplicating engines. There will also be in the same power-house, a single 10 inch turbine wheel developing 40 h.p. net. This is directly connected with one Westinghouse 4 pole lighting generator of 22.5 kilowatts capacity, 125 volts. This is for lighting the entire plant and is self-contained.

There will also be in the same power-house one single 13-inch horizontal turbine water wheel, which will develop 55 h.p. This wheel is belted to a Stillwell-Bierce & Smith Vaille Company triplex pump of a double-action type, having a guaranteed capacity of 750,000 gallons each 24 hours, against a maximum pressure of 100 lbs. to the square inch, or against a 200-foot head. This pump will furnish water and pressure to granulate the slag as it runs continuously from the furnaces.

The power house is 117 feet long, by 30 feet wide, and all the batteries are set in line, on one long concrete foundation.

The smelter proper consists of two double-decker, steel-jacketed furnaces, 160 x 44 inches. The total height of the furnace, from the charge to the furnace floor, is 14 ft. The jackets come within 18 in. of the charge floor. These furnaces should smelt 300 to 500 tons per day, the capacity depending, of course, upon the character of the ore. The maximum capacity of the works will not exceed 500 tons per day, unless it should be decided to add two furnaces, something which may, very probably, be done within a year or two. The furnaces are set in a building 70 x 104 feet, and are 39 ft. apart from centre to centre. The downtakes of the furnaces are connected with the big flue chamber, 10 x 10 ft. on the inside, and 800 ft. in length. The stack is 11 x 11 ft., inside measurement, and 153 ft. high. The blower room is 50 x 58 ft., and is 12 ft. from the furnace building. It will contain three No. 8 Connorsville blowers, one for each furnace, and one in reserve. There is room in the building for another blower should the plant be increased. Each of these blowers are driven by an 88 h.p. variable-speed Westinghouse induction motor, which is belted directly to the blower.

The main sampler building is 64 x 70 ft., and is surrounded on three sides by ore bins. The ore train as it comes into the smelter will be carried by an incline to a series of receiving bins parrallel to the front of the sampling works, 23 ft. above the floor of same, and 33 ft. distant. These receiving bins will have a total capacity of 1,000 tons. The bins are filled directly from the cars, which have a bottom dump. During the day the ore is taken from the receiving bins by small iron cars, which dump into No. 5 Gates Gyratory crusher. This crusher has its opening a little below the floor of the floor of the sampling works, and crushes a ton at a time. After this rough crushing, which reduces the ore to the size of a man's fist, it is elevated to the top of the building by a continuous steel bucket elevator. It is next sampled by a Snyder automatic sampler. The bulk of the ore is distributed to the bins on three sides of the sampling works by a special cast-iron spout. A ter being cut, the sample passes to a 7 x 10 inch Blake crusher. Once more it is cut by a smaller Snyder sampler, and the sample is delivered on steel plates, where it is again cut by hand, and then goes to a fine sample grinder.

It is intended that the matte shall be shipped after being brought up to 45 to 50 per cent. copper. For the present it will go to some eastern refinery. This shipping matte, after having been cooled will be crushed by a 7 x 10-inch Blake crusher, which will be placed in one corner of the furnace building on the furnace floor. This crushed matte will be raised by an ordinary cup elevator to a special matte sampler. This matte sampler building is built on the corner of the furnace building and is 26 x 30 ft. The building is so arranged that the crushed matte can be sampled automatically or by hand. The lower part of this building contains four bins holding about one car of matte each.

When the works are increased in a year or two it is proposed to put in a matte-converting plant and to ship converted copper. Next spring a roasting plant, and if it is deemed desirable, a Briquette machine will be installed. Plans have already been drawn up for a roasting building and Briquette plant 60 x 128 ft., but nothing will be done until it is known exactly what capacity will be required. In any case roasters cannot be delivered for six months. For the present 50 per cent. of the ore will be roasted in piles.

The works contain a carpenter shop, and planing mill 42 x 48 ft. The machine shop, 28 x 50 ft., contains two lathes, drill press, planer, bolt cutter and pipe machines. There is also a blacksmith and repair shop 28 x 40 ft., containing punch, shears, forges and steam hammer. A warehouse 30 x 100 ft., where supplies can be loaded and unloaded directly from the cars, will be a great convenience, especially as it is the intention of the smelter company to furnish all supplies and do all repairs for the several mines.

Behind the smelter and at an elevation of about 100 ft. above the works is a 100,000 gallon tank which is supplied with water through an 8-inch steel rivited pipe extending from the pump in the power-house, a distance of about 2,000 ft. from the tank. This water is to be used principally for granulating the slag as it runs continuously from the settler in front of the furnace, All the machinery in the various buildings is run by Westinghouse induction motors. There is a 75 horse power motor for the sampler, a 30 horse power motor for the matte sampler, a 15 horse power motor for the machine shops, and a 10 horse power motor for the elevator in the main furnace building.

An office building two stories high will be situated within 1,000 ft. of the works. There is 1½ story labatory building, 45 x 50 ft., containing an assay office. The Superintendent's residence is 35 x 40 ft., and two stories high. These buildings are very modern in style, with bath rooms and all conveniences, lighted by electricity, and heated by a steam plant situated in the basement of the office building.

We commenced the grinding of the mile flume line about the middle of August, and finished the same about the latter part of September. The dam was started in September as it could not be started sooner on account of the high water. We expected to find a good foundation for the dam, but were disappointed and had a great many stops on account of water, the most serious one being at the time when our log boom broke at the mill, and let down about half a million ft. of logs and broke our coffer dam, which delayed us about three or four weeks. Quite a little delay was experienced in turning the river, from one side to the other, and we were compelled to put in about two weeks' extra time in driving piles in solidly to keep the treacherous bed of the river from washing from under the coffer dam, but this coffer dam is now in good shape and we hope in the next month, without any serious drawbacks, to have the dam completed. The height of the dam from the bed of the river will be 25 ft., and the flume will be 11.5 ft. wide on the inside and 7 ft. deep. The flume will be about a mile long and will give an effective head of water of about 45 ft. fall. The power house is so constructed that more water wheels can be put on with very little expense, until the capacity of the flume is exhausted. The amount of water in the river heretofore has been only guessed at approximately, and we had several approximate figures from different engineers, but when we turned the water on the east side of the river through the temporary flume which we had constructed, we had water enough for three flumes the size of ours, and water at this time of the year is supposed to be near the minimum.

In the construction of the works everything is being done in a first-class manner, and with a view of increasing its capacity, and while the cost of a works smelting 500 tons might be built for less money, we have so arranged it that we can increase the capacity with a very small cost.

The grading of the railway spur will be finished about the middle of this month, and it may take a month or six weeks to put in the 150 ft. span bridge, which will span the river from rock to rock above and over the dam. The flume will be completed the end of this month, as will also the installation of machinery in the power house and electrical apparatus. The office building, residence, and assay office, which are complete in every detail, will be completed this month.

The work about the smelter proper is almost completed, with the exception of the installation of the two blast furnaces, three blowers and electrical motors for the different buildings. The motors are all at present either on the ground or on the road, and the furnaces are on the road from Chicago, which will complete the Gates Iron Works contract, with the exception of the blowers, which are so heavy that we will have to wait until the spur is completed to the smelter, before they can be brought in.

The cost of the water power plant will be somewhat in excess of what we had figured at first, due in the first place to the difficulty with water at the dam, and the sand and gravel bottom in the river; secondly, to the excavation of the tail race, a lot of it having to be cut out of solid rock. This raised the cost of the dam $15,000 or $20,000 above what it would have been had we found bed rock in the river and no rock in the tail race. We have also expended about $5,000 more for lumber than we would have done, on acconnt of the boom of logs breaking away last fall; and instead of our water power plant costing us about $65,800 it will cost in the neighborhood of $95,000, still at that cost it is a fine investment.

The excavating of the tail race at the power house, the blasting out of the rock, and riprapping the entire sides; building 125 ft. of concrete wall, 125 ft. of concrete foundations, and 140 feet of concrete foundations for water-wheels and generators, the whole thing complete will cost about $33,000, the machinery having cost about $12,000 of this amount. The flume will cost about $23,000 for the mile, this includes the grading through dirt and rock, which was about $9,000, the rest being lumber, nails, etc. The smelter proper will cost about $210,000, this includes, of course, the assay office, laboratory, office building and dwelling, which will amount to a little over $20,000.

In clearing the bottom for the over-flow land, which has to be done, we will probably have to invest $15,000 or more in cutting and storing up cordwood. We have already cut about 5,000 or 6,000 cords; this will be hauled out of the bottom and placed in yards around the edge of the lake, where it will be allowed to dry out, and we will then transfer it to the smelter as we need it for roasting purposes. This will probably give us a wood supply for the first one or two years' active smelting operations. The investment of wood was rendered necessary by the clearing off of the lake to make it valuable for floating logs for saw-mill purposes, and while it is a large advance to make now, we will need the wood. We have also $10,000 or $15,000 invested in saw-mills, and have had to advance $4,000 or $5,000 on logs and timber, and against this we have a saw-mill with a $5,000 or $6,000 stock of plain lumber and small dimension timber. We have also advanced the railroad company $45,000, which it seemed necessary to do, in order to push the spur along to the smelter, but this amount will be returned to us as we pay freight. This $45,000 was an extra charge we did not anticipate, but it will be returned to us later. It is possible, if the Railroad people want to push matters, to have our bridge and spur completed into the smelter by the first week in March, as the grade is nearly completed for track laying, and we have two trestles to build at the smelter and a bridge. We can then begin to receive ore from the mines at that time, and have two or three thousand tons of ore roasting and ready to start smelting the latter part of March, at which time, there is no doubt, but that the dam will be completed and everything ready to run.

Yours truly,

(Signed) A. W. B. Hodges, *Superintendent.*

FINANCIAL STATEMENT.

ASSETS.

Smelter construction		$182,376 95	
Columbia and Western Railway, Spur		30,000 00	
Water power construction		48,357 60	
Carson lands		26,302 26	
Phœnix property		21,214 12	
Mining department		21,772 44	
Mining development		25,227 41	
Mines and mineral claims		495,753 20	
"Victoria," "Aetna," "4th of July," "Phœnix"			
Treasury stock, unsold		100,000 00	
Office fixtures, Spokane		125 00	
			$951,128 98
Phœnix lots sold	$82,400 00		
Cash payments	$27,553 81		
Commissions paid	1,830 00		
	29,383 81		
			53,016 19

LIABILITIES.

Capital stock	$900,000 00	
S. H. C. Miner, trustee	3,535 16	
Phœnix townsite, unappropriated profits	22,541 41	
Profit and loss	1,422 73	
Cash, overdraft Eastern Townships Bank	23,629 68	
		$951,128 98
Balance due on contract for Smelter machinery and Smelter supplies		60,656 17

Another Successful Annual Meeting.

The Annual Meeting of the Society was held at the Halifax Hotel, Halifax, on the 11th ultimo. The morning session opened at 11 o'clock, with President Chas. Fergie in the Chair. Among those present were: Pres. Chas. Fergie, Vice-Pres. Intercolonial Coal Co; Geo. W. Stuart, Mayor of Truro; A. A. Hayward, Manager Golden Group Mining Company; W. L. Libbey, Manager Brookfield Mining Company; F. H. Mason, F.C.S.; H. S. Poole, F.G.S., A.R.S.M., Manager Acadia Coal Company, Stellarton; C. E. Willis, M.E.; R. H. Brown, Manager General Mining Association; J. H. Austen, of Austen Bros., Halifax; B. T. A. Bell, Editor CANADIAN MINING REVIEW; Alex. McNeil, Barrister; Charles Archibald; G. E. Francklyn, General Mining Association; B. C. Wilson, Waverley; F. T. Peacock, Montreal; Chas. Starr; G. L. Burret; H. M. Wylde; G. S. Troop; M. R. Morrow; B. F. Pearson, Secretary Dominion Coal Company; D. McAskill; W. R. Askwith, Assayer, and W. E. Cook, Boston.

The Secretary read the minutes of the last meeting, and the same, upon motion, were confirmed.

NEW MEMBERS.

On motion, the following members were duly elected:—James B. Woodworth, F. T. Peacock, E. A. Daly, H. Montagu Allen, H. W. Weller, Norman Dimock, J. P. Edwards, W. R. Askwith, B.Sc., and Thomas Caldwell.

PRESIDENT'S ADDRESS.

Mr. CHAS. FERGIE—As retiring President of this Society I am again privileged to deliver you an address.

It is with satisfaction I report the Society in a flourishing condition, both as regards the membership and its financial state.

In my address last year I drew members' attention to the importance of writing papers for the Society. I regret to say the same difficulty is still experienced and that very few members contribute, notwithstanding we have a very large number well qualified to do so. I therefore again appeal to you all to do something to help forward the Society by contributing a paper, however so small, at least once a year.

It is very gratifying that we note all branches of industry in this Province to be in a most flourishing condition, and particularly those of coal and iron.

Every coal mine is working full time and is taked to its' utmost and finds no difficulty in disposing of all it can produce, and no able bodied workman need now go idle. The output for the year ending September 30th, 1899, as shown by the Department of Mines returns, was 2,642,333 tons of 2,240 lbs., and it is safe to predict that the present year will show an increase of close on a million tons over these figures. The following figures show the number of persons employed, number of lives lost, and the production for each County during the year.

COUNTY.	Persons Employed above & below ground.	Lives Lost.	Production.
Cumberland	1,213	0	437,121
Pictou	1,244	2	460,236
Cape Breton	3,155	17	1,731,398
Other Counties	(Figures not given.)	0	13,578
Total	5,612	19	2,642,333

From these figures it is seen that one life was lost for each 139,070 tons of coal raised.

The iron and steel trades are most active, and they have all the business they can take care of, and this year will prove a record one for them.

A large and extensive steel plant is now being erected at Sydney, C.B., by the Dominion Iron and Steel Co., Limited, and is expected to be at work early next year. This will have a far-reaching effect on the Province, as it will be the means of starting up new industries, will give employment to many thousand men, and will create a home market for a very large amount of Cape Breton coal.

The production of iron ore was only 16,169 tons, showing a falling off of 14,881 tons as against the previous year. This no doubt was due to the importation of large quantities of Newfoundland ore, and which can be produced and laid down so much cheaper than the Nova Scotia ores.

Whilst it has for years past been affirmed by Government officials and others supposed to know that there is an abundance of valuable iron ore in Nova Scotia, still the fact remains that out of this boasted abundance, last year only saw the production of some sixteen thousand tons. I suggest that this is a matter well worth the Government of Nova Scotia looking into without delay, and ascertaining what the Province really does possess in the shape of iron ore, and if it would not be wise to encourage and stimulate the iron ore industry by offering a bounty on each ton of Nova Scotia ore entering into the manufacture of pig iron in this Province.

The production of gold was 27,772 oz, some 3,332 oz. less than that of the previous year.

As this Society has in the past done considerable kicking in reference to the Mines Act, it is only just that we should now give to the Government credit for the very careful manner in which this Act has lately been revised, and I congratulate the revisors upon the very satisfactory and efficient way in which they have done their work. Both as regards coal and gold I think we now have a very perfect Act.

The past year must have been a gratifying one to the Nova Scotia Government, seeing that no less a sum than $319,150 was secured from royalties from mines. This is the largest amount, and about 78% of it was from coal royalties.

Whilst on the subject of Government returns I would like to draw the attention of the Government to the importance and desirability of the Mines Report showing the values of the minerals in the Province. This matter was brought up by Mr B. T. A. Bell last year, and is one that should not be overlooked before the next Mines Report is given to the public.

In conclusion I beg to thank the Vice-Presidents, Council, and members of this Society for the kind way in which they have supported me during the past two years of my Presidency.

Mr. GEO. W. STUART—As to the falling off in our gold production—one of the reasons is that several of the large producers were doing chiefly development work during the past year. Another reason is, that there are quite a number of mines that are tied up under option unfortunately, and all of those that have been so tied up have ceased to produce. That is the chief reason for the shortage. The summer was somewhat dry too. During the dry season there were not so many water mills running as formerly.

The SECRETARY then read the financial statement of the Society for the past year, which was adopted.

Mr. B. T. A. BELL—I am sorry I was not present when the President's address was delivered. I would like to call the attention of the Society to the Provincial Government Mines Report. I would suggest that it show in future more clearly the real value of the mineral production of this Province. I think we are all agreed upon the point that these figures in the summary of the Mines Report give a wholly inadequate idea of the value of the mineral production of this Province in comparison with the production of minerals in the other Provinces of the Dominion. We read of British Columbia producing $11,000,000, Ontario $9,000,000, Quebec $3,500,000, and so on, but when we come to the Mines Report of Nova Scotia we find no values given. If the values were published they would show that Nova Scotia occupied a very much stronger position than most people imagined. Again, the method of computing the values of our mineral production is, to my mind open to objection. The Geological Survey bases its figures at the pit head. I should suggest that the best course would be to give the selling price at the pit's mouth.

Mr. H. S. POOLE—I do not know that I could agree with Mr. Bell. In fact I have not given the subject attention. From a mining point of view what other basis could be adopted than taking the value at the pit's mouth.

The PRESIDENT—Take the selling price at the pit's mouth.

Mr. POOLE—You cannot get the cost, can you?

Mr. BELL. You are not going to tell me that the total value of the coal production of Nova Scotia is $2,500,000 or $3,000,000! That is published as the value of the output of the Province.

The PRESIDENT—It is nearly $5,000,000.

Mr. POOLE—I suppose you are speaking of two or three years ago. The value of the mineral production to the country is the use to which it is put—What it is worth F. O. B. to sell. It is worth to the county what it will bring on cars shipped to the United States or elsewhere. If you had manufacturing industries in this country it would be worth more. I am merely giving my own view.

Mr. B. T. A. BELL—Take a ton of iron ore—It is customary to give the value of this at the pit's mouth and this, as a rule, is tabulated as the value of our output. As a matter of fact every pound of that ore is manufactured into pig iron and steel in the Province, so that our value of iron production is very much greater than the statisticians give us credit for.

President CHAS. FERGIE—That is the view that I would take. If you only take the cost of production you make no allowance for the capital invested.

Mr. B. T. A. BELL—I believe that Nova Scotia produces quite $10,000,000 annually in mineral products. It is quite safe to say that. There is another point in the President's address I would like to call attention to. It is just a question whether the bounty paid on pig iron from Newfoundland ore is not detrimental to the development of the iron ores of Nova Scotia.

President CHAS. FERGIE—We certainly cannot produce ore in competition.

Mr. W. L. LIBBEY—Are bounties beneficial to the country?

Mr. B. T. A. BELL—Yes. Under certain circumstances.

Mr. W. L. LIBBEY—Another way of putting it is taxing the many for the benefit of the few.

President CHAS. FERGIE—Don't the many get the benefit of it in after years?

Mr. W. L. LIBBEY—Yes, but it is so many years afterwards that they do not appreciate it. (Laughter.)

President CHAS FERGIE—This matter was brought up in the House of Assembly lately by Mr. McDonald of attaching values to the mineral production in the blue book, and Mr. Church distinctly said it could not be done—and he asked the question why, but I do not know that he got any clear answer. I was going to make the suggestion here to day that Mr. B. T. A. Bell mentions, that if the Nova Scotia Govern-

ment is not capable of attaching the value to the Nova Scotia mineral production that we as a Society shall do it for them.

Mr. B. T. A. BELL.—If the Society formed a committee to report two or three months before the annual meeting and prepare a statistical report or review I think it would be well.

President CHAS. FERGIE—There is a table here in reference to the labour.

Mr. B. T. A. BELL.—But it should be shown in that summary. It should be shown in the front page if that book is going to be useful.

President CHAS. FERGIE—I have been trying to compile data for the last two or three weeks, but neither these returns nor the financial returns gave me what I wanted.

Mr. B. T. A. BELL.—Would it not be well to embody in the annual report of this Society a review of the progress and operations of the mines of this Province. If it was started, for the sake of convenience it might be made for the fiscal year of the Government, say the 30th September. We could have on the committee to compile the review two or three gentlemen who are interested in coal, and and one or two on iron. I think an interesting report could be obtained from the result of their labours, which would do a great deal of good for the Province. The people outside of the Province have no idea of what they are doing here, and the Government is to a large extent to blame for not making public the information.

President CHAS. FERGIE—I think Mr. Bell's idea is a good one. I think we would do something for the Government as well as bring the Society before the public.

Mr. GEO. W. STUART—I quite agree with Mr. Bell. I think the Mines Department are relaxin their duties. They do not seem to have any system.

Mr. C. E. WILLIS—About a year ago I was in Mr. Gilpin's office and a copy of Mr. Bell's paper was there which had in it the advertisement of the Commissioner of Mines for British Columbia. I think it has given for the last two or three years the coal, copper, gold, and silver production with their values—and I asked Dr. Gilpin why it would not be an excellent idea to put that same thing in with respect to Nova Scotia so as to advertise the resources of the Province, and he said it never occurred to him. He said he would speak to Mr. Church about it. Mr. Church happened to come in just then and he called his attention to it and Mr. Church made the statement that it would be practicably impossible to do it. This was about a year ago. It was a suggestion that struck me forcibly at that time. Dr. Gilpin said he thought it would be a great advertisement, but Mr. Church stated that it would be impossible so far as he could see to get at the value. He thought it could not be done.

President CHAS FERGIE—There is no trouble with respect to it being done. It is simply a question of work.

Mr. B. T. A. BELL—To bring the discussion to a focus, I would move that the Society as a feature of its work prepare a brief summary of the progress of the mineral industries of the Province each year to be embodied in the annual report of the Society and that a special committee be nominated each year for that purpose.

Mr. W. L. LIBBEY—It seems to me Mr. Bell's suggestion is well worth consideration, but I hardly coincide with the suggestion. It involves an amount of clerical work to really make a complete report and collaberation of the statistics that is perhaps more than any one member or any committee are likely to be able to do. And if we adopt that suggestion it would seem to me that some one man should be selected and paid for his services. It will really entail an amount of work that is entitled to remuneration. There could be no question of its value to the mineral industries of this Province, and no question of the value to this Society as a Society. The individual members would be willing to contribute all they could to the general fund of information. The arrangement and tabling of the statistics is a task of no small consideration.

Mr. B. T. A. BELL—A Summary Report such as I have in mind might be made to correspond with the figures furnished by the Mines Report for the fiscal year. It could be made to deal concisely with trade conditions, progress, costs, freights, improvement in machinery, wages, and generally review in a readable and intelligent manner the condition of the various mining industries during the year. It need not necessarily be elaborate, but surely something can be done by our Society to give to the public a better understanding of the real conditions and progress of mining in Nova Scotia. A small committee representing the coal, iron, gold and other industries might be appointed.

Mr. GEO. W. STUART—Your proposition is to relieve the officials of the Government of their duties for which they are paid.

Mr. B. T. A. BELL—We would take it upon ourselves as a labor of love. We might show them an example of what we think might be done.

Mr. C. E. WILLIS—I do not think you could get the statistics before the Legislature met each winter.

Mr. B. T. A. BELL—You could get it from the department—that blue book was printed a month ago.

Mr. CHAS. ARCHIBALD—I cannot fail to see how the Government could refuse to give the Society the information if it was asked for it. They have the means of giving you the information you want and they have at their service clerical help that will do all we are asking to do, and I do not see why they should not do it.

Mr. B. T. A. BELL—The point I want to make is that we have in this Society quite a number of good men who could make up a report that would be a great deal more presentable than the whole concentrated ability of the Mines Office put together could produce. We might make an effort.

President CHAS. FERGIE—I see no difficulty in the matter myself.

Mr. ALEX. MCNEIL—The object of such a report as is suggested, is for an advertisement for this Province, but I do not think it would have the same intrinsic value coming from the Society as from the Government It is my opinion that the Government would be willing to co-operate with this society in preparing an elaborate report of that kind, and certainly not to make use of channels the Government have, would be entailing an amount of work on this Committee which would be quite onerous. If the matter were brought before the Government I feel quite sure they would take it up readily, as I know they are as anxious as we are to have the mineral industry of this Province advertised.

President CHAS. FERGIE—The matter was brought before their notice a few weeks ago in the House of Assembly, and Mr. Church said distinctly it could not be done.

Mr. ALEX. MCNEIL—I have no doubt but what they would take the matter up. I am not particularly in sympathy with them, but I believe they are anxious to take up any matter of importance to this Society. I think they are a little disappointed that we do not go to them more than we do. This is a matter peculiarly within their Province, and it is a matter they can deal with properly. You can get up a report, but it has not the official sanction like one from the Government. The statistics from this Society cannot go to the outside public like an official statement from the Mines Department.

President CHAS. FERGIE—I think it would do as much as one from the Government.

Mr. ALEX. MCNEIL—I do not think so. When a foreign investor looks for information, he is very apt to find it or get it from disinterested parties.

President CHAS. FERGIE—I think the Society is disinterested.

Mr. ALEX. MCNEIL—I do not think so.

President CHAS. FERGIE—Take coal for instance.

Mr. W. L. LIBBEY—Did not the Government treat the Committee well?

Mr. ALEX. MCNEIL—I was on one committee and they treated us with great consideration. I have no doubt if a committee of this Society went before the Government on this question the would be met cordially with regard to it.

Mr. B. T. A. BELL—I think that Mr. McNeil has given an importance to this report which I hardly intended it should have. My idea was that by adopting a scheme of this kind, we would be able to concentrate the ability, intelligence, and knowledge of a large number of our members who do not contribute anything to our proceedings. We would furnish a report that would give this Society matter for good discussion at its annual meeting, and at the same time act as an advertisement for the Province.

Mr. ALEX. MCNEIL—I think it would be a good thing.

President CHAS. FERGIE—It is distinctly understood we are not antagonistic to the Government.

Mr. H. S. POOLE—I have listened with a great deal of pleasure to the remarks of Mr. McNeil, and I fall in with a great part of what he has said. The head of the Government is only too anxious to have suggestions made for the dissemination of accurate information. He expects some of the officials in the employ of the Government to take the suggestions he might make, and act upon it. There is where the weak point is. If, with the information the Government possesses, they had somebody who had ability and disposition to compile, codify and utilize the facilities that it possesses, and who met with the approval of this Society, then we would expect in a manner, the very object Mr. Bell has in view. If the Mines Department was thoroughly in sympathy with this Society, and would furnish the collection of data necessary for such a review, then the work would be very much easier.

Mr. R. H. BROWN—I agree with what Mr. McNeil has said. They have the material and I do not believe they would object if they were asked formally for it.

Mr. GEO. W. STUART—It seems to me that if it could not be arranged for the Government and this Society to work in unison, there would be a conflict in the reports.

Mr. W. L. LIBBEY—I do not think if we prepared a report it would conflict with the Government report.

Mr. B. T. A. BELL—I would appoint a Commitee to co-operate with the Government. I have not the slightest desire to ignore the Government or criticize the Government beyond reasonable limits. I would move:—"That this Society, recognizing the value and importance to the Province of a proper summary report or review of the operations of mining in the Province during the year, deems it desirable to appoint a committee to act in conjunction with the Government, with a view to the preparation of such a report, and that that committee be appointed in ample time to present such a report at the annual meeting.

Mr. ALEX. MCNEIL—I second the motion.

The motion passed unanimously.

Mr. B. T. A. BELL—To carry that resolution into effect, I would move that a Committee be appointed, and that the Committee for the ensuing year be as follows: *Coal:* H. S. Poole, Chas. Fergie, and R. H. Brown; *Gold:* W. L. Libbey, F. H. Mason, E. A. Daly, C. E. Willis, and Geo. W. Stuart; *Iron and Steel*. R. Chambers, C. A. Meissner; *Gypsum:* C. H. Dimock; *Other Minerals:* Dr. Gilpin, and others. And I would also move that Mr. Poole be the Convener and Editor of the Notes of this Committee.

Mr. F. H. MASON—I second the motion.

The motion passed unanimously.

Chas. Fergie, H. S. Poole, R. H. Brown, W. L. Libbey, and Alex. McNeil were then appointed a Committee to interview the Government with respect to the project.

The meeting adjourned until 3 p.m.

AFTERNOON SESSION.

President CHAS. FERGIE—The Committee appointed this morning to interview the Government met the Premier at noon to-day and discussed the matter we had before our meeting this morning, and he falls in with the view that was suggested that we should work in conjunction with the Government in getting out some returns for the blue book next year—and in any case he will be glad to meet us in any way.

I propose that the committee stand as suggested this morning, and the first meeting be convened by the incoming President when the matter can be thrashed out then. We will now proceed to business.

THE NON-CAKING COALS OF NOVA SCOTIA.

Mr. F. MASON presented a brief paper on this subject (reproduced elsewhere).

Mr. H. S. POOLE—I would like to ask Mr. Mason whether he has found any distinction between caking and coking coal, because some of lignites carry decidedly a percentage of water which make a very fair coke.

Mr. F. H. MASON—These were bituminous coals.

Mr. H. S. POOLE—Do you draw the line between coals that coke and drier coals which at ordinary temperature burn without coking and only in presence of excessive heat make a coke—many of the lignites in the same way under an ordinary fire will not coke.

Mr. F. H. MASON—My reference really with regard to them is that they will not coke in an oven My tests were made in crucibles.

Mr. H. S POOLE—I have seen coals that would not coke in an ordinary oven, but would where the temperature was higher.

Mr. F. H. MASON—You would have to submit them to a high temperature at first.

Mr. H. S. POOLE—Yes. You have not drawn the distinction between caking and coking coal.

Mr. F. H. MASON—Technically I take it that the residue, after the votile matter has been driven off is a coke, whether it has caked or not.

President CHAS. FERGIE—You will find a coal which will cake in a laboratory test but not in an oven.

Mr. F. H. MASON—Do you mean it will not coke in any type of oven?

President CHAS. FERGIE—I have that experience in one seam now.

Mr. H. S POOLE—Sometimes coal will coke when it comes fresh from the mine and will not coke after it has been banked for a few days.

Mr. F. H. MASON—What has it lost?

Mr. H. S. POOLE—I don't know.

Mr. B. F. PEARSON—I have a good deal of diffidence in speaking on this subject but for the purpose of eliciting some information I understand from the paper that Mr. Mason has just read that he finds that a non-caking coal has more water and has more oxygen. He also finds that with some few exceptions given a certain amount of oxygen and water you obtain a non-caking coal. We had some experiments at the North West Arm in manufacturing producer gas. We found that in our experiments that Cape Breton coal it would be almost impossible to manufacture. It is impossible for the steam to rise up and the experiment was practically a failure. We found by using Springhill coal and Joggins coal we had much greater success. Those coals do not coke in manufacturing producer gas and we had success. It is an interesting problem. Caking coal takes from its value especially for the purpose of making producer gas. I suppose you were trying to find what element could be eleminated in order to use it for coking purposes. I think the suggestion made by Mr. Poole that in coal freshly mined it would have more volatile matter that would escape by exposure to the atmosphere. I almost thought the caking was on account of the large amount of tar or volatile matter than anything else.

President CHAS. FERGIE—There is one peculiarity about coking coals taken from the same seam—one section may coke and the other will not. If you take certain coking coals of South Wales and mix them with non-caking steam coals you produce a good marketable coke.

Mr. F. H. MASON—Do you know the kind they are using at Dowlais, South Wales?

President CHAS FERGIE—It is bitumi s coal. They are mixing it with steam coal. They are mixing not-coking with a coking coal. Why one coal should coke and another not, I think is a question not yet solved.

Mr. B. F. PEARSON—Take Springhill coal for instance?

President CHAS. FERGIE—It is a caking coal but not to the extent of the Cape Breton or Pictou coal. I saw some remarks about caking coal the other day by washing the highly bituminous coal a good caking coal could be obtained by taking the water and sediment and passing that through other tanks with a non-caking coal and a good coking coal was produced.

Mr. F. H. MASON—With the scum.

President CHAS. FERGIE—Yes.

A COMBINED EXHAUST AND BLAST FAN.

Mr. F. T. PEACOCK presented his paper (reproduced elsewhere.)

Mr. R. H. BROWN—We have two ventilating fans. We have one called a Guibal, built by Walker Brothers, and another of the Murphy type, built by the Bullock Manufacturing Company of Chicago. It has a hood underneath the fan, which is reversible, so that in a moment the fan can be altered to force air into the mine, instead of exhausting it as at present. The Guibal is 30 ft. in diameter 10 ft. in width, and produced, at the velocity we drive it, 101,000 cubic feet of air per minute, and leaves the inside open.

President CHAS. FERGIE—Don't you make a practice of reversing in the winter.

Mr. R. H. BROWN—A. No.

Our fan is on a higher elevation than the down cast shaft.

President CHAS. FERGIE—The idea I take, it is the interchangeability of this fan in cases where they are troubled with ice in winter, principally in the mines in Cape Breton, and to prevent the formation of ice, the return air is reversed and sent up the down cast shaft in winter. With regard to the mines in Pictou County, I do not think they would apply at all, because we could not undertake to reverse our currents at all.

Mr. R. H. BROWN—All the doors would have to be reversed underground. When ice is making in the shaft the better way would be to put in hot air pipes. I never saw it done except at the Foord Pit—to put in hot air and melt the ice of the shaft.

President CHAS. FERGIE—The way they sometimes do it in England is to make a coke fire at the mouth of the shaft.

Mr. R. H. BROWN—The forcing a column of air down a perpendicular shaft produces more friction than exhausting the column.

Mr. F. T. PEACOCK—Have you the same amount of work to do in the case of an exhausting fan as in the case of a force fan?

Mr. R. H. BROWN—No. It has no force down the shaft. The friction would be greater. The same amount of work has to be done, but with more friction.

President CHAS. FERGIE—With the exhaust fan you create a vacuum, and the pressure of the atmosphere does the work of forcing the air into and around the workings.

Mr. F. T. PEACOCK—You must have a partial vacuum.

President CHAS. FERGIE—The pressure per square inch on your air when forced is always greater than in the exhaust. You must necessarily have it, because you could not get the air through the mine. Is not that so.

Mr. F. T. PEACOCK—Is not the same amount of work to be done whether you are using the fan for exhausting or forcing? In other words is not the friction and the air to be moved the same in each case?

President CHAS. FERGIE—I think practically it is, but as I have said before, you must have a greater pressure per square inch when forcing your air through the mine.

Mr. F. T. PEACOCK—In exhausting with an exhausting fan, you start your engines under no load and you gradually work up to the necessary degree vacuum, whereas in the case of a force fan you have got to first run your fan until you get the required pressure to circulate the air through the mine before obtaining any results. Whereas in the case of an exhaust fan you start the ventilation gradually.

Mr. R. H. BROWN—Why is it that they always use the exhaust fans if there is a choice between them.

Mr. F. T. PEACOCK—I do not think the exhaust fan will ever be replaced. In England, where the ventilation of mines is far more intricate than on this continent, the force fan is very seldom used. They do not generally adopt the force fan but accomplish it by other means.

Mr. R. H. BROWN—Do they use the exhaust fan?

Mr. F. T. PEACOCK—Yes.

Mr. R. H. BROWN—Why is it preferred?

Mr. F. T. PEACOCK—Because it is the simplest and most natural method of mine ventilation. You start your engines, as I said before, with practically no load, and the load becomes greater and greater until the circulation is complete; whereas in the case of forcing, you must obtain the full pressure necessary to move the air through the mine workings before any circulation can take place.

Mr. GEO. W. STUART—Would not the effect of an exhaust fan be to draw the dust out of the mine, whereas a force fan would have the effect of depositing it about the mine, making it more liable to explosion?

President CHAS FERGIE—No. I do not think that would cut any figure at all.

Mr. R. H. BROWN—The effect of the exhaust fan, not as far as dust is concerned, but as far as gases in the coal are concerned, the exhaust takes them out, but the force fan drives them back.

President CHAS. FERGIE—Because you would have a greater pressure on the face of your coal, and that effect would be noticed by a heavy fall in the barometer.

LIQUID OXYGEN AS AN EXPLOSIVE.

Mr. W. E. COOK—General Manager, Liquid Oxygen & Ozone Company of British North America—said: It is well known to Physics generally that oxygen is the most powerful explosive in the world. For a great number of years the best scientific minds of the world have been working on the problem of liquifying oxygen so that it can be used not only for explosive purposes, but in a number of other ways. The Professors of the Royal Institution of Great Britain have been working on this, and have finally accomplished it, and they are the authority backing up the claims which our Company, a Boston corporation makes. I think this will satisfy you at once that we are on a firm foundation and know whereof we are speaking. The liquification of oxygen was first produced some nine or ten years ago, and the first half pound of this material cost some $30,000 to $40,000 to produce, and from that time on they have been working very industriously with the best chemical knowledge and mechanical knowledge in the world, with the result that to-day they have in the basement of the Royal Institution of London, a machine which can produce 250 gallons of liquified oxygen in 24 hours.

I might give you a short sketch of the situation as it stands to-day. There have been four men who have been striving for this end. One is Professor Lynn of Germany. He has accomplished very creditable results, but Professor Lynn has been handicapped by not being the best scientist, and also in his mechanical ideas. In France they have done little at it. Professor Pictou of Geneva, Switzerland, has accomplished something, but it is in the refrigerating line principally. Professor Tripler of New York has produced a machine, but when a man comes out and claims to produce 10 gallons of liquified air with power derived from three gallons, it is absurd, and requires no further comment.

The sum and substance of it is that these outside parties have been working without scientific principles, and on the other hand the Royal Institution have had at their command all the best gray matter in the world, for which they pay a large amount every year and the result is that they have perfected this system.

The principal features of difference between this and the other systems that are propounded are that we do not liquify air, we liquify oxygen. Air as you know is composed of nitrogen, oxygen and some carbonic gases. We compress the air to a certain point, then we separate the nitrogen from the oxygen and liquify the oxygen. The oxygen is the explosive property.

Our company has bonds from the English manufacturers who build all the machines for the Royal Institution of Great Britain, in which they guarantee a machine of a certain capacity and certain cost of finished product. If that machine does not fulfil the guarantees it is not shipped from London, and consequently we are perfectly secure. On the other hand our chemists tell us what we can do in the explosive field. Professor Dewar, Chief Chemist of the Royal Institution has practically demonstrated its use as an explosive.

We are prepared to take any group of mines and sign a contract with the holders that we will displace their present explostves at less than what it costs them to-day to do a certain amount of work. We guarantee our explosive is superior to any other. One peculiarity of our plant is that we must put it right in the mining centres. But we take the entire burden upon ourselves of building and operating it. We simply furnish the explosive cartridge ready to put in the blow hole.

As to the special strength desired, from nitro glycerine to slow burning black powder, we can meet your need. On the other hand it is absolutely harmless to handle. It is impossible to ignite it by concussion—in fact you can take a cartridge and "play ball" with it. We prefer exploding it with an electric spark. It will no freeze in winter, as its temperature is considerably more than 300 degrees below zero. Consequently there is no thawing required. We are willing to make one or two contracts at a low figure to introduce our article in Canada. The machinery will be built by the Lennox Reynolds & Fyfe, Limited, London, England; is under guarantee, and when we have these machines in operation and demonstrate the advantages of our explosive the other fellows will rapidly come into line.

Colonel Greener, one of the most expert engineers in the world, has spoken very highly of our air compressor. We have, besides the air compressors, storage batteries to keep our product in.

I thank you very much for your kind attention, and only wish that I was better fitted and more learned in science, so that I could go more fully into the special property of the matter.

Mr. H. S. POOLE—Am I right in supposing that these cases are not hermatically sealed and that oxygen has to be used within a certain length of time after being compressed and liquified, and you cannot keep it indefinitely?

Mr. COOKE—The Dewar Vacuum Bulb is known all over the world. This storage receptacle is built on the principle of the Dewar Vacuum Bulb. In this storage apparatus we can keep our oxygen from 20 to 30 days. Our plan of operation is this, that we will put a plant in the centre of a mining district, say covering a radius of 50 miles. We will run our machines night and day, turning the oxygen out into these receptacles. We will then ship the receptacles to each mine, and also a number of blank paper cartridges. At the mine we will have a man there loading them and furnishing them as they are wanted. The oxygen will keep from 20 to 30 days.

The evaporation is very slight, and whatever occurs is our loss.

When the cartridges are furnished they are ready to be put in a blow hole.

With respect to force it is simply a question of the quantity of nitrogenous material and oxygen put in each cartridge to produce the required power.

President CHAS. FERGIE—Have these cartridges been tested in coal mining centres?

Mr. COOK—Not on a large scale, but still quite sufficiently to prove its commercial value and demonstrate its special feature of shattering large bodies of coal without breaking into small particles.

Mr. H. S. POOLE—How does it compare with high explosives?

Mr. COOK—We sent a cablegram to England about this and received in reply that 5 oz. of liquid oxygen is equal to one pound of 40 per cent. dynamite. We can reduce the liquified oxygen to ozone, and the ozone is more terrific than nitroglycerine, and is absolutely harmless. The cartridges are specially constructed.

Mr. W. L. LIBBEY—How will it work in rock?

Mr. COOK—It simply moves heavy bodies and it will take everything right out.

Mr. W. L. LIBBEY—Black powder does not work like dynamite?

Mr. COOK—No, it is slow burning.

Mr. W. L. LIBBEY—It will be something to know just how ozone or oxygen works in hard rock—hard whin.

Mr. COOK—It has the combined properties of all explosives, of dynamite and powder, it simply expands in all directions.

Mr. H. S. POOLE—You vary the strength by the amount of nitrogenous material you put in it.

Mr. COOK—Yes.

President CHAS FERGIE—Do I understand that you are going into the manufacture of air compressors. I mean for any purpose?

Mr. COOK—Yes, to be used for any purpose. Our air compressor is far in advance of any other. It is simpler and more efficient. The whole apparatus comes from such high authority that its success is inevitable.

VISIT OF THE AMERICAN INSTITUTE.

Mr. B. T. A. BELL, of Ottawa, editor of THE CANADIAN MINING REVIEW, said he had been unable to prepare a paper as promised on "The Commercial Aspect of Mines," owing to engagements and illness, but he would read it at the next meeting. He said he wished to bring to the notice of the Society that the American Institute of Mining Engineers proposed to hold a meeting in Canada this year. This well known organization would meet in Quebec during the last week in August and would afterwards go to Cape Breton and probably Newfoundland. He had seen Hon. Mr. Murray, and he had promised to assist toward the expenses. Mr. Fielding had also shown deep interest and held out the possibility of assistance from the Dominion Government if it was required. He should be glad to hear how this Society regarded this visit, and if it would assist in carrying out a suitable programme.

Mr. B. F. PEARSON thought everything ought to be done to induce them to come to Nova Scotia, as the benefit which would accrue to the Province in bringing in capital might be great. It would be a splendid advertisement. Cape Breton was scarcely yet in condition to entertain them properly, owing to lack of hotels, but the suggestion of using the cars might work. He thought Halifax would do something towards entertaining them and funds could be raised. Other speakers favored offering every inducement to bring them here. The matter was referred to the incoming council to devise ways and means.

OFFICERS ELECTED.

Officers were elected as follows:—President, W. L. Libbey; Vice-Presidents, George W. Stuart, C. A. Meissner, M. R. Morrow; Council, F. H. Mason, B. C. Wilson, G. A. Pyke, C. E. Willis, A. McNeil, J. G. McNulty, J. H. Austen, A. A. Hayward, and B. F. Pearson.

Mr. Libbey made a graceful speech on taking his seat.

Mr. B. T. A. Bell then moved a vote of thanks to the retiring officers. In Mr. Fergie, the retiring President, they had had one of the most active and able members that occupied the Chair since the Society had been organized.

Mr Fergie made a graceful reply.

The meeting then adjourned.

COAL MINING IN CAPE BRETON.

Dominion No. 1 Colliery.—Knocking screens of the new type are being put in so that with the aid of the stationary bar screens six different kinds of coal can be shipped. The rope guides in the man shaft are being replaced by three spears which will give greater safety and speed in handling the miners.

International Colliery.—Two new pumps have been installed in the lower sump, replacing one which was unable to handle all the water that the workings are now making.

Dominion No. 2.—The main hoisting shaft is down 265 feet, and the air shaft 236 feet. Mr. Hayward, who has just taken charge of the sinking, expects to be able to put it down at the rate of 100 feet per month. This is considerably more than has been done so far, the record being about 60 feet last month.

Dominion Nos. 3 and 4.—Slopes are down 950 feet and 800 feet. The trestle approach to the bank head is finished and work started on the bank head. It is expected to be in full working order by the middle of June.

LARDEAU DISTRICT, B.C.

REVELSTOKE, BRITISH COLUMBIA, May 16th, 1900.

It is as yet rather too soon in the season to have much in the shape of mining news from this district, although the spring this year is more than a month earlier than usual. The principal item of interest is that the Boston and B. C. Copper Co. has dissolved itself, and has come out under the new name of the Prince Mining and Development Co., whose prospectus is truthful and moderate, and therefore in strong contrast to the one issued by the original company. Several men have gone up to the claims already, and it is the intention of the owners to work the thing legitimately and thoroughly this summer, so as at least partially to remove the stigma cast upon the concern by the bad faith of the original promoters. It is certainly no wild cat, the ore is undoubtedly there, and the present system of working (which was recommended by Von Rosenburg of New York after a thorough examination) should in the course of a few months open up what will most likely prove to be a very large body of ore. If this turns out to be the case, it will give a great impetus to the incipient mines already in existence in that neighbourhood, (Keystone mountain) and show to possible buyers what a wealth of mineral is there. No difficulty exists in the construction of a rope way, or even a tramway part of the distance, that could haul the ore to the river, and it might be of advantage for several companies to arrange for a joint use of such a method of conveyance. That is a matter that will settle itself, as could also the eight hour law, without any outside interference.

The Eureka claim, in the Adair group, has some very fine arsenical iron in sight, and as that almost invariably carries gold in considerable values, the owners think they are all right. There is no fresh news from the Carnes Creek Co., who are working just now with a small staff of men, but according to their annual report which was lately issued, they also have reason to be satisfied with the showing in their mine. It is stated on very good authority that although there has been a reconstruction of the Waverley and Tangier outfits, neither of those mines will be worked this year, which is scarcely pleasant news for the shareholders. If however, we are rather quiet up in the north part of Kootenay, the middle and south parts are busy enough, though these notes will deal chiefly with the Lardeau district, to which Revelstoke is at present the gateway.

Very favourable reports are to hand of several properties situated on the north-east arm (Arrow Lake) though there has not been a great amount of work done on them yet, hardly indeed more than the annual assessment, still some excellent results have been obtained, in one case $16 00 to $100.00 per ton in gold. Round Comaplix, which is near the mouth of Fish Creek, there has been a great deal of prospecting done during the last year or two, and some of the claims are likely to prove valuable—time alone will show that. Up Fish Creek and about the numerous creeks that flow into it, there has been an immense amount of work done, and this season will see a still further increase as several of the better developed claims have been bonded by companies who intend to lose no time in finding out what they have. Perhaps one of the best is the Pontiac group on Pool Creek, which is a high grade free-milling proposition, and likely to turn out very well indeed. But there so many that it is a difficult matter to select the best, some are payers from the grass roots, while others need time and money to prove them; enough however, has been shown to indicate this region as one well supplied with minerals awaiting capital and labor. It is possible that a small smelting plant may be erected in the vicinity, and if so it will be a boon to the many claim owners whose output is at present no more than a few tons a month, as after all it is the smelter returns that settle the value of the ore and guide one in knowing what to reject and what to ship. Too much faith is put in the samples (which are more often specimens) submitted to the assayer, and the result of a trial shipment to the smelter is apt to produce a very painful surprise. It is very gratifying to report that the long neglected road from Thompson's Landing to Trout Lake and Ferguson, is now being put in thorough repair, the first effect of which will be the more rapid shipping of ore from the Trout Lake and Ferguson districts, and consequently increased profits to the shippers. The Silver Cup, so well known, reports having struck some 3 feet of high grade ore (galena) in the 350 foot level, this is all the better as it proves conclusively that the ore bodies in the district may be expected to hold out in quantity and value as depth is gained. The same thing has happened in the Nettie L. The lower tunnel having caught the vein in as good shape and value as it was on the surface.

It is quite impossible to enumerate the claims that will be worked in the immediate neighbourhood of Ferguson this season: several groups have been bonded lately, which would seem to show that the country is attracting the attention of capital, a state of affairs most satisfactory to the claim owners who are usually unable from want of cash and excessive transportation charges to make any profit out of their properties but struggle on from year to year always hoping for better luck. There is no doubt whatever that the Lardeau district is very well worth investigation, and that in most cases those who speculate there in mining properties, will find they have made a first-class investment.

H.

LONDON & B.C. GOLD FIELDS.

DECLARE ANOTHER HANDSOME DIVIDEND.

The following is excerpted from the Directors Report for the 10 months ended 31st December last:—

It will be seen from the accounts that the profit made during the period dealt with amounts to £27,256 1s. 0d., after writing off all expenditure in connection with options which have been abandoned.

The amount of £4,183 12s. 6d., under the heading of general expenditure in British Columbia, includes the engineering and local administration expenses in connection with the Ymir, Enterprise, and other Companies, for which the amount of £1,608 6s. 8. has been received.

The £2,040 for Consulting Engineers' Fees, represents principally the balance paid to Messrs. Bewick, Moreing & Co., in accordance with their agreement, which has now terminated.

Out of the profit of £27,256 1s., the Directors recommended the distribution of a dividend of 15 per cent., payable in fully paid shares in The Enterprise (British Columbia) Mines, Limited.

It is interesting to note that the profit of £27,256 1s. is arrived at without taking into the accounts the increase in the value of the principal share assets of the Company arising from the difference between their cost price (at which they appear in the accounts) and the present market prices.

The effort of this method of treatment of the Company's assets is that an important reserve is created in the handsome margin of profit to be derived upon the realization of the Shares, which at the present market prices amounts to over £70,000.

The Directors have pleasure in again congratulating the Shareholders upon the satisfactory condition of the Company's affairs, notwithstanding the past year has been one fraught with grave difficulties, and the almost complete stoppage of work at most of the mines in which the Company is interested, arising from the unfortunate miners strike which continued during nearly the whole period covered by the accounts.

The Directors also have pleasure in testifying to the able manner in which the Company's interests have been guarded and served by Mr. J. Roderick Robertson, Manager; Mr. S. S. Fowler, Chief Engineer, and the Local Staff generally during the past year, to whose unremitting efforts the settlement of the Labor dispute and the resumption of work is to a large extent due.

MINING NOTES.

LAKE OF THE WOODS.

Mining matters are somewhat dull just at present, owing to the shutting down of a number of prospects, such as the Lizzie, of the Virginia Co., on Sturgeon Lake; the Bullion No. 2, Cameron Island, and the Sirdar Point. The Sirdar itself was reported as shut down, but there are a number of men working there, altho' it is said, it will close entirely. In none of the cases cited does there appears to be any information available to the public as to the reason for the suspension of work. It is no small comfort to know that probably in no instance has the shut down been due to a want of confidence in the ultimate value of the prospect.

It is satisfactory to know that what might be called the second crop of valuable prospects, viz.:—the Anglo Canadian in charge of Allan Sullivan on Denmark, the Gold Panner in Sturgeon Lake, the Nino at Deer Lake, and the Wendigo on Witch Bay, are showing up fine under the active development which each is undergoing. The Nino was the latest of these to start, and it has a shaft down 100 feet already on ore vein, and a good many feet of an adit driven upon another. A contract has been let for 300 feet of sinking and drifting. Both veins are looking very well indeed.

At the Gold Panner the sinking had been stopped whilst the force of miners were blasting out the foundation sites for the mortars of the mill that is being built; this work is almost completed now. They expect to have the mill ready by the 12th of July. Mr. Richard Hall is in charge of the work.

Some good finds have been made in Eagle Lake, and locations surveyed: also in Denmark Lake.

Captain Pritchard has been down at Black Bay, Lake Superior, taking up more land on the copper bearing belt. Some Rat Portage and Port Arthur parties are interested with him.

The Bad Mine has had its name changed to the Champion and will shortly ship some ore to the Keewatin Reduction works. The Bullion Company acquired the property and then formed a subsidiary company, retaining of course a certain amount of the stock of the new concern.

On the 18th inst. a gang of men left Rat Portage for the Crown Point Mine; a double shift will be run. The five stamp mill will be started at once, and the company purpose putting in ten stamps more at an early date.

S. H. Brockunier, late superintendent for the Virginia Company, has, it is said, gone to Central America, presumably on mining business; and Mr. Maiville, who has for a considerable time been connected with the Regina Mine, has accepted the offer of a lucrative position with a gold mining company in Rhodesia, South Africa.

The Independence Mine.

Mr. N. C. Westerfield the promoter who formed the company that acquired this property publishes a letter in the Wabigoon *Star* of 17th inst., in which he says he deems it "necessary to make a statement at this time that the public may know the true situation."

If Mr. Westerfield would make "a statement" shewing how much stock was sold, the amount of money it realised, state where the money went, and explain how it was that the mine was allowed to run so much in debt that it had to be sold, he would be giving all the explanation that the public cares to hear.

On these points however, Mr. Westerfield's letter throws very little light, but is occupied instead with a recital of circumstances which have no direct bearing upon the point at issue. Some of the holders of stock were lucky enough, for he tells us that he purchased several thousand shares that had been sold for 10 cents and 25 cents a share, in each case paying the holders exactly what they had paid for the shares, together with interest at 6 per cent. This required an outlay of $14,000. Then Mr. Cross, of Winnipeg, who supplied the company with an outfit for a stamp-mill, taking payment in stock, became nervous about the value of his shares, so that Mr. Westerfield bought in his stock also. But for whom were these shares bought? Not for the Company, for they had run out of funds. Mr. Westerfield controlled these shares for the parties who put up the cash to buy them. Did so under his advice. Supposing he did not buy them for himself: with the acquisition of these large blocks of shares, he and his friends evidently controlled the situation, so that he is able to say in his letter that "there was nothing left for the Company to do but to sell the property." He says further that "every person who purchased treasury shares at ten and twenty-five cents each are entitled to the same number of shares in the new Company that now owns this property."

The closing down of the Independence was a very "black eye" for the Manitous, and under the circumstances, Mr. Westerfield's letter is evasive and unsatisfactory; its evident design is not to make explanation and give information, but to discourage inquiry, and to cover up, rather than to uncover. Perhaps some other official of the late company, or some stockholder will come forward and give us a little light.

J. M.

Rat Portage, 19th May, 1900.

COMPANY NOTES.

Queen Bess Proprietary.—Cable from the mine:—"Last month 226 tons mined. Net value is estimated at $10,100. Total expenditure, $6,150. Employing 45 men. Main tunnel driven 566 ft. Everything progressing satisfactorily.—Woakes."

Granite Gold.—The following return is announced:—Clean up from plates only for (say) 25 days of March, 621 ozs. of bullion; estimated value, $10,500.

Enterprise (British Columbia).—Cable from the company's representative at Nelson:—"Shipped to the smelting works, 205 tons; now on the road from the mine, 84 tons; at the mine, 65 tons; total mined, 355 tons. No returns from smelting works as yet. Net estimated value, $40 (£8) per ton. The mine looks splendid."

Lloyd Copper.—Cablegram from the mine, dated 3rd inst.:—"Shipment has been made per steamer 'Aberdeen,' 50 tons copper." Office note: Making 447 tons shipped since the company took over the property.

Bosun Mine.—Telegram from the manager reports 100 tons galena and 20 tons zinc shipped in March.

Bell's Asbestos Company, Limited.—The secretary writes:—"I am instructed to inform you that the Directors of this Company in view of the audited accounts for the year ending 31st December, 1899, have resolved to recommend to the shareholders at the general meeting, to be held on 26th proximo, the payment of a dividend at the rate of 6 per cent. per annum, to place £2,500 to reserve account, and to carry forward about £1,420."

Amalgamation of B.C. Companies.—At extraordinary general meetings of the Goldfields of British Columbia, the Waverley Mine and the Tangier Mine, on Wednesday, resolutions were unanimously adopted for the voluntary liquidation of these companies, and for the appointment of Mr. R. Stanley Williams as liquidator. A new company, entitled the Empire Goldfields, Limited, is to be formed with a capital of £200,000. The scheme provides that every holder of five shares in the Goldfields of B.C., will receive one share, with a liability of 1s., in the new company; holders of four shares in the Waverley one share, and holders of one share in the Tangier one share. A working capital of close on £20,000 is anticipated.

The Yukon Goldfields.—The following cablegram has been received from the manager in Dawson City:—"Adams United Mines, April output, $21,272; Bonanza No. 4 output, $790; the total receipts of the month are $27,373."

The Granite Gold Mines, B.C.—Cable from mining engineer:—Since resumption of work after strike mill ran 18 days in April. Bullion produced, 392 ozs.; estimated value, including concentrates, $7,100.

Queen Bess Proprietary.—Cable:—"Last month 150 tons mined; net value is estimated at $6,600; total expenditure, $4,500; main tunnel driven 642 feet. Surface water will interfere with working. Rate of extraction of ore temporarily reduced."

Ymir.—Cable from British Columbia giving the estimated returns for last month (the actual returns will be received later in the usual way):—"Total amount crushed, 3,000 tons (dry weight). The mill has run 29 days 2 hours. Bullion, $18,000. Concentrates, 175; gross estimated value, $7,000."

Mikado.—The following return is to hand:—Clean up for 26 days ending April 30, crushed 893 tons, yielding 607 ozs. of gold, and from cyanide 287 ozs. of bullion. Estimated profit for the month, £1,300.

Granite (British Columbia).—Cable from engineer at Nelson:—"Struck lode 4th level north 1 ft. wide." It is announced that an extraordinary general meeting of the shareholders will be held on the 28th inst. for the purpose of considering the resolution authorising an increase of capital.

Velvet Mines.—Under date April 30th, the manager writes:—"Both the north and south drifts 300-ft. level continue to hold good. Surface showing: We have discovered a new and good lode, about 50 ft. south-east from the present shaft. For a surface showing I consider this the best I have seen in the mine, and the character of the ore is similar to the ore from the 250-ft. level to the 300-ft. level. We have sunk on it for 12 ft., and the ore is from 2 ft. to 3 ft. wide, and improves as we go down. The ore contains good pannings of free gold, with copper and iron pyrites, &c., between well-defined walls."

The Bosun Mines.—Telegram from the manager reports returns from smelters for 60 tons silver-lead shipped in April, $2,786. Zinc returns not yet received.

Richardson Gold Mining Co.—The monthly brick of gold from the Richardson mine at Isaac's Harbour, N.S., has come to be such a permanent feature that it is only when of unusual size and value that attention is called to this well known producer. During the month of March the record has been broken by the receipt of a brick weighing 536 ounces, with a value of about $10,500. This return to be appreciated must be cousidered in connection with the costs of the same, and as is well known, the cost of operating at the Richardson has been reduced to a low figure. We find that for the month of March the cost of the above brick including labor, crushing, mining, interest, and depreciation amounted to about $3,500, leaving a net profit of $7,000 for the month's work. This is a record to be proud of and should be duplicated in many other properties throughout Nova Scotia.

Northern Exploration Company of British Columbia, Ltd.—A winding-up order having been made on April 13 against this company, the meetings of creditors and contributories were held this month in London, at the Carey-street offices of the Board of Trade, Mr. A. S. Cully, Assistant Official Receiver, presiding. The Chairman stated that the company, which was promoted by Mr. F. Callow Hole, was incorporated in June, 1898, with a nominal capital of £200,000, divided into 190,000 preference and 10,000 ordinary shares of £1 each. The objects with which the company was formed were to adopt and carry into effect an agreement dated April 12, 1898, and to prospect, explore, and enter into contracts with respect to mines, mining rights, and property in British Columbia. From the terms of the agreement of April 12, 1898, it appeared that Mr. Hole had made certain arrangements with a Mr. Thomas Kellie, a member of the Provincial Parliament of British Columbia for the organisation of a party for exploration purposes in the vicinity of Revelstoke, B.C. Mr. Hole had agreed to equip, maintain, and bear the cost of such exploration party for the period of one year from May 2, 1898, and the company were to acquire the benefit of any options which the party might secure during that period and to pay Mr. Hole $4000 in cash and £20,000 in fully-paid shares. A prospectus was privately issued by the directors to their friends, with the result that 5,020 preference shares were applied for and allotted. The agreement of April 12, 1898, was adopted by the company, the shares were allotted to Mr. Hole or his nominees, and various sums amounting to £2113 were paid to him. Mr. Hole equipped and despatched the exploration party under Mr. Kelly, and options were acquired by it, but the directors stated that the options were offered on such conditions that the company were unable to deal with them. On March 7, 1899, the company entered into an agreement with Mr. Grant Govan with reference to the proposed acquisition of a portion of the Pine Mountain group of mines in Arizona. Mr. Hole went to Arizona to inspect the property at a cost to the company of £350, but ultimately the directors decided not to proceed with the business. In May, 1899, Mr. Govan, in consideration of the company paying him £1000, undertook to deliver to them an interest of not less than £10,000 in cash or shares in a company which he was then forming to take over the Pine Mountain property. In the event of Mr. Govan making default the £1,000 was to be returned to the company. He did make default, but the £1000 was not repaid. The statement of affairs showed liabilities £428, and assets consisting of the claim for £1000 against Mr. Govan and unpaid calls £350. There were circumstances associated with the promotion of the company and other matters which would require further investigation. At both meetings it was resolved that Mr. S. Jeffreys, chartered accountant, be appointed liquidator of the company, with a committee of inspection.

Acadia Coal Co.—Shipments, April, 1900: Acadia, 6,626; Albion, 8,806; Vale, 4,706. Total, 20,138 tons. Shipments, April, 1899, 13,001; increase, April, 1900, 7,137 tons. Coke sales, April, 1900, 1,782 tons; coke sales, April, 1899, 989 tons; increase, April, 1900, 793 tons.

Dominion Coal Company, Limited.—Approximate output and shipments, April, 1900: Output, Caledonia, 38,520; International, 16,014; Dom. No. 1, 42,265; Reserve, 50,200. Total output, 147,005. Total shipments, 95,770. Shipments, April, 1899, 50,698. Increase, April, 1900, 45,072. Shipments to U.S., April, 1900, 51,359; shipments to U.S., April, 1899, 20,565; increase to U.S. 30,794.

Intercolonial Coal Mining Co.—Drummond Colliery, April, 1900, 18,122; Drummond Colliery, April, 1899, 14,616; increase, April, 1900, 3,506 tons.

Cumberland Railway and Coal Co'y.—Shipments, April, 1900, 32,722 tons; shipments, April, 1899, 31,882 tons; increase, 1900, 840 tons.

Van Anda Copper and Gold Company, British Columbia.—The statement made by H. W. Treat, president and manager of this company of Texada Island, B.C., dated December 31st, 1899, covers the entire period since the inception of the company in April, 1896.

In order to thoroughly understand the balance sheet and general statement of assets and liabilities it is necessary to refer to the early history of the company's organization.

The capitalization was placed at $5,000,000, in shares of $1 each. This stock was divided between the promoters and owners of the properties and treasury stock, 3,000,000 shares being appropriated by the owners and promoters, for which the property consisting of some 800 acres of Crown granted mineral claims on Texada Island was transferred to the company, while the other 2,000,000 shares were placed in the treasury for development purposes.

Although but little criticism was made relative to this capitalization at the time of organization, yet it was very soon demonstrated that such over-capitalization had been a mistake, and it became absolutely necessary, in order to obtain funds to carry on work of development, to sell this treasury stock for whatever price it would bring, the result being that $54,667 has been realized from the sales of the entire block. Not only had this entire amount been expended previous to March, 1899, but that it was considered advisable about that time to issue $75,000 worth of bonds, in order to pay up outstanding indebtedness, and to have funds to meet the expenditure necessary to erect a proposed smelter and carry on the work of developing the mines on a systematic and business-like basis. The installation of these permanent improvements, which have been carried on during the past year, has not only consumed all of the available capital in the hands of the company a year ago, but has caused the floating liabilities to amount to $195,644.

In order to meet these liabilities and provide funds to cover any financial difficulties that might arise, an additional issue of $225,000 in 6 per cent. gold bonds, running 10 years, dated February 1st, was authorized at the annual meeting of the shareholders held February 3rd, 1900. It appears from the balance sheet that $57,007 cash has been advanced by Mr. Treat, which is included in the floating liabilities.

The following is a statement of the smelter returns from July 15th 1898, to December 31st, 1899. Total ore smelted, 4,133 tons, yielding 442,005 lbs. fine copper, 9,522 oz. fine silver, 1,444 oz. gold; total value smelter products, $99,484. Deducting contents of 595 tons of ore purchased, containing 82,563 lbs. copper, 2,246 oz. silver, 170 oz. gold, value $13,694, shows contents of 3,538 tons of Van Anda ores to be 359,442 lbs. copper, 7,276 oz. silver, 1,270 oz. gold; value $85,790. This is a value of $24.24 per ton of ore containing 6.32 per cent. copper, 2.06 oz. silver, 0.486 oz. gold.

In January, 1896, there were 619 tons of ore taken to smelter. The receipts were $24,929, the expenses $20,905, and the profit for the month $4,024. In February 749 tons of ore were taken to smelter. Receipts were $22,880, expenses $20,017, and profit $2,863.

The number of tons of ore in sight is estimated at 16,500 tons in the Copper Queen Mine and 13,333 tons in Cornell Mine.

Amalgamated Copper Plates and Electrolysis.—Dr. T. K. Rose, of the Royal Mint, has recently conducted a series of experiments (Institute of Mining and Metallurgy, April 25, 1900) on the electrolytic recovery of gold from cyanide solutions in which mercury and amalgamated copper plates were used for receiving and retaining the deposited gold. It was found that the electric current had to be of very low density, about 0.01 ampere per square foot of receiving service, to obtain complete amalgamation of the gold removed from the solution, since stronger currents threw down a portion of it in the form of a black powder, which would neither amalgamate nor wash off the surface of the mercury without brushing or wiping. The proportion of black powder increased rapidly with denser currents until most of it was deposited in this form. Consequently for the adequate recovery of the gold by electricity and amalgamation a low density of current was essential, and this necessitated a large cathode or receiving service. Owing to the high cost of mercury and also to the outlay in providing large copper plate services, the author arrives at the conclusion that the lead cathode at present in use is not likely to be superseded by a mercurial or amalgamating one. Furthermore, it was found that the amalgamated copper plate cathode was attacked, in spite of the electric current, by the cyanide solution, to the detriment and waste of the latter. This would further militate against the practical use of these plates.

MISCELLANEOUS.

The shipments from the collieries of the Dominion Coal Co., show a large increase. For the four months ended 30th ult., the figures were 377,100 tons, as against 148,586 tons during the same period last year.

Statistics collected by Mr. Charles G. Yale, of the United States Mint at San Francisco, show that the receipts at mints, assay offices, private refineries and smelters for the calendar year 1899 from the North west Territory (Yukon) were $15,986,627 gold and $267,390 silver, a total of $16,254,107. This shows a marked advance in output for the Klondike field, since the increase over the previous year is $5,028,198.

The exports of asbestos, mainly from the mines of the Eastern Townships, Que., during the year ended 30th June last, were: No. I, 672 tons of a value of $59,350; No. II, 2,875 tons of a value of $153,961; No. III, 10,973 tons of a value of $239,865.

The exports of Canadian mica during the same period (probably undervalued) were: Cut to size, 50,067 lbs. of a value of $7,493; edge trimmed, 1,033,983 lbs. of a value of $128,961; untrimmed, 63,135 lbs. of a value of $11,885.

During the year 1898-9 Canada exported iron ores as follows:—From Ontario, 248 tons, valued at $2,550; Quebec, 225 tons of a value of $596; British Columbia, 1,370 tons of a value of $1,822.

Of phosphates (apatite) there were sent to Great Britain, 719 tons of a value, $8,100; to Germany, 122 tons of a value, $1,100; and to the United States, 20 tons of a value of 90.00.

The Electro-Magnet in Boring. The hardened end of a steel bit or chisel broke off in a bore-hole 165 fathoms deep, put down near Ostroppa by the Upper Silesia deep-boring company, Zoellner & Co.; and this obstruction effectually prevented further boring of the hole, because all diamond crowns wore away. After the most varied attempts had failed to remove the piece of steel, the following plan, says the "Colliery Guardian," was hit upon by Engineer Degenhardt, of Gleiwitz. A soft steel bar, 5 feet in length and of 2·7 inches diameter, was covered by a single winding of indiarubber tape, and magnetized by the current of a small dynamo driven by the portable engine employed for the work of boring, and the current was kept constant at about 30 amperes by means of a simple resistance coil. The steel bar was let down into the hole magnetised, and when it reached the bottom the current was switched through the conductor enclosed in the rope for letting down and drawing up. On the first day that this method was employed the piece of steel was drawn up to the surface, so that boring could be resumed.

Shaft Sinking under Difficulties.—A paper was read before the Midland Institute of Engineers, at Sheffield, by Mr. James Keen, on the sinking of two shafts through heavily watered strata at Maypole Colliery, Abram, near Wigan, for the Moss Hall Colliery Company. The pit was sunk to reach the celebrated Abram cannel, which gives 14,111 cubic feet of 39 candle-power gas, with a large percentage of valuable residuals, and 7 cwt. of good coke per ton. The work has been carried to a complete success by the author, a rich bed of fine cannel now being wrought, in a dry mine, the pumps in the shaft dealing with some 90,000 gallons of water per hour, a diminishing quantity.

A Boring Appliance.—An under-reamer for boring has been designed by Victor Petit, of Kobylamka, Galicia, in which the side cutters that pivot on pins in the shank are kept pushed outwards in their position for cutting by a wedge pointing upwards being drawn in that direction by a spiral spring. The wedge is, however, connected by a small vertical rod, sliding in the shank with a lever pivoted therein, which lever, on the rods being drawn up, strikes against the lower edge of the lining tube, and thus frees the wedge from the influence of the spring, so that the side cutters fall within the diameter of the tube, and may, therefore, be drawn up.

Copper in 1899.—It is to be hoped that copper prices of last year will remain exceptional. On average standard copper fetched £73 10s., against £51 15s. in 1898; in summer it rose even to £80 and higher. More than a third of the world's copper output is now electrolytic—in the United States, more than one half, indeed—and the best electrolytic copper commands the highest prices. America produced about 232,000 tons of copper last year, and introduced 31,000 tons. The Amalgamated Copper Syndicate controls perhaps half the market. New mines have been opened up, and old ones re-started. But that may go too far, although the electricians always want more copper. Last year, aluminium conductors were tried in America on an extended scale, and on the Continent for the first time. It was in consequence of the abnormal copper prices, and may possibly prevent a repetition of an artiffcial advance in copper.

SCHOOL OF MINING,

KINGSTON, ONTARIO.

The Following Courses are offered

1—Three Years' Course for a Diploma in

(A) Mining Engineering.
(B) Analytical Chemistry and Assaying.

2—Four Years' Course for a Degree in

(A) Mining Engineering.
(B) Chemistry and Mineralogy.
(C) Mineralogy and Geology.

3—Post-Graduate Course for the Degree of

Doctor of Science (D.Sc.)
For further information see the calendar of Queen's University.

4—Prospectors' Course.

The School offers to Mine Foremen, Assayers, Prospectors and Mining Men generally, Special Courses of Instruction beginning January 9th, 1900, and continuing eight weeks.

Next Session begins October 2nd,
. . . 1899 . . .

The School is provided with well equipped Laboratories for the study of Chemical Analysis, Assaying, Blowpiping, Mineralogy, Petrography and Drawing. In the Mining Laboratory the operations of Crushing, Amalgamating, Concentrating, Chlorinating, Cyaniding, etc., can be studied on a large scale.

FOR CALENDAR OF THE SCHOOL AND FURTHER INFORMATION APPLY TO

Dr. W. L. GOODWIN,

DIRECTOR

SCHOOL OF MINING, KINGSTON, ONTARIO.

PROVINCE OF NOVA SCOTIA.

Leases for Mines of Gold, Silver, Coal, Iron, Copper, Lead, Tin

—AND—

PRECIOUS STONES.

TITLES GIVEN DIRECT FROM THE CROWN, ROYALTIES AND RENTALS MODERATE.

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 quarts crushing mills who are required to pay Royalty on all the Gold they extract at the rate of two per cent. on smelted Gold valued at $19 an ounce, and on smelted gold valued at $18 an ounce.

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

MINES OTHER THAN GOLD AND SILVER.

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

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

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

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

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

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

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

THE HON. C. E. CHURCH,

Commissioner Public Works and Mines,

HALIFAX, NOVA SCOTIA.

NOW IN PREPARATION — READY ABOUT 1st JULY

..The..
Canadian Mining Manual

For the Year

10th Edition — 1900 — 10th Edition

A COMPLETE, UP-TO-DATE, AND AUTHENTIC WORK OF REFERENCE TO ALL MINING, SMELTING AND METALLURGICAL ENTERPRISES IN CANADA AND THE COLONY OF NEWFOUNDLAND.

Edited and Published by

B. T. A. BELL

Editor, The Canadian Mining Review;
Secretary of the Canadian Mining Institute;
Secretary, Ontario Mining Protective Association;
Secretary, Quebec Mining Association;
Hon. Sec., The Mining Society of Nova Scotia.

FROM THE PRESS

It has been a pleasure year by year to welcome the successive issues of this valuable work, and to express our recognition and appreciation of its increasing interest and value. The *Canadian Mining Manual and Mining Companies Year Book* is the best volume of its kind published either in the Canadian Dominion or elsewhere. To all those, whether resident in Canada and immediately interested in the mineral resources and works, or resident elsewhere, but likely to have a personal and direct association with with Industrial Canada, the book is simply invaluable. We know no other man so competent as our friend, Mr. B. T. A. Bell; and we do not think that even he has ever given better proof of his industrial Editorial talents than in this particular publication. We shall have further opportunities of placing before our readers some of the fascinating information of which the book is full; we content ourselves at present with saying that the present issue excels all its predecessors, and is a magnificent four dollars worth.—Dr. C. M. Percy in the *Science and Art of Mining*.

Mr. B. T. A. Bell, the editor of the CANADIAN MINING REVIEW, has forwarded me the new edition of his *Canadian Mining Manual*, which has now attained its ninth year of publication. Authentic information regarding companies operating abroad or in our Colonies is always difficult to obtain by the home investor; and Mr. Bell's book is therefore doubly welcome. Indeed, in some ways it sets a high example to our own reference books. Even the admirable "Skinner" cannot boast of so much detail as its Canadian contemporary affords. In the case of the Hall Mines, for instance, over twelve pages are devoted to an exhaustive account of the company and its property.—*The Critic, London, England.*

A capital piece of work has been done by Mr. Bell in his *Mining Manual*, a handsome octavo volume, which gives a full account of every incorporated mining company in Canada.—*The Financial News, London.*

FROM THE PROFESSION

MR. S. M. ROBINS, Superintendent, New Vancouver Coal Mining and Land Co., Nanaimo.

I take this opportunity of again expressing my appreciation of your carefully prepared and valuable work. I really do not know what we should do without it now, for one at once turns instinctively to it when seeking mining information of all kinds. In addition to the four copies ordered on enclosed slip, please forward one copy to the Secretary of the Company in London.

THE INTERCOLONIAL COAL CO., Westville, N.S.

We are very much pleased with the *Manual*, and find it very useful for reference.

MAJOR R. G. LECKIE, M.E., Sudbury, Ont.

I find it a ready and correct book of reference. It is of very greot service, not only to those directly interested in mining, but to business men throughout the Dominion, containing, as it does, full information regarding all mining and metallurgical interprises in Canada.

THE JAMES COOPER MANF'G CO. Limited, Montreal.

The *Manual* is the most useful book in our office.

JAMES MACBETH & CO., New York.

We appreciate the *Manual* very highly. It is just what we want, and we consider it cheap at ten times the amount.

GEORGE E. DRUMMOND, Canada Iron Furnace Co., Montreal.

The *Manual* is an admirable production, and will prove a standard book of reference for everyone interested in the development of Canadian mining resources.

DR. E. GILPIN, Deputy Commissioner and Inspector of Mines for Nova Scotia.

It is found to be very convenient in our office, and is frequently referred to.

SIR CHARLES HIBBERT TUPPER, M.P., Victoria, B.C.

I find this a most useful book, and you must permit me to congratulate you on the manner in which it has been prepared.

ALL PREVIOUS EDITIONS COMPLETELY SOLD OUT

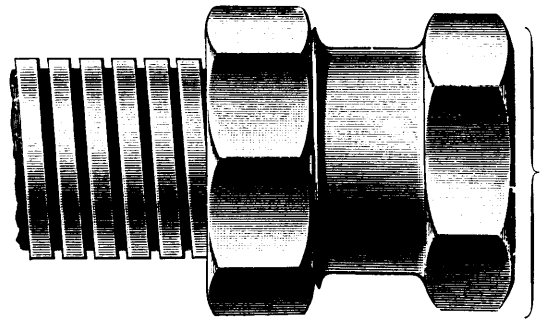
PRICE, FOUR DOLLARS

FLEXIBLE METALIC HOSE

THIS Hose is made entirely of metal; there is NO rubber in connection with it. It will therefore stand ANY pressure of steam. It is at the same time as flexible as rubber steam hose, and with proper care it will last many years.

This Hose is made in sizes from ¼ inch to 8 inches inclusive, and can be made to stand 2,000 (two thousand) pounds pressure to the square inch.

This Hose can be readily connected to Iron Pipe.



Screwed for Standard Iron Pipe Thread.

We supply for this Hose the usual Rock Drill Hose Connections, or any other special connections which may be required.

We have just introduced this Hose in this conntry, and miners who have seen it are taking to it like a mouse to cheese.

Write to us for catalogue and particulars.

We carry stock to 2½ inches diameter, and can import larger sizes.

A. R. WILLIAMS & CO.

320 St. James Street, MONTREAL, Que.

THE SNOW STEAM PUMP WORKS,

MANUFACTURERS OF

Steam Pumps, Pumping Engines and Hydraulic Machinery.

General Agents for Canada, DRUMMOND, McCALL & CO., Montreal.
Local Agent F. R. MENDENHALL, Rossland, B. C.

Pumps Kept in Stock at Montreal and Rossland.

MONTREAL...

PIPE FOUNDRY CO.

LIMITED.

MANUFACTURERS OF...

CAST IRON
WATER AND GAS **PIPES**

OFFICES:

CANADA LIFE BUILDING

MONTREAL.

WORKS: LACHINE, QUE. PRICES ON APPLICATION.

The Montreal Car Wheel Co.

. MANUFACTURERS OF .

Works:
LACHINE,
Que

CHILLED WHEELS

Offices:
CANADA LIFE
BUILDING.

For Railroad, Electric Car, Street Railway and Lumber Truck Service, Etc.

THOMAS J. DRUMMOND, General Manager.

MONTREAL.

CANADA IRON FURNACE CO. Limited

MANUFACTURERS OF

Brand:
"C. I. F."
Three Rivers.

CHARCOAL PIG IRON

ALSO MAKERS OF PRESSED AND REPRESSED BRICKS.

Canada Life Building

MONTREAL.

PLANTS AT
RADNOR FORGES, QUE.
LAC A LA TORTUE, "
THREE RIVERS, "
GRANDES PILES, "

GEO. E. DRUMMOND, Managing Director and Treasurer.

THE DOMINION WIRE ROPE CO. LIMITED

MONTREAL, CAN.

Manufacturers of **"LANG'S" PATENT WIRE ROPES**

FOR COLLIERY AND GENERAL MINING PURPOSES.

ALSO BEST STEEL WIRE ROPES FOR ALL PURPOSES.

BRANCH OFFICES: Vancouver, B.C. Rossland, B.C. Winnipeg, Man. Toronto, Ont. Ottawa, Ont. Halifax, N.S.

CATALOGUE ON APPLICATION.

HAMILTON POWDER COMPANY.

Manufacturers of Sporting, Military and Blasting

GUNPOWDER, DUALIN, DYNAMITE and ECLIPSE.

Dominion Agents for Safety Fuse, Electric Blasting Apparatus, Etc.

Office: 103 St. Francois Xavier St., Montreal.

FRASER & CHALMERS

Mining Machinery,

Stamp Mills,

Smelters,

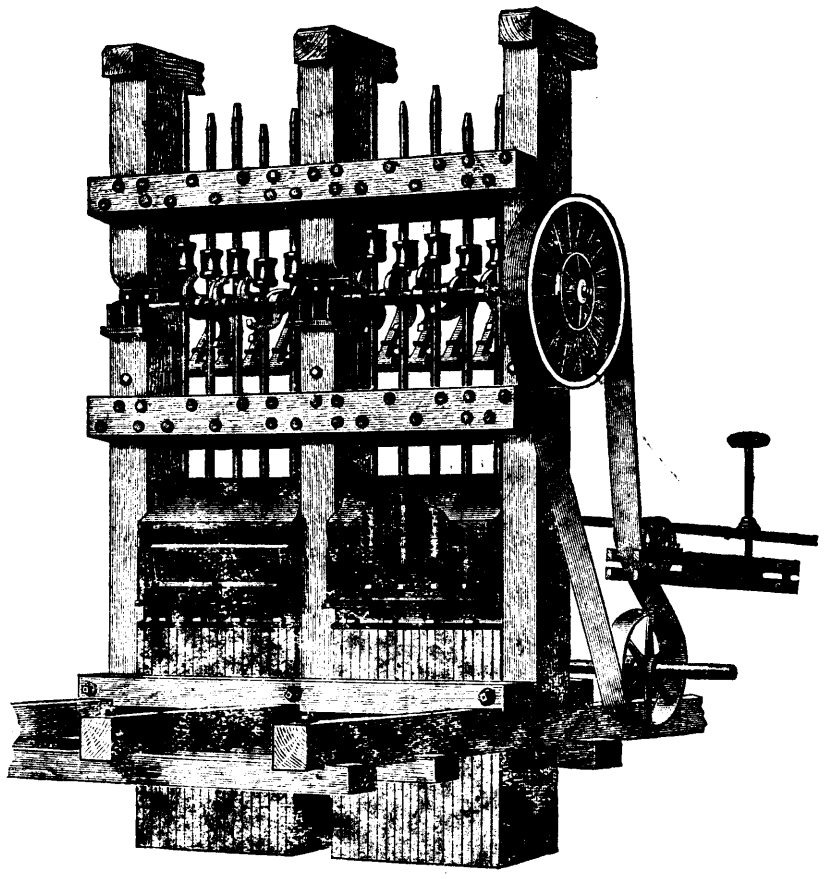
Rock Crushers,

Riedler Pumps

and

Air Compressors

CHICAGO, ILL., U. S. A.



AND LONDON, ENGLAND.

Hoisting Engines,

Frue Vanners,

Sederbohm, Adams and Wood Boilers,

Corliss Engines,

Concentrating Machinery.

FRASER & CHALMERS have the best manufacturing facilities for making anything in the Perforated Metal line, Placer Grizzlys with Taper Holes, Stamp Mill Screens, Trommels, Coal Screens, &c. Screen Samples on Request.