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CIRCULATION.

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MINING ENGINEERS AND MINING INSTITUTES.

Mr. J. D. Kendall, in a forceful article printed in this number of The Canadian Mining Journal, asks an exceedingly pertinent question. "Why," enquires Mr. Kendall, "should men who know their business, and are prepared to do it honestly, allow a large part of it to be taken from them by imposters who . . . are always ready to barter a favourable opinion for an approved monetary consideration, and who in doing so bring disgrace upon a profession which, when properly practised, is in the highest degree honourable? . . . The rooting out of imposters must, at all times, make for the benefit of a mining country generally."

The rooting out of imposters is left, in Canada, to the individual or to circumstances. Public sentiment is lax. Professional sentiment is uncrystallized. Hence Canada is a favorite hunting-ground for the fake mining expert.

Mr. Kendall recommends that every person practising as a mining engineer should be compelled, by law, to become a member of an institute to which admission shall be gained only by examination. Those eminent in the profession might safely be exempted from examination. But, in all ordinary cases, the requirements for admission should be as rigid and as exacting as possible. Persons practising before admission to the institute should be liable to a heavy penalty.

With the spirit of Mr. Kendall's proposal we are in hearty accord. The problem of elevating and regulating the profession of mining engineering in Canada is urgent. We are not sure, however, that we can go as far as Mr. Kendall indicates. Our Canadian Mining Institute is in process of change. Full membership is no longer attainable by the layman. But the present membership is miscellaneous. Hence, although the institute can concern itself effectively in many public questions, it must avoid the dangerous ground of professional qualifications.

A solution, however, has been suggested. Restrictions as to admission cannot be made retroactive. They apply only to the present and the future. But segregation can be effected within the institute, by the creation of a special professional section. This, properly managed, should be robbed of all invidiousness. It will not discount ordinary membership, but will place a definite meaning on special membership. And ordinary membership should be always a preliminary stage.

In this special membership should be included only those who can qualify under some such scheme as that outlined by Mr. Kendall.

We cannot refrain from citing here an instance that was brought to our notice not long ago. A young man, who can claim membership in several institutes, was engaged to write a report upon a cobalt-nickel property. That report was the most complete demonstration of ignorance and ineptitude that we have ever seen. We believe that it was written in all honesty; it is impossible to think otherwise. But as an exhibit of crassness, carelessness, and unfitness this precious document was the limit. This is precisely the kind of malpractice that is most disastrous to the profession. The fakir can be explained; the unfitness of the respectable practitioner cannot.

A PERENNIAL PARADOX.

Attention has been drawn frequently to certain anomalies that exist in the methods of valuing the mineral products of Canadian mines and smelters. An outstanding example of discrepant methods is afforded by a comparison of the returns for Ontario nickel, as given respectively by the Ontario Bureau of Mines and by the Dominion Mines Branch. This discrepancy is noted annually in the Report of the Bureau of Mines; but, so far, there has been no attempt to reach a common basis.

As explained in the Bureau's Report, the Dominion statistics are based upon the average price of refined nickel in New York, while the Bureau's figures represent the value of the nickel in the form of matte at the point of production, "as given by the producers." The last phrase is significant.

The net result is that the Bureau's returns are little more than 20 per cent. of those of the Dominion. For 1908 the Bureau reports the value of nickel produced in the province as \$1,866,059; while the Dominion Mines Branch sets the value as \$8,224,180—a difference of \$6,358,121.

We have no reason to think that the former evaluation, \$1,866,059, is excessive. It takes account only of the nickel as matte, at point of production, and sets a value of about 9 cents per pound of nickel. On the other hand the Mines Branch calculates the nickel at 43 cents per pound. In other words, nickel ore mined and smelted in Canada gives a product worth approximately one-fifth of the price obtainable after the matte has been refined on the other side of the border.

The industrial magic, whereby the metallurgical product is enhanced five times in selling price by means of operations incomparably less costly than mining and smelting, arouses our interest. It is obvious, of course, that a restricted market may have much to do with fixing the price of refined nickel. But that difference of more than six million dollars can hardly be referred to market exigencies.

Certain international aspects of the nickel industry we are tempted to touch upon. But we shall refrain.

It will be sufficient to suggest that we would like to hear a just reason why part, at least, of the nickel produced in Canada cannot be refined here. Several Ontario manufacturing centres would welcome the opportunity of helping to produce that odd six million dollars.

KENORA MINING NEWS.

Our Kenora correspondent, on another page, gives an interesting account of his impressions concerning the decline of gold mining in that once flourishing country. The usual causes, incompetent management and unlimited gold stealing, are believed to have been at the bottom of Kenora's failure. There appears to be ample evidence to warrant the statement that gold stealing assumed shockingly large proportions.

It is difficult for one who has no experience in gold or silver mining camps to credit the stories that are told.

But the history of rich camps is everywhere the same. Enormous quantities of Yukon gold were stolen under the very eyes of employers. Lurid tales, many of them amply substantiated, came from Goldfields, Tonopah, and Rawhide. Systematic and extensive high grading is practised in certain Australian camps. In South Africa, the misappropriation of amalgam and bullion is by no means uncommon. Hence it is not unreasonable to assume that there is a foundation in fact for the Kenora stories. As in Nova Scotia, where "high-grading" prevailed to an astonishing extent not long ago, the ores of the Kenora mining division contain frequent patches of beautiful specimens of native gold. Native gold makes a notably direct appeal to the wage-earner.

Undoubtedly gold stealing has been a serious drawback to the Kenora mines. But competent supervision should, and can, reduce to a minimum the possibilities of this illicit habit.

It would be an instructive experiment to place one of the old mines of the district in qualified hands and watch the results. An Ontario gold mine, run on its own merits, would be something of a novelty.

PARLIAMENTARIANS AND FACTS.

It is unfortunate that the mineral industry has no representation in the Dominion House of Commons. Recently a Liberal member, Mr. Ralph Smith, in the course of a speech advocating the cause of technical education, made a wild reference to the number of fatalities in Canadian coal mines. Although Mr. Smith's statements were partly corrected by the Hon. W. L. Mackenzie King, they are calculated to leave a totally wrong impression upon his hearers.

Mr. Smith asserted that the rate of fatalities in Canadian mines is greater than in any other civilized country. This is incorrect. Nova Scotia coal mines,

owing largely to enlightened managerial policy, show the lowest death rate per million tons mined. British Columbia's rate has been excessive, but will be reduced when the use of safety-lamps is made compulsory. Alberta, where statistics are very loosely gathered, makes a fair showing.

The metalliferous mines of Canada are not adequately inspected. But, so far as can be determined, the death rate per thousand men employed, is lower than the rate obtaining in many districts in the United States. As regards the newer camps of British Columbia, Ontario, and Nova Scotia, where large numbers of small prospects are being worked, it is manifestly unfair to make comparisons. In well-organized and established mining centres the rate of fatalities will always be lower than in new districts.

Mr. Smith might well have urged that the Federal Mines Branch take up, as a regular duty, the prevention of mine accidents, the Dominion Government has been entirely apathetic in this respect.

OTISSE.

The suit brought by E. Kenyon-Stowe to set aside the sale of the Otisse mine to the Otisse Mining Company was thrown out by Justice Latchford on November 24th. Costs are to be paid by the plaintiff.

During the progress of the suit the Otisse mine has been steadily developed, since the owners were fortunately able to finance operations. Hence the obvious purpose of the plaintiff was defeated. He succeeded, however, in harassing and hampering the Otisse Mining Company for considerably more than a year.

The fact that irresponsible persons are permitted to institute mischievous litigation of this kind is a reflection upon our judicial system. The result of this suit discredited Mr. Kenyon-Stowe completely. This, however, is little consolation to those who have suffered from a protracted and groundless lawsuit.

EDITORIAL NOTES.

To our editorial comment upon Mr. Kendall's article we may add here our opinion that every mining engineer who joins the Canadian Mining Institute should give to the secretary a full record of his professional career. Further, it would be well to complete this record by annual additions. This would be one construction step in the "rooting-out" process to which Mr. Kendall refers.

An article that will reveal some startling figures as to actual cost of producing compressed air will shortly appear in The Canadian Mining Journal. It will be accompanied by a series of diagrams that represent actual tests made under working conditions in a leading Canadian mining camp. The name of the camp and

the identity of the mines where the tests were made are suppressed—for reasons that will be obvious.

Our two review numbers, January 1st and January 15th, will be worthy of attention. All the larger mining fields will be suitably dealt with and many new possibilities pointed out.

The closing year has been one of unprecedented activity. The number of foreign investments has rarely been exceeded. German, French and United States capital has come into Canada freely. English investors manifest less aloofness than heretofore.

The strike that is tying up Australian coal mines is having its effect on Canada. Enquiries for coal have reached Vancouver. It is probable, in the event of the strike continuing indefinitely, that orders will be filled at British Columbia collieries.

REPORT ON THE IRON ORE DEPOSITS ALONG THE OTTAWA AND GATINEAU RIVERS.

By Fritz Cirkel, M.E.

The iron ores of the valleys of the Ottawa and Gatineau Rivers have been the subject of an investigation by Mr. Fritz Cirkel, M.E., for the Mines Branch of the Department of Mines, and his report has just been published.

The publication of this report comes at a very opportune time, owing to the development lately assumed by the smelting of iron ores by electricity; for the region in question possesses great water powers, a part of which could aptly be applied to the establishment of an iron and steel industry.

After describing in detail various iron ore deposits in the townships of Hull, Templeton, Wakefield, Bristol, Grenville and others, Mr. Cirkel concludes that many of these would yield ores which could in all probability be treated profitably in the electric furnace. It is stated in the report that this method of reducing the iron ores can compete with the blast furnace for the production of pig iron, when electrical energy can be developed at a low cost.

All engineers and metallurgists interested in the iron and steel industry will read the report with interest, more especially the general conclusions, which are given from page 100 to page 107.

An appendix to the report gives a synopsis of the water powers, both developed and undeveloped, in the region under consideration. These data have been compiled from the latest authoritative sources available. The following falls can all be developed to produce large quantities of power: Paugan Falls, Cascades, Chelsea Rapids, Great Falls, Coulange River, Roche Fendue, Calumet Falls, Chats Falls.

The report is well illustrated by five plates, fifteen drawings, and two maps, and the whole forms a volume of 147 pages, which constitutes a valuable addition to the series of bulletins on the mineral resources of Canada issued, under the direction of Dr. Eugene Haanel, by the Mines Branch of the Department of Mines.

MINING ENGINEERS AND MINING INSTITUTES

Advance copy of paper to be read before the Canadian Mining Institute.

By J. D. Kendall.

On more than one occasion I have tried to induce engineers to discuss this subject with the view to arriving at some general understanding and resolution as to the means necessary to place mining engineers in a position before the law, similar to that occupied by members of other professions.

Spencer has truly said "It is only by varied iteration that alien conceptions can be forced on reluctant minds". I therefore, return to the subject once more, knowing, however, that the conceptions are alien to some only, although the reluctance to deal with them seems to be almost general. Why it should be so I cannot understand. Why should men who know their business and are prepared to do it honestly allow a large part of it to be taken from them by imposters who, gathering in all new mining districts and sometimes old ones, are always ready to barter a favourable opinion for an approved monetary consideration, and who, in doing so, bring disgrace upon a profession which, when properly practised, is in the highest degree honourable? This, of course, I know is only an egoistic view, but from the altruistic standpoint the prospect is equally satisfactory. The rooting out of imposters must, at all times, make for the benefit of a mining country generally. To the persons who employ these imposters there would, doubtless, be a serious loss, or rather the sources of their illegitimate revenues would disappear, but that would be a matter for congratulation rather than regret.

The question then arises, how are these imposters to be weeded out. In my opinion it can only be done in one way. In every mining country an institute should be established by Parliamentary enactment, and every person practising as a mining engineer in any country should, after the expiration of his privilege, be compelled, under serious penalties, to become a member of the institute of that country, and gain admission to it by examination only, except in the case of men eminent in their profession in whose favour, for the first six months or so after the establishment of an institute the Examining Boards might dispense with the usual conditions of entry. Every candidate for admission should have to produce to the examiners at least two written testimonials as to character from persons who have known him intimately for at least four years. After the first six months of an institute's existence these testimonials should be from members of the institute. Any person practising before admission to the institute should be liable to a serious penalty enforceable by law.

Membership by the institute should be graded according to experience, and other qualifications, and the different grades should be indicated in such a manner that the public cannot possibly be misled as they are at present. I recollect the case of a man who some years ago in recommending a very wild cat to the public, wrote the initials "E.M." after his name. Later he was obliged to appear in a law court to support his recommendation, and was there asked if he was an Engineer of Mines. He said, "No, the letters in my case simply mean Expert Miner." A similar mis-

leading use of the initials employed by a statutory-formed institute to indicate membership should be made punishable by law.

The requirements of the Examining Board should be ethical as well as intellectual. I am convinced that our whole system of education is wanting in this connection. The ethical side of a man's mind is not cultivated to anything like the extent it should be. A knowledge of right conduct no more grows with us than a knowledge of right geology. Besides the general rules of conduct, which ought to be taught with the three R's, there are rules of special application to the different walks of life. Some of these, so far as they effect the mining engineer, were referred to in a previous communication. They should be made rules of the suggested institute, and their infraction should be made punishable by removal from its rolls. They should, moreover, form part of an engineer's education, and not be left for him to find out in later years after he has unwittingly done some of the mischief to which their non-observance will surely lead. Engineers are frequently offered contingent fees which, I need hardly say, should always be refused unless the contingency be legitimate profit to their employers. Young engineers are often greatly puzzled to know what to do under the circumstances, such matters never having been dealt with in their training, as they ought to have been. I remember a case in which a well known person went into a young engineer's office for the purpose of obtaining a report on a property he intended placing before a company of which he was a director. He said, "I am not sure that I can sell the property, so I want to make an arrangement with you something like this: If I don't sell the property I shall give you fifty dollars for your report; if I do sell it I shall give you fifteen hundred dollars". The young engineer very properly declined this offer, saying, "My charge will be two hundred and fifty dollars whether you sell or not". Think of the inducement there is in such an offer to produce a favourable report, and the necessity of pointing out to students the true inwardness of such offers must be at once conceded.

I have purposely refrained from loading this communication with the many illustrations which might be adduced to show the necessity for the suggested changes, because there must occur to the mind of every engineer of experience many such illustrations. Can anything conclusive be urged against the proposed changes? If not, I hope this institute will take the lead in what I, and others with whom I have spoken, consider to be a much needed reform, and establish itself on the lines indicated, or some similar lines which will give its members and the mining public that protection from the operating of the "Yellow-legger", and the unprincipled promoting they so much need. Much can be done by such an institute in the way of exposing, and thereby putting a stop to, the crooked methods of the latter, that individuals, however courageous, could not afford to do.

It is not for a moment thought that any or all of the suggested changes would place engineers on one plane

of efficiency. Differences must always exist so long as variation and environments are factors in organic evolution. But with the suggested reforms we should have engineers and engineers. Now we have engineers and fakirs.

The institute advocated, which might be called the National Institute, need not in any way interfere with the local or Provincial Institutes which are so

necessary for the reading and discussion of papers, but if the publication of the papers were undertaken by the National Institute, the reduced cost would, to some extent, if not entirely, effect the diminished revenue, for the number of members would certainly be reduced under the proposed scheme. But I think engineers would readily agree to an increased subscription in consideration of the protection they would obtain and their improved position generally.

THE NORTH THOMPSON VALLEY, B.C.

By J. C. Gwillim. *

The recent election campaign in British Columbia has brought to the front a railway route that will pass through a little-known district, but a district that at one time promised to be on the main line of the C.P.R.

This is the valley of the North Thompson River, which cuts diagonally from near the great depression west of the Rocky Mountains proper at Tete Jaune Cache into the heart of the great central plateau at Kamloops. Thus it avoids crossing the Selkirk ranges met on the main line of the C.P.R. and Crow's Nest railway.

The Grand Trunk Pacific, issuing from the Yellowhead Pass of the Rocky Mountains proper into the same great valley as the proposed C.N.R., will follow another diagonal valley, the valley of the Fraser, and so reach the central district of Fort George without crossing the usual summits of the ranges west of the Rocky Mountains proper.

Both railways expect to reach the Pacific coast with a maximum grade of four-tenths of one per cent. by using the low pass at Yellowhead and, one going south-west while the other goes north-west, reach the ports of Vancouver and Prince Rupert respectively.

The proposed C.N.R., after emerging from the Rocky Mountains at Tete Jaune Cache, will pass down the great open valley southwards to Canoe River 16 miles, thence over the low pass at Albreda River, down this river to its junction with the North Thompson, 48 miles, thence along the narrow valley of the North Thompson, through the "wet belt" of cedar, hemlock and devil's clubs, into the dry, more open country of the interior plateau 100 miles north of Kamloops; thence, still following this more open valley, to its junction at Kamloops, a total of 240 miles from Tete Jaune Cache.

Yellowhead Pass at one end of this district and Kamloops, or old Fort Thompson, at the other end, each has a history dating back to the fur-trading days early in the last century. For David Thompson, the explorer and trader, according to Mr. J. B. Tyrrell's "Life of David Thompson," passed through Yellowhead Pass on his way from the plains to the newly-established ports on the Kootenay and Columbia in 1810, while Fort Kamloops, according to Father Morice's "History of the Northern Interior of British Columbia," existed prior to 1821 and was on the route for supplies from the lower Columbia to the posts on the upper Fraser River.

But the great narrow valley of the North Thompson

between them was a solitude, first travelled and described by Milton and Cheadle in their memorable journey of 1863, and a few years later by Dr. Selwyn, the C.P.R. surveyors, and the late Principal Grant.

This account gives little information beyond references to various local features of the topography and the obstructive character of the vegetation, such as the presence of the "devil's clubs" or "aralea and the gloomy forest," as Dr. Selwyn described it when he traversed it eight years later in the opposite direction.

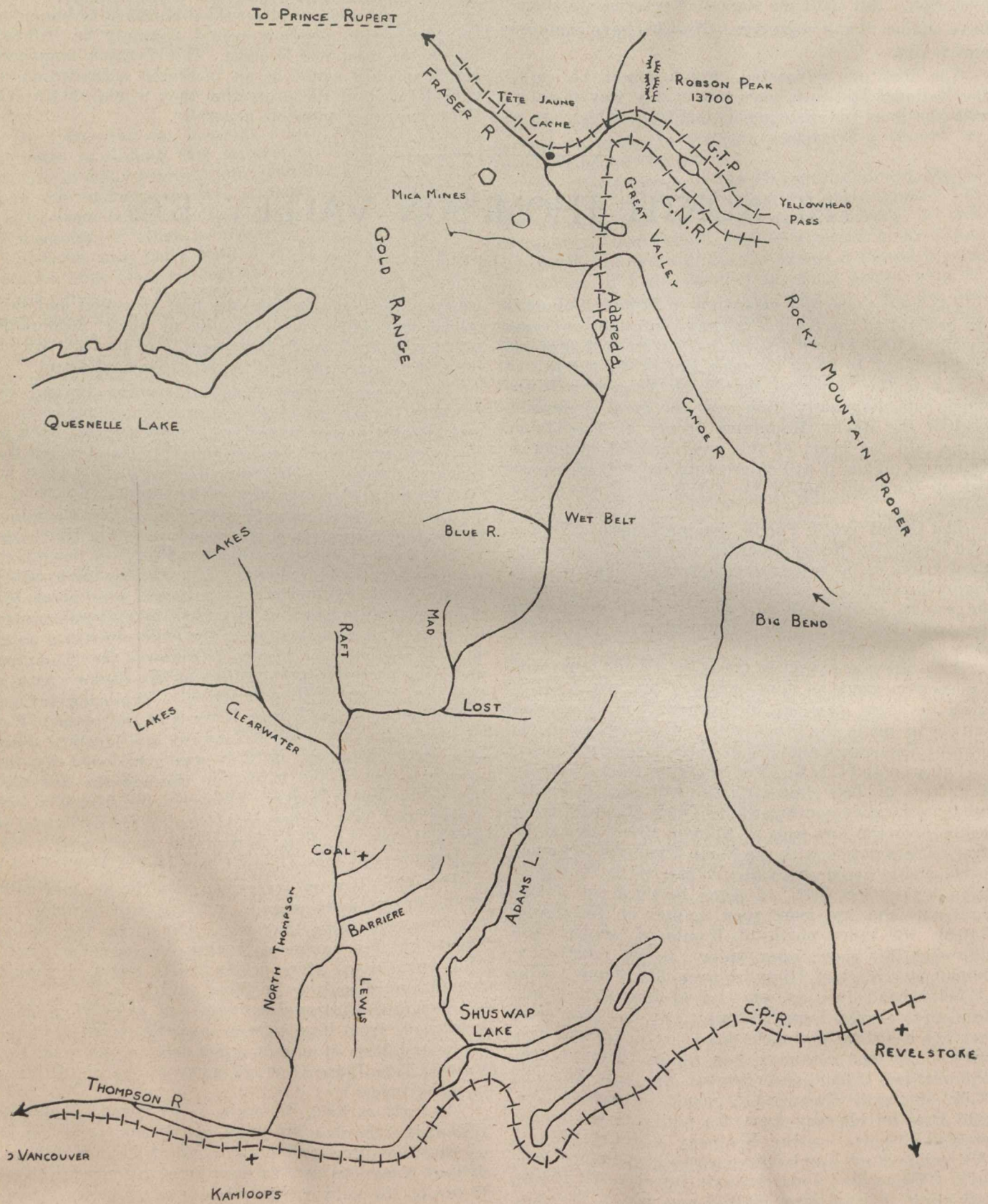
In 1871, Dr. Selwyn, then Director of the Canadian Geological Survey, made an expedition from Kamloops to Tete Jaune Cache and "Leather Pass"—a trip which took him nearly two months. Finding the main valley of the North Thompson too toilsome, at a point 105 miles above Kamloops, he ascended the plateau country to the west of it, returning to the main river at a point 45 miles further on. Thence he followed the Thompson and Albreda to the great valley at the Cache. At this time, 1871, the C.P.R. was active in exploring various routes between the Fraser River and the plains. For several years they pushed forward this location along the North Thompson until it was abandoned for the present route of the main line through the Selkirks, located by Major Rogers. However, the surveyors left a good trail with bridges and camping places, at one of which, Canoe Landing, is recorded on a board:—"F. A. Hassack and John Dillon, Camp 1871, C.P.R.S."

This trail is now overgrown with brush, and most of the bridge work is gone, yet it is still passable for the few who come that way. Otherwise the valley, beyond the few scattered ranches, has lapsed into solitude, until now, after nearly thirty years, a second generation of railway locators invade it.

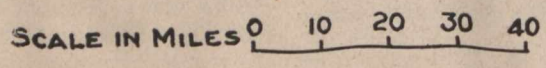
During the interval a number of expeditions have been made from Kamloops to the mica mines of Canoe River and Mica Mountain, a few miles south-west, and west of Tete Jaune Cache, a journey of about 15 days by pack train.

As early as 1852, Bancroft, in his history of British Columbia, records a report of placer gold being found on the Thompson, and in 1857, Chief Trader McLean, of Fort Kamloops, sent to Fort Victoria for iron spoons to scrape the gold from the bed rock crevices. It was in 1858 that California miners first worked the bars of the lower Fraser River leading up to the discovery of Old Cariboo, which resulted in the sad hardships of some gold-seeking emigrants, who, in 1862, attempted to reach them overland by way of Yellowhead Pass and the upper North Thompson.

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SKETCH MAP OF NORTH. THOMPSON RIVER



Principal Grant, passing through Yellowhead Pass with Sir Sanford Fleming, then Chief of Location for the C.P.R., attributes the name of this pass to an old Iroquois hunter who cached his furs at the great valley of Tete Jaune Cache until he was ready to pack them over the Pass to Jasper House on the Athabasca. His hair being of a light colour gave the place its name. Another story is that it was named after a yellow-haired packer of the Hudson Bay Company who made this place a depot on his way from Fort George on the Fraser to Henry House on the Athabasca. Be that as it may, there is, or was, one lonely family group of Indians permanently encamped at this place who might well be descendants of the original Iroquois "Tete Jaune," save the yellow hair, which is not possessed by "Old Moy-ees" or any of his family.

The earliest account of a traverse from the "Cache" to Kamloops seems to be that very bright chronicle of the Milton and Cheadle expedition, "The North-west Passage by Land," made in 1863. These valiant travellers had a most troublous time and would likely have perished but for the resource of Mr. and Mrs. Assiniboine, Stoney Indians, who accompanied them.

For 100 miles up the climate is fairly dry, the valley lightly wooded, and dotted with open spaces and bunch grass. A few isolated ranches and some fair-sized patches of fertile land exist along this distance, after which the wet belt is reached. Thence with few exceptions the valley is narrow, rocky, and heavily-timbered with hemlock, cedar, and other vegetation

of a wet country, until the great open valley near the Cache is reached. At this point the rain- and snow-fall is light, and a heavy growth of grass is observed. This is a place that for many years has been considered good wintering ground for horses, where there is a larger tract of land fit for agriculture than elsewhere on the route.

Concerning the timber resources, there is much heavy cedar in places, and there may be extensive areas on some of the tributary streams; but riding along in the narrow, gloomy valley one does not see far afield.

The most extensive meadows or valley lands are at the Indian Reserve, 50 miles north of Kamloops; Stillwater Flats, 125 miles; and Blue River Meadows, 155 miles up the river. Otherwise there are a few small areas and benches; but for much of the way the valley is, as Dr. Selwyn says, remarkably deep-cut and narrow for so large a stream.

At the Indian Reserve, on Coal Creek, 50 miles from Kamloops, there is a small area of coal strata, similar to the Nicola in age and quality of the coal. The seams exposed are thin. A section given by Mr. McEvoy, in 1894, is:—

Coal—6 inches.....	Hygroscopic water, 2.22%
Sandstone—2 feet.....	Volatile Comb, 32.05%
Coal—9 inches.....	Fixed Carbon, 52.81%
Sandstone—6 inches.....	Ash, 12.02%
Coal—18 inches.....	

Some of this coal has been taken on scows or boats to Kamloops, and is well spoken of.

(To be continued.)

CANADIAN AND ENGLISH COMPANY LAW.

(A continuation of the discussion that appeared in our issue of November 15.)

A letter of an English correspondent of The Financial Times, of London, England, that was published by our contemporary on September 1st, was reprinted in the Canadian Mining Journal of November 15, along with a reply from Mr. J. J. Harpell. The Times' correspondent asserted that there exists in Canada no such legislative control of company promotion as is maintained in England. Mr. Harpell, replying to this, pointed out that the Ontario Companies Act is much more rigidly enforced, especially as regards mining companies, than is the English law.

In The Financial Times of October 29th the anonymous correspondent takes exception to certain of Mr. Harpell's statements, and asks some leading questions. These questions Mr. Harpell answers completely in the letter reproduced here.

We are compelled to remark that The Financial Times' correspondent displays not even a casual acquaintance with Canadian company law. He has arrived at his conclusions without taking the trouble to glance over even the Ontario Act on which he has so much to say. Moreover, his knowledge of the English law is certainly superficial and inaccurate.

We do not choose to pose as apologists of Canadian business morals, beyond remarking that the worst Canadian examples of business turpitude flourish better in foreign lands than on their native soil. Canadian company laws are patently defective in some respects.

But, despite all talk of Somerset House, we believe that our legislative machinery does not suffer unduly by fair comparison with that of the Mother Country. Fair comparisons, however, cannot be expected from a writer who rushes into print totally misinformed or uninformed, or both.

This particular kind of Pharisaism we cannot and need not tolerate. Grave abuses exist in Canada, as in every prosperous and exploitable country. The man who is brave enough to point these out, whether he be a Canadian, an Englishman, or a Turk, we respect. But the destructive critic must, above all things, make sure that he is well and truly informed. Slipshod, acidulous, and vain generalities do nothing but harm. They cannot remedy abuses, because they are aimed at wrongs that do not exist.

But the reader may judge for himself:—

From The Financial Times, October 25th.
**CANADIAN COMPANY LAW—HOW IT DIFFERS
 FROM ENGLISH LEGISLATION—REPLY
 TO CRITICISM.**

(From a Correspondent.)

On 1st September The Financial Times published an article by the writer dealing with the over-capitalization of Canadian companies and defects in the Dominion and Provincial Companies Acts. The article was

written for the purpose of giving information to British people who are investing largely in shares of companies of Canadian origin and administration and sounded a note of warning, such as it is the peculiar province of a paper like the Financial Times to give to its readers. Naturally the article has provoked much resentment in many interested quarters and has evoked considerable hostile newspaper comment, as was to be expected. Editorially, a London financial paper remarked that "in the case of a young and growing country it is inevitable that much latitude should be allowed to individual enterprise." This is undoubtedly true, but that such latitude should extend to the Directors and promoters of Canadian companies in dealing with other people's money is a matter on which British investors in these companies are entitled to hold strong opinions. As was pointed out in the former article, Canadian Directors have not come to realize, as a class, that they are trustees for the shareholders in a company, as well as for the "controlling interest" in any company. When the law confers the privileges of incorporation and limited liability upon a company in England it, so to speak, constitutes the new entity its ward and carefully supervises the proceedings of its trustees, the directors.

The British Investors' Standpoint.

Such is not the case in Canada, where the controlling interest is supreme and the controlling interest is usually in the hands of the promoters. It may be urged with considerable truth that the promoters of an enterprise are usually the persons most capable of managing it successfully. On the other hand, it is the fact that there are Canadian companies in which British investors are interested where the interests of the promoters—that is, the controlling interest, otherwise the Board of Directors—are not in harmony with the interests of the minority shareholders, British or Canadian. Take the case of a large corporation that forms several subsidiary companies, the shareholders in each of these being different, but the "controlling interest" the same. The smaller companies will probably be managed entirely in the interest of the larger concern, regardless of the shareholders in the smaller company. The idea in general in Canada that if a British investor gets anywhere from 3½ to 5 or 6 per cent. for his money he ought to be entirely satisfied and ask no questions. But what of the large profits made by the Canadian promoters who have contributed little or no money towards the cost of such enterprises? The state of the Canadian company laws permits these undisclosed profits to be concealed beyond the hope of finding out by any shareholder. Of recent years the whole force of English company law has been directed towards compelling the most complete disclosure of contracts, antecedent to the formation of a company, which might in any way influence an investor in taking or refusing to take shares in such company, and such contracts are on file, so that "he who runs may read." Such is not the case in the Dominion of Canada. However, nearly all the shares in Canadian companies that are sold in England pass by transfer and not by original allotment, consequently the transferee takes them with the same knowledge as the transferor had. Of course he has not actually got this "knowledge," but in accepting the transfer he is assumed to have it, which amounts to the same thing.

Cobalt Flotations.

In The Financial Times of Saturday last there was a letter from Mr. J. J. Harpell complaining that the writer of the article of 1st September had "done much injustice to Canadian people and to many of their laws and institutions." Mr. Harpell then goes on to state that "it would be a great mistake to leave your readers under the impression that Canadian company law has not been modelled after similar English legislation, because nothing could be further from the truth." On the other hand is the deliverance of your financial contemporary, already referred to, who in criticising the aforesaid article gave the valuable opinion that the Canadians, being wise in their generation, had adopted in their legislation the best points in both English and American company law. As there are now nearly fifty States in the American Union, and each has its own special company laws, the framers of Canadian legislation must have had a wide fund of information to draw upon. Had space permitted, allusion would have been made in the former article to the attempt made by the Ontario Government and Parliament to reform the company law of that province. This was brought about by the absolutely scandalous state of affairs in Toronto in the way of company promotion at the time of the Kootenay boom in the closing years of the last century. It is to be feared that a not much better state of things exists at present when one reads in the Toronto papers that Cobalt claims—"claims," and not "mines," is written advisedly—were incorporated as public companies in one week for an aggregate sum of no less than \$16,000,000. The smallest of these capitalizations the promoters, with modest assurance, placed at \$1,000,000.

Differences in Canadian and English Law.

Mr. Harpell says that "The Companies Act of Ontario is almost an exact replica of the English Act of 1901, with one or two very important amendments." Will Mr. Harpell state that the Ontario Act prohibits the issuance of shares at a discount or the giving of shares to directors to qualify them? Does it prescribe a minimum subscription upon which a company can go to allotment? Mr. Harpell says that all the information available about English companies at Somerset House can be found in a similar way at the Provincial Secretary's office in Toronto in regard to companies incorporated in Ontario. Not very long ago the writer had occasion to make a search at the Ontario Provincial Secretary's office in regard to an important company incorporated in the province and doing business outside the Dominion, and all the information he could get "didn't amount to shucks"—nothing like the returns that are compulsorily filed at Somerset House. In the search made by the writer the main object was to peruse any contracts or agreements made antecedent to the incorporation of the company in question. Nothing of the kind was to be found, though there were some details showing the date of incorporation, names of the incorporators and details of capitalization, all of which had already been obtained from the files of a Toronto newspaper. Mr. Harpell is, no doubt, familiar with the letter of the Ontario company law, and the writer is not, but he has had considerable experience of its operation. He has also some experience of the Dominion Acts and special Charters, as well as those of several of the provinces, and has no hesitation in repeating the warning given to British investors in the article of 1st Sep-

tember that before buying into Canadian companies they should ascertain (if they can) whose shares they are buying, what cash has been paid into the treasury of the company from sales of shares, and for what consideration, if any, the shares were originally issued.

Evil of Over-Capitalization.

Mr. Harpell, in the second half of his letter, after commending your correspondent for his criticism of the over-capitalization of the Canadian electric power companies, goes on to say: "Almost every conceivable commodity in Canada is being syndicated and capitalized to an extent that is forcing up the cost of living and production to a point where the prosperity and development of the country are being threatened." In this he is quite correct, and the cause is to be found in the laxity with which the various Companies Acts are framed and administered. If adequate disclosure of every company's affairs were compulsory, and a sufficient *ad valorem* tax placed upon all share capital issued for anything except cash at full par value, or its legitimate equivalent, the monstrous over-capitalization that has been going on would cease. The writer has been accused of dealing in "vague generalities," but it would be easy to cite particular cases. They are well within the knowledge of every Canadian, but it would be invidious to name one or two where many Canadian companies are in the same boat, and when their operations are perfectly legal and meet with the approval of the commercial communities in which they are domiciled. This much may be said: These enormous over-capitalizations, if attempted here, would shock the commercial conscience of England and become impossible of accomplishment. That is why it was written in the former article that the commercial morality of Canada is patterned upon the United States rather than upon Great Britain. Mr. Harpell himself shows how Canada is following the lead of the "Land of Trusts" rather than in the footsteps of the Old Country, and to that extent exonerates the writer from making any imputation against the people of Canada, for whom he has a great regard and admiration. If, however, some of the leading Canadian business men conduct their operations on the lines of high finance in the United States, it is the duty of influential English papers to draw attention to the fact, for, after all, it is money subscribed by the British public that provides the cash basis upon which many Canadian companies have built up monstrous super-structures of share capital unrepresented by any asset save the commercial astuteness and assurance of the promoters and their associates.

MR. HARPELL'S SECOND LETTER IN REPLY TO THE ABOVE.

To the Editor of, "The Financial Times" London, Eng.
 Sir,—There are a few points raised by your correspondent in his communication that appeared in the Financial Times of Oct. 29th, which require answering. Further than replying to these I have no desire to prolong the discussion. It has been sufficiently demonstrated that if avaricious and reckless promoters choose to charter Limited Liability companies in Canada and sell their securities in England, no greater blame can be attached to the people of one country than to those of the other. This is particularly so when both countries have shown themselves equally desirous of curtailing and of stamping out this sort of thing

by the best legislation they can conceive. Furthermore, as I have pointed out in my former letter the losses sustained by the over-capitalization of these companies are not borne altogether by the investor. In so far as they have been able, these companies have compelled the Canadian consumer to pay a price for their products that would enable them to earn the dividends promised the English investor. For this reason, if for no other, the people of Canada are just as anxious to expose and punish the perpetrators of this kind of fraud as are the people of this country.

In the course of his article your correspondent writes as follows,—"Will Mr. Harpell state that the Ontario Act prohibits the issuance of shares at a discount or of giving shares to directors to qualify them? Does it prescribe a minimum subscription upon which a company can go to allotment?"

In answering these questions the writer has before him copies of both Acts. So far as he can discover the English Act makes no mention of issuing shares at a discount. It does not seem either to permit or to forbid it. On the other hand the Ontario Act permits it in the case of mining companies only. But in Section 141 the Ontario Act states that "No shares shall be issued at a discount unless authorized by a by-law of the company confirmed by a majority of the shareholders thereof——." A copy of this by-law must be filed in the office of the Provincial Secretary and on each of the share certificates of such a company the words "No Personal Liability" must be distinctly written.

As regards the giving of shares to directors to qualify them, both the English and Ontario Acts permit this. But both also require that the prospectus shall state full particulars of the nature and extent of the interest (if any) of every director in the promotion of or in the property proposed to be acquired by the company with a statement of all sums paid or agreed to be paid to him in cash or shares by any person either to induce him to become, or to qualify him as, a director. This is verbatim Sec. 99 Sub. Sec. 1 (m) of the Ontario Act as well as Sec. 10 Sub. Sec. 1 (n) of the English Act.

Again, neither the English nor the Ontario Act prescribes a minimum subscription upon which a company may go to allotment. But both are equally exacting in requiring that this be set forth in the articles of incorporation and that if it is not so stated the company cannot go to allotment until the whole capitalization is subscribed. Both Acts also require, in the following words, that the prospectus "must state the minimum subscription on which the directors may proceed to allotment" Sec. 10 Sub. Sec. 1 (d) of the English Act and Sec. 99 Sub. Sec. 1 (d) of the Ontario Act.

In a recent issue of "The Accountant" the following reference to this section of the English Act occurs:—"Although Sec. 10 Sub. Sec. 1 (d) of the Companies Act provides for a minimum subscription to be stated in the prospectus, there is no regulation as to the ratio it should bear to the nominal capital, and in a recent registration the minimum subscription was fixed at £100, while the potential capital reached £70,000. It may be very difficult to draw a hard and fast line in this matter, and the draftsman of the Act may have been under the impression that cases such as we have illustrated would carry their own condemnation by such a bare-faced evasion of the spirit of the measure; yet it is not easy to see wherein lies the benefit of the Sub. Sec. in the absence of any limit."

You will notice, sir, that neither in this nor in my former letter have I made any attempt to exonerate or defend the excessive flotation of private Canadian companies. My only desire in writing is to disassociate the Canadian people from the promoters of this sort of thing, and to point out that the Companies Act of the Province of Ontario which is modelled after your own English Act, is even more effective than the latter in protecting the public from fraudulent flotations. If the English Act required, as does that of Ontario, prospectuses and advertisements of foreign companies to disclose as many material facts as is required of the

prospectuses and advertisements of home companies there would not be so many offering their securities in this market, and much would be done to protect the English investor from the losses that he will undoubtedly suffer. It would be interesting and, no doubt, instructive to know to what extent the English Companies Act is responsible for the large foreign investments of English capital, as compared with the amount that is being invested in local securities.

I am etc.

J. J. Harpell

PRACTICAL HINTS IN THE PRECIPITATION OF SILVER FROM CYANIDE SOLUTIONS

by R. B. Lamb*

The precipitation on zinc shavings of silver from cyanide solution is a function of the richness of the solution. The success of the precipitation and recovery of the bullion depends largely on this very important factor. The richer the solution in silver, the more easily precipitation is effected, and the simpler the subsequent recovery operations become. It is therefore important in the manipulation of cyanide solutions, before passing through the zinc boxes, for the metallurgist to arrange the flow of his solutions in such a way that the values are concentrated in a given amount of solution, or at least, in a certain or certain solutions before passing through the zinc boxes. When this method is employed, precipitation gives little or no trouble and a higher grade zinc silver product is obtained. With very high grade solutions in many instances 75 per cent. or even 85 per cent. of metallic will be found in the zinc silver precipitate, and the precipitation will occur almost wholly in the top compartments of the box. The consumption of zinc is much less on high grade solutions, and the deposition of base metals and minerals does not take place to such an extent, particularly in the top compartments of the zinc box.

It is no longer the best practice to move the zinc of the bottom compartments to the head of the box in filling with new zinc. The zinc should be disturbed as little as possible, and sufficient new zinc put into the compartments, the corners and sides, being packed firmly, but not tight enough to cause channelling, and the new zinc being placed on top of the old. This should be attended to daily with as little disturbing of the zinc as possible. Every compartment should be gone over carefully and repacked daily.

Instead of moving the zinc from bottom to top, it is far better to depend upon the manipulation of the solutions, aiming to get a high grade solution that will give the successful precipitation desired by the metallurgist. At all times this method will give a higher grade of precipitate than will result from distributing of zinc from bottom to top.

The most important item in precipitation by zinc shavings is to have an ample zinc box capacity. Certain features of construction must also be carefully

attended to. The box should be constructed in such a manner that the flow of solution from the head to the tail of the box will be very sluggish and uniform. There should be no currents or channelling through the zinc. To obtain this result the width of each compartment should be not less than 18 inches. It should have a depth no greater than the length of a man's arm. The length of the box and the number of compartments will depend on the volume of solutions that have to be run through in a given time. The width of the box will depend on the individual taste of the operator. A single unit box should be of such width that a man on each side of the box can work comfortably and clean up. A double unit box must be constructed so that one man can clean up from one side. The space underneath the screen upon which the zinc shavings rest should be not less than four inches deep on one side, tapering to from 8 to 12 inches on the other side. The bottom of each compartment should be connected to the common launder by means of a plug or valve, preferably the former.

In present practice the zinc shavings should not be washed outside the box. To permit of this the compartments of the box should be of ample capacity, and should receive a small moveable trommel which is set up in the first compartment of the zinc box where the clean-up begins, and the washing should be done in the solution of the box itself. After all the compartments of the box have been washed in this manner by moving the trommel into each compartment successively, the washings carrying the silver zinc precipitate are run out through the launder to the clean-up tank. The compartments of the box are then thoroughly hosed out, the box filled with water, and the zinc returned.

It is unnecessary to describe the method of filling the box, as every metallurgist is acquainted with this procedure. The washing of the zinc boxes should be conducted once or twice, and with rich ore, possibly four times a month, and the resulting product should be collected in the clean-up tank. It is unnecessary also to describe the method of recovering the zinc silver slime from the clean-up tank. Either decantation or filtration may be used, the object of either method being merely to get rid of surplus water.

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Although it may be used with advantage in many cases, it is not essential to use the acid method of refining, silver being too cheap a metal for this process. In some silver cyanide problems where the ore is particularly free from base metals, and the precipitation has been conducted by the metallurgist in a way that gives a high grade precipitate, it will be found that smelting with borax is the only refining operation necessary. The amount of borax used is for the operator on the plant to determine, but it should not run over 40 per cent.. It is quite unnecessary to dry the precipitate. In cases where a little base metal is present, it is sufficient, providing the solutions have been comparatively high grade, to melt the moist precipitate with borax, soda, sand, and 2 per cent. nitre. A tilting furnace of the Monarch type should be used; the precipitate should be charged into a nearly cold pot, and the melting should be pushed rapidly with a good hot fire to finish.

For refractory precipitates to prevent roasting and incidental loss, I give the following method, bearing in mind that silver precipitate at most plants will not stand roasting on account of silver losses, and the low price of the metals:—

Place moist precipitate in a large iron pan, and add water up to from 30 to 50 per cent. of the total weight. Add, as fluxes, borax, soda, and 2 per cent. nitre. The borax and soda should be kept to the minimum that will permit of good refining. Add a very small proportion of glass powder or fine sand; mix the fluxes with the precipitate in the pan, and shovel the mixture about well. It will be found that this product resembling in physical appearance a soft mud, can be melted without roasting. Moreover, fluxes are utilized to better advantage, the base metals are more easily got

rid of, and the pots will stand longer. Use a somewhat slow fire to start, rapidly increasing the heat to a hot and strong finish. After pouring, allow the charge to cool thoroughly before disturbing. Should the precipitate contain arsenic, antimony, or other base metals, or if lead acetate has been used in the treatment, there will probably be a matte or speiss, or a mixture of speiss and alloy of lead and antimony or other base metals formed on top of the bullion. If the button does not break off clean after a proper length of time for cooling there is a certain amount of alloy formed on top of the silver. The best way to deal with this is to remelt the bullion from the entire clean-up in a hot furnace and pass a current of warm air free from excess in moisture, through the molten bullion to oxide the base metal. Finish up with nitre refining flux. This flux should be made of borax, soda, and 5 per cent. nitre. It should not be added until the bullion has been formed, the slag removed, and the bullion remelted or the entire charge skimmed without pouring. By this method there will be practically no silver losses in refining, and the resulting bullion should not be less than 950 fine if the operation has been carried out by a careful manipulator. With a little patience it can be sent away from the plant 990 fine, or better, without adding to the cost of plant refining. I do not recommend roasting silver precipitates for the elimination of base metals, except possibly in a few exceptional instances. The method given above is the best that is known at present. It will be found on a little practice that the silver clean-up can be accomplished with a very small percentage of flux. The total percentage of flux on the method outlined should not exceed 50 per cent. the weight of the precipitate smelted for comparatively low grade precipitates, with corresponding less amounts for higher grades.

REPORT ON THE WHITEHORSE COPPER BELT YUKON TERRITORY

By R. G. McConnell

Issued by the Geological Survey Branch, Department of Mines, Ottawa—Abstract Prepared for the Canadian Mining Journal.

(Continued from last issue.)

Ore Bodies and Ores.

The outcroppings of the Arctic Chief ore body at the surface, consist of a long lens of nearly solid, practically unoxidized magnetite, stained in places with copper carbonates. The hard surface section is grooved and striated by ice. The oxidized upper portion, if any existed, was removed during the glacial period, and since then little alteration has taken place.

The ore body, as defined by the workings in the main level 65 feet below the surface, consists of a mass of magnetite, approximately 190 feet long, and from 25 to 40 feet in width. The mass is fairly regular in outline, but curves gently away from the granite contact, towards the west. Small parallel lenses have been disclosed by the workings at two points.

Little is known of the ore body below the main level. A centrally located shaft, 50 feet in depth, followed ore

for 25 feet, then passed through altered diorite. A short drift to the north, from the foot of the shaft, penetrated mixed ore and altered rock for a few feet, and then entered limestone. A lens of well mineralized magnetite was encountered in a short cross-cut from this drift to the right, following the lime-diorite contact; but the work done was insufficient to show whether this represents the downward continuation of the main ore body, or the upper part of a new lens. A cross-cut to the left, along the lime-diorite contact, led to the discovery of a vein of rich silver-bearing tetrahedrite. The vein varies in width from a few inches, to a couple of feet, and had been followed about 40 feet, at the time of my visit. It does not appear on the surface, and this mineral is not known elsewhere in the camp.

The main magnetite lens of the Arctic Chief is enclosed directly between altered granite and crystalline

limestone, at its eastern end only. The western portion of the lode bends away from the contact, and has developed entirely in limestone. Where the lode adjoins the granite, it is bordered by a zone of mixed ore, and diorite, largely replaced by secondary minerals. In the limestone it is more sharply defined, the dark magnetite usually ceasing abruptly against a wall of white limestone, either pure or containing only a few scattered grains of iron. Horseshoes of nearly pure iron occur in the magnetite, and tongues of magnetite occasionally penetrate the lime for a few feet.

The magnetite varies greatly in texture, often passing in a short distance from a fine close-grained condition to a coarsely granular one. In certain areas, especially near the boundaries, the grains are separated by a soft serpentinite mineral resulting from the hydration of secondary augite and actinolite. Clinocllore is also present, in places, in considerable quantities.

The principal economic minerals associated with the magnetite are the two copper sulphides, bornite and chalcocopyrite. They occur in about equal quantities. They are distributed in grains and small patches throughout the whole lode, but are more abundant in some areas than in others. They occur both in separate grains and bunches, and are intimately intergrown.

Copper minerals, resulting from the alteration of the sulphides, are less plentiful at the Arctic Chief than at most of the other mines. The two copper carbonates, malachite and azurite, occur in small quantities at the surface and along the walls, but are seldom found in the interior of the lode. Cuprite, the red oxide, also occurs sparingly along the walls, and is usually associated with small quantities of native copper.

The iron sulphide, pyrrhotite, is occasionally found at this mine, in small masses enclosed in magnetite. The common zinc sulphide, sphalerite, also occurs, but is comparatively rare. No pyrite was observed.

The gold and silver values in the Arctic Chief are important. Assays invariably show gold in some quantity, the tenor ranging from traces, up to over two ounces per ton; and the whole lode probably averages over \$4 to the ton. The gold values are not influenced by the copper percentage, since ores high in copper, often carry light values in gold. Specks of native gold are occasionally found, both in the ores and in the crystalline limestone. The silver tenor of the ordinary shipping ores averages about two ounces per ton; and assays of 147 ounces to the ton have been obtained from the tetrahedrite vein in the lower level.

The average copper percentage of the Arctic Chief lode is difficult to estimate, but probably exceeds 4%. A selected shipment of 140 tons, made in 1904, gave returns of 0.39 ounce of gold, 2.5 ounces of silver, and 7.22% of copper. A shipment of 83 tons, made during the past season, yielded 0.18 ounce of gold, 2.00 ounces of silver, and 5.37% of copper.

The following partial analyses of Arctic Chief ores were made at the Ladysmith smelter:—

	Au	Ag	Cu	SiO ₂	Fe	Al ₂ O ₃	CaO
(1)	0.09 oz.	2.45 ozs.	8.13%	8.60%	44.84%	15.78%	None
(2)	0.08 oz.	1.12 ozs.	3.57%	6.60%	53.20%	13.28%	None

Claims in the vicinity of the Arctic Chief, developed to some extent, include the Whitehorse, Golden Gate, the Suburban in the Corvette group, and the Verona.

The two former belong to the same company operating the Arctic Chief, and extend southward from it. They are situated in a granite area, destitute, as far as known, of limestone inclusions. The croppings on both claims are similar, and consist of partially decomposed

granite, or diorite, seldom more than a few feet across, stained with iron and copper. Quartz, calcite, white mica, and chalcocopyrite, are the principal minerals present. The workings consist of a few shallow pits.

The Suburban is situated east of the Arctic Chief, on a valley branching off from McIntyre Creek. The lime-granite contact line passes through it, and is well exposed in the steep southern bank of the valley. The contact here is very sharp, and nearly vertical. The bordering granites are not mineralized, and are comparatively fresh. The limestones near the contact are altered mostly into fine-grained magnetite and serpentine, stained with copper carbonates. The altered zone has a width of 4 feet, and is followed by 6 feet of limestone, beyond which is a second, narrow, copper-stained bed.

North of the valley the contact is bordered by a narrow garnetized band, containing some bornite, chalcocopyrite, and magnetite. A shaft 50 feet deep has been sunk on the deposit.

The Verona, northeast of the Arctic Chief, is underlain mostly by basic granites or diorites, and limestones only occur as occasional inclusions. The granites bordering the inclusions are altered and partly replaced by epidote, garnet, augite, and other secondary minerals, including bornite, chalcocopyrite, and magnetite.

A lens of magnetite, 30 feet in diameter, carrying copper minerals, occurs on the same claim. The lens is situated about 300 feet southeast of the line of limestone inclusions, and is surrounded by epidotized and garnetized diorite. No work has been done on it.

The Grafter.

The Grafter ranks among the important mines of the district. It is situated about a mile north of the Arctic Chief, at an elevation of 730 feet above Whitehorse. A wagon road, 7.3 miles in length, connects it with the terminus of the railway at the latter point.

The Grafter was staked August 5 1899, by Wm. Woodney, and in the following year a shallow shaft was sunk on a small oxidized area near the eastern boundary of the claim. In 1901, the claim was bonded to a local syndicate, and in that, and the following year, the shaft was continued down to a depth of 50 feet, and a southwesterly drift from the foot of the shaft was carried forward for a distance of 137 feet. Work was resumed in the spring of 1907, by Robert Lowe, the present owner, and a considerable quantity of ore was mined, and shipped during the season.

Geology.

The Grafter is situated in an area of narrow alternating bands of limestone and basic granite or diorite, all more or less altered. The intrusive here is a light to dark grey, rather coarse rock, mottled everywhere by dark areas, from a few inches to several feet in diameter. Most of these are basic segregations, but the angular character of a few of the larger ones suggests inclusions. Small light coloured aplite veins cut across both light and dark areas, and give the rock a very variegated appearance.

The intrusive is more basic than usual, the sections examined indicating a diorite, and in some instances, where augite is present in considerable quantities, a diorite-gabbro rather than a granite. The segregations consist mostly of hornblende, and a kaolinized plagioclase with some pyroxene, orthoclase, biotite and magnetite. Secondary minerals, mostly andradite, epidote, augite and actinolite, and copper sulphides, have de-

veloped in the granite near the limestone contact, and occasionally almost completely replace it.

The narrow limestone bands near the Grafter are enclosed in granitic rocks, and are altered into coarse, white and greyish marbles. In the immediate vicinity of the ore body, and at other points along the contact, the limestone is strongly mineralized, chiefly with andradite and varieties of pyroxene and hornblende. Besides these, a few nodules of serpentine, probably derived from the ferro-magnesian minerals, are also present. A peculiar, yellow banded variety proved on examination to be impregnated, in layers, with silica and iron.

Workings

The workings on the Grafter consist of a shaft somewhat less than 100 feet deep, sunk on the ore body. At the 50 foot level, the ore body, which here describes a semi-circular course, has been followed for a distance of 150 feet, and has been stoped out in places nearly to the surface. A southwesterly drift, 137 feet in length, has also been run on the same level, to undercut a second surface showing. No ore was found in the drift, but more cross-cutting is necessary to prove definitely its existence, or non-existence, at this depth.

Ore Body and Ores.

The Grafter ore body has developed near the end of a small limestone tongue, which penetrated the main granite area for a few hundred feet. The limestone at the extremity of the tongue is irregularly altered, portions of it being completely replaced by the ordinary assemblage of secondary minerals; while other portions, sometimes directly above, are almost free from them. The granites, or diorites bordering the limestone are also more or less completely replaced along a narrow intermittent zone by the same minerals which have developed in the limestones, and in some areas the present representatives of the two rocks are so similar that they cannot be distinguished in the field.

The ore body worked at present has formed around a core of nearly pure, white crystalline limestone, 28 feet across. Development work has not proceeded far enough to show whether the central limestone mass is entirely encircled or not. At the 50 foot level, ore has been followed continuously around one end of the core, for a distance of 150 feet. The ore body here has a maximum width of 17 feet, and with the exception of one lean stretch, at the end of the oblong limestone core, is seldom less than 6 feet in width.

The continuation downward of the ore body, to a depth of 90 feet at least, was proved by a shaft, sunk during the past season; and preparations were being made at the time of my examination to drift along it at that level.

The Grafter ores consist essentially of bornite and chalcopyrite, in varying quantities, disseminated through a hard garnet-augite-tremolite gangue. Malachite and azurite, cuprite and native copper, also occur in small quantities. Magnetite is common, but does not form large masses, and grains of pyrite, a somewhat rare mineral in the ore bodies, are occasionally found intergrown with the chalcopyrite. A small veinlet of quartz, carrying specks of native gold, was cut in sinking the shaft. The gangue minerals, besides those mentioned, include actinolite, canerinite, and epidote.

The copper minerals are usually most abundant close to the unaltered limestone, and the grade of the ores decreases gradually, as a rule, away from it, until they become too lean to ship. Occasional grains and bunches of bornite and chalcopyrite occur throughout the whole altered area.

The shipments from the Grafter to date, mostly made during the past season, have amounted to about 2,000 tons. The ore shipped carried from 6 to 8 per cent. of copper, and contained besides, values in gold and silver, averaging about \$3 per ton. It was practically unsorted.

The smelter returns of a couple of average shipments are as follows:—

Lbs.	Moist.	Dry W't.	Copper.	Silver.	Gold.	
183,460	...	1.5%	180,708	7.83%	1.88 oz.	0.12 oz.
221,370	1.3%	218,492	7.03%	1.64 oz.	0.10 oz.

Claims in the Northern part of the District

The Pueblo

The Pueblo mine is situated in the valley of Porter Creek, near the northern end of the copper belt, at an elevation above the sea of 2,260 feet, and above Whitehorse of 570 feet. It is connected with the latter point by a good wagon road, 6.5 miles in length.

History

The Pueblo concession was staked July 7, 1899, by H. E. Porter. The original discovery was made—so it stated—not on the great copper-stained hematite mass which now gives it value, but on an unimportant quartz vein situated near the eastern boundary of the concession. It passed, soon after being staked, into the possession of the Whitehorse Copper Company, and was almost immediately bonded—with fifteen other claims owned by the same Company—to the British-America Corporation. Some development work was done by the latter company; but the grade of the ore not proving satisfactory, the bond was thrown up. Early in 1906, the concession was bought by the Yukon Pueblo Mining Company, of Spokane, Wash., U.S.A., and a systematic exploration of the ore body has since been in progress.

Development Work

The development work by the British-America Corporation consisted of sinking a shaft 70 feet deep, and drifting across the lode from the bottom of this. These workings were filled with ice and water at the time of my visit, and were inaccessible. The main drift extends about N. 19° W. from the bottom of the shaft, for a distance of 120 feet; and 30 feet from the face a shaft was sunk to a depth of 30 feet below the level of the drift. A second drift extends southwest from the bottom of the 70-foot shaft for a distance of 35 feet.

The long drift, and both shafts, are reported to be entirely in ore, while the short drift penetrates crystalline limestone. Work under the present management has consisted mainly in determining the surface outline of the ore body, and in removing the boulder clay which covers the eastern part of it.

Geology

The Pueblo ore body is situated near the granite-lime contact; but appears to be enclosed entirely in crystalline limestone. Just how close it approaches the actual contact is not known, as the country east of it is heavily drift-covered. The first outcrop of granite—here a hornblende variety—occurs in an easterly direction, at

a distance of 380 feet, and in a northerly direction, at a distance of 270 feet. The limestone replaced by the ore body was originally cut by granite dykes, and partially altered portions of these are still recognizable. A porphyrite dyke, 2 to 4 feet in width, younger than the ore body, crosses it in a northerly direction. The dyke has been attacked by solutions containing copper, and is everywhere decomposed and copper stained. Portions of it, for a considerable distance below the surface, have been removed, and the space filled in with gravel and boulders.

The limestone in the vicinity of the lode is highly crystalline, and contains a few garnets, but is not rich in secondary minerals. The granites immediately bordering the limestone, descending Porter Creek valley, are also only slightly mineralized. Further down at a distance of 840 feet from the main ore body, an area of intense mineralization occurs. The granites exposed on the right bank of the Porter Creek are filled with secondary minerals, mostly garnets, for a distance of over 300 feet. Some iron, in disseminated grains and small bunches, carbonates of copper, and occasional grains of chalcopyrite, are also present. Limestones occur on the opposite bank of Porter Creek, and probably border the mineralized area, but the contact is concealed beneath the wash-covered flats of Porter Creek.

Ore Body and Ores.

The Pueblo ore body, as exposed on the surface by present development, is an irregularly shaped mass, 300 feet in length, and 170 feet wide, near the centre. The surface section measures approximately 33,000 square feet. It has been proved to a depth of 100 feet. The horizontal section at this level is not known, as it was only reached by a single shaft. At the 70 foot level the dimensions probably equal those at the surface, as a drift 120 feet in length from the foot-wall failed to reach the hanging-wall. The general dip of the lode has not been definitely proven. The foot-wall near the shaft has a northerly inclination of about 60°.

The ore is essentially a cupriferous hematite, deposited in limestone by a metasomatic replacement of the latter. The replacement has been nearly complete, only occasional traces of the original limestone remaining. The replacement of a granite dyke which cuts the limestone is less perfect. Portions of the dyke have been wholly or partially altered to iron and other minerals, but in places its original character is still evident.

The hematite grades in texture from a fine compact variety to a coarse glistening specularite. It is always slightly oxidized, even at the lowest depth reached, but the oxidation is confined, as a rule, to the surface of the grains, and no complete conversion of the hematite to limonite has been effected, except at a few spots on the surface. An irregular silicification of the lode, by surface waters, has produced important changes in the character of the ore. Certain areas have been converted by this agency into hard siliceous masses.

The copper sulphides associated with the hematites have suffered more by alteration than the hematite itself, and have been largely altered into carbonates, oxides, and silicates. No bornite has so far been found, although this mineral was probably present originally, as it is common throughout the district. Chalcopyrite has also disappeared from the greater portion of the lode, but has been preserved in a few limited areas. The carbonates of copper, especially the green carbonate, are the most important economic minerals in the portion of the lode explored at present. They occur disseminated

throughout the hematite, and while more abundant in some portions than in others, nowhere form large, pure masses. The silicate of copper crysocolite is common, especially in the silicified portions. Cuprite, the red oxide, is sparingly distributed in veinlets, and small masses, through limited portions of the lode.

The alteration of most of the original copper sulphides into various secondary minerals, was accompanied by an impoverishment of certain portions of the lode and an enrichment of others, especially near the periphery. The grade on this account is variable, ranging from 1% up to 10%, or more. The smelter returns from a shipment of 700 tons, taken from different parts of the lode, gave 5 1-2% of copper, and 1 1-4 ounces of silver, while the average grade of the whole lode, so far as explored, probably approximates 4% in copper. The great excess of iron over silica—usually amounting to from 26%, to 30%—is an important feature of the ore.

The gold and silver values in the Pueblo ores are small, as a rule, although occasional assays show from \$1 to \$2 in gold, and from one ounce to three ounces of silver per ton.

No shipments were made from the Pueblo during the past season.

The Anaconda.

This claim is situated west of Porter Creek, near the northern end of the copper belt. The principal development work consists of a long tunnel, driven westerly from the bottom of Porter Creek valley into the centre of a band of copper stained limestone which crosses the claim. No shipping ore was encountered, and the tunnel is now abandoned. During the past season the claim was under bond to Col. Thomas, of Pittsburgh, and a small amount of development work, principally stripping and trenching, was done.

Geology.

The Anaconda is situated along the eastern side of the main granite belt, and is underlaid largely by granite of the usual character. Limestone outcrops along the north-eastern portion of the claim, and a spur of limestone from the main mass, 200 to 600 feet in width, crosses the claim in a diagonal direction. South of the limestone spur several small inclusions of lime occur in the granite.

The limestone is coarsely crystalline, and in places is irregularly mineralized, chiefly with garnet, augite, tremolite, and epidote, usually associated with more or less bornite and chalcopyrite, and carbonates derived from them. The principal mineral development takes place, as a rule, some distance away from the granite, and not at the immediate contact.

The limestone dips steeply toward the granite, and the bedding seems to have exerted an important influence on the mineralization. Certain beds are largely replaced by garnet, while others alternating with them have been converted into tremolite, augite, and the copper sulphides, and others again have not been affected, or only slightly. The bands replaced by tremolite are usually rich in copper minerals, and constitute the ores, while the garnet bands are only occasionally productive.

Ores.

Croppings of copper minerals occur at a dozen or more points on the Anaconda claim, but have only been opened up by shallow pits and trenches, and practically

nothing is known of their behaviour in depth. A promising ore body, situated in the limestone, about 50 feet from the granite contact, was uncovered by trenching at a couple of points during the past season. The following section, measured along one of the trenches, illustrates the irregular manner in which the limestone is mineralized.

The principal ore body has a width of 12 feet, and is overlaid by limestone, and underlaid by a gabbro-porphyrized dyke. It consists mainly of tremolite, with subordinate quantities of augite and garnet, all carrying more or less bornite, chalcopyrite, and copper carbonates. Two small ore bodies, each about 3 feet in width, alternating with garnet and lime, parallel the main deposit, on the south. Other openings to the north and south, along the strike, show that the main lens carries its width for a distance of about 100 feet, and then narrows down. A shaft sunk on the lens to a depth of 30 feet, followed ore to the bottom.

Other lenses in the limestone, of more or less promise, have been trenched across, southwest of the one described, and one also occurs at several points in the bordering granite. The character of the croppings fully warrants further development work.

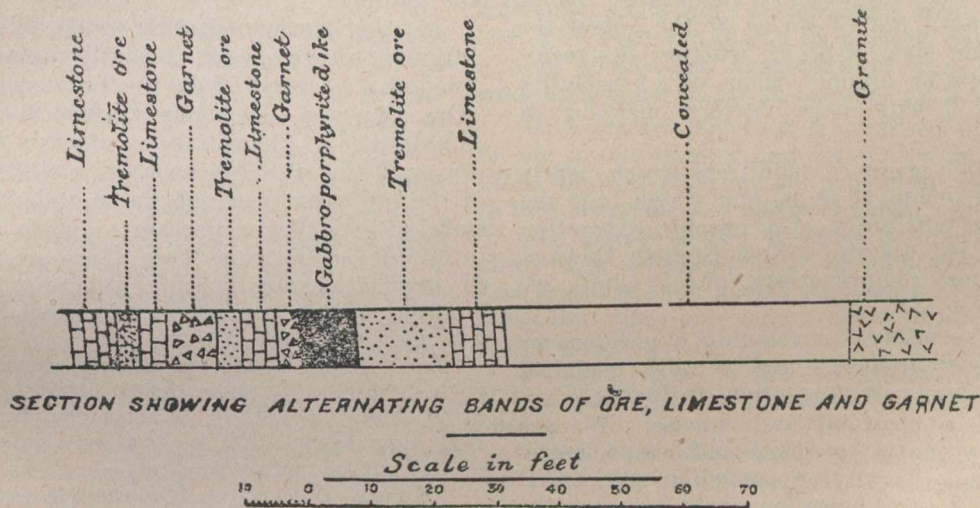
bodies, as usual, have developed. The limestone is crystalline, and at various points along the contact is partially replaced by augite, garnet, chalcopyrite, magnetite, etc. The grano-diorites have also been mineralized, principally with garnet and epidote, for varying distances back from the contact, but otherwise, present no special features.

Development.

The workings consist of a shaft, or steep incline, 92 feet in length, affording a depth of 84 feet. From the foot of the shaft exploratory drifts, totalling 270 feet in length, have been run in various directions, partly in ore and partly in more or less altered lime and diorite. Besides the main shaft, two other shafts, each about 20 feet in depth, have been sunk on promising outcrops of ore, and some stripping has been done.

Ore Body and Ores.

Copper minerals in some quantity are seldom absent from the exposed portion of the lime-grano-diorite altered contact zone on the Valerie. They are irregularly distributed, rich areas alternating with comparatively lean stretches. The upper part of the present



Claims in the Southern Part of the District—The Valerie.

This is the only claim in the southern part of the copper belt on which any considerable amount of development work has been done. It is situated west of the head of Miles canyon, and about three miles south of the Arctic Chief. A wagon road, two and one-half miles in length, to Wigan station, on the White Pass railway, was under construction during the season. The Valerie was staked August 22, 1899, by Gustave Gervais. The early development work consisted in sinking shallow shafts on the principal ore outcrops. From these 40 tons of high grade chalcopyrite ore were shipped, in 1904. Development work was resumed, in 1907, by Mr. A. B. Palmer, of Whitehorse, the present owner, and important discoveries of ore have since been made.

Geology.

The western portion of the Valerie is underlaid by limestone, and the eastern portion by hornblende granite, passing in places into a diorite, and it is along the ragged contact between these rocks that the ore

working shaft is sunk in an outcrop of chalcopyrite ore, 10 to 15 feet in width. At a depth of 25 feet, the ore ceased, and the shaft was continued through barren rock, mostly altered diorite, down to the present 84 foot level. Short drifts to the north and north-east, from the foot of the shaft, soon entered ore, and further exploratory work outlined a shoot of rich ore, approximately 50 feet in length, with a maximum width of 17 feet. An outcrop of ore on the surface, about 50 feet north-west of the shaft, probably represents the upward extension of this shoot. Three lenses, containing shipping ore, occur on the surface, while only one has so far been found in depth. It is probable that others will be discovered, when the present short drifts are extended farther along the limestone contact.

The ore shoot penetrated in the lower workings of the Valerie, is bordered on the south by a wide zone of altered and unaltered limestone, and altered diorite, impregnated with arsenical pyrites, in grains and bunches, associated with small quantities of chalcopyrite. The values in this belt are small, as the copper percentage is low, and assays show only traces of gold and silver.

The Valerie ores resemble those of the Pueblo, in consisting entirely of chalcopyrite, and derivative minerals. Accompanying these are mispickel, magnetite, augite, garnet, and calcespar. No bornite has been found. The chalcopyrite aggregates are larger than usual, and occasionally form solid bunches, several inches across.

The derived minerals, mostly malachite, azurite, cuprite, and native copper, are fairly abundant, down to the lowest depth reached.

No shipments have been made from the Valerie since 1904, when 40 tons of selected ore, obtained from the surface workings, were sent to the smelter. This ore is stated to have averaged 18% copper, and over \$5 in gold per ton.

A considerable quantity of high grade ore was obtained from the exploratory drifts run during the season.

The equipment at the mines consists of a 20 h.p. boiler; an 8 h.p. hoist; and a No. 5 Cameron sinking pump.

WHAT IS AN ORE ?

By J. F. Kemp, D.Sc., Dept of Geology, Columbia University, N.Y.

(Annual Meeting, Canadian Mining Institute, Montreal, March, 1909.)

(Continued from Nov. 15th issue.)

The idea or condition of profit enters here, but it would appear that the authors intended to define an ore according to the condition that the metalliferous deposit should attract the attention of the miner; that is, it should be a deposit out of which at the outset the miner thinks he can make a profit, whether the result justifies his expectation or not. There is a possibility in this of which I will make further mention in conclusion.

We now come to a group of definitions which clearly treat of ore in the technical sense, and which base the meaning upon the possibility of profitable extraction or treatment. In Dr. Murray's New English Dictionary, 1905, the most comprehensive of its kind, we find:—

"Ore.—A native mineral containing a precious or useful metal in such quantity and in such chemical combination as to make its extraction profitable."

This definition is clear-cut and concise. We are reminded, however, that an ore is sometimes an aggregate of several minerals, any one of which perhaps if considered by itself would not be profitable, yet the sum total is. In the low grade copper ores of the Boundary district, the little gold and the little silver which are present are important factors in the total, yet no one of the three metals alone in these percentages could constitute an ore. It would have been well to have added after native mineral the expression "or aggregate of minerals" to allow for such cases.

In the "Universal Encyclopedia and Atlas," published by the Appletons in 1901, the following definition by Professor Thomas Egleston appears. It is taken from Johnson's Encyclopedia published twenty years earlier and of which the Universal is the continued revision.

"Ore.—A metal chemically combined or in the native state, mechanically mixed with other substances, which render treatment necessary to separate it. In a strictly technical sense, only those substances are ores, which contain the metal in sufficient quantity and of sufficient purity to make the treatment profitable. Arsenopyrite, a combination of arsenic, sulphur and iron, contains 34.4 per cent. of iron, but it is not an ore of iron because the metal made from it is not of sufficient commercial value to pay the expense of treating it."

In the same volume the expression "ore deposits" is defined by R. Pumpelly and Charles Kirchoff along the same lines, but a distinction is drawn between ore and gangue.

In other works of similar scope, like the New International Encyclopedia, recently published by Dodd, Mead & Co., very much the same definition appears. "Ore Deposits, the name applied to deposits or accumulations of metalliferous minerals or ores found in the earth's crust. The term ore includes those portions of the ore body in which the metallic minerals form a sufficiently large proportion to make their extraction profitable; aside from these, there are often quantities of associated non-metallic minerals forming masses containing little or no metal, which are termed the gangue."

Authors of books on mining are inclined to look with favour on the same line of attack. In the "Manual of Mining," by M. C. Ihseng and E. B. Wilson, 4th Ed., New York, 1907, p. 3, after a paragraph treating of the native metals we find:—

"Ores.—With these few exceptions (i.e., the native metals) the metals are found in chemical union with non-metallic substances more or less completely segregated to constitute mineral. Any accumulation of mineral of good quality and in sufficient concentration to warrant the expenditure of energy for its extraction is an ore. Manifestly this is a fickle term since it depends for its stability upon the casual conditions of the market as well as upon the mineralogical features." In a glossary at the close of the work there appears: "Ore.—A mineral of sufficient value (as to quality and quantity) which may be mined at a profit."

The short definition from the glossary is a little infelicitous in form, and a little sweeping in statement. It would, of course, include coal, asphalt, ozocerite, and other non-metallies, which the greater number of us would certainly hesitate to call "ores."

The longer statement introduces the term "mineral," which deserves a word of comment. Aside from its general meaning under which are included substances of inorganic origin as against organic, the word mineral is used, in the United States at least, to designate in the large way the objects of mining, without special reference to profit or loss. Thus the law affecting the Public Lands recognizes "mineral claims," but either from a disinclination on the part of its framers to enter into the

question of profit or loss, or else from a desire to embrace also possible non-metallic deposits, mineral is consistently used instead of ore. Thus C. H. Shamel states in his valuable treatise on "Mining, Mineralogical and Geological Law," New York, 1907, pp. 55-56:—

"We may summarize the American law as to the legal definition and meaning of the word 'mineral,' when used in deeds, leases or other legal instruments, as including in the absence of special provisions in such instruments, all metallic minerals of sufficient value to justify mining and extracting the same, whether for the purpose of reducing the metal therefrom or some other industrial use. It also includes rock used for building materials, etc., coal, petroleum and natural gas. Kaolin, brick-clay, slate, etc., have not been passed upon by the American courts; but on the authority of the English cases, and the decisions of the land departments hereinafter mentioned, the probabilities preponderate that the courts will hold them to be included under the term 'mineral,' the same as granite, marble, etc."

In the paragraphs immediately following in the work cited, Dr. Shamel reviews the meaning of "ore" in the few cases in which it has been defined by the courts. The definitions are in the purely scientific rather than in the technical sense. The courts apparently prefer "mineral" to "ore," wherever possible.

A definition very similar to the one from the glossary of Ihseng and Wilson, is to be found on p. 598 of the "Coal and Metal Miners' Pocketbook," which is published by the International Correspondence Schools of Scranton:—

"Ore.—A mineral of sufficient value (as to quantity and quality) to be mined at a profit."

As remarked above, this definition of course includes all manner of non-metallic minerals.

Several definitions from works on ore deposits will perhaps not be without interest. Thus in "A Treatise on Ore Deposits" by J. Arthur Phillips, 2d Ed., revised by Henry Louis, 1806, p. 1, we find:—

"Metals which occur in a state of approximate purity are said to be native, and when two or more such metals are found in combination the substance is called a native alloy. Usually the metals sought after by the miner are, however, not found in the native state, but are mineralized by being united with various non-metallic bodies. In this way they combine with sulphur or chlorine, giving rise, respectively, to metallic sulphides or chlorides; with oxygen the metals form oxides, and with acids they yield salts, such as carbonates, sulphates, and phosphates.

"All natural combinations of a metal with such mineralizing substances are called ores when the proportion of metal which they contain, after suitable mechanical preparation, is sufficiently large to admit of their being advantageously treated by the metallurgist. Although perhaps not strictly correct, any material obtained by mining that contains a workable proportion of a metal is often called an ore, even if the whole of the metal be present in the native state."

"This definition perhaps unconsciously so far as its writer was concerned, contrasts the point of view of the metallurgist with that of the miner. But it is a contrast of which we shall need to take cognizance. Thus a miner might extract a quantity of metalliferous minerals from the ground at a loss. He might sell them to a metallurgist at such a price that the latter could profitably treat them. They might thus not be ore for the miner, although ore for the metallurgist. If you saw a pile of magnetite at a blast furnace being successfully treated

you would call it ore, even though it had been bought at the bankrupt sale of some miner.

In W. H. Weed's translation of Richard Beck's *Lehre von den Erzlagerstaetten*, under the title, "The Nature of Ore Deposits," New York, 1895, p. 1, we find the following:—

"In a mineralogical sense an ore is a metalliferous mineral or a mixture of such minerals. Practically, however, this definition of an ore must be qualified by the statement that only those minerals and mixtures of minerals are ores from which metals or metallic compounds may be produced on a commercial scale and at a profit.

Two examples of equal mineralogical or petrographic value may differ materially; a basalt carrying enough magnetite to influence the magnetic needle, but yet containing less than 10 per cent. of iron, is far from being an iron ore. On the contrary, a vein with a silver content of only 0.5 per cent. is an ore deposit since with this content it is commercially valuable. In the case of a gold deposit the amount sufficient to distinguish a gold ore from barren rock may be even less, for in California and Dakota gold ores with only 4 to 6 grains per ton of gold are exploited. Hence it is the economic point of view that must always be borne in mind, the profit of working being subject to variation in the course of time. While nickel and cobalt were formerly nicknames for materials which were thrown upon mine dumps as useless, and were considered as a mere nuisance in silver mining, to-day, the compounds of these metals and the associated minerals are in great demand as ores.

To a certain degree a mineralized material may be an ore in one locality and yet not be an ore in another place, the cost of reduction depending on the proximity to lines of traffic and cheap freights.

The science of ore deposits is, in other words, the study and consideration of the deposition, distribution, and origin of rock bodies containing ores in such quantities that they may be extracted profitably by mining operations."

Heinrich Ries, in his "Economic Geology of the United States," New York, 1905, p. 223, gives the following:—

"Definition.—The term, ore deposits, is applied to concentrations of economically valuable metalliferous minerals found in the earth's crust, while under the term, ore, are included those portions of the ore body of which the metallic minerals form a sufficiently large proportion to make their extraction profitable. A metalliferous mineral or rock might therefore not be an ore at the present day, but become so at a later date, because improved methods of treatment or other conditions rendered the extraction of its metallic contents profitable."

R. H. Stretch, in his handbook on "Prospecting, Locating and Valuing Mines, 4th Ed.," New York, 1903, p. 206, writes in this way:—

"An 'ore,' strictly speaking, is a single mineral which is a chemical compound of a useful metal and some other element or acid. In common usage, however, complex mixtures of pure minerals are considered as single ores; while free gold, native silver and native copper, together with their accompanying gangue minerals, are also classed as ore. Among miners, whatever will pay to treat or ship and sell is considered ore, as also low-grade mineral which might be utilized by concentration or improved facilities; but there is an indefinite shading off into material containing traces of ore minerals, but hopelessly unavailable, and this is not considered ore; neither are gold gravel or platinum sands called ore. To avoid

misunderstanding it is best to distinguish between the 'ore' (meaning thereby the whole bulk of the available product) and the 'ore mineral' (usually very much smaller in quantity in all ores except those of iron, manganese, and some lead and zinc ores)."

Probably with search a few other definitions might be found, but without adding anything essentially new or important. I think that we must conclude that a distinction should be drawn between the purely scientific use of the word and the technical. Not every metalliferous mineral is an ore even in the former sense. Many can be cited which it would be ridiculous to call by this name. Nor can a metalliferous mineral be called an ore unless at some time it has proved to be a practicable source of some metal. Once successfully used, it establishes its standing and joins the group of the ores. This differs from Professor Dana's definition that in an ore a metal should be a prominent constituent, since a species of amphibole might have 5 or 10 per cent. of iron, iron being thus a prominent constituent, and yet not be an ore. I suggest the following:—

"In the scientific sense an ore is a metalliferous mineral belonging to the group of those which have profitably yielded the metals to the miner or metallurgist."

"In its technical sense an ore is a metalliferous mineral or an aggregate of metalliferous minerals, more or less mixed with gangue, and capable of being, from the standpoint of the miner, won at a profit; or from the standpoint of the metallurgist, treated at a profit."

The test of yielding the metal or metals at a profit seems to me in the last analysis to be the only feasible one to employ. In a new enterprise, as we all know, it is customary to refer to the mineral in the ground as ore, before it is proved to be such by profitable operation. If the enterprise should subsequently prove unsuccessful, it would only remain for those engaged in it to say that they thought they had ore, but that they had made a mistake. As soon as a shifting or variable standard is introduced, such as individual beliefs or expectations, such uncertain, changeable and on the whole unsatisfactory conditions are developed that a sharp definition upon a secure and unmistakable basis becomes an impossibility. On the other hand, the test of profit certainly meets the requirement that "Use is the law of language."

AN ENGLISH OPINION OF MINING IN NORTHERN B.C. AND THE YUKON.

At the recent general meeting of the White Pass and Yukon Railway Company, Ltd., held in London, Mr. S. H. Graves, referring to the mining possibilities of the regions served by the W. P. & Y. Railway, expressed himself as follows:

The year has opened up new sources of encouragement for the future in several directions. In the Klondike district the Guggenheim plant has been in successful operation throughout the season, and I understand that the results have more than come up to expectations, and are likely to lead to further installations on a large scale. The same is true of the working of the dredges in the Stewart and Forty Mile districts. But perhaps of even greater promise for the future is the work which has been done in the way of quartz development in the Klondike district, which, as you know, has so far been dependent upon its gold bearing gravels. For several years work of a more or less desultory nature has been done on various gold ore veins and prospects in the Klondike district without

any very definite results, but a year ago work on a serious basis was commenced on what is known as the Dome lode where the surface croppings were considered sufficiently encouraging to warrant exploration at greater depths. With this in view a tunnel was started to crosscut the surface veins at several hundred feet in depth, and this tunnel has been driven into the side of the mountain a distance of about 1,200 feet during the past season, and has already encountered some of the veins. But in order to prove the surface croppings it will be necessary to drive the tunnel probably about 500 feet further. The work so far as it has gone seems to indicate the continuity of the surface formation, and gives good hope of developing a gold mine of first-class importance. On another Klondike quartz property the Lode Star mine in Victoria Gulch, they have already commenced taking out ore, and the first crushing, I understand, averaged about \$17 per ton. You will therefore see that there is ground for hope that the Klondike will repeat the history of other important placer camps and develop from a placer into a quartz mining district. In the Atlin district most of the hydraulic plants were worked last summer with satisfactory results and increased outputs. The Guggenheim plant on Pine Creek was under reconstruction, but I understand that everything will be finished in time for it to be in active operation next season.

In the Windy Arm silver and lead ore district a new company has been organized for the purpose of working the "Venus Extension," and I am informed that the intention is to instal a plant on the property with a view to active operation. But the most important work of the season in this district has been in connection with the development of the "Big Thing" mine, situated about seven miles south of Caribou Crossing on our railway, with which place the Yukon Government is connecting it by a road. The owners of this property are men of means, and as the result of last summer's work it is now proposed to instal an air compressor and ship ore on a moderate scale during this coming winter, with a view subsequently to connecting the mine with our railway by tramway, and shipping on a large scale should these preliminary shipments prove satisfactory. For several seasons a good deal of attention has been attracted to the Wheaton district, situated about 20 miles west of Robinson, a station on our line, with which place it is connected by a good road. Considerable development work was done last summer on some of the properties in this district, and the results are most encouraging for its future. Many competent judges think that it is destined to become a quartz mining camp of great importance, and there can no longer be any doubt as to the existence of large bodies of highly mineralized ore. In the White Horse copper district operations are still restricted by the difficulty of procuring capital consequent upon the low price of copper. But the work done has demonstrated that some of the mines could ship steadily at a profit even at the present low price of copper, and negotiations are pending in connection with several of the properties which, if carried through, are likely to result in steady ore shipments in the near future. From what I have said you will realize that during the past year in no less than four widely separated and important mining districts on our line substantial progress has been made towards the development of permanent quartz mining and its attendant industries, while at the same time the output from the workings of the gold-bearing gravels of the Yukon by modern machine methods continues to increase.

COAL MINE ACCIDENTS AND THEIR PREVENTION.

Address Delivered Before the National Civic Federation
in New York, November 23.

By J. A. Holmes, expert in charge Technologic Branch,
United States Geological Survey.

Our coal industry in its phenomenal growth has nearly doubled during each succeeding decade of the past 60 years. It has had to do more than keep pace with our increasing population, for, while it supplied less than one ton per capita to the American people in 1880, it has had to supply nearly six tons per capita during 1908. Its growth has been too rapid for systematic development; and the industry to-day represents a great host of scattered, warring, discouraged elements, without organization or co-operation.

In this industry are now employed some 600,000 miners, who work at some 6,000 different mines, and produce yearly about 500,000,000 tons of coal.

Not only is the nation increasingly dependent upon this coal for its heat, light and power for its manufacturing industries and transportation facilities, but this coal and other mineral products now contribute in tonnage more than 65 per cent. of the total freight traffic of the country.

The economic conditions upon which coal mining is based in this country are fundamentally bad; and the evil consequences are so far-reaching as to both time and extent, and are so essentially national in character, that this subject demands the earnest consideration of our best statesmen, as well as of our best engineers.

(1) In spite of this rapid growth in our demand for coal the normal productive capacity of our coal mines under continuous operation greatly exceeds this demand;

(2) Ruinous competition exists not only between the operators in the same field, but between the operators of one field as against those in another field, or in another State, where different mining laws and regulations exist;

(3) This competition is first of all driving out of the business the small operators except where they find protection under local freight rates; and is forcing even the larger operator to mine coal under conditions which he cannot approve but from which he finds no escape. If he and his fellow-operators endeavor to "get together" and place the price of coal at the mine on a reasonable basis they go to jail under either a Federal or a State statute; and as the only alternative each must live (or succumb) by underbidding the other, which he can do only through wasteful and unsafe mining methods;

(4) Even when the demand for coal and the prices are at their best, under existing conditions, the operator can mine only that part of his coal which can be taken out most cheaply and sold at higher prices; and the remainder must be left underground in such shape as may preclude its future recovery. And thus we waste yearly more than 250,000,000 tons of the nation's fuel supply;

(5) The American mine owner is as humane as is the mine owner of any other country; and he would like to follow every practice and use every appliance for safety to be found in Britain, or France, or Belgium, or Germany, or elsewhere; but he pays his miners higher

wages, and at the same time receives for his coal at the mine less than half the price received for similarly mined coal by the operator in these countries; and he must employ miners an increasingly large percentage of whom come to him unfamiliar either with the practices of the industry or with the language or traditions of the country;

(6) And the penalty which the nation is paying for this bad system is this increasing waste of resources and the still more unpardonable increasing waste of human life—the yearly loss of 250,000,000 tons of coal, and the killing or injuring yearly of from 8,000 to 10,000 men.

And what are the remedies for this bad situation?

(a) Investigations, such as are now being conducted by the government, as to the causes of mine explosions; and other similar investigations as to the causes of mine accidents of other kinds, and as to methods of prevention;

(b) Educational work among the miners and the lower active mine officials as to these causes and remedies;

(c) The training of men at each mine as to the best methods of using explosives, using electricity, handling of gases and dust, of timbering, of preventing and extinguishing mine fires; as to the methods of rescue work, and as to the methods of first-aid-to-the-injured work;

(d) The development of better and more uniform mining laws, rules and regulations, based upon accurate data and experience;

(e) Active, determined co-operation between the miners and the mine management and the State's inspectors in the enforcement of these rules and regulations with a view to the maintenance of the safest possible conditions in every mine.

The above are all parts of the program for lessening and alleviating mine accidents; but they do not complete the program. It is an essential part of this program that:

(f) The ruinous competitive system upon which coal mining in the United States is based at the present time should be changed, and that the price paid for coal at the mine should be such as will permit and secure safe and efficient mining—mining unaccompanied by either this large loss of life or waste of resources—mining which can have due regard to not only the safety but also to the health and the comfort of the men who toil underground and whose labour is so essential to the welfare of the nation. All this can be done without adding appreciably to the burden of the average American citizen; without any increase in the price of coal at the poor man's cottage, and without the risk of any unreasonable restraint of trade.

There can be no permanent industry without reasonable profits. It is unjust and irrational that in this great and essential branch of industry, reasonable profits should be dependent upon any unnecessary sacrifice of human life, and unnecessary waste of resources which we can neither replace nor restore and which will be essential to the future development of the country.

This industry needs and deserves fair treatment at the hands of the American people, and upon its receipt of such treatment depends in no small degree not only the welfare of the operators—though nobody cares about them—but also the welfare of the 600,000 miners who risk their lives in supplying the fuel for the nation's comfort and convenience.

BOOK REVIEWS.

The Metallurgy of the Common Metals—Gold, Silver, Iron, Copper, Lead and Zinc. By Leonard S. Austin. Second edition, revised and enlarged. 500 pages. 195 Illustrations. \$4 post paid. Mining and Scientific Press, 667 Howard Street, San Francisco.—1909.

Only by contrast and careful revision can a scientific text-book be kept approximately abreast of the times. Only the books that have filled satisfactorily their niche in the worker's library see more than one edition. In other words, except in the case of books prescribed for use in schools and colleges, the number and size of successive editions may be considered as quantitative measures of merit.

"The Metallurgy of the Common Metals" was published in May, 1907. Its second edition, revised and enlarged, is now being distributed.

The volume, in its first edition, outlined processes for winning the common metals from their ores and then refining them. In its second edition, the subject of thermo-chemistry is given fuller treatment, the description of the cyanide process has been amplified, improvements in milling methods noted, and the commercial aspects of various metallurgical methods more adequately dealt with.

Professor Austin's book is a general guide to the study of metallurgy. It covers a wide range of subjects; but it also elucidates plainly broad principles and general practice. To the student it is of particular difficult study. The operating metallurgist will find value, as it presents a bird's-eye view of a complex and much that is suggestive in its pages.

"The Metallurgy of the Common Metals" is the only up-to-date handbook covering the field indicated by its title. Its author has kept in view the practical phases of his subject. While one or two chapters, notably that on "Iron," are a trifle too sketchy, yet, on the whole, the author has exercised excellent judgment in choosing, condensing, and presenting his material.

The Cost of Mining—An Exhibit of the results of Important Mines throughout the World. By James Ralph Finlay. 415 pages. Illustrated. \$5 post paid. McGraw-Hill Book Company, 239 West 39th St., New York.—1909.

"The Cost of Mining" is the outgrowth of discussions and correspondence that appeared during the past six years in a contemporary mining periodical. "While all of the material in this book is either old or public property to the extent of being known to at least a portion of the profession, there is nevertheless something new in it in that it presents a view of the economics of mining on a grand scale and in broad outline." This quotation from the preface sums the aim of the author.

Mr H. C. Hoover's recent work on the "Principles of Mining" has proved most acceptable as a resume of the processes of valuation, organization, and administration used in mining enterprises. Mr. Finlay's "Cost of Mining" makes an excellent companion to Hoover's "Principles."

Contents.—Mr. Finlay has drawn freely upon mines in all parts of the world for data and examples. His twenty years of experience has been unusually varied.

After general consideration of valuation, costs, etc., certain specific branches of mining are analyzed. These branches are the mining and production of coal, iron, copper, lead, silver-lead, zinc, gold and silver. The table of contents is as follows:—

- Chapter I.—Value of Mining Property.
- “ II.—Factors Governing Variations.
- “ III.—Partial and Complete Costs.
- “ IV.—Statistics of Coal Production.
- “ V.—Cost of Mining Coal.
- “ VI.—Cost of Mining Lake Superior Iron.
- Chapters VII. to XII. deal with various Copper Districts.
- Chapter XIII.—The Copper Mining Business in General.
- “ XIV.—Lead.
- “ XV.—Silver-Lead Mining.
- “ XVI.—The Cost of Silver-Lead Mining.
- “ XVII.—Zinc Mining.
- “ XVIII.—Occurrence and Production of Gold.
- “ XIX.—Quartz-Pyrite Gold Mines.
- “ XX.—Cripple Creek, Kalgoolie and Goldfield.
- “ XXI.—Silver Mining at Cobalt and Guanajuato.

General.—In his introductory chapter, "Value of Mining Property," Mr. Finlay first emphasizes the vastness of the "real mining business—the great bulk of which the precious metals constitute only small percentages." He then proceeds to demonstrate the fundamental importance of considering all the factors that affect investment. For instance, the price of any product must be carefully averaged over periods of years before probable future fluctuations can be safely approximated. Low prices need not mean corresponding loss. Various factors in mining, such as the shipment of selected rich ore to smelters when low prices prevail, help to maintain profits.

In tracing the general relation of cost to price, Mr. Finlay illustrates his points aptly. For example, copper is produced for 10 cents a pound. When copper stands at 15 cents a pound the normal profit is 5 cents. Suppose that copper goes up to 20 cents a pound. Generally this rise is due to a shortage of ore or to a shortage of labour, or to both. Immediately each mine, under the stimulation of a higher price, undertakes the working of a proportion of ore of lower grade than would be payable with copper at 15 cents. Consequently costs are very much increased, and profits are relatively lessened. Developing the theme further, Mr. Finlay shows that in these circumstances costs may be so augmented as to absorb the whole advantage of the increased price.

Diminished cost per ton, due to larger scale of operations, hardly ever results in an increased profit per ton. This and similar propositions are dwelt upon. The nature of mining investments is stated, and the determination of present value from known factors is set forth. Here we shall quote an axiom, tersely stated by Mr. Finlay: "The general principle at the root of the matter is that the annual dividends must yield a good annual interest on the sum invested, and also permit a certain sum to be set aside each year, which

securely invested at compound interest will repay the investment when dividends cease on the exhaustion of the mine."

Chapter II. commences with a definition of the cost of mining, which runs in part as follows:—"(a) The use of capital in acquiring the opportunity to mine, i.e., ownership of ground, or leases. (b) The use of capital for equipping and developing a mine, for providing mills and smelters. (c) Current operating costs, including taxes, the maintenance of company organization, insurance, litigation, etc." For purposes of discussion, Mr. Finlay confines himself to "The complete cost of developing, equipping, and working out a mine, allowing interest on the capital required for these purposes until it is returned in dividends." Dividing factors governing variations into two groups, external and internal, Mr. Finlay proceeds to set forth the elements of a complete cost statement.

"Partial and Complete Costs" is the caption of Chapter III. Costs chargeable to operating, maintenance, depreciation, and amortization, dividend and selling costs, depreciation, amortization are dealt with. The concluding section is written for the investor, and is cogent and pointed.

Various classes of coal mines, iron mines, and copper mines are then discussed. Actual cost statements are adduced. Particularly interesting are the conclusions reached in Chapter XIII.: "(1) No copper can be produced in North America under present economic conditions at a profit for less than 10 cents a pound. (2) At 11 cents a pound only half the present output can be produced. (3) At 12 cents many of the largest producers would only be getting a new dollar for an old one. (4) At 15 cents the business as a whole is prosperous and profitable only to an entirely legitimate degree. (5) As long as the demand increases as it has increased steadily for the past quarter century, it is safe to count for the next ten years on an average price of 15½ cents, which has been the approximate average for the last ten years."

The last chapter is a comparison of silver mining at Cobalt and Guanajuato. Cobalt is taken as an example of high mining costs. The Kerr Lake Mining Company's statement for the year ending August 31st, 1908 shows that the ore mined, 528 tons, cost about \$579 per ton, including all plant and machinery investment charges. The silver content per ton was 2,790 ounces. The total cost of mining worked out at less than 21 cents per ton. The present cost of silver per ounce at the Guanajuato mines is roughly 50 cents. The operating expenses per ton of ore are about \$521. The average ore is worth \$7 or \$8 per ton.

* * * * *

"The Cost of Mining" is undoubtedly a thoughtful exposition of a subject to which far too little thought is given in this country. It abounds in suggestions and statements that will make the investor sit up.

The statement that low costs in mining may mean greater expense elsewhere, that low wages do not mean low costs, and so on, will, no doubt, sound paradoxical to many. Mr. Finlay establishes their accuracy.

In general treatment and in diction, "The Cost of Mining" leaves little to be desired. The arrangement might have been improved. Incidentally, there are several printer's errors that distress the eye. But, on its merits, Mr. Finlay's new volume is entirely worth while.

THE KOPPERS BY-PRODUCT COKE OVEN AT SAULT STE. MARIE.

After thoroughly investigating the different systems of by-product coke ovens, the Lake Superior Corporation placed a contract for the erection of a by-product plant at Sault Ste. Marie, Ont., Canada, with H. Koppers of Joliet, Ill., whose ovens and by-product plant are used by the Illinois Steel Co., at Joliet, and also adopted by the Steel Corporation at their plant at Gary, Ind.

The plant at Sault Ste. Marie will consist of 110 ovens, arranged in two batteries, each of 55 ovens. The type of ovens will be the same as is being erected at Gary, Ind., the size of each being 37 ft. between doors, 17 inches at pusher end, 21 inches at quenching end and 9 ft. 10 3-8 inches at top of arch. The cost of the plant will be about one and a half million dollars.

The charge of coal for each oven will be about 13 tons, making a total charge for the 110 ovens, of over 1400 tons of coal.

The yield of coke per oven will be about 10 3-4 tons, or nearly 1200 tons per day. For the generation of industrial power, nearly 10,000,000 cubic feet of surplus gas will be available. Indicated by heat units, the quality of this gas is 500 B.T.U. per cubic foot, and represents a heat value of about 200 tons of good coking coal.

Koppers improved method of recovering the by-products will be adopted at this plant. The distinguishing feature of this system, is the extraction of ammonia direct from the gas, in the form of sulphate of ammonia, without the employment of the water scrubbing process.

An improvement in the coke quenching arrangement will also be instituted, so that instead of having a coke bench, the coke will be pushed into a coke quenching car.

It is expected that the plant will be in operation by January 1911.

CANADIAN PATENTS.

The following is a list of Canadian patents issued on November 23rd, 1909, relating to mining and metallurgy and furnished by Fetherstonhaugh & Co., 5 Elgin Street, Ottawa, Canada. Russel S. Smart, resident, from whom all information may be obtained:—

122012.—V. Raisin, Paris, France, apparatus for the separation of acetic and formic acids assigned.

122016.—T. C. Johnson, New Haven, Conn., fire arms, Winchester Repeating Arms Co.

122057.—D. Belloni, Edri, Pa., systems of mine ventilation.

122112.—J. S. McIlgenny, Washington, D.C., methods of treating gas.

The following is a list of Canadian patents issued on November 16th, 1909, relating to mining and metallurgy, and furnished by Fetherstonhaugh & Co., 5 Elgin Street, Ottawa, Canada, Russel S. Smart, resident, from whom all information may be obtained:—

121968.—J. C. Clark, Atlanta, Ga., pulverizing mills.

121906.—W. H. Paul, Birkenhead, Eng., treating grain for milling.

121982.—H. W. Doughty, Amherst, Mass., methods of treating wood during distillation. H. W. Doughty and F. E. Waters.

PERSONAL AND GENERAL.

Mr. G. Brewer Griffin has recently been appointed manager and actively is directing the sales policy of the Detail & Supply Sales Department of the Westinghouse Electric & Mfg. Co., in which department transformers, meters, fans, heating appliances, switches, switch-boards, railway line material, etc., are sold. Mr. Griffin has been assistant manager of this sales department for six years past, having previously been connected with the sale of detail apparatus in the Boston office, altogether having been employed some 7 years with this company. Previous to his connection with the Westinghouse Company, Mr. Griffin was with the Manhattan General Construction Company of New York as a special representative, finally opening an office for them in Boston.

Mr. Samuel A. Chase, who for the past few years has been with the Westinghouse Electric & Mfg. Company in their New York Sales Office as a special detail and supply salesman, has recently resigned to accept a position with the White Investing Company, of New York City, a financial investment company handling stock of many different organizations. Previous to Mr. Chase's employment with the Westinghouse Electric & Mfg. Company, he was a salesman for the Western Electric Company, where he was highly successful.

Mr. S. L. Nicholson has recently been appointed general sales manager of the Westinghouse Electric & Mfg. Company, and has direct charge over the sales policies of the entire company. Mr. Nicholson has been with the company for 11 years in many different capacities, as salesman, as district department manager, and as industrial and power sales manager for the past five years, from which last position he resigned to take the present post. Before coming to the Westinghouse Company he was with the C. & C. Electric Company. He is perhaps best known to motor manufacturers as the organizer and President of the American Association of Motor Manufacturers, an organization which has done much in the two short years of its life to improve the art of manufacturing motors.

Mr. Charles Robbins who has for many years been connected with the Westinghouse Electric & Mfg. Co. in the industrial and power sales department, in connection with the sale of industrial motors, has recently been appointed manager of this department. Mr. Robbins has been with the company since 1899, in which time he has been in the manufacturing department, the New York district office sales department and for the past three years in the industrial and power sales department at East Pittsburg. His headquarters will continue to be at East Pittsburg.

Mr. A. D. Miles, mining engineer, Sudbury, Ont., was in Toronto on December 7th.

Mr. R. B. Lamb returned to New York on December 8th.

Mr. J. D. Ramsay has accepted an appointment as manager of Rand Klipfontein Mining Company in the East Rand.

Mr. C. B. Willmott, Sault Ste Marie, has returned from British Columbia where he was engaged in examining mining prospects for United States clients.

The Soledad Mining and Milling Co. of Mexico has installed complete mills for amalgamation and cyanidation, the machinery consisting of four Nissen stamps, 1,500 lbs. each, machinery complete for regrinding, steam power plant, electrical equipment, the complete order being placed with Fairbanks-Morse & Co.

The Canadian Fairbanks Co., Limited, beg to announce that they have been appointed the exclusive sales agents for Canada for Dicks' Balata Belting and have purchased the business of J. S. Young. All orders in the future should be sent direct to their nearest branch house. Large stocks are carried at the present time at Montreal and Vancouver, and stocks are on the way to the branches at St. John, N.B., Toronto and Winnipeg.

All mineral collections for the Leonard Prize should be forwarded to the Provincial Assayer at Belleville not later than Dec. 31, 1909.

AN INSTRUMENT FOR DETERMINING VERTICAL DEPTHS IN DIAMOND DRILL HOLES.

In the construction of the new aqueduct of the city of New York, which crosses the Hudson River just north of West Point, it became necessary to determine accurately the vertical depths of the narrow diamond drill bore holes which are being sunk under the Hudson River at various angles and which have already reached depths of 1,500 feet.

This problem has been solved by Professors G. N. Lewis and H. T. Kalmus, of the Massachusetts Institute of Technology, who have devised a self-recording pressure gauge which has a diameter of less than $\frac{7}{8}$ in. and can therefore be placed directly in the terminal section of the drill rod. Since the bore holes are constantly filled with water, the maximum hydrostatic pressure recorded is a direct measure of the vertical depth. It seems probable that this instrument may be of service in other engineering and mining work where it is desirable to determine the vertical depth of bore holes used in prospecting.

The pressure gauge proper consists of a very thin strip of tempered steel bent into the form of a hollow rectangular tube approximately $\frac{3}{4}$ in. wide, 1-32 in. thick, and 18 in. long. The edges and the lower end of the tube are welded together with the oxyacetylene flame. Into the upper end is welded a small steel tube which in turn is sealed to a straight glass tube, the upper end of which enters an air-tight chamber. The gauge and connecting glass tube are filled with mercury and when subjected to an external pressure the thin steel walls of the gauge undergo considerable temporary deformation, thus diminishing the total volume of the gauge and forcing the mercury from the upper end of the glass tube into the surrounding chamber. When the pressure is released the gauge resumes its original volume and the mercury level in the glass tube falls through a distance which measures directly the pressure to which the apparatus has been subjected. The mercury may now be returned to the glass tube from the surrounding chamber by a simple device.

The instrument gives remarkably reproducible results and is able to record vertical depths up to 1,500 feet with an error of no more than 2 or 3 feet. On account of the extremely small volume of the thin steel gauge, the effect of temperature changes, even amounting to 30 or 40 degrees, is entirely negligible.

EUROPEAN PETROLEUM.

The production of petroleum by European companies for the week ended October 31st was 1,931 tons.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay.—The U.M.W.A. Strike.—In November the mines of the Dominion Coal Company produced 221,000 tons of coal. The figures for the strike period, brought down to date, are as follows:—

	Total Output.	Average Daily Output.
July	136,000	4,200
August	154,000	5,900
September	180,000	7,200
October	205,000	8,200
November	221,000	9,100

The outputs of the individual collieries compare with November of last year, as under:—

	1908.	1909.
No. 1	38,226	49,034
" 2	54,309	49,970
" 3	18,323	20,369
" 4	31,171	26,196
" 5	26,385	30,675
" 6	12,224
" 7	13,507	592
" 8	12,366	10,660
" 9	24,444	15,597
" 10	13,359	12,594
" 12	2,025	3,651
" 14	1,836
	246,339	221,200 (approx.)

On looking these figures over it will be seen that a number of the collieries show an increase over last year's tonnage, and at others the figures closely approximate. No. 6 Colliery is still idle.

Report of the Deputy Minister of Labour.—Considering the extremely complicated issues which have brought about the U.M.W.A. strikes in Nova Scotia, the Deputy Minister of Labour has presented to Parliament a report which mirrors the conditions attending the labour disputes at the Nova Scotian collieries very clearly, and Mr. Acland is to be congratulated on having compiled so lucid an account from the conflicting statements which he no doubt met with. At Glace Bay he finds that the strike is "practically broken" and that "the majority of those on strike will be surplus labour during most of the winter." Mr. Acland makes one pertinent annotation—the report says "in twenty-six years Secretary Moffatt says there has been no Provincial Workmen's Association strike calling for financial assistance. These figures justify the claim that the organization has not encouraged strikes, while they are also used to support the contention that the organization (that is, the P.W.A.) was ineffective." "Here," remarks Mr. Acland, "the real test would lie in the relative value of the conditions of work secured in Canada without formal strikes, and in the United States where a more aggressive policy is pursued." When Mr. Lewis, the present President of the U.M.W.A., was in Glace Bay last spring he told an audience of miners that he had found the condition of the miners and their work to be better in Nova Scotia than in the United States. Mr. John Mitchell, late leader of the same body, has just delivered himself of a pronouncement on coal mining conditions in the United States which, if it be only half true, points to a great need for reform in the coal industry in the United States. Mr. Mitchell says "coal mining is the most hazardous industry in America." He points out that since 1889 coal mine disasters in the United States have resulted in the death of 23,000 persons and serious injury of 50,000, and he re-

fers to the extraordinarily high proportionate death rate in the coal mines of the States compared with that in other countries. Mr. Mitchell says: "This proportionate death rate from accidents is attributable to two things—the inadequacy of the laws and the laxity of their enforcement, and to the fact that unskilled emigrant labour is employed in the mines." Reference is also made to a bill which was introduced into Congress to encourage the introduction of life-saving devices in coal mines, but which failed to pass. Such devices have been installed in Cape Breton mines on the sole initiative of the coal owners without assistance or recognition from the Government. In Nova Scotia we make the reasonable boast that our mining laws are adequate and that they are properly enforced; further, even in the face of the large influx of foreign labour that has come to Canada in recent years, the great majority of the Nova Scotian miners are skilled men speaking the English tongue. The fatal accident rate in Nova Scotia coal mines is from two to three per thousand. In 1908 in the United States the figure will not be very far from five per thousand. It is not correct to say that coal mining is the most hazardous industry in America, if America is taken to mean the North American continent. This statement may be true of the United States, and we believe it is, but it is not true of Canada. It is significant that those coal mining Provinces of Canada which have the highest death rate are just those Provinces which have allowed themselves to come under the guidance of the United States labour unions. If the test suggested by the Deputy Minister's report could be applied to the condition of affairs existing in Nova Scotia to-day, the strike would end because the U.M.W.A. would be compelled to return home—there they will find work sufficient to absorb all their energies and all their funds.

Mr. Daniel McDougall, the President of the Nova Scotia District of the U.M.W.A., some time ago published an open letter setting forth the contentions of the men on strike at Glace Bay. He made a strong point of the assumption that the strikers would be content to return to work if the Coal Company would merely consent to receive a committee of employees—thereby implying that the Dominion Coal Company had not been in the habit of receiving committees of their employees, which, as we pointed out at the time, was an entirely baseless implication. Mr. Acland states that the three strikes in Nova Scotia, that is the strike at Glace Bay and those at Inverness and at Springhill, were all called to obtain recognition of the labour organization known as the United Mine Workers of America. There is not now and there never has been any other cause for these strikes, except the straight refusal of the coal operators of Nova Scotia to recognize this foreign union, and it is evident that Mr. Acland has appreciated Mr. McDougall's subterfuges at their true value.

Ancient History.—During the past two years the United Mine Workers have monotonously reiterated certain phrases and certain claims. Some of these were as follows: The United Mine Workers came to Nova Scotia at the request of the miners of Nova Scotia, "entirely unsolicited," as the patent medicine advertisement would say. The United Mine Workers regard contracts as sacred things, for which reason they would have carried out the obligations undertaken by the P.W.A. under the Two Years' Contract. The leaders of the U.M.W.A. have again and again stated their dislike for sympathetic strikes, and have—for Canadian consumption only—made light of that clause in the U.M.W.A. Constitution which specifically provides for such strikes, when it is considered they will "conserve the best interests of the U.M.W.A. as a body."

In view of these oft repeated statements some excerpts from the proceedings of the Convention of the U.M.W.A. at the end of 1905 are interesting. That Convention received its impression

of matters in Nova Scotia from a report the nature of which is best illustrated by a few quotations. "At the Grand Council of the Provincial Workmen's Association held in Halifax last September, Charles O. Sherman was given a hearing. . . A movement is on foot to try and get Mr. Sherman to speak at the various centres so that the body of workers will have an opportunity to hear him. The 'safe and sane' men in the P.W.A. are kept busy trying to destroy the growth of the seed planted, but that is impossible." One might call this sort of thing "ground-bait," but it is a little hard on the fish that is hooked to claim that the hook was an "invitation."

The Three Years' Contract is referred to as a "pistol" forced upon an unwilling body of men who could not resist, and the report flouts any wage contract based upon an "identity of interests basis," enunciating the doctrine that "labour is entitled to all it produces." The Three Years' Contract is also attacked because it provides that the employees should not attempt to restrict the sale of coal, which the report remarks "precludes any sympathetic strike." Evidently sympathetic strikes met with the approval of the U.M.W.A. in 1905, and their Constitution is the same to-day. Is not a sympathetic strike, or a union that approves of sympathetic strikes, a conspiracy to restrict the facilities for the mining of coal? The report makes queer reading in face of the prosecution of the coal operators in Nova Scotia by the U.M.W.A. on a charge of conspiracy.

The "invitation" which the miners of Nova Scotia gave to the U.M.W.A. was exhorted by the lavish expenditure of large sums of money. This was quite a natural move on the part of the leaders of the U.M.W.A. It has long been the policy of the heads of that union to control the whole of the great coalfield which occupies the eastern half of this continent, and to consolidate their power throughout the length and breadth of the Appalachian coalfield from Alabama to Cape Breton. This is the policy of the U.M.W.A. Whether it bodes any good to Nova Scotia is for the Nova Scotian to say, and he is saying unmistakably that it does not. It is, however, quite time that the U.M.W.A. threw off the pretence of an "invitation" to Nova Scotia.

The respect of the U.M.W.A. for a brother labour organization is shown by the manner in which they conducted the strike at Inverness, which, as the Deputy Minister of Labour points out, was a "closed shop" of the P.W.A. The sacredness of a contract to the U.M.W.A. is shown by the strike at Glace Bay, which was called, fatuously enough, at a time when the Two Years' Contract had only six months to run, and called also by men who had taken a leading part in the making of that contract.

Rescue Apparatus for Mines.—The First Report of the British Royal Commission on Mines, issued in May, 1907, dealt very fully with the use of breathing appliances, and the merits of the different types of apparatus in the present stage of development. In the Second Report the commission has dealt with the organization and ambulance and rescue work, and reviews the experience of the past few days in this regard. The commission report having visited many rescue stations both at home and on the Continent of Europe, where they remark the use of rescue apparatus is becoming general. In Austria their provision is compulsory, and the regulations of the French Government of a similar character became effective at the beginning of this year. In Belgium also the law requires the provision of rescue apparatus. The commission remark: "Our attention has also been drawn to a recent instance in which breathing apparatus was used with success in a colliery in Nova Scotia in dealing with an underground fire. We understand that the establishment of the rescue station of the Dominion Coal Company was due to the occurrence of several underground fires, two of which were so serious as to necessitate the flooding of the pits; and that since the fire at the Sydney mines, the Nova Scotia Steel & Coal Co. has decided on a similar course." The commission expresses its opinion that rescue apparatus is of proved value in case of

underground fires, and that systematic provision of apparatus and for the training of men in its use should be pursued with greater energy. The commission also expresses the opinion that men trained should not be expected to be prepared for a call for their services "outside their district in order to supply the needs of collieries where no provision has been made for such occasions of emergency, and it places an unfair burden of responsibility on those owners who have taken the precaution to have men trained. We do not think any colliery owner should excuse himself on the ground that his mines are not liable to explosion or to fires. . . . Having regard to the experience of recent years, no owners should be rash enough to regard themselves as entirely immune against risk of explosion." In concluding its remarks on the organization of rescue corps, the commission sums up the matter very definitely, as follows: "We have, therefore, come to the conclusion that the provision and use of breathing apparatus should be general throughout the country, and that every mine should either be provided with a properly trained brigade of its own, which appears to us the best arrangement, or have the right to call for a sufficient number of equipped and trained men from a rescue station."

The report makes a strong plea for the combination of the work of the St. John's Ambulance Association with that of training in the use of special devices, and instances several cases where even an elementary knowledge of first aid would have saved life or prevented suffering.

North Atlantic Collieries, Limited.—The Dominion Coal Company has sub-let to the North Atlantic Collieries Co., Limited, the successors of the old Gowrie & Blockhouse Company, a strip of territory, passing through a lease of the Coal Company which intervenes between the North Atlantic Company's submarine areas, and the land workings. The North Atlantic Company will now commence to drive tunnels through the sub-leased area, which will take about two years to reach their submarine take. The line of the tunnels will occupy almost exactly the trough of the narrow coal basin which forms the Morien Coalfield. The North Atlantic Company estimate that the submarine area of the Blockhouse Seam, which will be reached by the new tunnel, contains available coal to the extent of 56,000,000 tons. The Blockhouse Seam is generally considered as the equivalent of the Hub Seam in the Glace Bay Basin, and of the Barachois in the Lingan Basin, but there is considerable doubt about the proper correlation of the Glace Bay and the Morien Basins. This extensive exploration which is projected by the North Atlantic Collieries Company will doubtless afford interesting data in this connection.

ONTARIO.

Cobalt, Dec. 4.—The first consignment of ore to be sent out of the South Coleman district, except from the Temiscaming, was recently shipped from the Beaver mine. This ore is from the vein discovered some months ago, which is still being worked and continues to show good values.

Several of the Gillies Limit lots acquired in the recent sale are now being actively worked. Among these is A 54, for which was paid the second highest price of any of the properties. It is stated that the owners of lot A 91 are prepared to spend fifty thousand dollars in developing their holdings. This property is one on which a three-inch vein was found. Some time ago a small shaft was sunk to a depth of about twenty-five feet, but the silver values were very low. Favourable results have also attended the work being done on A 48 and A 53. Good veins have been located and traced for a considerable distance.

Considerable uneasiness has been felt lately among the mine managers of this district on account of the T. & N. O. Ry. threatening to place an embargo on freight billed for Cobalt. The congested condition of the traffic between Cobalt and

North Bay has improved very little, and many of the mines have suffered on account of the lack of fuel. The railway claims that the cars are not unloaded as fast as they should be, and as a consequence the yard is always full of freight, much of which it is impossible to get at. The railway commission threatened to place an embargo on freight if this condition was not improved. A great part of this congestion is due, however, to the lack of system in the freight office here, and the inability of the T. & N. O. to handle matters in a businesslike manner. Several of the mines have at one time or another had to shut down for lack of coal, so that the question has assumed rather serious proportions.

The interest in the gold discoveries in the Porcupine Lake district continues to increase, and it is probable that when once the cold weather sets in there will be a considerable rush into this section. So far, however, no work of any consequence has been done and it is impossible to determine the value of these discoveries. There is a considerable feeling that this section will turn out to be a replica of Larder Lake, and there are bound to be many disappointments.

In sinking the shaft on the Wyandoh property, at one hundred feet from the Waldman boundary, and on the continuation of the Waldman vein, good ore was encountered at a depth of nine feet. The shaft was started on the barren end of the vein, but now they have about three inches of smaltite ore with good values in silver. The point at which this silver was encountered is about one hundred feet from where the good showing was found on the surface.

The T. & N.O. Railway is planning for heavy traffic between Charlton and Gowganda during the coming winter, and is making extensive preparations to handle the large amounts of freight expected. New freight sheds and sidings have been constructed, and conditions should be very much better than last year. It is understood that the company has decided to bill goods through to Gowganda, and it is the intention of the road to make arrangements for teams at Charlton to take the freight in from the railway, and negotiations are now under way for the hire of a large number of teams for this purpose. Increased competition and much better roads will serve to bring about a very substantial reduction in the rates that were in force a year ago.

The physical condition of the Cobalt Lake Co. has been steadily improving the last few months. The new vein that was discovered a short time ago has been showing up well under development, and carries a number of stringers of high grade ore. Between the walls there is thirty inches of mineralized area, and in this are three stringers. Assays taken from these stringers have gone over four thousand ounces to the ton.

The recent report circulated about the condition of the Crown Reserve Mine has created a good deal of excitement in various circles outside of Cobalt. There is no truth in these rumours that the mine was flooded, and the management has taken every precaution to avoid such a contingency. The shaft is at present down 200 feet, and drifts have been run on the vein at the 100 feet and 200 feet levels, and connected with a raise over 200 feet from the shaft. The block of ore between the 100 ft. and 200 ft. level, is in good ore, and has scarcely been attacked. The upper level has been stoped out as far as it was reasonably safe to do so, though the management has been very conservative, and allowed a safe margin in discontinuing stoping in this upper level. These remarks apply to the main or Carson vein, but the company also has reserves in the shape of a considerable number of veins, which while they have not the spectacular values of the main vein, nor are they so large, will, when opened up, add materially to this property's reserves.

The Wetlauffer Mine in South Lorraine has shipped another car of high grade ore, and it is understood that two more will be shipped in the near future. All this ore is from development work in sinking the shaft, and drifting on the 140-ft. level.

It is expected that the annual meeting of the Cobalt Central,

which is to be held shortly, will be very stormy. It has been decided by the representatives of the committee that is investigating the affairs of this company to take further action. This is in regard to certain loans which it is stated have been made to the company, and which have not appeared in the financial reports. The Cobalt Central has always come in for a good deal of criticism, on account of the very indefinite statements that have been issued, and it is stated that there has never yet been a complete financial report issued to the shareholders.

The continuation of the mining operations of the Colonial Mine has resulted in the discovery of two new veins. One of these is about 2½ in. in width of cobalt and considerable native silver. The wall rock is also well mineralized for about two feet on each side of the vein, which promises a large amount of milling ore. The main work now being done is in the No. 2 tunnel above Cross Lake, and this is now being connected with No. 2 tunnel. It has been decided to add a tube mill to the equipment of the concentrator. This mill is being operated by electric power from Hound Chutes.

It is expected that the government road from Elk Lake to Gowganda will be completed about the middle of December. This road is in good shape with a very low gradient, and will assist very materially in cutting down the price of supplies going into the country. This winter there will be three roads into that section, one via the C.P.R. and Bisoo, the end of the steel of the Canadian Northern, and the T. & N.O. at Charlton. The former is rather too long to be seriously considered in competition with the other routes, which, as far as distance from the end of the steel to Gowganda is concerned, are about equal.

Considerable progress has been made at the Nancy Helen since the new ore bodies were discovered on the 60-foot level some time ago. Recently in a cross-cut about 80 feet from the Buffalo line a rich stringer about one inch in width was encountered. It is believed that within a couple of weeks another shipment of high-grade ore will be available. At present practically all the work in the mine is being done at the 60-foot level. In the vein that is running towards the City of Cobalt line, about 150 feet has been developed by a drift, and the face of the drift is still about 300 feet from the line. This vein shows a good width of high-grade ore.

After sinking the shaft on the Silver Cross to a depth of 125 feet, diabase has been encountered below this point. It is a very important matter for the company, and will have considerable bearing on the future development of the property. The shaft was started on a cobalt vein carrying practically no values in silver. After the diabase was encountered the vein was much stronger and better defined, and carried higher values in silver.

Another vein of high-grade ore has been cut at the 75-foot level of the Right-of-Way in a cross-cut about fifty feet from the shaft. At the No. 3 shaft, which is between the Silver Queen and McKinley-Darragh, four veins showing high-grade ore are now being worked. This shaft is 95 feet deep, and at the 75 foot level a cross-cut has been run north and south. South 210 feet, and in the north 900 feet. In this latter cross-cut three veins carrying high-grade ore were struck.

The annual report of the Coniagas Mines has just been issued. In addition to the usual statement of ore reserves and work done during the year it also gives a map showing the veins and the amount of stoping and development work done during the year. The ore reserves on October 31st were estimated at 12,500,000 ounces, contained in the following:—

Vein matter, 3,427 tons—ounces silver	9,125,500
Milling rock, 103,000 tons—ounces silver.....	3,432,200

12,557,700

This estimate does not take into account the opening up of a new level in which considerable ore has been found. This level

In the Detola Company's mine has been built a new blacksmith shop. The shaft house has been boarded in and everything made snug for the winter. The old blacksmith shop has been made over into a comfortable and commodious dryhouse for the miners. The shaft is now down below the 200 foot level and it is the intention of the management to sink to the 250 foot level before cross-cutting; when this level is reached they intend to drift along several different veins which they have cut and have already laid out cross-cutting amounting to 700 feet.

The master mechanic is now on the ground at the Minnehaha property, near Beaudro's Landing, waiting till the lakes freeze up so he can get in the new plant which is to be installed this winter.

Historical.—The Kenora Mining Division of which to-day there is little heard was once and will be again one of the foremost gold fields of Canada.

The seeming lack of interest in this field at present is, in my opinion, due entirely to bad management, gold stealing by miners, and last, but by no means least, "wild-catting" of the most deliberate and cold-blooded description.

In 1900 there were operating in this district the following mines, not merely prospects staked out and held, but bona fide mines:—

Mine.	No. of Stamps.	Weight of Stamps.
Mikado	20	850 lbs.
Sultana	30	850 "
Olive	10	850 "
Regina	8	...
Big Master	10	1,050 "
Sakoose	2	850 "
Decca	10	850 "
Olive	15	900 "
Independence	10	850 "
El Delora	2	950 "
Lake Harold	5	850 "
Headlight.....	2	1,050 "
Lucky Coon	5	850 "
Alice A	2	850 "
Golden Winner	5	900 "
Minnetakie	10	900 "
Haycock	2	850 "
Shores	2	950 "
Rainy River Develop. Co.	1	1,250 "
Foley	20	750 "
Empress	10	950 "
Golden Star	10	1,020 "
Hammond Reef	40	900 "
Crown Point	5	850 "
Gold Panner	10	950 "
Glass Reef	10	1,000 "
Sawbill	10	850 "
Combine	10	850 "

These mines all give from assays, made by reputable people and firms, values warranting development work; and many gave promise of surpassing even the hopes of their owners. To-day, except for some six or eight, these mines are not being worked and their plants are lying idle, in some cases being looked after by caretakers. In many cases, however, the machinery is rusted and useless, not because the properties are valueless but because the shareholders never got the consideration, or even the smallest chance at a fair, honest deal that should have been theirs. To take the causes of trouble in their order and to show that laying the blame on these conditions previously mentioned is not a mere fancy, it can be pointed out that men were placed in charge of mines in this district who were not fitted, either from point of education or practical experience to fulfil positions one tenth as exacting. Before a mining property had been duly tested, either by sinking, drifting, cross-cutting or even diamond drilling, the inexperienced, ignorant or wilfully dishonest man

in charge would send away his order for expensive mill machinery, often times ordering a class of machinery so totally unsuited to the needs of the particular property in question as to be absolutely useless.

Men have been put on as mine captains whose only claim to the position was having married somebody's wife's sister's cousin, and who had so small a conception of what was meant by a shift's work that they never knew what to expect from the men in regard to a fair equivalent value of work done for the moneys expended by the employers.

Apart from this matter of not getting for the absent shareholders a decent return in work done for their investment, how could men so magnificently ignorant of even the fundamentals of mining direct to the best advantage what little work they might manage to coax from their amused miners? Their lack of knowledge is apparent to-day in many of the mines; but without raising hostility and heart burnings it would be impossible to give names either of people, mines, or places. So, knowing that anyone really interested can to-day get for his own benefit data to prove every statement here given, we will leave this phase of the subject and go on to the second, that of gold stealing.

To-day, in the town of Kenora, with any group of say 10 men, if gold mines or properties be the topic of conversation, it is almost certain that one member of the group will hold out his hand to show a gold ring, or his cuffs to show his cuff buttons, remarking, "These are some of the —gold; boys, she must have been rich!" Many of the blacksmiths will tell of smashing up quartz with their hammers and putting it in an iron spoon in their forges to get a button for so and so, so that he could get a ring made from the "specimens" he brought to town from such and such a mine. One man bought an overcoat from a local tailor and paid for it in specimens he had brought in from the mine. The tailor got \$200 for the gold taken from these specimens. This man, asked if he had no compunctions about taking these specimens, said: "Say, one night I was out of my bunk and I saw two men moving away round an out-house over the snow. I sneaked after them quietly. They went up into the loft of a stable, and I got a good look at them from where I lay hid in this stable as they came down. They were the mine captain and the storekeeper. When they had gone I felt sort of curious as to what had taken them up there, so went to find out. I found under the hay a sack full of specimens, and those I looked at were more gold than quartz, for we were then in the very richest part of the vein. I thought I had as good a right as they had to those specimens, so I took the sack and carried it into the bush and buried it in the snow, covering my tracks as best I could. Next day I went down to get it but the bag had gone; someone had followed me, and though I did my best to find what had happened to them I never ran across those specimens again. Now, if the shift bosses and mine captain could take the stuff like that, why shouldn't I?"

This is only one case—there are many others.

I have it on reliable authority that a miner was showing a friend a sample of gold containing a one ounce nugget on the main street of Kenora. The manager of the mine came past and recognized the sample as being from his mine. He asked to see it, looked it over and asked if it had not come from such and such a mine. The miner said "Yes." So the manager put the specimen in his pocket, asserting that as a representative of the company it was up to him to keep it. The miner, however, ordered him to give it back, threatening if he did not to expose him for stealing gold from the same mine! And these were the men sent to this district by the shareholders to safeguard their interests! Men who in most cases were well and even liberally paid and whose receipt of their salary was, on account of their ignorance and lack of technical education, almost a steal!

To go now to the last case, that of wild-catting, I am not going to mention the ordinary everyday scheme of taking

samples from one claim and placing them on another; and then taking the prospective purchaser to view this carefully salted vein. That of course has been done here and perhaps in no case more daringly than that of the would-be tin mine, where the dishonest promoters were convicted of having loaded the face with tin ore. Conviction was easy, for not only was it the fact that such rock had never before been known to contain tin ore, but also, in spite of the risks they were running, the men were too lazy to destroy the barrels in which the ore had been shipped to them. Many readers of this paper will doubtless remember the circumstances accompanying this scandalous transaction. This is not, however, the type of wild-catting I refer to. I have reference to the kind that causes men to sink a pit in barren rock where there never was nor could be any sign of auriferous ore, simply that the partner or the stock market may escape criminal proceedings for trying to sell stock in a mine that never existed.

In one case an old miner who had some remnant of a conscience left approached the manager to try and convince him of the futility of working further in the barren country rock and was told he was paid good wages to hold his tongue. In another case, after working for months in barren rock, a company that had sold much stock to the public and had never had even a quartz vein on which to sink, set a diamond driller to work on a small stringer some 500 yards away from the main shaft. The driller came into camp one night and whispered to the miners that they had struck it rich with the drill on the stringer at 100 feet and gave dimensions of the vein cut by the drill and its approximate richness. The miners bit, and spent all the wages coming to them for shares in the mine. The manager wired his directors that the miners themselves believed so heartily in the mine that they were buying shares. Stock rose, and within six months the mine closed down. The diamond drillers had misled the miners. It is this wild-catting that has been so disastrous. In this regard we must in fairness report at least one case of which we know, in which the manager of a mine resigned his position rather than falsify his reports as ordered by those who were placing the stock on the market.

Since all these facts are being gradually assimilated by the public, and even the unfairly treated shareholders are beginning to see that the blame should be laid upon the individual and not on the property, this district is experiencing a gradual return of public interest, and before long we may again see the whole district busy and work resumed upon the many valuable properties now lying idle with that idleness that is a lasting record of the evil of deliberate dishonesty.

BRITISH COLUMBIA.

Rosslund.—The shipments of ore from this camp still continue to average about 5,000 tons per week, the Centre Star, Le Roi and Le Roi 2, Ltd., shipping and the concentrator at the Le Roi 2, Ltd. treating 260 tons of "second-class" ore per week. The lessee of the Velvet-Portland property shipped 35 tons of ore from the dump during the past week, which will give smelter returns of about \$32 per ton. Work is being prosecuted on the Velvet property with a view to shipping steadily as soon as the snow roads get in good condition.

The shaft on the Josie property of the Le Roi 2, Ltd. is now down below the 1,250 level and nearing the 1,300-ft. level. The company is stoping and shipping from five to seven hundred tons per week to Trail smelter.

Two diamond drills are at work in the Le Roi and considerable drifting and stoping is being done, and occasional shipments made as ore accumulates.

The usual steady progress is noticeable about the Centre Star group of the Consolidated Co. Shipments are averaging 4,300-4,500 tons per week of average grade ore. The claims lately acquired are being opened from the lower workings of the

Centre Star and War Eagle mines, while considerable diamond drill work is being done, on the surface as well as from the underground workings. At the Trail smelter this company, in addition to custom ore, is receiving approximately 4,500 tons per week from its Snowshoe mine at Phoenix, 300 to 450 tons per week from the St. Eugene and occasional shipments of \$42 product from the Richmond-Eureka. The returns from the Trail smelter for the month of October amounted to \$412,865. While this is not as high a figure, by any means, as prevailed in July and August, still if it is maintained to the end of the present calendar year it will carry the total figure for the smelter over the \$6,000,000 mark, which will be close to a million dollars greater than any previous year in the history of the plant. Of course this is a natural consequence where an industry is progressing and enlarging. This works is now turning out silver .999 fine, fine gold, base bullion, copper matte, pig lead, lead pipe, bluestone and electrolytic bearing metal.

The buildings and foundations are being hurried along at the Fife mines, to accommodate the 100-h.p. boiler and air compressing plant when it arrives. As soon as this mining plant is working the management intends to open the property on a larger scale than it has been worked hitherto.

Boundary.—It looks as though the men behind the billion dollar copper combine had not overlooked the Boundary district in making their calculations toward controlling the copper output of this continent. It is rumoured that the Granby Consolidated Mining, Smelting and Power Co. will very likely be absorbed if the deal is consummated. If the Granby Co. is acquired there is no doubt that the British Columbia Copper Co., which now controls the New Dominion, will also be taken in. As it is, this property is controlled by New York capitalists, many of whom are closely allied with the men connected with the proposed copper combine. It does not seem reasonable to think that the men arranging the merger could afford to overlook a copper-gold producing district that is now putting 30,000,000 to 35,000,000 lbs. copper annually on the market and which under normally favourable conditions, with the B.C. Copper Co. and Granby working steadily, could possibly double this output.

Former State Geologist of Minnesota, H. V. Winchell, now connected with the Guggenheims, is in the West examining various copper mines and it is said that he is headed for the Boundary where in particular he will look over the Granby property. It is not likely that the merger crowd will show their cards until they have matters well in hand, so that all the outsiders can do until that time will be to keep guessing. Even if the Granby were included in the merger it might not benefit this district any, for in the course of curtailing the copper output work might be cut down at the local mines. The merger is a big game in which someone is going to be damaged. If the price of the red metal is controlled by any other means than the law of demand and supply then it is very likely that someone may have to pay the piper. But we will know more about this phase of the situation later on.

The Granby mines touched still another high mark when 30,577 tons were shipped for the week ending Nov. 13th. At this rate Granby shipments will run over the million ton figure by the end of the year, but will not exceed the shipments of last year by very much. Despite several months' shut-down, the B.C. Copper Co. will exceed last year's shipments, while the Snowshoe will ship 100,000 tons more this year than in 1908.

It is hoped by local people interested that the Granby directors while in convention on December 7th, will see their way clear to declare a dividend. It is understood the company is in a good position to do this and that it merely rests with the directorate.

The Granby Company, the B.C. Copper Co., the Le Roi Mining Co., and the Con. Mining and Smelting Co. of Canada, Ltd., have all had engineers working in the new mining camps on the Coast

and in the northern part of British Columbia this season. The districts visited included Valdez Island, Queen Charlotte Islands, Portland Canal, and the several districts within a radius of 100 miles of Hazelton on the Skeena River. The prospects in these districts are reported as being favourable, but it remains, of course for greater development to prove the value of the ore bodies at depth and to determine their permanency.

It is stated that the B.C. Copper Co. earned a net profit of \$33,000 during the month of October and produced and sold its copper at 8.5c. per lb. It is pleasing, of course, to see the Boundary mines touching these low cost figures, but conditions in this district are not yet ripe enough for the maintenance of this low cost the year 'round. It is stated that the Granby Co. could produce copper at 5c. per lb. if the future of the mine was not kept in mind; that is, if the management neglected development and only worked on getting out and smelting the ore. So it can be seen that the average figure for a year must be taken as a criterion.

East Kootenay.—The coal measures of the South Fork of Old Man River, it is said, give nearly as much promise as did those of the Crow's Nest Pass district in early days. As there are two trans-continental railways hurrying toward this section it will be opened to the surrounding market in the near future. An important strike has been made on the property of the Carbon Hill Coal Co. in this district. As there are indications of oil, that promise well, prospecting is being done in this direction. The Chicago-Alberta Oil Co. is erecting a drilling plant about seven miles from the summit.

A well-known mining man, A. Gowing, was in the Lardeau within the last few weeks looking after personal interests there. He has lately been operating in the Queen Charlotte Islands, where he has staked 17 claims near Tasso Harbour. The ledge, which carries from 6% to 17% copper, \$1 gold and \$3 silver per ton, is nearly 360 feet wide where opened up and can be traced for several thousand feet. The group has been bonded to eastern capitalists at \$400,000.

GENERAL MINING NEWS.

NOVA SCOTIA.

Sydney, N.S.—No official announcement has been as yet made as to who will direct the destinies of the new steel-coal merger, though it was generally expected that after the meeting of the local officials, held here on Nov. 27th, some definite announcement would be made.

When seen, Mr. Plummer had nothing to say in connection with the business of the companies, or who the new general manager to succeed Mr. Jones would be, but intimated that an announcement would probably be made within a short time.

Mr. Plummer left for Montreal, where there will be a meeting of the directors.

In a circular addressed to the heads of the departments at the plant, Mr. Plummer assured them their relations with the company and their respective positions and work with those now or hereafter in charge at Sydney and among themselves, were all matters of intimate personal concern to himself, and he added that no official need feel that the departure of Mr. Jones affects the security and comfort, or emoluments of his own position.

On the sailing of the steamer Fornebo, which left International Pier on Nov. 27th with a full cargo of coal for Quebec, the Dominion Coal Company shipments up the St. Lawrence were completed for the season. The total shipments amount to 960,000 tons approximately. The shipments for 1908 were 1,344,200 tons, the decrease being due to the strike.

The steamers Christian Knudsen and Borgestad completed their charters with the Coal Company last week, and several others will finish before the end of this week. The company has had eleven chartered steamers this season, besides their regular steamers of the Black Diamond Line. Last season the company only had two chartered boats in the Louisburg-Boston trade, but two more will be added, making a total of four steamers, besides its own regular fleet. Shipping will be continued for the winter months from Louisburg.

ONTARIO.

Toronto.—At Osgoode Hall, Toronto, before Chief Justice Falconbridge, in the non-Jury Sittings last week, John H. Casler, of Los Angeles, Cal., began an action against Messrs. Geo. J. Blake, Adam Witzel, Wm. J. Cusher, and John F. Vogt, directors of the Grace Mining Company, the properties of which are situa-

ted on Eagle Lake, in the Rainy River district. The plaintiff seeks to recover \$12,000, the amount of a mortgage on the properties. Mr. Casler claims the lands, comprising twelve parcels, have not been paid for. The defendants have entered a counter claim for \$150,000 against Casler for alleged fraud and misrepresentation.

The defendants, all of whom are Buffalo people, claim that while the plaintiff was a director of the company he induced the other directors to give him the mortgage, which, they say, was not executed under the authority of a properly called meeting of the directors.

The plaintiff's evidence engaged the Court for half a day. Mr. Casler, in cross examination, denied that he had ever told his assistant that he would keep those Dutchmen in Buffalo busy raising money, and that he could sink it just as fast.

A former secretary-treasurer of the company said he thought none of the directors knew anything about mines. Before Mr. Casler became president of the company he was in the plumbing line.

According to the evidence of Wm. Richards, a mining engineer, foreman for the company, the plaintiff, while manager of the company misled the directors as to the values of the property. He was in the habit of pouring gold dust on the ore matter while demonstrating its value by means of the panning process. As regards the amount of work done by Casler, the witness said he spent most of the time in the office reading his bible or sailing around in a motor boat. Similar evidence was denied by Casler when cross examined by the counsel for the defence on the first day of the trial.

Kenora.—Pending the outcome of legal proceedings now in progress, active mining operations at the Laurentian mine have ceased. The official referee at Toronto is calling for tenders for the assets of the Imperial Mines Co., including the buildings, plant, machinery and supplies. The superintendent of the mine, R. B. Nickerson, who paid a brief visit to Kenora last week, has departed for his home in California, accompanied by his father.

On Saturday last Jas. Sherman arrived at Dinorwie from Kenora, en route to the Manitou, where he has been engaged for the past three months erecting the ten-stamp mill at the Paymaster mine. The mill is now in full commission, reducing the extensive ore dump which has accumulated, into bullion. No record of the result of the mill's performance up to date is available as yet, but it is understood that the percentage of gold is quite satisfactory to the management.

Cobalt.—The new addition to the McKinley-Darragh concentrator is nearing completion and will have a capacity of 120 tons daily. On the Savage claim belonging to this company another mill of smaller capacity will be erected, probably treating twenty-five tons per day. In addition to this the high grade production is considerable.

ALBERTA.

Frank, Nov. 26.—Andrew Laidlaw, of Spokane, president of the Galbraith Coal Co. of Lundbreck, this province, has brought before the Railway Commission the charge of gross discrimination against the mines of this district in the new coal and coke tariff of the C.P.R., which became effective on October 4th.

Mr. Laidlaw found the new tariff so to discriminate against the product of his mine, placing his company at so serious a disadvantage in the domestic coal market, that he caused complaint to be laid before the Railway Commission, and a hearing on the complaint was had at Regina a few days ago.

The Galbraith Company complained that in the new tariff as compared with the old one, there is a discrimination against the mines of The Pass in favour of Lethbridge, and specified that in the rates from Lundbreck and Pass points to 147 points named, there is an increase of from five to fifteen cents a ton; to 20 points the rates remain the same, while in a few instances there is a slight reduction.

It was shown that from Lethbridge to all points, except in a few instances where the rates remain the same, there was a general reduction running from 25 to 40 cents a ton. For example, from Lundbreck to Regina, there was a reduction of five cents a ton, while from Lethbridge the reduction was 30 cents, thus making a considerable increase in the differential in favour of Lethbridge, which formerly had been but 15 cents.

Other specifications show that the rate from Lethbridge to Cranbrook is \$2.30 for 204 miles, while from Lundbreck to Cranbrook the rate is \$2.25 for 127.7 miles, and that west of Cranbrook the rate is the same from both places.

Other specifications show that the rates from Lundbreck and Pass points to points south on the Alberta Railway and Irrigation Line, the road running from Lethbridge to Great Falls, now owned by the C.P.R., are greatly out of proportion, as, for instance, from Lundbreck to Raymond the rate \$1.60, while to Magrath, less than ten miles distant, the rate is \$2.30.

BRITISH COLUMBIA.

Sheep Creek.—One of this Province's wealthiest mineral districts is the Sheep Creek Valley. Development work has been carried out during the past summer to a very large extent, as well as a large amount of exportation of the ore. Mr. W. G. Burnham, who has been inspecting that district and the properties opened up, arrived in the city the other day, and in an interview gave a long and very interesting resume of the work done.

From the Queen, in all some \$600,000 has been exported. A 20-stamp mill has been set up, and the property is showing up remarkably well. It has been tunnelled for some 500 feet. It was purchased a couple of years ago by a Wisconsin syndicate for \$175,000.

Second in importance is the Mother Lode, a property recently purchased for \$150,000 by Mr. John MacMartin, of Cobalt. Development work has occupied all the time of the owners, and some \$500,000 worth of ore has been exposed. The lower tunnel taps a rich vein of from three to five feet with an excellent showing. In addition to this extensive work, new offices and bunk-houses have been erected; a new trail has been constructed and a two-mile road built to a location where a mill will be constructed shortly.

The Nugget claim is the next most highly developed property. For the past twelve months a four-stamp mill has been in operation, turning out from \$8,000 to \$10,000 monthly entirely from the stoping. Four levels have been opened for some 500 feet. In the lower tunnel a three and a half foot high grade milling ore has been uncovered, which runs from \$40 to \$90. There is half a million dollars worth of ore in sight alone, and when exportation begins, it is expected that the claim will be one of the richest in the district.

The Golden Fawn property has two parallel veins to the Nugget claim. It is only in the early stages of development, but the surface outcroppings show from \$83 to \$225. Two tunnels are being excavated, and a paystreak has been unearthed in the centre for some 20 feet, assaying at \$185 to \$225. The property is being controlled and managed by Vancouver people and has started with a better showing than the others.

The Bonanza claim is another wealthy property, and was taken over last week for \$75,000 by a Vancouver syndicate.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

The Central Zinc Company's plant at Seaton Carew, West Hartlepool, has a smelting capacity of about 35,000 tons of zinc blende per annum, which should produce about 10,000 tons of spelter. This company is a subsidiary of the Sulphide Corporation, formed to treat the Broken Hill Central mine's zinc blende. It was formed in 1906, since which time extensive experiments have been carried on prior to the starting of the plant at West Carew in May, 1908. The distillation furnaces are of the recuperative type. The pottery is 315 feet long, the upper floor of which is constructed of reinforced concrete. The roasting furnace is steel-panelled, 105 feet long by 75 feet wide, and the distillation works are 415 feet long by 56 feet wide. All the latest developments for zinc blende treatment have been adopted.

At a meeting of the Cardiff Chamber of Commerce on Nov. 24th, Mr. Griffiths (President) said there was a decrease in shipments at the South Wales ports last month of 250,000 tons. He attributed this to decreased output consequent upon the Eight Hours Act. Other speakers who are connected with the collieries

stated the output had decreased from 10 to 15 per cent. since the new Act came into operation, and this despite the fact that more miners were now employed in pits.

SOUTH AFRICA.

Johannesburg.—At the meeting of the Transvaal Chamber of Mines on Nov. 17th, Mr. Reyersbach made reassuring statements as to the native labour position. The present shortage gave no reason for anxiety. The speech has made an excellent impression.

Definite arrangements have been come to with the Government on the bewaarplaatsen question. The companies entitled to the ground will receive a fixed allowance of 2s 6d per ton treated, plus 25 per cent. of the net profits. No allowance is to be made for capital expenditure.

Development work for October on the Van Ryn Deep proved a record, 361 ft. having been driven on the eastern extension. Assays give 9 dwts. over 36 ins. for 50 ft. of driving from the shaft.

Upon technical advice, the Midas Deep is to shut down the mine and mill, but operations will be continued upon the treatment of slimes.

Mr. Webber, acting as chairman at a meeting of the Transvaal Chamber of Mines, made a speech in which he bade farewell and paid a tribute to Mr. Reyersbach, who is taking up a partnership in London in the firm of Wernher Beit & Co.

Mr. Reyersbach referred to the general situation on the Rand. He admitted that there was a shortage of native labour for the mines at present, but thought there was no cause for anxiety. All the colonies under the Union would be bound to take the utmost interest in the mines. He announced that an equitable settlement had been practically arrived at with the Government on the bewaarplaatsen question on a sliding scale basis. He urged the discontinuance of the monthly reports of output, labour supply, working costs, etc., suggesting that yearly reports would be sufficient and, indeed, the more advantageous.

AFRICA.

Nigeria.

With the recent revival of interest in West African gold mining, the other mineral resources of the country are evidently not to be neglected. It has been announced that the Champion Gold Reefs of West Africa has abandoned its option on a gold area in Apollonia, and has taken up tin mining in Nigeria. Now, the Nigerian Tin Corporation has been formed with a capital of £100,000, "to acquire and develop alluvial tin areas in Northern Nigeria, and, as suitable opportunities may offer, to co-operate with existing or future organizations in the same field." The frank admission that the Corporation has at present no properties, nor even options on any, disarms criticism.

Egypt.

There is every indication of growing activity in the oil industry in Egypt. The most recent company to make its appearance is the Helouan Petroleum Company. The capital is £60,000, in £1 shares, of which £20,000 is set aside for working capital, and the objects of the concern are stated to be the developing and dealing with petroleum and other mineral rights in Egypt and the Soudan, the Red Sea Littoral and Sinia Peninsula, and elsewhere in Northern Africa. A prospecting license has been granted by the Egyptian Government over an extensive area to the south-east of Helouan, about eighteen miles from Cairo, and already strong indications of petroleum have been discovered. The license is renewable yearly on payment of £25, and royalties are payable to the Government as follows:—6d on every ton of coal, 6d on every hundred gallons of raw oil and 3s on every ton of mineral wax or other substances produced.

RUSSIA.

Increasing activity is reported in the Baku oilfields, and for the first nine months of the year the production reached a total of 367,700,000 poods, as against some 344,440,000 poods for the corresponding period of 1908. During September the output amounted to 43,800,000 poods. This was rather less than in August, a circumstance explained by the fact that the month is a day short.

Active development operations are reported in the oil districts of Southern Russia, the latest to attract attention being Maikop, which lies within easy distance of the Black Sea. Already boreholes have yielded highly encouraging results, and refineries are now being erected and equipment installed.

AUSTRALIA.

Sydney, Nov. 24.—Dissensions are reported among the Northern colliery proprietors, due to the alleged previous knowledge by some of them that a strike was coming.

A shipment of 3,000 tons of coal has arrived from Newcastle. The miners' congress has decided to handle it, as it is intended for use on the railways. Another shipment of 6,000 tons for the Fiji Islands has been intercepted at Norfolk Island and recalled.

The Southern miners are restless, and it is rumoured that they desire to break away. A non-unionist has been assaulted in the western district, and two strikers have been arrested.

The Southern proprietors have notified Mr. Lee, the Acting Premier, that they do not agree to the men's proposal for an open conference to discuss the principal questions in dispute. They are, however, willing to refer the dispute to the Wages Board.

NEW ZEALAND.

The Minister of Mines, Nov. 24th, declared that since the Greymouth miners' union cancelled its registration under the Arbitration Act he had been endeavouring to arrange a working agreement on this crucial point. He considered that trucking from the surface would involve an extra charge of fourpence per ton, equal to £4,000 on last year's orders. "We could not stand it," said the Minister. "I proposed reference to the Conciliation Commissioner or the Arbitration Court, but the men refused. We cannot see our way to make further concessions."

UNITED STATES.

Arizona.—The Miami Copper Company are attempting to enlarge considerably their ore resources by means of diamond drilling. The company owns 260 acres of unproven ground.

Washington.—The gold mines of the United States produced \$94,560,000 worth of the precious metal during 1908, according to the Geological Survey and the Bureau of Mines, which have co-operated in preparing an analysis of the reports from private refineries and Federal mints and assay offices.

The total gold output was 4,574,340 ounces, a net increase in value of \$4,124,300. Colorado led with a productive value of \$22,871,000; Alaska was second with \$19,858,800; and California was third with \$19,329,700.

Porto Rico was the smallest producer with a total of only \$600.

The Philippines show an increase of \$219,800 to a total of \$284,500.

Some States of the Union, usually not associated in the public mind with gold mining, make a showing in the reports. In fact twenty-one of the States and territories, not including Porto Rico and the Philippines, are producing gold. Texas produced \$500 worth in 1908; New Hampshire mined \$3,700 worth, and somewhere in the vast grazing country of Wyoming was produced \$7,600. The summary shows a net decrease of 4,073,900 ounces of silver, with a value of \$28,050,600. The total production was 52,440,800 fine ounces.

Montana leads with a production of 10,356,200 fine ounces.

As in gold, the Philippines show a remarkable increase in silver production. From 100 ounces in 1907, the production of the islands jumped to 1,300,000 in 1908.

A new safety lamp for miners has the lamp bulb enclosed in a large air-tight glass globe, and the heat of the light expands the enclosed air, creating considerable pressure. If the bulb is broken in any accident, the compressed air rushes in and extinguishes and cools the incandescent filament before the explosive air of the mine can reach it. A single-cell storage battery, enclosed in a celluloid case, supplies current for twelve hours on a single charge, yielding a light of between one and two candle power.

STATISTICS AND RETURNS

COBALT ORE SHIPMENTS.

Shipments of ore from the Cobalt camp last week consisted of 1,189,157 pounds of ore, divided among nine mines, which included the usual leading shippers and the first shipment from the Beaver.

Shipments from the camp for the year to date total 26,917 tons. Shipments for week and year to date in pounds of ore are:—

	Week ending	
	Nov. 27.	Year to date.
Beaver	50,000	50,000
Buffalo		988,891
Chambers-Ferland		961,110
City of Cobalt	41,325	1,141,447
Cobalt Central		731,328
Cobalt Lake		141,340
Coniagas		1,505,830
Crown Reserve	183,310	5,478,296
Drummond	220,000	1,672,100
Keeley		96,000
King Edward		233,022
Kerr Lake		2,186,657
La Rose	262,298	11,646,568
McKinley	43,903	1,980,535
Nancy Helen		124,700
Nipissing	259,328	11,666,749
North Cobalt		40,000
Nova Scotia		480,810
O'Brien	63,993	2,653,153
Peterson Lake		324,040
Right of Way		2,726,090
Silver Queen		684,814
Silver Cliff		241,820
Temiskaming		1,746,060
Trethewey	65,000	1,883,323
T. & H. B.		1,666,485
Wettlaufer	58,000	108,000

Following are shipments from the Cobalt camp for the week ending December 3rd and those from Jan. 1st, 1909, to date:—

	Dec. 3.	
	Ore in lbs.	Since Jan. 1. Ore in lbs.
Buffalo	53,300	1,052,191
Beaver		50,000
Carnegie		63,410
Chambers-Ferland		961,010
City of Cobalt	63,480	1,204,927
Cobalt Central	40,820	772,147
Cobalt Lake		141,340
Cobalt Townsite	54,369	54,369
Coniagas ..	62,958	1,504,378
Crown Reserve	123,900	5,725,419
Drummond	100,000	1,772,100
Foster		187,800
Hudson Bay	120,735	1,287,220
Keeley		96,000
Kerr Lake	126,740	2,313,391
King Edward		233,022
La Rose	124,021	12,554,589
McKinley-Darragh		1,980,535
Nipissing	197,344	11,863,093
North Cobalt		40,000
Nova Scotia		480,810
Nancy Helen		124,700
Peterson Lake		324,040
O'Brien	64,500	2,727,653
Right of Way	127,265	2,853,355

Silver Queen	684,844
Silver Cliff	241,820
Stewart H. J.	62,392
Timiskaming	1,746,060
Trethewey	127,500 2,010,823
Wettlaufer	108,000

Ore shipments to Dec. 3rd from Jan. 1st are 55,221,438 pounds, or 27,610 tons.

Total shipments for week ending Dec. 3rd are 1,386,932 pounds, or 693 tons.

SILVER PRICES.

	New York.	London.
	cents.	pence.
Nov 25.....	Holiday	23 3/8
" 26.....	50 3/4	23 3/8
" 27.....	50 7/8	23 7-16
" 29.....	51	23 1/2
" 30.....	51 1/4	23 5/8
Dec. 1		
" 2.....	51 1/4	23 9-16
" 3.....	51 3/8	23 5/8
" 4.....	51 5/8	23 3/4
" 6.....	51 1/2	23 11-16
" 7.....	51 1/2	23 11-16
" 8		

ASBESTOS.

The Amalgamated Asbestos Corporation has issued its statement of operations for the five months ending October 31st.

TORONTO MARKETS.

Metals.

Dec. 8.—(Quotations from Canada Metal Co., Toronto.)
 Spelter, 6 1/2 cents per lb.
 Lead, 3.75 cents per lb.
 Antimony, 8 1/2 to 9 1/4 cents per lb.
 Tin, 33 1/2 cents per lb. (Very strong and active.) We look for higher prices.

Copper, casting, 14 cents per lb.
 Electrolytic, 14 cents per lb.
 Ingot brass, 9 to 12 cents per lb.

Dec. 8.—Pig Iron. (Quotations from Drummond McCall Co.)

Summerlee, No. 1, \$24.00 (f.o.b. Toronto).
 Summerlee, No. 2, \$23.50 (f.o.b. Toronto).
 Midland, No. 1, \$21.00 (f.o.b. furnace).
 Coal, Anthracite, \$5.50 to \$6.75.
 Coal, Bituminous, \$3.50 to \$4.50 for 1 1/4-lump.

Coke.

Dec. 6.—Connellsville coke (f.o.b. ovens).
 Furnace coke, prompt, \$2.80 to \$2.85 per ton.
 Foundry coke, prompt, \$3.00 to \$3.25 per ton.

Dec. 6.—Tin (Straits), 31.90 cents.

Copper, prime Lake, 13.50 cents.
 Electrolytic copper, 13.37 1/2 cents.
 Copper wire, 15.25 cents.
 Lead, 4.40 cents.

Spelter, 6.37 1/2 cents.
 Sheet Zinc, 8.50 cents.
 Antimony, Cookson's, 8.37 1/2 cents.
 Aluminium, 23.00 to 24.00 cents.
 Nickel, 40.00 to 49.00 cents.
 Platinum, \$29.50 to \$33.25 per oz.
 Bismuth, \$1.75 per lb.
 Quicksilver, \$52.50 per 75-lb. flask.