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### CIRCULATION.

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### FIRE FIGHTING IN COAL MINES.

The first important call upon the Draeger equipment at the Dominion Coal Company's Rescue Station came on September 10th. A fire in one of the collieries of the Nova Scotia Steel and Coal Company threatened to do great damage. Unprotected miners found it impossible to get within fighting distance of the trouble. A call sent to the Dominion Coal Company met with a prompt response. Instructor James McMahon was despatched with 22 trained men from Dominion collieries 2, 9, 1, 3 and 5. Under singularly adverse circumstances the men, with the aid of the Draeger equipment, fought the fire at close quarters. The heat was so intense that it was possible for each relay to work only ten minutes at a time. Had the call come sooner, or had the Nova Scotia Company possessed an equipment of their own, flooding need not have been resorted to.

We have given a prominent place to Mr. Gray's article on the above-mentioned occurrence, especially because he emphasizes the national character of rescue and fire-fighting work in mines. The nations are awakening to a live sense of their duty in the conservation of natural resources. One most lamentable source of waste and loss is the colliery fire. The only practical safeguard is a well-trained corps of men, properly equipped with modern respiratory apparatus.

### LARDER LAKE.

We are glad to present in this issue a short note on Larder Lake from Mr. H. L. Kerr. Our readers will observe that Mr. Kerr writes in a hopeful strain. In effect he states that from his personal examination of the district, there is justification for prospecting and exploratory development. Beyond this we think no competent mining man will go. It is true that striking gold specimens have been found. But the relatively small amount of sinking, drifting or tunnelling performed leaves the camp still to be classed as problematical. High purchase prices and capitalizations running into the millions have been and are the worst drawbacks from which Larder Lake can suffer. When a few payable ore shoots have been delimited and their value ascertained, there will be something to work on. Meanwhile good roads, fewer newspaper puffs, honest work and less talk are needed.

### PARIS GREEN.

Out of 72 samples of Paris green examined in the year 1895, five were declared doubtful and 15 were found to be unmistakably adulterated. Of late years, doubtless on account of the fact that the Dominion

Government investigated and reported upon the purity of the articles put upon the market, a great improvement has been observed. During the current year 150 samples, taken at random from retailers all over the Dominion, were subjected to analysis. Only one adulterated lot was found. The manufacturer of this lot was, we regret to say, a prominent Canadian concern. The sample showed incomplete solubility in ammonia. Adulterants were found in large amounts. Barytes, which would lend weight to the article, was present to the extent of 26.87 per cent., and acetic anhydride to 6.75 per cent. The pure samples were completely soluble in ammonia, and contained from 31 to 33.5 per cent. cupric oxide, and from 51.5 to 59 per cent. arsenious acid.

These figures are worth noting. Arsenic, which soon will become a staple metallurgical product in Canada, is the principal constituent of Paris green, and Paris green is itself an important article of commerce. We notice the names of four foreign manufacturers in the Bulletin issued by the laboratory of the Inland Revenue Department. It should be easily possible for Canadian manufacturers to meet the whole domestic demand.

#### DISCOVERY AND LOCATION.

The recent pronouncement of a United States authority to the effect that rigid requirements as to valuable discovery before location of claims would kill prospecting, has much to support it.

That discovery of valuable mineral in place is not an essential of legitimate location is tacitly acknowledged in all foreign mining countries. When the law demands such discovery, its requirements are either ignored or interpreted leniently. In several of the mining States local statutes allow a fixed period of time for marking the location after discovery. In the absence of statutory regulations it is usually understood that the prospector has a reasonable time in which to mark his location.

The tendency of mining legislation in this respect in the United States and elsewhere is strongly in favor of the man who is doing the work. Thus a prospector who has sunk a shaft, but who has made no discovery, is protected until he has made discovery. Upon discovery of valuable mineral he is allowed to make location relating back to the time of beginning work.

In this manner development is not hindered, nor false swearing encouraged.

#### CHINA'S NEEDS.

Reports from Shanghai indicate that China is soon to purchase large quantities of silver and copper. The Imperial Government is delaying purchase until the appearance of the report of an Imperial Commission appointed to reorganize and consolidate the Chinese coinage system. The design of both silver and copper

coins is to be changed, the weights are to be increased and standardized, and the issue largely increased. The Imperial Government, after taking over all the provincial mints, will operate the plants at full capacity for some time.

There is now a pronounced scarcity of silver and copper coins throughout the vast and populous empire. An adequate expansion of currency will mean unusual demands upon the American metal producers. There is, then, sound cause for expecting a rise in the price of both silver and copper.

#### BREATHING APPARATUS.

The wisdom of providing collieries with breathing apparatus was illustrated lately in Nova Scotia. One section of a colliery operated by the Nova Scotia Steel and Coal Company took fire through the carelessness of employees. It was at first thought that flooding would have to be resorted to. But the Dominion Coal Company generously volunteered the services of men trained in the use of the Draeger apparatus. Equipped with these respiratory devices, the rescue party fought and conquered the fire at close range.

This is but one instance of the "insurance" value of modern breathing devices. Fires that, if left to run their course, would cause immense loss, can be coped with successfully by men instructed in the use of breathing helmets. For life-saving, after explosions, they are an absolute necessity. Their introduction into every coal mining district should be made compulsory.

#### ABITIBI LAKE DISTRICT.

Lying between the 48th and 49th parallels, the district surrounding Lake Abitibi is popularly supposed to be a barren, rocky, semi-arctic wilderness. Professor M. B. Baker, who has spent a few summers in the Abitibi country, contributes a letter to this issue of the Canadian Mining Journal. The statement that tomatoes can be grown and ripened so far north would be received with incredulity were the evidence not unimpeachable. This is but one item. Professor Baker's letter will be read with deep interest. He emphasizes the agricultural value of this section of New Ontario.

#### EDITORIAL NOTES.

We would especially draw attention to Mr. T. A. Rickard's able article on "Dredging in the Yukon," which appears elsewhere in this issue. Mr. Rickard is a mining engineer of the highest standing. He is editor of the Mining and Scientific Press of San Francisco, and he went to the Yukon this summer to study mining conditions there at first hand. In our issue of the 15th of January last, we had occasion to point out the inaccuracies of some statements made by a contributor to the Engineering and Mining Journal, with the deliber-

ate intention of belittling the mining, and especially the dredging enterprises that are being energetically undertaken in the Canadian Yukon. Mr. Rickard's article brings out the truth and justice of our contention that the mining engineers at work in the far north are proving that with a reasonable amount of time to work in, and abundance of water, the warmth of summer will extract the frost from the ground, and consequently that the frozen gold-bearing gravel can be dredged at a splendid profit.

As is explained in a letter from a correspondent in this issue, the name of an important producing gold mine was inadvertently omitted from the list of Nova Scotia mines published by us on September 1st. Oldham has been one of the richest gold producers of the province. The omission was, therefore, a serious one.

The article on Mining in Western Australia should be read by Canadians. It shows what effective administration and sane methods can do. The records of divi-

dends paid is astonishing. Canada should take the lesson to heart. We need less promoting and far more clean development.

With a few notes on the reception of the Canadian Mining Institute at Cobalt, we reproduce the scheme of Mr. A. A. Cole's mineral collection. Mr. Cole should have the gratitude of the community for his enterprise and energy. If these collections could be duplicated and placed within the reach of prospectors and others, we are sure that a large demand would be created.

The annual report of the Consolidated Mining and Smelting Company of Canada, excerpts from which appear on another page, announces that the gross value of metals produced at the company's smelting works up to date is over \$31,000,000. During the year ending June 30, 1908, the gross value of metals produced was \$5,428,501, as compared to \$3,786,196, the production for 1907, being an increase of over 43 per cent.

## THE USE OF OXYGEN BREATHING APPARATUS AT THE SYDNEY MINES FIRE.

By F. W. Gray.

A fire which occurred at Sydney No. 1 mine, of the Nova Scotia Steel & Coal Co. on the 9th September, has served to demonstrate the usefulness of oxygen breathing apparatus for underground fire fighting, and to bear out the statements put forward in a note by the writer, which appeared in the Canadian Mining Journal of 1st May last regarding lessons to be learnt from the fire at Hamstead, Eng.

The fire at Sydney mines originated some time towards the evening of the 9th inst. from a blown out shot. The seat of the fire was a partly driven room, set in some thirty feet from the back deep, at a point near to the barrier and distant about 2 1-4 miles from the shaft. The water supply was inadequate and subject to interruptions, being carried for the last 500 feet in ordinary firemen's hose, which burst under the great head of water. Owing to this the fire gained on the workmen, and involved the back deep and the room opposite to the one where it started. The fumes from the fire prevented a sufficiently close approach to make the hose stream effective in extinguishing the flames, and two men were rendered insensible by the "fire-stink." It was decided to ask the assistance of the Draeger equipment of the Dominion Coal Co. to enable the fire to be fought at closer range. A telephone message was received at Glace Bay about 8 p.m. on the 10th, and by 11 p.m. a party of twenty-four was got together, consisting of District Superintendent N. McKenzie; the instructor at the Rescue Station James McMahon, and twenty-two men from collieries Nos. 2, 9, 1, 3 and 5. Reaching Sydney at 12 p.m. they were taken by a special tugboat and arrived at Sydney No. 1 about

1 a.m. The face was reached about 3 a.m. and by 5 a.m. the fire was attacked. It was found possible to get within 50 feet of the fire in good ventilation, and a base was established at this point. The men attacked the fire in relays of three at a time, while others were detailed to brattice and timber as required. The whole of the operations were directed by Mr. McKenzie. The chief obstacle to the fighting of the fire was a heavy fall at the entrance to the second room into which the fire had spread from its original starting point on the other side of the back deep. It was found necessary to surmount this fall to get the hose on to the fire, and the heat was intense. The men could not endure it for longer than ten minutes, after which they had to retreat. The instructor would then relieve the retiring men of their apparatus and fit out a fresh relay, and so on. After working in this way from 5 a.m. till about 3 p.m. the fire was driven back and confined to the small room where it had originated. When this was done the Glace Bay men withdrew, and a dam was constructed by the workmen of the Nova Scotia Co. across the mouth of this room, and it was slowly flooded through a pipe left in the dam.

The work performed by the Glace Bay men was done under the most arduous conditions. The stream of water was so feeble owing to the breaks that it was necessary to get quite close to the flames to effect any good, and the interruptions to the water supply sometimes allowed the flames to recover the ground they had lost through the previous exertions of the workers. The heat was very great, and the steam scalded the men, until they obtained the protection of oilskins.

Some idea of the heat may be gathered from the statement of the instructor that the metal parts of the apparatus burnt his hands when taking it from the backs of the retiring relays. All the work of course was done in an atmosphere that would have been very quickly fatal to any unprotected person. The men worked by the light of electric hand lamps of the Hubbell type. Neither the weight of the lamps nor the apparatus seems to have caused the men particular discomfort. The protection afforded to the face and head by the helmets seems to have been of great value. One of the men wore a mouth breathing apparatus, as owing to his large physique no helmet had been found large enough to fit him. He suffered from the heat and steam on his face, and could not advance as far as those fitted with helmets, although he is an old fire-fighter. It is evident that for smoke and fire the helmet type is likely to be the most useful one.

The lessons of this fire are exactly those of the Hamstead fire, which we may quote in part from the article of 1st May, above referred to.

"1. To be really effective and useful in time of need, oxygen apparatus should be kept on the spot, and should be available for use instantly."

Had the Draeger apparatus been used at Sydney Mines when the fire was first noticed it could of course have been extinguished with much greater ease than was actually the case.

"2. It is absolutely necessary that men be trained in the use of these apparatus in conditions that are as nearly as possible actual conditions, that is, in really unbreathable gases. . . . Untrained men are worse than useless when the emergency comes. No man knows his hidden idiosyncrasy until he makes the test."

In the case under review, there can be little doubt that the effective way in which the men from Glace Bay dealt with the fire and handled their apparatus was due to their having trained rigidly and conscientiously in the smoke chamber. Every man was known to be fit for the work.

3. . . . Relays of fresh men should be ready to take up the work."

Twenty-four men were in the Sydney Mines party, as compared with the small parties at Hamstead. They were able to work in relays and constantly relieve each other. Of course it must be admitted the conditions were distinctly different from those prevailing at Hamstead, for in that case the whole mine was involved.

"4. An adequate supply of oxygen and cartridges should be at hand."

The Glace Bay corps took with them ten apparatus, with sufficient spare oxygen cylinders, potash cartridges, and electric lamps to last each apparatus for twelve hours.

A further lesson, which although it may not meet with general approval, we consider cannot be too strongly emphasized, is the national character of rescue work in mines. The conditions which existed at Sydney Mines to occasion the visit of the Glace Bay corps did not fortunately involve any especial danger to human life. But there is a danger that where men have trained and lives are in danger the services of the trained men will be called upon. In our note of the 1st May we said: "We know that willing volunteers will never be wanting when other men's lives are in danger, and it is hard to refuse aid under such circumstances. But what right has anybody to expect volunteers from another district to risk their lives in the unknown workings of a strange colliery at long dis-

tances from their base of supplies? Such men are like the mariner in uncharted seas, and could be accused neither of cowardice nor inhumanity if under such circumstances they refused to endanger their lives. But we know they would not refuse, and therefore the national character of the matter becomes at once apparent."

That large corporations should equip their mines with such apparatus is a wise precaution on their part, and a cheap fire insurance premium, apart altogether from the humanitarian aspect. The coalfields of Nova Scotia are the property of the Government. Anything that will or may save human life is a matter for Government action. Therefore apart from anything that that the coal operators may do on their own initiative, we cannot see how either the provincial or the federal government can ignore their share of the cost and responsibility of this matter.

### ANTIMONY.

Although a falling market throughout the year gave little encouragement to the development of American production of antimony, the output in the United States in 1907 showed an increase of 256 tons in quantity and of \$19,497 in value as compared with the output of the preceding year, the total being 2,022 short tons, valued at \$622,046, in 1907, as against 1,766 short tons, valued at \$602,549, in 1906.

As usual the greater part of the antimony produced in the United States was that contained in antimonial lead and sold by the smelters in that form. As this alloy is extensively used in type metal, babbitt metal, coffin trimmings, and similar wares the two metals need not be separated.

The imports of antimony in 1907, in the form of metal, regulus, ore, and salts, exceeded even those of 1906, up to that time the greatest recorded, rising in value from \$1,616,381 in the earlier to \$1,686,802 in the later year.

The consumption of antimony and antimony salts in 1907, as shown by the addition of the values of production and of imports, amounted to \$2,308,848.

A statistical report on the condition of this industry in the United States, prepared by Frank L. Hess, has just been published by the United States Geological Survey as an advance chapter from "Mineral Resources of the United States, Calendar Year 1907." Copies of this report may be obtained by applying to the Director of the Survey at Washington, D.C.

The death rate per thousand employees occupied in coal mining in the United States reached the startling figure of 4.86 in 1907. This is an increase of 1.55 over 1906, when the rate was 3.31. The number of tons of coal mined in 1907 for each life lost was 145,471 tons, as compared with 19,950 in 1906. West Virginia coal mines showed the highest death rate in 1907, 12.35 per thousand, and the lowest production of coal per life lost, 65,969 tons. Missouri's rate was the lowest, being 0.95 per thousand men employed, and 499,742 tons of coal mined for each life lost in spite of the general impression that the mine explosions are responsible for the majority of deaths in coal mining, it is found that while 947 deaths and 343 injuries were due in 1907 to gas and dust explosions, yet 1,122 deaths and 2,141 injuries were caused in the same period by falls of roof or coal; and 855 deaths and 2,416 injuries were ascribed to other causes.

## LARDER LAKE.

H. L. Kerr.

Although the optimistic hopes of some of the early prospectors in the Larder Lake country have fallen far short of realization, yet work done there recently has disclosed the fact that several promising bodies of gold-

would be a great pity if the foolish talk of three thousand ounce ore in the early days, causes us to overlook the possibilities of large bodies of low-grade ore, which in all probability exist.



VIEW OF LARDER LAKE FROM HARRIS-MAXWELL.

bearing quartz exist. Whether these locations shall develop into mines remains for the future to show. That there are ore bodies sufficiently rich to warrant the expenditure of money, in order to prove their value is

Both at the Maxwell-Harris, in the neighborhood of Larder City, and at least two other properties seven or eight miles distant, many fine specimens of visible gold have been found, and the hope is entertained that,



Vein from which rich specimens have been taken. This and all such veins require proving and development.

readily admitted by those who take the trouble to visit the camp. It must be said that a great deal of the early work done by some of the companies was sadly misapplied, and that most of the booming of the camp in the beginning was most reprehensible. Still, it

associated with these rich spots are large quantities of low-grade milling ore. Work is progressing slowly at both ends of the lake with the object of proving this. One small stamp mill is already in operation, and two companies have ten stamp mills nearly complete. In

each case provision has been made for the addition of more stamps and in the meantime prospecting on the possible ore bodies is being pushed ahead.

It is possible now to reach the lake from Toronto in less than twenty-four hours. A year ago the journey took the best part of a week. The Pullman train leaving the Union Station at nine o'clock every night, goes as far north as Englehart, about twenty-five miles north of New Liskeard, which station is reached about nine o'clock in the morning. From here another train may be taken three days in the week, Mon-

places in the city. The city consists of less than twenty buildings with a stationary population of about fifty. A small steamer belonging to the Northern Ontario Navigation Co., makes two trips daily up the lake, making it very easy for one to visit any claims in which they may be interested. If one is not interested in mining he will find it a delightful spot to spend a holiday. Not only is there good fishing in the lake but moose are plentiful not far back.

The trip may be made to the camp about four hundred and fifty miles north of Toronto, all the important



WENDIGO WAGON ROAD A YEAR AGO.

day, Wednesday and Friday to Dane (formerly known as Boston), where the stage for Larder City meets every train. (Return ticket to Dane, including Pullman both ways, is \$21.00). The wagon road from Dane to Larder City which has been built by the Government, is in first-class condition for probably fourteen of the eighteen miles and the balance of it is being rapidly rounded into shape. The stages run are very comfortable and considering the locality the charge of two dollars and a half each way is not at all excessive. Larder City is usually reached before dark. Good meals and sleeping accommodation may be obtained at two or three

locations visited and perhaps a moose got on the side, all within a week.

#### THE LAW CASE.

Many of our readers are interested in knowing how the prosecution of that enterprising quondam barber, Frank Law, is progressing.

The move on the part of Law's counsel to render proceedings abortive by claiming that Law had won immunity by giving evidence to the Crown, was met by Assistant Crown-Attorney W. H. Price in a sur-

prisingly frank letter, published in the Toronto Telegram. It may be explained that the case is now in the hands of the County Crown-Attorney, Mr. H. L. Drayton. Newspaper reports reflected upon Mr. Price, who conducted the prosecution up to the point where it was turned over to Mr. Drayton.

We publish herewith Mr. Price's open letter to Mr. Drayton. Mr. Price's letter states the case to our entire satisfaction. If there has been carelessness, indifference, or collusion, if the ends of justice are to be defeated, if a most unmistakable crook is to be allowed to escape without punishment, it is clear that the blame will lie on some person other than Mr. Price. The following is reprinted from the Telegram of September 17, 1908: "The following letter from W. H. Price, the commissioner who took the evidence in the Russell extradition case, to Crown-Attorney Drayton sets forth the facts in connection with the Law case in a new light. Mr. Price strongly urges the point that nothing has

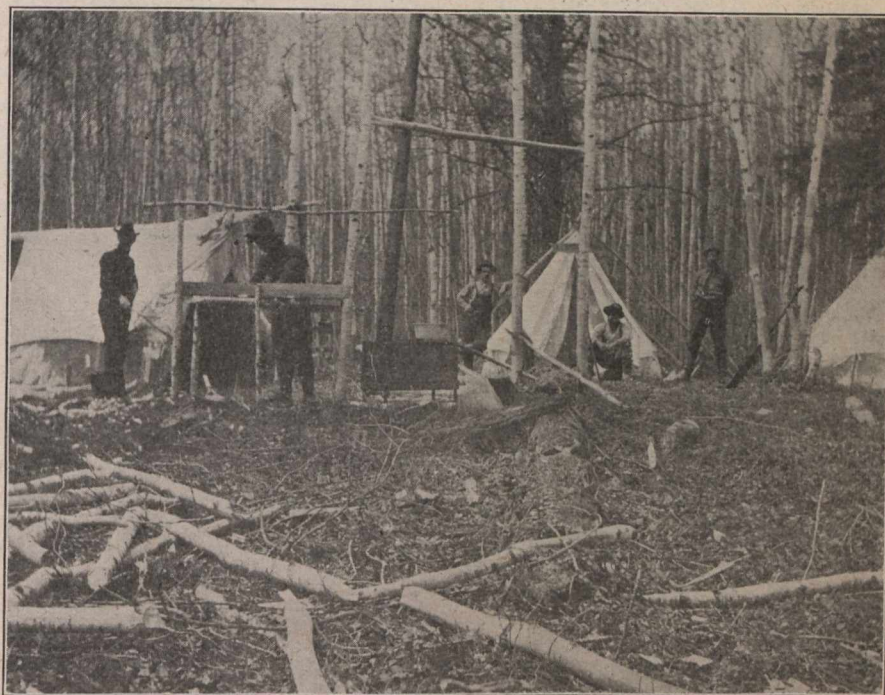
eral, and discussed the matter fully with him. He was of the opinion that evidence given in the Russell extradition proceedings, as Mr. Law had requested, would not affect or interfere in any way with the case then pending against him in the sessions.

2. That Provincial Detective Rogers discussed the matter with Mr. Law, in my presence, and saw Deputy Attorney-General and had instructions from the deputy attorney-general to take that evidence on the extradition proceedings. Law not only at this time volunteered to give evidence, but offered to pay expense of extradition proceedings.

#### Law was Warned.

3. Law was told, as also was his counsel, Mr. O'Connor, that he could give evidence or not as he pleased; that it made no difference to the Crown.

4. That Mr. Law's evidence taken on the extradition proceedings against Russell could not in any shape or



KERR'S LANDING—A TYPICAL LARDER LAKE CAMP.

been done by the Crown in using evidence given by Law which should prevent his being prosecuted, notwithstanding the remarks of Judge Winchester.

#### Rex vs. Law.

Dear Sir,—I am handing you a memorandum of what took place before Mr. Law was examined on the extradition proceedings taken by the crown in Rex vs. Russell. You will see by this memorandum the position of affairs at that time. After this, Mr. Law left the room, and was away for about half an hour, while I proceeded with other witnesses who were on hand. He then came back, and after being told that he could either give evidence or not as he desired, he submitted himself to be sworn. I beg to draw your attention to the following facts in connection with this matter:

#### Consulted Mr. Cartwright.

1. When Law volunteered to give any evidence which would assist in bringing back Russell, I communicated with Mr. Cartwright, the Deputy Attorney-Gen-

eral, and discussed the matter fully with him. In fact there is nothing in this evidence which points against Mr. Law, neither was there any attempt to glean any information from him.

5. That although Mr. Law's evidence on the Russell extradition proceedings was taken on the 28th of February, 1908, and two Sessions have passed, no objection had been raised by Mr. Law or his counsel, on the score that he had given evidence in the extradition proceedings.

#### Fully Aware of Proceedings.

6. That you were fully aware of what had been done in the Russell extradition proceedings some months ago, and discussed it with Mr. Corley, Mr. Rogers, and other parties.

7. That Mr. Blackstock notified you on Thursday, the 10th inst., that he would make this motion, yet I was not apprised of the fact until you had reached court, and apparently discussed the matter on Monday, the 14th.

**The Usual Result.**

8. That Mr. Blackstock, counsel for the prisoner, did not state in court that any arrangement had been arrived at with Law, but merely stated that he was used as a Crown witness, and the usual result should follow.

9. That the Judge's statement before hearing what you had to say was not fair to the Crown or to anyone connected with the case.

**Plenty of Evidence.**

In addition to these points, I draw your attention to the fact that we could not in any event succeed against Law, on the charge upon which extradition proceedings were taken against Russell. The charge of conspiracy to defraud must, as a necessity, cover almost all transactions of the firm of Law & Co., Limited. I do not consider, however, as a point of law or practice, that Blackstock has raised any point that cannot be met satisfactorily, I am quite satisfied that there is abundant evidence which points to Law personally, and which should leave no possible doubt as to his conviction.

**Those Present.**

The parties present at the time this evidence was taken were Magistrate Kingsford, Mr. Rogers, Mr. Angus, Mr. O'Connor and myself. I do not ask you to take what I have to say in the matter, but you can consult with any of them and verify all the material outlined in this letter. It seems to me that the position taken by the court on such flimsy statements and without hearing everything that could throw light on the case was entirely uncalled for and unjustified. There is nothing to prevent this case being called and disposed of at the earliest available opportunity. You may show this letter to Judge Winchester if you so desire.

Yours truly,

(Signed) WILLIAM H. PRICE.

**Onus on Crown Attorney.**

P.S.—The onus in this case is surely on the defence to show any arrangement, and the duty of yourself as Crown Prosecutor not to permit anyone to impugn the motives of the Attorney-General's Department or Crown counsel.

(Signed) W. H. P.

## WESTERN AUSTRALIA.

### Report of the Department of Mines for the Year 1907.

In mineral production Western Australia ranks second among the states of the great Commonwealth of Australia. During 1907 Western Australia's output represented a value of £7,640,153, of which £7,210,747 was credited to gold. In respect of the production of this precious metal Western Australia is far in the lead of any of its sister states. Its closest competitor is Victoria, with a gold output of £2,954,617. In total mineral production, however, New South Wales has a strong lead. The record of this state for 1907 was £10,577,378, of which £2,922,419 is attributable to coal and £3,658,632 to silver-lead ore.

Thus Western Australia, although it produces respectable quantities of copper, lead, tin and coal, is pre-eminently a gold-producing state. Its mining laws have, therefore, been evolved, interpreted and administered more particularly from the viewpoint of the gold industry. Gold mining languishes in Canada to-day. Defective legislation and the apathy of those in authority are not the least causes of this. It is possible that some valuable lesson may be learned from a survey of Western Australia's work.

Regarding the gold production of the several states of Australia, the Territory of Papua and the Dominion of New Zealand as a whole, Western Australia's share is 46.29 per cent.

For three years, however, Western Australia's output of gold has been falling, not seriously, but quite perceptibly. The Government is adopting strong measures to check this decline. As a consequence new regions are being opened and the tide is turning. In another section of this paper we shall notice the policy of the Department of Mines of Western Australia. Meanwhile the state's gold industry claims our attention.

From the illuminating character of the statistical tables that form part of the Annual Report it is evident that close and constant attention is paid to every phase of the mining industry. Table 5 gives us an analytical

view of the production of ore and gold per man employed. The maximum tonnage per man employed underground and per man above and under ground is credited to the Peak Hill gold field, respectively 821.03 tons and 410.52 tons, with corresponding production of gold per man of 127.61 ounces and 63.81 ounces. The general average value of gold produced per man employed above and under ground was £438 in 1908, and £438.32 in 1907. The average tonnage of ore raised has increased from 173.31 tons in 1906 to 187.32 tons in 1907. The number of producing mines in 1907 was 1,062, a decrease of 89 as compared with the returns for 1906.

Up to the end of 1907 the enormous sum of £17,476,578 had been paid in dividends by Western Australian gold mining companies. During 1907 dividends to the amount of £1,738,163 were distributed. There are nine companies whose nominal capital exceeds £200,000 (\$1,000,000). Eight of these companies have made dividend payments amounting to sums greater than their nominal capital, and in some instances have returned 400 to 600 per cent on the original stock. One company, the Great Boulder Proprietary Gold Mines, Ltd., operating in East Coolgardie gold field, and capitalized at £175,000 (shares 2 shillings par), paid £262,500 in dividends during 1907, and has paid to date a grand total of £2,644,300. This quite takes one's breath away.

**Acreage.**

Under 507 mining leases are held 61,677 acres, of which gold mining leases account for 27,587 acres. Liberal conditions for prospecting have incited a large increase in prospecting areas. Classified and tabulated lists of all these holdings in each and every gold field are given.

**Men Employed.**

During the past year 16,058 men were employed in "reef" or "lode" mining on the gold fields; in alluvial



mining, 1,318; making a total of 17,926. It is significant that at the mines the number of employees above ground almost equalled the number under ground. The figures are 7,113 above and 8,945 below.

**Accidents.**

Forty-one deaths and 374 injuries is the record for 1907 in the gold mines. The first figures give a death rate of 2.55 per 1,000 persons employed for these mines. Eight deaths resulted from accidents above ground and 33 from accidents under ground. The fatal accidents (including four deaths in mines other than gold mines) are thus classified:—

	Deaths in 1907.
Explosions .....	3
Falls of ground.....	22
In shafts.....	8
Miscellaneous underground.....	4
Surface .....	8
	45

It may be noted that in 1906, 17 out of 40 deaths were due to falls of ground.

**State Aid to Mining.**

For nine years a system of state aid has been in vogue. There are now 29 state stamp-mills, 21 cyanide plants 3 slime plants (two of which were erected in 1907), 2 tin dressing plants, and one Huntington mill under Government operation.

Since the first state battery was started gold and tin to the value of £2,089,071 have been recovered at these plants; 505,286 tons of gold ore, producing gold to the value of £2,036,130 having been treated, and 31,166 tons of tin ore, producing tin to the value of £52,915. In addition gold to the value of £254,065 has been recovered by cyanide treatment, and £23,101 from slimes.

The tonnage of gold ore treated at state batteries has increased annually, until in 1907 the figures reported stand at 95,279 tons.

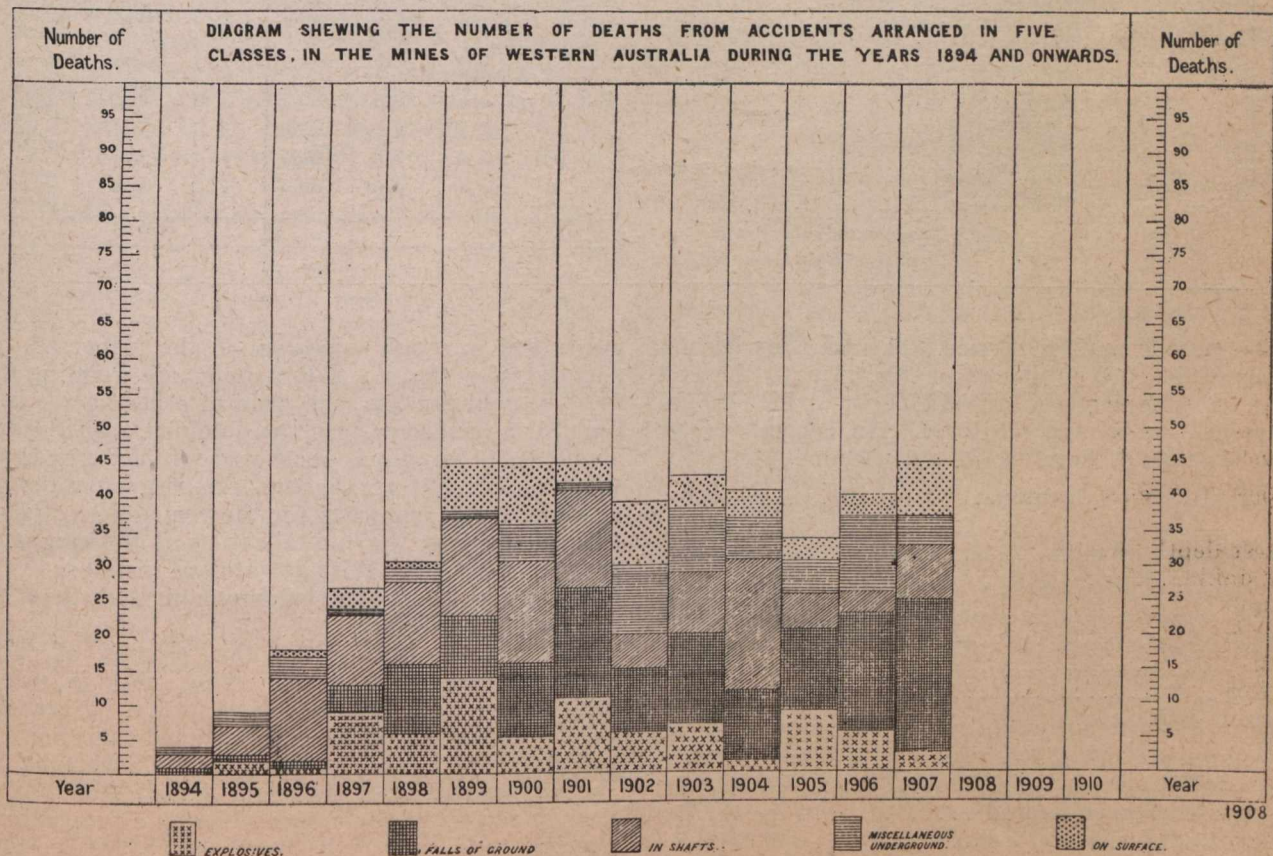
The revenue from all state plants was £91,274 during 1907, and the working expenditure was £91,351. Adding the sum of £1,622 spent in improvements, the net working loss for the year was £1,699. The plants used for the treatment of gold ore only show a loss on crushing of £8,724, and a profit on cyaniding and slimes treatment of £8,457. Expenditures from revenue in improvements and additions amounted to £1,622, leaving a net working loss of £1,889. To the end of 1907 the capital expenditure on state batteries and tin dressing plants was £237,029, and the working expenses for the entire period exceeded the receipts by £9,991.

The following statement, showing the sums advanced during the year 1907, under the provisions of the Mining Development Act, is worth reproducing:—

	£	s.	d.
Advances in aid of mining work.....	6,749	0	0
Advances in aid of boring.....	350	3	10
Advances in aid of crushing plants....	1,000	0	0
Subsidies to provide crushing plants...	2,300	11	0
Purchase of boring plants.....	2,490	16	2
Providing means of transport.....	1,052	19	11
Total .....	£13,943	10	11

In addition to the above, amounts totalling £7,832 11s. 4d. were expended from the Mining Development Vote on various matters for the assistance of mining, such as water supply, roads, subsidies to assist cartage or ore over long distances, drainage, timber tramways and subsidies for development work done below the 100-foot level in small mines.

Subsidies to the extent of £2,300 11s. were given to private crushing plants, the conditions being that they



crush for the public at fixed rates, in most cases conditions being imposed as to treating or purchasing tailings. The number of tons of ore crushed during the year was 38,143 tons. The receipts under the Mining Development Act, exclusive of interest payments, were £824-1s. 3d., made up as follows:—

	£	s.	d.
Refunds of advances.....	624	2	11
Sales of plant.....	199	18	4

**Report of the State Mining Engineer.**

The State Mining Engineer's report covers 19 gold fields. It is not our purpose to do more than notice a few outstanding features. There is much in each inspector's report for individual gold fields that is worthy of note. We shall be unable, however, to touch upon these beyond several specific paragraphs that deal with the equipment and work of operating mines.

In the Day Dawn division of the Central Goldfields division, the Great Fingall Consolidated Company oper-

	Fine oz.
Yield of gold over plates .....	56,451.093
Yield of gold from sands .....	19,502.630
Yield of gold from slimes .....	4,987.005
Yield of gold from concentrates .....	17,850.071
Yield of gold from accumulations .....	462.628

	Gallons.
Daily inflow of water about .....	30,000

	Fine oz.
Quantity of silver or other metals than gold .....	16,270,019
Average number of men employed under ground .....	332
Average number of men employed on surface .....	278
Cost per ton mined and hauled to surface	8s. 0.45d.
Cost per ton of ore treated .....	7s. 1.76d.

The working costs in this instance need fuller state-

TABLE 7.

Dividends paid by Western Australian Gold Mining Companies during 1907 and Total to date.  
(Compiled from information supplied by the Government Statistician's Office and the Chamber of Mines of W.A., Kalgoorlie.)

Goldfield.	Name of Company.	Par Value of Shares.	Paid up to.	Nominal Capital.	No. of Shares Issued.	DIVIDENDS PAID.		Grand Total paid to end of 1907.
						No. of Dividends paid.	Total Amount.	
		£ s.	£ s. d.	£			£	£
Peak Hill	Peak Hill Goldfields, Ltd.	1 0 0	1 0 0	80,000	72,500	18	29,906	180,886
East Murchison	Black Range G.M. Co., N.L.	1 0 0	1 0 0	48,000	42,000	2	2,100	90,656
Do.	Havilah G.M. Co., N.L.	1 0 0	1 0 0	48,000	42,000	2	2,100	2,100
Do.	Other Companies	1 0 0	1 0 0	48,000	42,000	2	2,100	62,750
Murchison	Barrambie Ranges G.M. Co., N.L.	1 0 0	2,500 f.p. up 47,500 p. up 15s.	50,000	50,000	2	3,750	3,750
Do.	Great Fingall Consolidated, Ltd.	10 0	10 0	125,000	250,000	4	137,500	1,543,750
Do.	Other Companies	1 0 0	1 0 0	350,000	325,000	4	65,000	74,195
Mt. Margaret	Sons of Gwalia, Ltd.	1 0 0	1 0 0	350,000	325,000	4	65,000	458,175
Do.	Other Companies	1 0 0	1 0 0	350,000	325,000	4	65,000	328,830
North Coolgardie	Other Companies	1 0 0	1 0 0	100,000	95,050	1	2,376	438,931
North-East Coolgardie	Queen Margaret G.M. Co., Ltd.	1 0 0	1 0 0	100,000	95,050	1	2,376	20,197
Do.	Other Companies	1 0 0	1 0 0	100,000	95,050	1	2,376	82,971
East Coolgardie	Associated Gold Mines of W.A., Ltd.	1 0 0	1 0 0	500,000	495,364	1	24,788	555,225
Do.	Associated Northern Blocks (W.A.), Ltd.	1 0 0	1 0 0	350,000	350,000	2	87,500	525,000
Do.	Golden Horseshoe Estates Co., Ltd.	5 0 0	5 0 0	1,500,000	300,000	3	255,000	2,520,000
Do.	Golden Ridge G.M. Co., N.L.	1 0 0	16 0	31,200	30,900	2	6,179	9,649
Do.	Great Boulder Perseverance G.M. Co., Ltd.	1 0 0	1 0 0	1,500,000	1,400,000	3	105,000	1,321,250
Do.	Great Boulder Proprietary G.M., Ltd.	2 0 0	2 0 0	175,000	175,000	4	282,500	2,644,300
Do.	Hainault G.M., Ltd.	1 0 0	1 0 0	150,000	150,000	1	7,500	46,613
Do.	Ivanhoe Gold Corporation, Ltd.	5 0 0	5 0 0	1,000,000	200,000	4	240,000	1,868,750
Do.	Kalgurli G.M., Ltd.	1 0 0	1 0 0	120,000	120,000	4	210,000	585,000
Do.	Lake View Consols, Ltd.	1 0 0	258,754 fully paid, 91,246 con. (5/- paid)	350,000	350,000	1	17,500	1,396,250
Do.	Oroya Brown Hill Co., Ltd.	1 0 0	1 0 0	450,000	450,000	4	258,750	2,058,000
Do.	South Kalgurli G.M., Ltd.	1 0 0	1 0 0	200,000	200,000	2	15,000	55,000
Do.	Other Companies	1 0 0	1 0 0	200,000	200,000	2	15,000	136,991
Coolgardie	Burbanks Main Lode (1904), Ltd.	4 0	4 0	30,000	150,000	1	3,000	3,000
Do.	Other Companies	4 0	4 0	30,000	150,000	1	3,000	323,001
Yilgarn	Greenmount Co., N.L.	1 0	3	5,000	100,000	1	884	884
Do.	Other Companies	1 0	3	5,000	100,000	1	884	47,744
Dundas	Cumberland G.M. Co., N.L.	10 0	6 0	40,000	80,000	2	4,000	16,000
Do.	Other Companies	10 0	6 0	40,000	80,000	2	4,000	127,000
Total Dividends paid during 1907							£1,738,163	
Total Dividends paid to end of 1907								£17,476,578

ates the Great Fingall mine. The company is capitalized at £125,000 in shares of 10s. Up to the end of 1907 the company paid £1,543,750 in dividends. In 1907 alone it paid out £137,500. An account of its equipment should, therefore, be not without profit:—

Number of stamps dropping.....	100
Feet.....	Feet.
Greatest depth of mine.....	1,880
Shaft sinking done in 1907.....	40
Drifting .....	2,432
Cross-cutting .....	739
Rising .....	2,884
Winzing .....	561
Diamond drilling.....	1,045½
Tons.....	Tons.
Ore treated .....	261,057
Accumulated slimes treated .....	3,335
Accumulated slimes treated .....	1,085

ment, but a rough analysis of the reported yield demonstrates that on a low-grade ore yielding about \$7.60 in gold per ton (the yield of other metals is negligible), a handsome profit is obtained. On the plates about \$4.30 per ton is recovered, or 56.6 per cent. of the gold content of the ore. Subsequent treatment, cyaniding, etc., accounts for the remainder. It is also noteworthy that the capitalization of the company is, roughly, \$620,000. With 100 stamps installed the company returns to its stockholders more than their entire investment each year.

Interspersed throughout the reports of district inspectors are remarks concerning work in new and outlying regions. In the inland Mount Margaret and East Murchison gold fields, it is noted that many good prospects are spoiled because the men working them, though possessed of sufficient knowledge, have not enough capital to begin operations on a proper footing. Hence "they continue to work the richest ore until it

gets below the payable stage with the appliances used and then abandon the place." So difficult is transportation in this part of the state and so costly are all kinds of supplies, that one enterprise abandoned a prospect as not then payable, although 1,357 tons of ore crushed yielded 1,309.71 oz. of gold over the plates of a five-stamp mill. In these remote mining fields camel teams are one of the principal means of transportation.

East Coolgardie gold field, with an area of only 532 square miles, occupies the first place as regards gold returns and dividends. During 1907 the gold mines of this field paid £1,489,697 in dividends. The larger mines are all served by railroad connections. Water is supplied by the Government, which controls an elaborate system. Close check is kept upon the daily consumption of water at the mines. Owing to the magnitude of mining operations the sand dumps around the mines are so high that they have become "a nuisance to the town . . . owing to the sands being carried by the wind." Arrangements are being made to sluice the residues away from the mines.

The Golden Horseshoe Company, operating in East Coolgardie, has erected a large and complete change house for its 882 employees. The building is fitted with wash-basins, shower-baths, swimming-pool, etc., and hot and cold water are laid on. The used water is pumped back to the batteries. It may be mentioned in passing that this company, with a capital of £1,500,000, paid dividends to the end of 1907 amounting to £2,520,000.

The inspector for the last-mentioned gold field adds a note of keen criticism regarding the competition among managers to report low treatment costs and large percentage savings. He first alludes to the apparent contradiction between the low values reported for tailings from certain treatment plants and the fact that several of the mines are erecting ore treatment plants. Further, he animadverts upon the disastrous effect of competition for reduction of figures of cost per ton. Although "by incurring further cost of 3 shillings per ton another pennyweight of gold, worth 4 shillings, can be extracted, there is a strong temptation for the manager nevertheless to let the profit go, rather than show costs 3 shillings a ton higher than those of his neighbors."

Among the reports of ore treatment costs we notice particularly favorable returns from two mines in the Yilgarn gold field. At the Never Never Gold Mine ore is being mined for 1s. 3d. per ton, milled for 3s. per ton, and cyanided for 3s. 6d. per ton, a total cost of 7s. 9d. per ton for mining and treatment. At the Queen's Cross Gold Mine, Coolgardie, ore is being mined and milled by a party of tributers at a total cost of 5s. per ton. It is remarked by the inspector that "plants are now erected to reap profits from the large and more persistent low-grade ore bodies rather than from the high-grade ore shoots which characterized the operations a few years ago."

**General.**

The operation of the Mines Regulation Acts, which are stringent and wholesome pieces of legislation, appears to have a salutary effect upon mining. Negligence on the part of employees and miners is discouraged by means of promptly levied fines. Reported cases of non-compliance with statutory requirements are investigated with little loss of time. Managers, shift-bosses and miners are included in the list of convictions.

Sunday labor is countenanced only where necessary. Legislation provides that only those who have secured special permits from an inspector can Sunday work be legally undertaken. "In the case of one large mine," writes the State Mining Engineer, "I have been assured by the management that the cessation of Sunday work underground not only resulted in no loss, but was an absolute advantage to the mine in its working expenses."

We cannot in the space now at our disposal, touch upon the copper, coal and iron ore production of Western Australia. Before closing, however, in view of the recent discovery of scheelite in Nova Scotia, it may be timely to notice an occurrence of this mineral at Kundip, in the Phillips River field. Here a quartz vein carries gold and scheelite. After stamp-milling the scheelite was concentrated out and 17 bays were filled. Following are the particulars of the marketing:—

17 bags scheelite, gross weight.....	979 kilogrammes
17 bags scheelite—gross weight....	979 kilogrammes
net dry weight.	943.38
net weight ....	950.7
Agreed assay: 75% WO <sub>3</sub> (tungstic oxide)	
= 707.535 kilogrammes,	
@ 45.50 marks per unit per 1,000 kilos	
= M 3,219.30	
Less charges..	59.50
	<hr/>
	M 3,159.80
	£ s. d.
@ 20.45 M to £1 =	154 10 4
Less stamps, comm'n and interest	4 7 1
	<hr/>
	£150 3 3
Less charges of transport, etc.	11 2 1
	<hr/>
Net proceeds..	£139 1 2

This profit appears profitable on a consignment of less than a ton.

**TALC AND SOAPSTONE.**

Extract of advance chapter of mineral resources of the United States:—

**Production.**

Including the production of fibrous talc, most of which is quarried at Gouverneur, St. Lawrence County, N.Y., the total output of talc and soapstone in the United States in 1907 amounted to 139,810 short tons, valued at \$1,531,047, an increase, as compared with 1906, of 19,166 short tons, or 15.9 per cent., in quantity and of \$99,491, or 7 per cent, in value. The increased production in 1907 was distributed among all the new important producing States.

The smaller percentage of increase in value was not due to any general decline in price, but to a larger proportion of the product which was sold in the crude or unmanufactured state, and in this portion of the product there was a decline in price. By far the larger number of the talc and soapstone quarries are operated or controlled by the manufacturers, and only a comparatively small part of the output is sold in the crude state. In 1907, however, there was an unusually large quantity sold crude, and part of this was low-grade material. The quantity sold crude in 1906 was 15,211 short tons, having an average value per ton of \$2.65. In 1907 the marketed production of rough or unmanufactured soap-

stone was 25,538 tons, at an average price per ton of \$1.36, so that while the quantity sold exhibited a gain of 10,327 short tons, or about 66 per cent., the total value decreased \$5,712. The average price for ground soapstone was the same in 1907 as in 1906, while prices for manufactured articles or partially manufactured materials were higher.

The tale and soapstone production is classified in the following four groups: Rough or crude, sawed into slabs, manufactured articles, and ground. A part of the crude product, represented in the first group, is sold to factories, and some of this is probably again included in the estimates of manufactured articles or ground materials represented in the other three groups, though duplication is avoided if possible. The relative quantities and values of these varieties produced in the United States during the last year are shown in the following table:

Condition in which marketed.	Quantity (short tons).	Value.	Average price per ton.
Rough .....	25,538	\$34,625	\$1.36
Sawed into slabs.....	4,822	91,668	19.01
Manufactured articles ..	23,484	648,475	27.61
Ground .....	85,966	756,279	8.80
	139,810	\$1,531,047	\$10.95

**Production of Fibrous Talc in New York.**

Practically all of the fibrous variety of talc produced in the United States comes from the vicinity of Gouverneur, St. Lawrence County, N.Y. It is all ground and is used principally for filling in the manufacture of medium grades of paper, though some goes into the paint trade, and some is used in the preparation of wall plasters, for which its fibrous character and heat-resisting quality make it well adapted. The production of fibrous talc in New York in 1906 and 1907 is shown in the following table:

Use.	1906.		1907.	
	Quantity.	Value.	Quantity.	Value.
Paper filling ..	61,672	\$557,200	67,800	\$626,000
Paint . . . . .	61,672	\$557,200	67,800	\$626,000
Wall plasters .	61,672	\$557,200	67,800	\$626,000

**Imports.**

The imports of talc into the United States have never been large, though the prices obtained are usually somewhat higher than the averages shown for the American product, and the values quoted for the foreign material are at point of shipment and are exclusive of freight and duty. The reason for these higher values may be attributed to the fact that only the fancy grades, which are used for the manufacture of face power and for medicinal purposes are imported into this country. The imports in 1907 showed an increase of nearly 50 per cent., both in quantity and value, over 1906.

Talc imported into the United States, 1902-1907, in short tons:—

Year.	Quan.	Value.
1902 .....	2,859	\$35,366
1903 .....	1,791	19,677
1904 .....	3,268	36,370
1905 .....	4,000	48,225
1906 .....	5,643	67,818
1907 .....	10,060	126,391

**Canadian Production.**

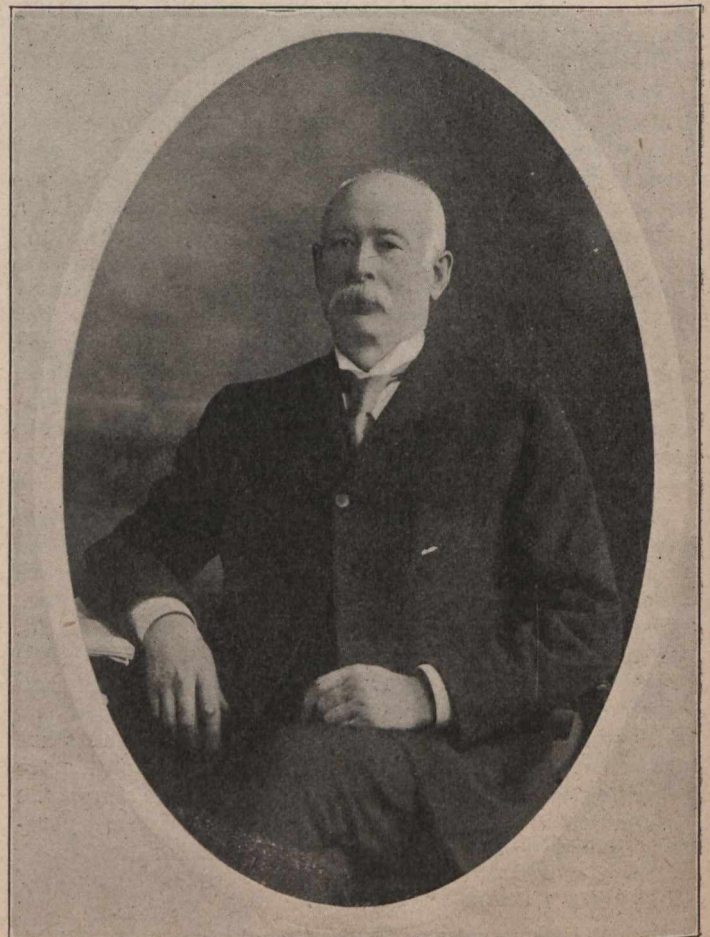
There has been a small production of tale in Canada for several years, but the tonnage and values have varied considerably. In 1907 the production amounted to 1,534 short tons, an increase of nearly 25 per cent. over that of 1906, which in turn was more than double than that of 1905. The Canadian Geological Survey reports the production of tale in the Dominion for the last six years as follows:

Production of tale in Canada, 1902-1907, in short tons—

Year.	Quan.	Value.
1902 .....	689	\$1,804
1903 .....	688	2,064
1904 .....	840	1,875
1905 .....	500	1,800
1906 .....	1,234	3,030
1907 .....	1,534	4,602

**NOVA SCOTIA PERMANENT EXHIBIT.**

In our last issue we gave a brief illustrated account of the mineral exhibits sent by the eastern and western provinces to the Canadian National Exhibition at Toronto. No detailed description of Nova Scotia's min-



HON. C. P. CHISHOLM, MINISTER OF MINES, NOVA SCOTIA.

eral exhibit was included in this account for the reason that an article covering this ground had been published in the Canadian Mining Journal of May 15, 1907, and to this the readers were referred.

We decided at the time, however, that, although space would not permit printing a full list of the Nova

Scotian display, something more was due than mere mention.

The conditions under which Nova Scotia exhibited were unique. Hence we can, without making invidious comparisons, point out a few respects in which that province's Department of Mines is especially praiseworthy.

The Ontario exhibit was stronger, better arranged, and more complete than ever before. Alberta's exhibit sent from a longer distance than any other, was most attractive. But the mineral section was only part of a fine display of natural products.

The Quebec and New Brunswick exhibits were smaller than either Ontario's or Nova Scotia's. Both the first-mentioned provinces, however, had little time in which to get together a collection.

Nova Scotia's beautiful and striking collection of coal, gold ores, antimony, gypsum, and many other minerals representing the varied resources of our easternmost mining country, was most suitably housed. The exhibit is a permanent one. That is, it has been used at several expositions and is again to be used. But it is being constantly augmented by the addition of new specimens and improved by the replacement of old or broken specimens. From the Canadian National Ex-

hibition it won two gold medals, one as an exhibit of economic minerals and one for its beautiful specimens of free-milling gold ores. Already it has a considerable collection of gold medals to its credit.

But the principal point to which we would allude is the fact that the N. S. Department of Mines is willing to go to the trouble and expense of preserving a permanent and portable mineral exhibit, in such form that it can, on a few days' notice, be sent to any quarter of the globe.

Such an exhibit is the most effective advertisement possible. It gives the public a complete view of the mineral possibilities of Nova Scotia. Its setting is so attractive that it compels attention.

Therefore, while Ontario especially, and Quebec, Alberta and New Brunswick generally, are to be commended for their enterprise and liberality, it is due the Nova Scotian Department of Mines to say that they have set an example that should be followed by all our mining provinces.

The word "department" has a vague and impersonal sound. Behind departments there are live men. Accompanying this note is the photographs of the minister of Mines for Nova Scotia.

## INAUGURAL ADDRESS.

By the President of the C. M. and M. Society of South Africa.

(R. G. Bevington, M.I.M.M., M.Am.I.M.E.).

I must first thank you for the honor which you have done me, and the confidence you have reposed in me in accepting me as your president for this coming year, and you may be sure that all I can do to further the interests of the Society will be done. I have been a member of the Society from its earliest days, and have its well-being and well-doing at heart. Prof. Yates has just joined, what he has termed the "Old Guard" of Past-Presidents, and I am sure you will all unhesitatingly agree with me that the Society is greatly indebted to him for the excellent manner in which he has carried out his duties during his term of office. The zeal and energy which has been displayed by your late Council in the carrying on of the business part of the work of the Society, and producing our valuable Journal, merits the highest praise, and I am very glad to see that it has pleased you to re-elect so many of its members to assist me during the coming year. Of the work of our Secretary, Mr. Fred. Rowland, one can only speak in terms of the highest commendation, and the Society is fortunate in possessing the services of one who is so keen in its interests.

It has been left to me by my predecessor to touch upon the work of the past year, the business aspect of which has been placed before you in your Council's Report.

With regard to the practical and scientific aspect, the members must have gained much knowledge from the number of instructive and interesting papers upon mining, milling, metallurgy, mine ventilation, stope drills, and so many other subjects which fall within the scope of the Society's work, which have been read before them. I am very pleased to see that we have had so many papers contributed by members in distant

parts of the world, for that shows the hold which our Society has upon its members though far away, and the interest which they take in contributing papers upon subjects which they know will afford us food for reflection and healthy criticism, and I trust that the ensuing year will be as productive in this respect, and even more so.

The increase in mining members and the number of able papers on mining matters which have been given us has fully justified the course taken in adding the word "Mining" to the title of the Society. I feel sure that there are still many more mining men who will become members when they realize that the Society is not a closed one, but is open to all to whom the subjects dealt with are of sufficient interest to cause them to wish to join. It is through the interchange of views at our meetings, and in our Journal, that one's interest becomes carried into other branches of our work than that particular one with which one is perhaps specially occupied, and thus an incentive is given to learn more of the work being carried on by others and the difficulties which they have to contend with, which all tends to cultivate a broader and more tolerant frame of mind.

In reflecting upon the progress of mining and metallurgical work upon the Witwatersrand, having been associated with these fields from their very early days, it is most interesting to me to look upon the great advance which has been made in every branch of the industry. Magnificent headgears and huge hauling engines have taken the place of the old horse whips and whips which I remember. Large shafts carefully planned and proportioned to the work required of them have taken the place of open cuttings. Batteries of

hundreds of stamps of heavy weight have supplanted the 10 to 20 light stamp mills, and in doing all this, the best talent and scientific knowledge obtainable has been brought to bear, with a result of which all who have been engaged in the work must feel justly proud.

The advent of the cyanide process marked a point from which the greatest strides in the metallurgical part of our work have been made, and this process has afforded food for deep thought and research on the part of our chemists with the result that the whole method of application has been most carefully studied and worked out, but that is not saying that there is no opening for further improvements.

Chemical researches in the matter of strength of solutions employed, the combating of cyanicides, and the treatment of zinc to obtain better precipitation, have resulted in replacing the strong solutions which were at first deemed to be necessary, by what then seemed to be solutions of such little strength as to be useless. This, assisted of course, by reductions in manufacturers price, has resulted in greatly reducing the cost per ton treated, of what is still the largest item in the cost of treatment, viz., cyanide. Researches have proved that these weaker solutions are as effective and indeed more advantageous in that baser metals, which may be present in the ore, are less readily taken up by a weak than by a strong solution, and in this connection it may be remarked that the more rapid, and, at the same time, thorough, the treatment can be made, the less the amount of base metal which will pass into the solution.

Slimes, the making of which we at one time strove to avoid, are now almost welcomed, and the evolution of their treatment in a satisfactory manner has added enormously to the quantity of ore of low grade which may now be treated at a profit, so much so that rock is now being milled, and yielding a very handsome profit, having a less original content of gold than the assay value of tailings from the same class of ore which were refused by a cyaniding syndicate many years ago, as not being of sufficiently high value to be worth treating. One must not overlook the process for re-treating old tailing dumps, nor the fact that solutions very weak in cyanide, but holding minute quantities of gold and which at one time were looked upon as waste, are now passed through extractor boxes before final disposal, in order to endeavor to recover every grain which may be recoverable.

Turning to present practice. Milling work on the Rand seems to have settled down to a great uniformity of practice in the conducting of the general operations, though, of course, the question of greatly increasing the weight of stamps is occupying the attention of some of our leading metallurgists, and in this connection I would refer to the new mill of the Simmer Deep G. M. Co., the weight of the stamps in which will be 1,700 lb. In this case will also be put to the test the advisability of dividing up a large mill into separate units of 10 stamps, each unit being electrically driven. I cannot but think that this scheme will prove an undoubted success. As you will doubtless learn more about this, one of the newest plants on these fields, from another source, I will leave the matter to be dealt with by those more able to do so than myself.

Cyaniding, too, would appear to be conducted upon generally recognized lines in the carrying out of work, but still the energy of our members is always being devoted to the bringing out of some further improvements.

Slimes, which I have before referred to, as having been at one time looked upon as a bane and a bugbear, are now so successfully, and, one may say, so easily treated, that if the general grade of the ore on these fields are higher, it is quite a question whether the practice of all sliming would not be resorted to. In the near future I think we shall see some improvements made in the means for handling sands and slimes, so as to make plants less cumbersome and extensive, thereby reducing the initial cost of same, and it seems possible with the many improvements which are being made in slime filters that the decantation process may be superseded, or at least greatly assisted, by filters of the pressure or vacuum type in order that the slimes residues may pass out of the works deprived to the fullest extent of their content of soluble gold.

Tube milling, which on its introduction met with many objections, seems to have held its own and with very beneficial results upon the gold production and the lowering of the value of the final residues, but I would suggest that there is yet work to be done in discovering and defining the most suitable size and shape of the mill and the correct speed at which it shall be driven, also with regard to the diameter of the discharge outlet as governing to a certain extent the length of time which the pulp shall remain in the mill before making its exit therefrom. I am also inclined to think that a means should be provided for varying the number of revolutions, as the internal diameter becomes greater through the wearing of the lining, for it does not appear to be theoretically correct that what is the correct speed for one internal diameter is correct for a different diameter. The use of tube mills as secondary crushers, or rather grinders, has resulted in greatly increasing the duty per stamp owing to the possibility of using screening in the battery of larger mesh than would otherwise have been economically possible, and withal has reduced the value of the final residues.

In mining work there is always something new being done in the application of methods and overcoming the difficulties of getting the broken ore from the working places quickly to the surface. We are all looking to the near future to give us a handy stoping drill, and in this connection I would refer to the forthcoming stope drill competition. This competition will, I am sure, be most closely followed by mining men, not only here, but in all parts of the world. The benefit of the results to this community, provided that a reliable, light, efficient, and economical stoping drill, and one which will not be costly in repairs, can be found, will be immense, as it is the cost of mining which tells so much against many low grade propositions. The conditions and regulations for the trials appear to have been drawn up with the utmost care, and it is hardly conceivable that any question or contingency can arise under them which has been overlooked and not provided for. The composition of the committee, both as regards the members nominated by the Transvaal Government and those nominated by the Transvaal Chamber of Mines, is such as to inspire complete confidence in those who may be competitors, and also in the whole of the mining community and the public, who will await the findings and awards with the keenest interest.

The metallurgy of gold is simple compared with the problems which beset the metallurgist who engages in the work of dressing base metal ores and winning their contents. Our country is without doubt very highly

mineralized, and although not much has as yet been done in this direction, there will rise up in the future a large base metal industry, and one would, of course, wish to see the youth of South Africa in a position to take an active and leading part in such an industry. This it will not be able to do without having gained its knowledge in a practical and thorough manner, and this is the advantage which the Transvaal University College will offer in its new building, by means of ore dressing and metallurgical laboratories, and I counsel all those who desire to be able to take their due part in the development of the mineral resources and wealth of the country to lose no time in undergoing a thorough course of tuition in this excellent institution, under the direction of the able and energetic staff of professors which is associated with it. There is no place in up-to-date practice for the out-of-date worker. It is becoming more and more essential that a man should know both the theory and practice of his profession if he would compete with and rise above his fellow-men, and I venture to say that men who have had a good technical and practical training will be more and more in demand to the exclusion of the rule of thumb worker.

With regard to the ore dressing and metallurgical laboratories, there will, of course, be certain items of plant, models, etc., required beyond those which are now possessed, and it is to be hoped that money for this purpose will be unstintingly provided, in order to place the college in a position to compete with oversea mining schools. It is also to be hoped that the ore dressing plant there may be thrown open to all who may be com-

petent to use it, and by this means assist prospectors, miners, the mining houses, etc., in short, be of benefit to the country generally. At present ore is being sent out of the country to be treated, but several small plants are now, or are about to be, erected in order to treat the ore on the spot.

That the base metal possibilities are receiving attention, and that the output from the various sources is growing, may be seen from the report of the Government Mining Engineer for the year ending June, 1907, wherein it will be found that in the year 1906-07 base metals were produced of an estimated value of over £90,000 as against £19,500 in 1905-06, and I trust that in the next report a further increase will be shown.

The fine new building of the Transvaal University College, over which your retiring president, Prof. Yates, was kind enough to conduct me recently, is nearing completion, and I understand it is the intention to provide rooms for the offices of the various technical societies. This, I consider, will be a very good thing, as it will bring us all together under one roof, and will, doubtless, lead to the establishment of a common room, open to the members of the various technical societies, where technical papers and the journals of similar societies all over the world will be on view, and such meetings of scientific men on a common plane will assuredly lead to that co-operation among scientists of every branch which is so desirable and necessary for the progress of science in general, and which should eventually make for that closer union of all the scientific societies in South Africa, which is so much to be desired.

(To be continued.)

## DREDGING IN THE YUKON.

Abstract of article in the Mining and Scientific Press. By T. A. RICKARD.

Frozen ground is generally supposed to be a fatal obstacle to the profitable dredging of gold-bearing gravel; it is usually assumed that all the alluvium of the Far North is in a perpetually frozen condition; in consequence, the opinion obtains even among well informed engineers that dredging in the Yukon is at best a costly experiment. The following data, recently gathered by personal observation, will be of interest to the profession and to others engaged in this branch of mining.

The first dredge to go to work in the Yukon was that of the Lewes River Mining & Dredging Co.\* This machine was built to operate on the Cassiar bar of the Lewes river, a tributary of the Yukon, in 1899. In 1901 the dredge was moved to Claim No. 42 Below Discovery on Bonanza creek, and in 1903 up the creek to the Discovery group of claims. Last year the dredge was moved down to No. 6 and 7 Below Discovery, where it is now. On claim No. 42 the work was done on the basis of a 50 per cent. "lay," that is, the gross output was divided between the claim-holder and the dredging company, but in every other instance this dredge worked on ground belonging to its owners. This machine is now out of date, but it has given excellent service despite hard treatment. It was built by the Risdon Iron Works of San Francisco, and has 3¼ cu. ft buckets, open-connected, giving a capacity of 900 cu. yd per day. The of the Risdon type, that is, a bucket-conveyor, which

the superintendent, Edward Simpson, says has not given a minute's trouble. For a short stacker of small capacity such as this, the bucket-conveyor is well adapted. The digging-depth reaches to 20 ft., that is, a maximum depth below water of 18 ft. About 4 ft. of bed-rock is removed, up to a maximum of 6 ft., as determined by panning the material brought up by the buckets. The dredge is operated by steam power obtained by burning 3 cords of wood per day, or 85 cords per month. The season averages 160 days. The dredge at the time of my visit was extracting 100 oz. gold, at \$15.50 per oz., per day, so that the yield must average \$1.70 per cubic yard.

\* \* \* \* \*

The ground is thawed artificially ahead of the dredge. It has been ascertained that the ground will keep warm for a month, so it pays to keep the thawing at least that much ahead of the digging. In any part of the creek that has been previously worked, as by drifts, accumulations of ice are found, due to seepage of water into voids and the effect of the ground-ice. In gravel that has not been molested the conditions are more favorable, for there the seasonal thaw will conquer the frost, if once the covering of moss be removed. The thawing was in progress just in front of the dredge, the steam-points being distributed at intervals of 4 by 8 ft. As the season progresses the interval is increased; at first, in April, it was 4 by 4 ft., and this was widened until by June 20, it had become 8 ft. one way and 4 ft. the

\* At the present time there are 17 dredges at work in the Yukon Territory.

other. On July 17, the day of our visit, the seasonal thaw had softened the ground down to 7 ft., so that the points had that much less to do. The cost averages 12c. per cu. yd. In virgin ground an interval of 24 ft. for the points would be effective, but it does not pay to take chances wherever there are old workings, for the frozen pillars, topped by patches of moss, constitute the best of the gravel, and in old workings there is an agglomeration of gravel and "muck," with ice, making it imperative to thaw the whole mass. It is poor economy to take chances, for not only does the frozen ground imperil the dredge, but it prevents extraction of the gold. In virgin ground, after stripping the moss and mould, the natural thaw would reach to 14 ft. at the end of two seasons. The dredge has extracted about \$700,000 in its various applications. By a life of seven years, that is, seven short seasons, and a probable further usefulness to the end of next summer, it has demonstrated what good service even one of the older and smaller machines will give under adverse conditions.

The Canadian Klondike Co. commenced work on the Boyle Concession three years ago, and began dredging in August, 1905. This boat, built by the Marion Steam Shovel Co., has done most satisfactory work, considering that it was designed in 1904, since which date much has been learned concerning details of dredge construction. It is interesting to state that this dredge in the valley of the Klondike river is practically a counterpart of the "California No. 3," at Oroville, operated by the Oroville Dredging Co., although strengthened in parts, and with a better screen-arrangement. The record of the dredge on the Klondike is fully as good as that working under the supposedly more favorable conditions in California. In 1906, from May 9 to October 23, this dredge handled an average of 2,935 cubic yards per day; in 1907, from May 15 to October 9, this dredge dug 3,490 cubic yards per day. It is known that a good profit was made in both these seasons.

This dredge is the only one at work on the Boyle Concession, a tract covering 40 square miles, and extending for 6¼ miles along the Klondike, so as to cover from half a mile to one mile wide of alluvium. The gravel is 22 to 35 ft. deep, and bedrock is soft schist, so that the buckets dig into it to a depth of 4 ft. No artificial thawing methods are employed, the ground having been softened by the successive seasonal thaws, following the removal of the overburden of moss by freshets sweeping across the flat valley. A little frozen ground was struck near the edge of the channel, without damage to the dredge, and without benefit to the clean-up; the buckets cut into it and excavated it successfully, but the fragments of frozen gravel were not disintegrated in the screen, passing onto the tailing-pile without the extraction of any gold that they might have contained. With the exception of this incident, the frozen ground, which is such a bugaboo to dredge-masters in the North, has played no part in the record of this particular dredge.

It remains to add that the buckets are each of 7 cubic feet capacity, close-connected, so that the machine handles 3,900 to 4,00 cubic yards per day. Power is applied through the medium of electricity, generated by a 400-kw. Westinghouse generator, making 3,600 revolutions per minute direct-connected to a Parsons steam turbine. Wood at \$7.75 per cord is burned in water-tube boilers, supplying steam at 165 lb. pressure.

\* \* \* \* \*

The Yukon Gold Company will have seven dredges in operation before the close of the present season. The three dredges first built had buckets of 5 cu. ft. capacity.

The four new dredges, of which two are completed, and two are nearly finished, have buckets of 7 cu. ft. capacity, and they have been designed to fit local conditions. On July 15 I visited one of these larger dredges, namely, that known as No. 6, on Bonanza Creek, at 90 Below Discovery.

\* \* \* \* \*

Dredge No. 6 of the Yukon Gold Company is an up-to-date machine of the most approved design and built by the Bucyrus Company, of South Milwaukee. Going aboard the dredge, it is noted that the buckets have lugs designed to transmit the digging-stress from the lips to the base, and to relieve the rivets from excessive strain. Mr. E. E. McCarthy, the dredge superintendent, informed me that the lips of the bucket were made of Manard manganese steel, the base of chrome-nickel steel, and the hood of cast-steel. Each bucket has a capacity of 7 cu. ft., and as the speed over the tumbler is at the rate of 23 buckets per minute, the capacity of the dredge is from 90,000 to 125,000 cu. yd. per month, depending upon conditions. These conditions include, more particularly, the depth of the gravel, the character of the deposit, and the amount of bed-rock excavated.

\* \* \* \* \*

Every part of the dredge is of the most approved construction, for the length of the season in the Yukon country is so short as to make experiments inadvisable. The choice of design is the outcome of wide experience in this branch of mining on the part of O. B. Perry, the general manager of the Yukon Gold Company, and it represents the best type of machine now at work in the North.

A part from economic conditions, which vary all over the world, the distinctive feature of dredging practice on the Yukon is the necessity for overcoming the frozen condition of the ground. This a geologic frost as distinguished from the seasonal frost.

The seasonal frost, as measured on ground that has been thawed in summer, ranges from 3 to 5 ft., but the geologic frost extends to a depth of 230 ft., if not more, wherever the ground is wet, as in valley-bottoms. On the other hand, the warmth of the short summer, lasting 4 to 4½ months, will thaw the ground to a depth of 4 to 7 ft., according to local conditions, the chief of which is the nature of the surface-covering. In two seasons the frost in a gravel deposit may be conquered by the seasonal thaw to a depth of 10 to 22 feet.

The Northland is covered by a blanket of moss and loam due to the decay of vegetation. This overburden is called "muck" by the miners because when it melts it runs like thin mud, for it is composed of 24 to 40 per cent. organic matter and 60 to 70 per cent. ice. When either the summer sun or artificial heat strikes this black blanket, it disintegrates and is readily floated on the running stream. Being a mixture of organic matter and ice, it makes a perfect insulator against heat and protects the underlying frozen ground from the warm air of summer. The thickness of this frozen muck varies from a few inches to 40 ft., the maximum being in gullies where it has accumulated by sliding from adjoining hillsides. Two feet is an average thickness.

It is obvious that before the seasonal thaw can become effective, the blanket of moss must be removed. This is done naturally by freshets and by meandering streams; it has been done in a general way as an incident in ordinary mining operations along the creeks, and it will be done systematically both by ground-slucing and also, much more rapidly, by hydraulicking. Where time is not an immediate factor and where bed-rock is not more



than 15 ft. deep, a gravel deposit can be thawed to bed-rock in two seasons by simply removing the cover of moss and loam so that the summer heat may get an opportunity to penetrate. But, on the other hand, where dredging operations cannot wait for such a slow method, or bed-rock is deeper than 15 ft. or where old workings exist, it becomes necessary both to accelerate and to perfect the thawing process by the aid of artificial methods. This is done by the application of steam.

By introducing steam into the frozen ground, the ice is melted; the more water (that is, ice) there is in the gravel, the more steam will be consumed in converting water from its solid to its liquid state. Ice is a non-conductor; rock is relatively a good conductor; therefore, the less water the gravel contains, the more easily it is thawed. The stones retain the heat imparted to them so as to radiate it slowly into the surrounding mass.

\* \* \* \* \*

Thawing the frozen ground is a temporary procedure. As soon as sufficient water is made available by the completion of a main ditch-system, it is intended to strip the covering of moss by the use of water under high pressure. The ditch and pipe-line of the Yukon Gold Company is now approaching completion, and the water will be ready for stripping early next season. Thawing will be discarded at the close of next season, except in isolated spots where the water cannot be used advantageously. The method of using water in preparing the ground for dredging will be as follows: First, setck-lines will be laid along the edge of the creek carrying water under high pressure, tapped from the main trunk line. The moss and muck will be stripped by "piping" (that is, the use of a large volume of water under pressure), driving from both sides to a longitudinal cut, down the centre of the claims. See Fig. 1. This work will be carried forward about two miles ahead of the dredges. When the ground has been stripped, the water will again be applied (at the lower end first), so as to cross-cut the gravel with trenches at intervals of from 20 to 50 ft. The effect of this exposure of faces of gravel to the air is to accelerate the natural thaw. After the cross-trenches have been made, the longitudinal trench will be deepened so as to drain the entire area. The depth of the trenches, and th extent to which this work is carried, will depend upon the depth to bed-rock and the rate of thaw. See Fig. 2 and 3. Experience thus far indicates that when the stripping has been completed, not much trenching is necessary to carry the thaw to bed-rock when the gravel is not more than 18 or 20 ft. deep. Each successive season will extend the thaw farther, so that the depth and amount of trenching will depend upon the nearness of the dredge. By this method, the total cost of preparing the ground for dredging should not exceed 5c per cu. yd., for there is no installation and maintenance of sluices, and many of the other expenditures incidental to hypradulic mining are lacking. The actual work of mining is done by the dredge; the amount of ground moved in the preliminary operation being small, compared to the yardage dug subsequently by the dredge itself. By thus making the most of the natural thaw, and preparing the ground for rapid dredging, the total cost of mining the gravel should not average more than 20 to 25c per cu. yd. The result obtained with artificial thawing in advance of dredging actually shows a cost of 19 to 35c per yd. The more the natural thaw is used to fight the natural frost, the smaller the expense will be, and the less the final cost of operation.

As a matter of interest, the following data concerning the operations of the No. 6 dredge may be quoted: The width of dredgeable ground, reaching from claim No. 88

Below Discovery on Bonanza Creek to No. 104, ranges from 500 to 1,300 ft. The depth to bed-rock averages 16.7 ft. The bed-rock itself is sericite-schist, with quartz stringers, decomposed so as to be dredgeable to 4 or 5 ft. deep. The gravel is small; immediately above bed-rock, where the stones are largest, the size is rarely over 6 in., with a few boulders that attain a weight of 100 lb. apiece. The length of campaign here is one-third of a year, and the dredge is expected to be in service for a period  $1\frac{1}{2}$  times as long as in California, that is, the actual working time is one-half that of a dredge working at Oroville. Depreciation in the Yukon is based on a service of 12 seasons, equivalent to 5 years of actual operation; in California it is 10 years.

During the 22 days of July that had elapsed up to the date of this writing, the No. 6 dredge had dug 51,952 cu. yd., from the start of the work. The total cost was \$11,728; the total yield was 2,718.48 oz. gold, worth \$44,281; the operating profit was \$32,553. In the costs are included \$1,443 for labor, \$50 for repairs, \$190 for supplies, \$1,500 for depreciation, \$1,752 for selling charges (including also tax, express and treatment) on the gold. Power cost, \$1,500, this being based on 300 hours at an average load of 200 kw. hr., or 60,000 kw., at 2.51c per hour. Thowing to the amount of 4,086 sq. yd. cost \$4,168. Repairs and supplies are low as compared to an average operation. If this item is increased by \$1,500 to \$1,800 per month for the season, the extra cost would be, say,  $2\frac{1}{2}$ c per yard. The allowance for repairs and depreciation together is then \$3,500 to \$4,000 per month.

It is noted that the thawing by steam-points covered 4,086 sq. yd. of bed-rock at a cost of \$4,168, to which must be added the preliminary sluicing-cost of \$800. Of the total yardage dug by the dredge, only 56 per cent. required artificial thawing; in consequence, the net cost of thawing was only  $9\frac{1}{2}$ c per cubic yard dredged.

The work of the 22 days showed a return of 85.3c per cubic yard; the cost was 22.6c, and the gain 62.7c. Adding 2.5c more for repairs, the cost becomes 25.1 and the profit 60.2 cents per cubic yard. It is interesting to state that the estimate based on the examination of this ground was 60 cents gross per yard. The actual return thus far affords an encouraging result; for the cost is as estimated, while the profit is greater. It must be remembered that the No. 6 dredge is a new machine, just put into operation. As the season progresses, the capacity will be increased; it ought to be at least 80,000 cu. yd. per month, as against the rate of 70,000 recorded for the period reviewed. At Oroville, dredges of the same type are digging from 120,000 to 150,000 cu. yd. per month in ground yielding 12c. per yard at a cost of 5c per yard.

At the present time the Yukon Gold Company has five dredges in operation and two more nearly ready to start. The economic results so far this season are uniformly good, and compare favorably with the original estimates. Difficulties due to frozen ground are almost negligible; the troubles that proved so annoying last year were due chiefly to inadequate equipment. While some artificial thawing by steam will always be necessary, in spots, and while such thawing is costly, the proportion of ground requiring the use of steam-points will be steadily reduced. The application of water under pressure, as already described, will become an important factor in diminishing the expense of preparing ground for dredging. On the whole, it is apparent that frozen ground is not the terror it has been represented to be, on the basis of the first experience with dredging in this region.

The Canadian Klondyke dredge showed a seasonal cost last year of  $16\frac{1}{2}$ c. per cubic yard, digging ground

that needed no artificial thawing. I am informed, on good local authority, that the Bonanza Basin dredge, at the mouth of the Klondike River, is now doing well, in rich ground. The dredge at the mouth of the Forty Mile River, belonging to the Consolidated Gold Dredging Company of Alaska, is also said to be working at a profit. The Yukon Gold Company's dredges are working at a total cost, including thawing, of 19 to 35c, and the expense will be reduced next season to an average of, say, 20 cents. The gravel is rich and patchy, as rich gravel

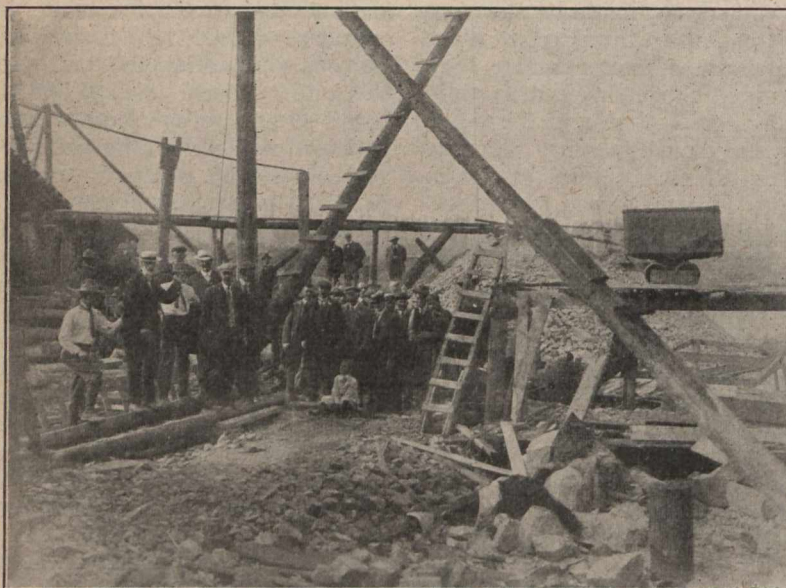
always is; but there is every reason to believe that some of the claims on Hunker and Bonanza Creeks will give yields constituting a new record in this branch of mining.

On the whole, the prospects for dredging in this region are vastly better than they were a couple of years ago. Where failures have been made, they were due mainly to light machinery of inferior design, hindered by inadequate equipment, rather than the poverty of the ground or natural obstacles to mining operations.

## COBALT VISIT OF C. M. I. EXCURSION.

The Reception Committee of the Cobalt Branch of the C. M. I. was as follows: M. T. Culbert, O'Brien Mine; E. L. Fraleek, Cobalt Lake Mine; R. W. Brig-

During the morning (Sept. 5) the following mines were visited: Buffalo, Cobalt Lake, Coniagas, La Rose, Nipissing, Right of Way. The following mills were



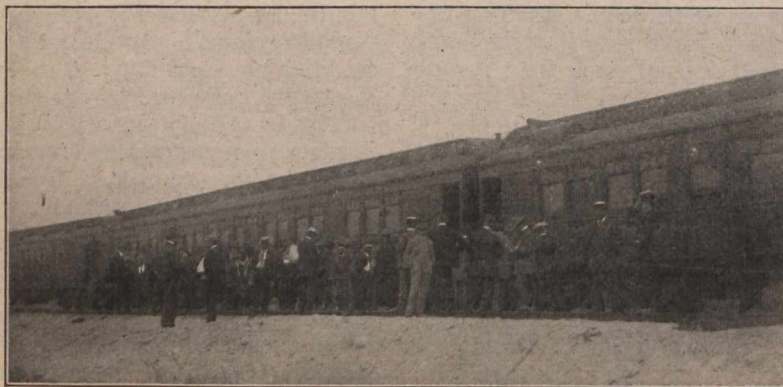
MINING ENGINEERS AT CROWN RESERVE.

stock, Drummond Mine; T. Jones, Buffalo Mine; R. P. Rogers, Coniagas Mine; G. McNaughton, Trethewey Mine; S. H. Logan, manager Canadian Bank of Commerce; Hugh Park, Nipissing Mine; D. B. Rochester,

also visited: Buffalo, Coniagas, Muggley.

Luncheon was provided for the party by the following mines: Coniagas, La Rose, Nipissing, Right of Way.

In the afternoon the private train was run out to the



CANADIAN AND BRITISH MINING ENGINEERS' TRAIN AT COBALT.

Cobalt Lake; R. A. Bryce, Silver Queen; Arthur A. Cole, T. N. O. Ry., chairman.

Before arrival at Cobalt the party was divided into four groups, and on arrival each group was taken charge of by two guides.

end of the Kerr Lake branch, and the following mines were visited: Lawson, Crown Reserve and Kerr Lake. The fine collection of native silver from the Nova Scotia had been brought over and was on exhibition at the Kerr Lake Mine.

Train was taken at 6 p.m. and the party run north, where they were entertained by the towns of New Liskeard and Haileybury.

Sunday morning (Sept. 6th) the train was run down to Temagami, where the Belle of Temagami was await-

The Cobalt Reception Committee presented each guest with a souvenir, which consisted of a small disc of refined metallic cobalt, on which was enamelled the word Cobalt, fixed to a nugget of native silver. The metallic cobalt was presented to the committee by the



ANOTHER VIEW OF THE GROUP.

ing the party. A pleasant run up the lake to Temagami Inn, where luncheon was provided, compelled the morning. After having a look at the Hudson's Bay

Orford Copper Company of New York. Besides this each foreign society which was officially represented was presented with a collection of rocks and ores of the

### Rocks and Ores of the Cobalt District

ONTARIO, CANADA

ROCKS	
Niagara.	1 Limestone.
Diabase Series	2. Diabase.
	3. Diabase. With red feldspar.
	4. Gabbro.
Middle Huronian.	5. Quartzite. Sea green.
	6. Arkose.
	7. Breccia.
Lower Huronian.	8. Slate. Red banded.
	9. Conglomerate.
	10. Slate. Intermediate.
	11. Greywacke.
	12. Quartzite.
Laurentian.	13. Slate. Basal.
	14. Granite.
	Keewatin.
16 do (Diabase)	
17. Pyroxenite.	
18. Lamprophyre.	
19. Quartz Porphyry.	
20. Graphitic Shale.	
ORES.	
	21. Native Silver.
	22. Silver Ore.
	23. Smaltite.
	24. Niccolite.
	25. Cobaltite.
	26. Cobalt Bloom.
	27. Nickel Bloom.
	28. Vein with rock attached, Calcite.
	29. do do Smaltite.
	30. Wall rock with native silver.
	31. Argentite.

Set No. .... PRESENTED BY THE  
**COBALT BRANCH**  
**Canadian Mining Institute**  
 To.....  
 September 5th, 1908

post at Bear Island, an early return was made to Temagami station. Mr. T. B. Caldwell conducted the party over his Iron Range, and at 6.30 the train pulled out for Sudbury.

Cobalt district. Chairman A. A. Cole, who was responsible for this idea, has got together a number of these collections. They are valuable aids in the study of the district.

## BOOK REVIEWS.

**Genesis of Metallic Ores and of the Rocks which enclose them**—by Brenton Symons, F.C.S., etc. 494 +XXXIII. pages. 154 illustrations. Price 7s. 6d. net. Published by "The Mining Journal," 46 Queen Victoria Street, London, E.C., 1908.

Technical treatises, professional text-books, brochures, monographs, reports, and theses are usually read under compulsion. The student in his salad days has before him the soul-searching examination. The mine manager or the consulting engineer is forced by the competition of his fellows to keep abreast of the times. The book reviewer (an odious beast at best) must earn his stipend.

It may then be postulated that few technical or scientific books are perused for refreshment or recreation. Consequently, or conversely, it is unusual to find books of this sort that are in and of themselves refreshing. Mr. Symons' "Genesis of Rocks and Ores" is refreshingly readable, and, therefore, unusual.

Mr. Symons' object has been to clothe his chosen topic with interest; to avoid superfluous technicalities; and to give the public a book that it can and will read. Considering the volume from this point of view it is vastly more approachable than the polysyllabic patter of our arch-enemy, the modern geologist. In fact Mr. Symons' book is suspiciously easy to understand, therefore he will merit the displeasure of those gentlemen whose function in life is the interdifferentiation of innocent magmas, the contortion of unsuspecting anticlines, or the erosion of unoffending landscapes.

"Genesis of Rocks and Ores" is divided into three books as follows: Book I., Sedimentation of Rocks and Ores; Book II., Metamorphism of Strata; Book III., Segregation of Metallic Ores in Veins. Each book is subdivided in careful and logical sequence. From examination of the table of contents it is seen that the author considers his subject as an organic whole with articulated branches, rather than as a disjointed assemblage of incompletely related phenomena.

Therefore the reader is carried naturally and easily from chapter to chapter and from book to book, for Mr. Symons possesses an exceptionally fluent style and has at his disposal a comprehensive vocabulary. Nor is his style devoid of charm. On the contrary, there are passages that are unquestionably graceful, powerful and lucid.

At pleasing intervals there are liquid inclusions of verse, which neither detract from the appearance nor impair the value of the work.

Lest we be tempted into unprofitable discursiveness, we wish to conclude with hearty approval of Mr. Symons' attempt to popularize a difficult and complicated department of science. The book is written by one whose whole heart is in his work.

The result is what one might expect—a book that shows every evidence of careful workmanship, profound erudition, sound judgment, and good taste.

We do not hesitate to recommend the "Genesis of Metallic Ores" to the mining fraternity in particular and to the reading public in general.

**The Miners' Pocket Book**—A reference book for engineers and others engaged in metalliferous mining—by C. G. Warnford-Lock, M. Inst. M. M., F.G.S. Fifth

edition. Entirely rewritten. Numerous illustrations. 624 pages... Price 10s. 6d. E. & F. N. Spon, Limited, 57 Haymarket, London, 1908.

As the author explains in his introduction, the professional mining man is constantly confronted with difficulties. He can carry with him no reference library. He must, in most instances, rely upon his own unaided judgment. Many pocket reference books have been published to aid the engineer in the field and to supply otherwise inaccessible data. Only long experience can indicate just what material should be included in such volumes and what omitted.

Mr. Lock's "Miners' Pocket Book" has entered upon its fifth edition. It has been completely rewritten. Numerous deletions have been made, and much has been added.

The question of suitable field-books is one of paramount importance to the mining engineer and to the prospector. We therefore think it not out of place to present a rough view of the contents of this particular pocket book, and to examine more critically one or two of the sections into which it is divided.

Beginning with a section on power, in which comparative costs of all varieties of power are given, power transmission, weights and measures, prospecting, mine surveying, drilling, blasting, shaft-sinking, developing, mining methods, hauling and hoisting, unwatering, ventilation, sanitation, lighting, signalling, aid in mining accidents, are successively disposed of. A substantial group of tables for the identification of minerals, a list of useful books and a glossary, complete the volume.

The illustrations, type, and paper are good. The cover is strong and durable, an important consideration in pocket books.

Naturally, as one of the most important divisions of the hand-book is that in which prospecting is described. Rough estimates are given of the expense per acre, etc., of clearing land. The methods of exploring superficial and deep deposits are outlined, and an excellent summary of diamond drill practice is included. The calyx drill is not touched upon. The crude Australian "dolly," or home-made prospecting stamp, is described, but no reference is made to the many excellent types of prospecting stamps manufactured on this side of the Atlantic. Indeed, although prospecting is taken up in a practical manner, yet the author's treatment of the subject is scant. Much material that is essential to the beginner is omitted.

In contrast to the section on prospecting, those devoted to mine surveying, drilling, blasting, shaft-sinking, trenching, etc., are up-to-date, lucid and comprehensive. Such modern developments as square-set timbering are given due prominence in the text and by means of diagrams. A short explanation of the uses of underhand stoping is one of the best passages in the book. In short, those parts of the volume that have to do with actual mining operations are most creditable. But they are, as is inevitable with English publications, tinged strongly with the methods and terminology of English mining districts along with Australian and South African modifications. Sometimes the charge of provincialism could be preferred with justice.

The chapter on "Fellow Aid in Mining Accidents," a most decidedly instructive addition to the volume, lends especial value to the hand-book. It is brief, but

well calculated to help the prospector or miner out of otherwise serious contingencies.

These random remarks do justice neither to the incidental shortcomings nor to the outstanding excellence of "The Miners' Pocket Book." It may be but fair to sum up our impressions by saying that Mr. Lock's sins of omission do not affect the volume seriously. On the other hand, the book has in it a great deal of mining information that the mining engineer cannot carry in his head, and much, also, that he is supposed to carry but usually does not. Imperfections will exist in books as long as they persist in mankind. Mr. Lock's book is not perfect; but it is, by long odds, the most useful pocket book that we have seen for some time.

**Cyanide Processes.** By E. B. Wilson, E.M. Fourth Edition, revised and enlarged. 12 mo., cloth \$1.50, 249 pages. John Wiley & Sons, New York.

Like a widower that has survived three wives and has consummated a fourth matrimonial arrangement, a book that sees four editions must have solid virtues.

The scope of cyaniding has widened tremendously since the first edition of Mr. Wilson's book was published. Its application is yet by no means universal. The fact that the limitations of the process are now more exactly known has eliminated many costly blunders.

The most marked feature of recent practice is the successful treatment of slime by means of filter-presses, distributors, agitators, and decantation. This topic Mr. Wilson treats in a new chapter, the longest in the volume.

No superfluous matter is included in "Cyanide Processes." Mr. Wilson has eschewed the customary device, to which authors not infrequently resort, of padding their text with extracts and details of construction from manufacturers' catalogues. He wisely leaves all details of plant construction to the discretion of the engineer and millwright.

The practice of cyaniding, the chemical and mechanical principles involved, the essentials of the subject, Mr. Wilson sketches admirably.

"Cyanide Processes," carefully read, will give the novice a working conception of this most important branch of metallurgy. The maturer expert will also find much that is suggestive and helpful.

Typographically, the book deserves equal praise. The half-tones and diagrams that elucidate the text are well chosen and clearly printed. The type is large and easy.

**Compressed Air Plant for Mines. The Production, Transmission and Use of Compressed Air, With Special Reference to Mine Service.** By Robert Peele, Professor of Mining in the School of Mines, Columbia University. First edition, 8 vo., 325 pages. Illustrated with plates, diagrams, half-tones and wood cuts. Price \$3.00. John Wiley & Sons, 43 and 45 East 19th Street, New York, 1908.

The author, while laying no claim to presenting new facts, has gathered together a great deal that is both practical and serviceable concerning the use of compressed air. Every year, every week indeed, there are pages of interesting and often useful matter appearing in current technical journals. Much of this material is lost or forgotten in course of time. Mr. Peele has evi-

dently followed his subject closely. He has extracted from the periodicals whatever has appealed to him as of sufficient importance. This material, together with his own intimate knowledge of modern practice, has enabled him to put together a book that is practical and instructive.

The first chapter traces the development of air compressors, and indicates the advantages of compressed air transmission of power over steam transmission. We will be pardoned for reproducing a few sentences from the first paragraph of the book, dealing with the history of the rock drill. "The first percussion rock drill, operating independently of gravity, was invented in 1849 by J. J. Couch, of Philadelphia. . . . Couch's machine, together with its immediate successors, such as the Fowle drill (1849-51) and the Cave (Paris, 1851), were steam driven, and therefore unsuitable for underground work. In 1852, the physicist Colladon proposed the use of compressed air for operating rock drills, in connection with the driving of the Mount Cenis tunnel. His idea was developed . . . between 1852 and 1860, and in 1861-62 an air-compressor plant was first used successfully at that tunnel. It was driven by water-power, and furnished air for ventilation as well as for the drills."

Straight-line, duplex, compound steam end, stage, direct and belt driven or geared compressors are described and compared in Chapter II. In Chapter III. the theory of air compression is outlined. Wet compressors, dry compressors, comparison of the two, compound or stage compressors, air inlet valves, delivery valves, performance of air compressors, air receivers, speed and pressure regulators, air compression at altitudes above sea level, air compression by direct action of falling water, are some of the subjects attacked in Part I.

Part II. is taken up with transmission and use of compressed air. The rules governing the economic conveyance of compressed air in pipes are enunciated and explained. Compressed-air engines are dealt with. In a clear and succinct manner freezing and its prevention are thoroughly discussed. The philosophy of reheating is the subject of an entire chapter. The four remaining chapters are devoted to rock drills, compressed-air pumps, pumping by direct action of compressed air, compressed-air haulage for mines.

Mr. Peele's volume is, in our opinion, exactly suited to the needs of the mine manager. This is tantamount to saying that it is a strong, well-balanced, usable book.

#### PERSONAL.

Professor M. B. Baker, School of Mining, Kingston, has returned from Lake Abitibi.

Mr. O. Simonis, of Henry Simonis & Co., London, Eng., spent September 21 and 22 in Toronto.

Mr. N. E. Isbell, a mining expert of Goldfield, Nev., has been making an examination of the Paymaster Gold Mine, Manitou Lake.

Prof. George R. Mickle, of the faculty of Applied Science, Toronto University, has accepted a position in the Ontario Bureau of Mines.

Mr. H. W. Scattergood, of Philadelphia, Pa., owner of the Little Master Gold Mine, Manitou Lake District, visited the property recently.

President Maurice Wendall, of the Northern Pyrites Company, has returned to New York after a visit of inspection to the company's property at Vermilion Lake, Ont.

## EXCHANGES.

**Engineering and Mining Journal, September 19, 1908.**

—Mr. Arthur R. Townsend writes on "Official Reports of Costs of Producing Copper." Remarking first upon the paucity of information as to capital, expenditure, etc., he dwells upon the diversity in arrangement of reports. "The cost per pound of copper, as has been noted above, is derived by dividing the total costs, less the income from other sources, by the total pounds of refined copper produced." Running over the costs of various Canadian and American companies, we note that copper was produced in 1906 at the following figures per ton.

	1906.
	\$
Dominion Copper .....	0.174
Granby .....	0.133
Greene Con. ....	0.130
North Butte .....	0.07
Tennessee .....	0.107
Utah Con. ....	0.042

In the Lake Superior country costs per pound range from 24.62 cents to 6.76 cents.

**The Iron and Coal Trades Review, September 4, 1908.**

"The Coal Dust Question" is the title of a leading editorial in the Review of this date. Experiments have demonstrated that a dense cloud of coal dust is not required to initiate an explosion. One pound of dust per lineal foot is sufficient to supply material for a disaster. Four recent explosions have resulted from the use of permitted explosives. In all these cases some percentage of inflammable gas was present. Why was its presence not discovered by the firemen, whose duty it was to ascertain whether firedamp was or was not present? Defective eyesight, our contemporary states, may be one of the prime causes of this omission. A fireman should be able to detect easily a 3 per cent. firedamp cap. This requirement is in vogue in British Columbia.

## CORRESPONDENCE.

To the Editor Canadian Mining Journal:

Dear Sir,—While I am pleased to note that Mr. Willmott has found leisure to reply to my criticism of his paper on "The Origin of Deposits of Pyrites," I, at the same time, regret that he has made no statement regarding the correctness of my criticism upon his paper on "The Iron Ore Deposits of Ontario." Instead of replying to this himself, he says that he will leave this task to Prof. Leith. For my own part, I do not consider it to be the part of a fearless combatant to send his friends into the firing line, and I am positive that Prof. Leith will not assume the work of answering me, because, from my intimate knowledge of him, I believe that he will gracefully accept the correction of a lapsus which admittedly has occurred. "Errare humanum est." Had Mr. Willmott's charity taken this adage into fuller consideration, he would not have been betrayed into a display of feeling which the occasion did not warrant. An old German saying would characterize such an outburst very tersely, but I shall not run the risk of falling into the very error that I have just been deploring.

In the following sentences Mr. Willmott has seen fit to admonish me: "Mr. Hille has done me the doubt-

ful honor of reading my paper so carelessly as to be unacquainted with its contents." And again: "Criticisms of such papers are welcomed by the institute, and by the writers, and if more written ones were made the institute's journal would gain in value. Such criticism, however, should be of the facts given, or of the inferences drawn, and here Mr. Hille lamentably fails."

In reply to Mr. Willmott's first retort I may say that his claim that I had read his paper carelessly, and, in consequence, was unacquainted with its contents, can only have been adduced by him in the hope of weakening thereby my correction as regards his determinations of some of the Thunder Bay iron and pyrrhotite deposits, in which such gross errors appeared. This he emphasizes by my remarks: "Mr. Willmott attributes the origin of a large number of pyrite deposits to sedimentation, and refers for support to Beck, Kemp and others." I will now admit that I ought not to have shown so much charity, but that it would have been better had I expressed myself still more plainly and exposed the quoting of these observers in its right light. But I may here ask what earthly good is served by the citation of "current opinions," if they are not shared by either the authors or even by Mr. Willmott himself? They should merely have been cited for the purpose of drawing attention to the hypotheses of others which were incidentally enumerated by the later writers. Had they been discussing the same deposits which were treated of by Mr. Willmott, the case might have been different, but the citation of the theories of others concerning occurrences of pyrites, that are, perhaps, totally dissimilar, carries little, if any, weight. In our consideration of the origin of ore deposits, it is impossible to apply the same rule to each individual instance, although it might be reasonable, in considering certain periods, to admit the existence of a certain fundamental law, and then, if our personal experience is sufficiently wide in this respect, we are entitled to speak with more confidence in the matter, but if this is not the case, it is then dangerous to make too free comparisons between our own investigations and those of others. I imagine that the grounds for such confidence were somewhat deficient in the case before us, otherwise Mr. Willmott would have given us the benefit of a fuller explanation as to the origin of these solutions carrying sulphide of iron. Did the meteoric water dissolve pre-existing pyrite deposits, or did volcanic mineral springs containing such salts in solution overflow their vents, carrying them into the depressions of which he speaks. Moreover, would not deposits formed in this manner, although produced under widely different conditions, which presuppose phenomena that I might say are diametrically opposed to each other, both be classed as sedimentary deposits? Has Mr. Willmott given us a clue by which we may learn to which of these sedimentation processes he attributes the existence of the pyrites deposits? Only from one sentence we might be led to the conclusion that he believes meteoric waters to have been the vehicle which carried in the iron and sulphur salts, but again he says: "How the silica, iron and sulphur were dissolved and precipitated is not absolutely clear. Presumably, the iron was partly transported as a carbonate and partly as a sulphate." Here we observe what difficulties Mr. Willmott has placed in his own way for considering the dissolution of these minerals by meteoric water, if that process was what he had in view. We find the same indecision not only in his paper, but also in a report to the Bureau of Mines for 1902, on the Michipicoten Iron

Region, in which he was a co-worker with Dr. Coleman. On page 162, a volcanic origin is indicated for these iron-bearing rocks, as expressed in the following words: "The source of the iron must be sought for perhaps in some of the basic eruptives of the series, if it is not looked on as a direct sediment, perhaps of a chemical nature, on the sea-bottom of the time." Also on page 170, under the heading, "Genesis of the Iron-bearing Rocks," a volcanic activity was spoken of, in the intervals of which the iron-bearing rocks, consisting of carbonate and sulphide of iron, were supposed to be laid down. It would doubtless have tendered more to the enlightenment of all parties concerned, if Mr. Willmott had informed us of the source from whence these solutions had been derived. He speaks of the existence of volcanoes at that period, which poured forth lava and ashes, doing so at repeated intervals, between which occurred the precipitation of various iron salts among those volcanic products. If it is implied that it was meteoric waters that brought these iron salts to those particular spots, I fail to comprehend where or how they managed to dissolve pre-existing pyrite deposits, because the overflowing lava and falling ashes and tuffs would have not only destroyed the permeability of the older rocks, but also destroyed their gossan, which might have accumulated upon them. Or, are we to understand that the solutions came from greater distances, overflowed these volcanic extravasations, and were relieved by them of their contents? If so, how can we account for the fact that oxygen did not act upon the iron in solution, precipitating it in the form of an hydro-ferric oxide long before it reached its supposed destination? Again, lava streams and ashes are usually understood to be mountain-building materials, and yet are we expected to believe that these solutions would flow uphill and nestle down into the rugged clefts and chasms such as are usually the features of the surface of lava streams? Yet further, I believe that it is almost universally conceded by geologists that the Keewatin rocks formed the first crust of our globe, by which is understood that first crust of which remnants have been preserved to us, and the rocks constituting this crust have been produced partly by the consolidation of the fluid, fiery constituents of the earth's earliest magma, and partly by a magma that became eruptive, broke through the former crust, and solidified thereon. We have further to take into consideration that the heat existing at that time, and radiating forth, from and through the cracks and fissures of these rocks must have been so intense that meteoric waters can have played only a very subordinate part in the deposition of minerals. We must, therefore, turn our attention to a much later period when the crust of our earth had attained such a thickness as to keep the subterranean heat confined to a far lower region.

Now the inference that must be drawn from the above considerations is that neither the pyrites nor the carbonate of iron deposits can be of Keewatin age, as claimed by Mr. Willmott. Of all the countries on our whole globe I do not think that there exists any locality in which the Keewatin rocks are so plainly observable as in the western part of our own province: further, there are very few portions of it which, in the course of my twenty years' residence here, I have not visited, and if it be not "contre etiquette" I might make an even stronger boast than that, that nature has favored me with a keen sense of observation, which has rarely played me false. Now I may say, that in all my experience I cannot recall one single case where an ore deposit found in the Keewatin could be termed a syngenetic

product, but I have seen hundreds and hundreds of ore deposits in the same rocks which are epigenetic, that is, subsequently introduced. In support of his theory, Mr. Willmott quotes Van Hise, Leith, Coleman, Merriam and others, and he also compares and reproduces in the Bureau of Mines Report for 1902, pages 174 and 175, with two illustrations from Van Hise's report on the Vermillion Iron Range, that is to say on the Chandler Mine, with which he considers the Michipicoten to be analogous. Van Hise indeed does classify the Vermillion and Sudan formation under the head of Archaean, and consequently Mr. Willmott will classify them under the Keewatin. Now the greenstone in which the Chandler Mine rests is neither an Archaean, nor, what in my opinion is the same, a Keewatin rock, but it is an intrusive greenstone dyke, breaking through the Keewatin and the sedimentary rocks of the Sudan iron formation, and it is therefore a much younger rock. Further, the Vermilion iron-bearing rock formation is considered to be the same as that of the Mattawin and Hunter's Island; if so, then it is not of Keewatin age, but of the same age as the Animikie. The fact that these iron-bearing rocks are found resting in the fissures of the Keewatin schists by no means implies that they are of the same age as the latter. The jaspers, ferruginous cherts, siderites, magnetites, martites and hematites of the Mattawin, Hunter's Island and elsewhere are identical in composition, structure and in origin with the Animikie, with this only difference, that, through local phenomena, the one is changed into magnetite and hematite, while the other has undergone less change, having partly retained the original structure, or having been changed only locally into hematite, and further the process of deposition was in the one case obstructed and in the other not. To explain this in other words: the plutonic springs, carrying the silica and iron in solution, overflowed their vents and deposited their contents unobstructedly into the depression of the Laurentian or Keewatin rocks, and these we recognize to-day as the Animikie: in the other case the flow of the solutions was partly obstructed by overlying rocks and they were compelled to seek an entrance into the larger and smaller fissures of the Keewatin. Of this fact we have ample field evidence, such as to leave the matter not in the slightest doubt.

In the foregoing argument I have endeavored to establish (1) that the iron ore deposits situated in the Keewatin rocks are not of Keewatin age, and (2), that consequently the Michipicoten pyrites, which Mr. Willmott thinks are so closely connected with the former, are also not of that age. He asks me to explain why this is the case.

If Mr. Willmott had studied what he calls the Keewatin iron ore deposits somewhat more closely, he would have discovered, (1) that, as I have explained above, they are not of Keewatin age, and (2), that they are not associated with pyrite deposits of the same age, and (3), that, whenever it so happens that sulphide of iron deposits occur in the neighborhood, the occurrence is accidental, because eruptions of greenstones, which were the originator of the pyrites, occurred all over the country, and, if a more precise definition is required as to the time at which this occurred, it must have been, as I have formerly stated, in post-Animikie times.

Mr. Willmott's own observation, that the Michipicoten iron-bearing rocks occurred neither in the Keewatin schists, nor in the Laurentian granites, nor in the Lower Huronian conglomerates, which border that strip for a distance of 60 miles in length and in varying width, supplies the very explanation that he desires,

namely, that the eruptions of younger rocks occurred along a line of weakness where the older rocks were cut out. Similar examples might be quoted from many localities in our western districts, but also just as many in which we find the pyrite deposits in the enlarged planes of the Keewatin schists, produced by laccolithic intrusion of basic rocks.

As an explanation of the fact that these deposits contain not only sulphide, but also a carbonate of iron, it may be assumed that in the earliest history of our globe magmatic waters, fumaroles and other volcanic emanations contained iron, not only in the form of a sulphide but also as a carbonate, and that a considerable portion that might not have been carbonated at the lower depths, became so after ascending to the surface, because in those early periods the outer atmosphere must have been saturated, or at least impregnated with a large percentage of carbon dioxide. Proof is furnished by the Mattawin, Hunter's Island, Steep Rock Lake, Animikie and all other Lake Superior iron deposits, that a large, if not the largest, portion of the iron ores of that age were laid down as carbonates, and therefore there is nothing so very astounding in the fact that the Michipicoten pyrites occur associated with siderite.

Before concluding, I wish to say that Mr. Willmott is hardly justified in complaining of my remarks regarding the statements, made in his first paper, concerning the Schreiber pyrrhotite deposits. He wrote: "Near Schreiber . . . is a pyrite, of a different character, . . . mixed considerably with pyrrhotite and associated with a diabase." It will have been noticed that Mr. Willmott mentioned this deposit among other "iron disulphide" deposits, and further he calls it a pyrite in which a certain amount of pyrrhotite is mixed with it. The fact that he associates this deposit with a diabase will not be taken to signify that he did not intend to class this deposit as a pyrite produced by sedimentation; otherwise he would have given a clearer definition of its origin. He has, however, fallen into the same error as regards the Schreiber deposit as he fell into in the case of the Kaministiquia deposit. Both are of the same nature; both are true pyrrhotites, produced by magmatic differentiation, from rocks which are, in neither case, diabase, but altered diorites. Moreover, there are in either locality at least five or six such deposits.

Your truly,

F. HILLE, M.E.

Port Arthur, Ont., Sept. 10, 1908.

Canadian Mining Journal:

Dear Sir,—Your correspondent takes exception to a statement said to be from the Geological Records concerning the origin of a fire in the coal seams of Glace Bay more than a century ago, and states that no one in Cape Breton ever heard this version of the occurrence. He further states that Brown's History makes no mention of it. Whether true or not, the most commonly accepted theory of the fire which occurred at Burnt Head is that it was fired by the French, as it was being worked by the English. It was defended by a blockhouse or fort garrisoned by fifty men, and was frequently attacked by roving bands of French and Indians. If your correspondent will turn to page 50 of Brown's History, which he quotes, he will read quotations from "History of Cape Breton" by M. Pichon, at that time Secretary to the Governor of Louis-

burg, in which he refers to a party of officers being sent by the Governor of Louisburg in the spring of 1752 to survey the coasts and gather statistical information. Pichon refers to this mine and fort, and states that the pit took fire in 1752, which is the date of their visit, and that both pit and fort were destroyed, but he does not mention the origin of the fire. Traces of this fort and the ravages of the fire in the cliffs are still plainly visible at a point still known as Burnt Head, where the Dominion Coal Company is working the Hub seam of coal.

Another story is that it was fired a second time and at a much later date than above recorded. This story is that during the lease of all the coal fields of Cape Breton to the General Mining Association some officers of the company, whose duty it was to patrol the coast to prevent poaching, discovered some pits at Burnt Head were being worked by coal poachers, and in order to stop this the officers exploded powder in the mouth of the pits or slopes in order to destroy the works and prevent any further operations, thus deliberately setting fire to the seam. It could hardly be looked upon as a reflection on the brave Frenchmen who were then constantly at war with the English, if they did destroy their property.

Yours truly,

C. M. ODELL.

#### ABITIBI LAKE DISTRICT.

Editor The Canadian Mining Journal:

Dear Sir,—Having just returned from Abitibi Lake, where I have been engaged in making a geological map of that area for the Bureau of Mines of Ontario, I am writing you a few impressions that may be of interest to some of your readers.

In 1900 the writer visited that area as geologist to an exploration party for the Bureau of Mines, and it is a great contrast to visit the same area now, only eight years later. At that time it was a week's journey by canoes and portages over the "Quinze" route, which forms the head waters of the Ottawa River. The starting point then was Temiskaming Station on the C. P. R. Now one can reach the same area in one day from the end of steel at McDougal's Chute on the Black River. Here a line of steamboats ply between the Chutes and points on Abitibi Lake, so that this area, which seemed so far away only eight years ago, is now at our very door.

Three districts in New Ontario have recently attracted attention as possible gold fields, viz., Larder Lake, Night Hawk Lake and Abitibi Lake. Gold was reported in Bureau of Mines reports in 1900, but the Abitibi Lake area did not attract much attention till 1907, when a pronounced rush took place, as evidenced by the promiscuous staking that was done there. If any honest, genuine mining man wishes to see the length to which men will go in a mining rush, where inspection is not operative, he has but to visit Abitibi Lake. Making all possible allowance for ignorance as to what is "valuable mineral in place," or even what is a possible economic occurrence, it is still painfully clear that a large part, yes, a majority of rush prospectors think nothing of the perjury of which they are guilty. One has only to see some of these disgraceful stakings to affirm that. Whether the present system of inspection as practised is best or not, certainly the underlying principle of inspection, viz., "discovery," must be insisted upon, to preserve for proper purposes those areas which are not nor ever can become mining lands.



This last point brings me to consider what I believe to be the future of the Abitibi District. Gold has been found at Abitibi Lake, it is true, but it can hardly be called a gold field. Three properties have been prospected honestly and well. The most important work has been done by Mosure Bros., on Shaft Island, numbered on the Government maps as 173. Here a shaft about 73 feet has been sunk on a quartz vein, varying in width from 4 inches to 4 feet. Free gold can be seen in selected specimens, and no doubt much of the ore in which no free gold can be seen assays well. The body, however, is not large, and unless the values run high it would be a difficult proposition.

The second property of importance is the Big Pete Mining Company's location on the east shore of the Lower Lake Abitibi. This company has a large vein of sugary quartz, impregnated with pyrrhotite, pyrite, chalcopyrite, graphite, etc. The manager was setting a diamond drill, which is to thoroughly test the veins at depth, and the results of these tests will be awaited with interest. A third party were working under a Mr. Reese, of Detroit, developing a quartz vein in diabase on the big island No. 149, just at the north end of the narrows which connect the two parts of Abitibi Lake. This work is still going on, but at the time of the writer's visit no free gold could be seen. It does not look, therefore, as though Abitibi Lake is to become famous as a mining camp.

As mentioned above, I believe the future of this area lies in agriculture. A generally mistaken impression seems to have been formed by the public in older Ontario, viz., that the portion of Ontario lying north of the C. P. R. main line is practically a rocky waste, with possibilities only as a mining district. This is decidedly incorrect, and a very few years will justify the confidence the Legislature of Ontario placed in that north land when it undertook the construction of the T. & N. O. Railway as a public utility. Beginning at the town of New Liskeard, just north of Cobalt, is an area of roughly one million acres of splendid sandy clay loam, just sufficiently rolling for good drainage. It is well watered, and will be well served

by the T. & N. O. Railway and the G. T. P. Railway when completed. I brought out timothy and ripe oats and barley pulled the second week in August. The samples are excellent, and the hay especially good. These were grown in the small clearings around the railway "caches" and horse-stables. Moreover, the engineers of the G. T. P. Railway have gardens, in which they have successfully grown peas, beans, carrots, onions, beets, radishes, lettuce, celery, cabbage, potatoes, in fact every table vegetable was grown by one or another. Mr. E. P. Goodwin, the divisional engineer, even ripened tomatoes on his vines.

This information goes to show clearly that once the country is cleared and cultivated, it will offer a splendid agricultural district. The land is timbered entirely with pulpwood, and will therefore be easily cleared, as a ready sale for the pulpwood can be had at the railway once it is operate.

M. B. BAKER, B.A., B.Sc.

School of Mining, Kingston.

Editor The Canadian Mining Journal:

Dear Sir,—In your edition of September 1, 1908, you give, on page 437, a list of the operating mining companies of Nova Scotia.

Your correspondent has made one important omission in failing to mention the Oldham Sterling Gold Company, Limited, operating at Oldham, in Halifax County. This mine has been in continuous operation for six years, and is mining successfully at a depth of 1,250 feet. The mine is easily the second largest producer in the province, its production being exceeded only by that of the Boston Richardson, at Isaac's Harbor.

Trusting that you will be kind enough to make the correction, I am,

Very truly yours,

C. V. BRENNAN.

Oldham, Nova Scotia, Sept. 18, 1908.

## SPECIAL CORRESPONDENCE

**Glace Bay, Sept. 17.**—There has been a little slackening off in the coal trade in Cape Breton during September as compared with the rest of this summer and with the same period last year. Last year it will be remembered the opening of navigation was unusually late, and the whole shipping season was marked by a scarcity of labor and a falling off in the effectiveness of the working force generally. This phenomenon was not confined to Cape Breton, but was pretty generally remarked in all English speaking countries. The result was that large outputs were requisite in September and October in order to fill the St. Lawrence requirements before the ice formed again. This year conditions have been very different. Navigation opened at least six weeks earlier than in 1907, and good outputs, exceptional outputs indeed, have been obtained all through the summer. Most of the Cape Breton companies are ahead on their shipping programme. The Dominion Coal Co., for instance, is 300,000 tons ahead of last year at this time. This is partly due to the favorable season, but more to the fact that labor has been more plentiful than of late years, and to the men having worked more steadily. We are feeling the reflex of the financial depression that has affected this continent since last winter, and the probabilities are that the coal trade will be quiet until next spring.

The miners of Cape Breton, more particularly those employed by the Dominion Coal Co., are to a certain extent to be blamed for the slackness that is manifesting itself. The actual capacity of the Dominion Coal Company's mines is very little greater this year than it was last, but during the whole of last summer, as we have said, owing to the disinclination of men to work, the outputs were restricted, and the Coal Company found it difficult to fulfil their contract requirements. This season they decided not to incur such a risk again, and they estimated their outputs very conservatively, making contracts accordingly. It will also be remembered that a little later than this time last year the Dominion Coal Co. offered their workmen the option of a three years' contract on the fairest terms, giving as their reason for so doing the importance of having settled conditions and long term contracts for the successful prosecution of their business. The Coal Company pointed out that these terms were offered in the face of a falling market, and a probable industrial slump. The men afterwards accepted under a Conciliation Board less favorable terms than were originally offered them, but the good faith and sincerity of the Company's offer is now evidenced by the fulfilment of the forecast of the management.

The supply and price of pit timber is a question that is every

year becoming more serious to the operators of coal mines in this Province. Mining at greater depths, the increased amount of long-wall extraction in the thinner seams, and the generally greater amount of roof that must be supported as mines go to the deep, and as the old pillars are withdrawn, are all matters that tend to increase the demand for pit timber. In common with the rest of Eastern Canada, the timber resources of Cape Breton and Nova Scotia have been shamefully squandered and wasted. The combined effects of insect pests, forest fires and reckless and unscientific lumbering operations have made good and suitable pit timber a difficult thing to obtain in a country where it should be a staple product. In Pennsylvania and other States of the Union coal operators have found it has paid them to systematically raise their own pit timber. About seven years growth under suitable conditions will produce timber that is very suitable for pit props. In the Black Forest of Germany, in the Vosges Mountains of France, in Sweden and Denmark, forestry has been raised to a fine art. Land suitably planted is found to return as much from timber as can be obtained from cultivated farm lands. It is an interesting sight to walk through the groves of one of the Imperial plantations in the Black Forest, and to see the straight clean timber, in symmetrical lines, every stick of which will be felled at an appointed date, to be succeeded by fresh saplings. It is only such scientific methods as these which have enabled the Baltic Provinces to supply the insatiable demands of the British coal mines year after year, and one has only to view the floating acres of pit timber in the East Coast ports of England to realize how profitable such a trade must be. We were recently told by a gentleman who buys large quantities of mine timber that there were large areas of young larch in the province, which would make excellent pit timber, if properly thinned out and cared for, but which in all probability will grow up useless and stunted for lack of care, or will some day be licked up in a forest fire. Scientific afforestation is a crying need of this continent, and it is needed in Cape Breton. That this country can produce large timber, or at least commercial timber, is evidenced by the large stumps that one notices in the woods, and the lusty growth of the young timber. Much of Cape Breton is sterile and stony country, and utterly unsuitable for farming, but under proper laws and supervision it could doubtless be made to raise profitable growths of timber.

The Draeger apparatus of the Dominion Coal Company received its baptism of fire on the 10th inst. at Sydney Mines, and the "boys" from the Rescue Station returned covered with grime and glory. They returned from Sydney Mines in the evening of the 11th after having had probably the most strenuous double shift in their lives. As they lined up in front of Sydney postoffice waiting for the Glace Bay car, they were about as tired looking a crowd of men as one would wish to see, and no doubt they slept well when they reached home. One could hardly imagine a more exacting task than these men had performed, and after their work at Sydney No. 1 they may be classed as past masters in the mysteries of oxygen apparatus. They did their work in a very effective manner, and made no fuss about it, as is the wont of miners when asked to render assistance. All the same the showing of the Glace Bay men was most gratifying, proving as it did their own effectiveness should a like emergency arise here, and the effectiveness of the Rescue Station equipment. This latter will shortly be augmented by a "Dr. Brat" automatic oxygen reviving apparatus, a most ingenious arrangement, which will induce artificial breathing, and will revive a person who is "gassed" more quickly than anything else. This arrangement can also be used to resuscitate unconscious persons on whom it is not possible to use the ordinary Sylvester method of inducing artificial respiration, by reason perhaps of a broken arm or fractured ribs or similar disablement. The coal company are also purchasing a stretcher, fitted with a similar arrangement to that described, on which it will be possible to strap securely an injured or unconscious person and supply him with oxygen. The

stretcher is fitted with a grooved wheel which can be run along the rail, and it is thus possible for a rescuer wearing a breathing apparatus to drag an injured person through after-damp or other noxious gases, and keep him alive until he can reach the outer air.

### QUEBEC.

**New Asbestos Industry for Quebec.**—The D'Israeli Asbestos Company, which was organized recently to develop their property at D'Israeli, Quebec, are actively pushing to completion their railroad which runs from D'Israeli to the quarries, a distance of some three miles. The asbestos ore found on the property of the company is of exceptionally high grade quality, and from an examination of the engineer's report the product from this mine can be mined and milled cheaply and conveniently.

It is expected that the plant, which will be of a 250-tons capacity, will be constructed and in operation about December 1, next.

### ONTARIO.

#### Cobalt.

**La Rose.**—The preliminary statement of production and earnings for the months of June, July and August, shows a net profit of:—

June .....	\$82,867.55
July .....	127,329.00
August .....	108,603.00
	\$318,799.55

The statement for the August production was as follows:—

	Tons.	Ounces.	Net Value.
Shipments .....	645	278,570	\$123,356
On hand August 31.....	40	78,000	40,000
Production .....	645	356,570	163,406
Less on hand July 31.....	57.94	79,739	38,803
	627.06	276,831	\$124,603
Estimated expenses.....			16,000
Net profit for August.....			\$108,603

As practically no ore has been stoped from the mine, there is no reason why this production should not be maintained, or materially increased.

**White-Hargreaves.**—The suit brought by the Attorney-General of Ontario to set aside the leases granted to the White Silver Mining Co. and E. C. Hargreaves on three claims located in the proven producing area of the Cobalt District, has been settled. This settlement provides that E. R. C. Clarkson is to hold the three claims as trustee for E. C. Hargreaves, Wm. F. White, Jas. McKay and Jas. C. McMillan. The Ontario Government is to receive a royalty of 25 per cent. on the gross output of the mine. These properties are exceedingly well located and the development work, which has been suspended since the spring or 1906 owing to litigation, should result in proving some valuable veins.

**Watts (King Edward).**—The new concentrating mill at the King Edward will be in operation next week. It has been decided to gradually increase the capacity to 200 tons per day. There are over 15,000 tons of milling rock on the dump. The underground developments are very favorable. A very rich vein ten inches wide was recently discovered and a large tonnage of milling ore is blocked out.

**Coleman Cobalt (Amalgamated).**—A very promising vein of calcite and silver has been found in the Coleman Cobalt lot, one

of the properties of the Amalgamated Cobalt Mines Co. This property is under lease to a syndicate headed by S. D. Madden.

**Coniagas.**—A new battery of ten stamps is in successful operation at the Coniagas mill. Twenty more stamps are being installed, which, when completed, will give the mill a capacity of 100 tons a day. As the output of the mine has been limited to the capacity of the mill, a large increase in output will result.

**Temiskaming.**—The new plant, which will be one of the most complete in Cobalt, is well under way. The plant will consist of a 20-drill Sullivan compressor, high-pressure boilers and a new hoist. A three-compartment shaft is being sunk to a depth of 250 feet to connect with the present workings. A 60-ft. steel head frame and a shaft house will be built. In an upraise from the 200-foot level the ore body has widened out from 6 inches to 2 feet of very rich ore.

**Crown Reserve.**—The exceedingly favorable development of the Crown Reserve vein, which is the widest and richest in the camp, is still the chief topic of interest in Cobalt. It is impossible to arrive at a fair estimate of the values existing between the open cut from which the first shipments were made, and the prospect cross cut from the working shaft. It is, however, safe to say that no vein in the Cobalt Camp can show an ore body extending for an equal distance of anything like such values. An open cut has been made 45 feet deep and 50 feet long at the west boundary of the property adjoining the Silver Leaf, and a winze sunk a depth of 40 feet from the bottom of the cut. The vein is persistent for the entire depth, averages over 5,000 ounces silver, and is from 12 to 30 inches wide. The wall rock is also heavily impregnated with native silver. A working shaft has been sunk at a distance of 200 feet from the west boundary line to a depth of 118 feet and a cross cut driven in 80 feet from the shaft at the 100 foot level. At a distance of 25 feet from the shaft the main vein was encountered and a drift started west towards the winze. This drift is now in 35 feet, all in high-grade ore, the vein averaging 10 to 12 inches in width. This indicates that the vein is continuous from the Silver Leaf line to the working shaft, practically blocking out a body of very high-grade ore 200 feet in length. The Silver Leaf shaft, which is also near the boundary line of the two properties, is producing high-grade ore at a depth of 200 feet. The new plant is practically completed. A six-drill compressor, boilers, electric light plant, etc., have been installed and a 60-foot head frame completed. An extensive plan of development has been inaugurated. At the 100-foot level the cross cut will be driven in to the north boundary line, a distance of 100 feet. From this point a prospect tunnel will be run to the east the full length of the property, approximately 800 feet, and at intervals of 500 feet, prospect cross cuts will be run. It is expected that the No. 7 vein of the Kerr Lake Mine will be encountered in the prospect tunnel about 200 feet from the cross cut. Ore valued at \$300,000 has been shipped. There is approximately \$200,000 worth of high-grade and \$25,000 worth of unsorted ore in the ore house. It is estimated that over \$150,000 worth of ore is left standing in the mine.

**Rochester.**—A party of directors of the Rochester Cobalt Mining Company visited this property last week. It was decided to increase the working force and sink the main shaft to a depth of 200 feet. The improved outlook at the Badger Mine, where high-grade ore is being taken from the main shaft, offers every encouragement that the Rochester vein will show paying values at depth. The veins on both properties are in a contact between Keewatin and diabase.

**Davis Silver Cobalt.**—Two 20-acre claims of this company, which adjoin the Badger Shamrock, and Fisher-Eplett, on the north, have been leased to the Shamrock Company. A discovery of two parallel veins of calcite and cobalt with small silver values has been made on one of the Davis properties at Giroux Lake. Twenty men are now employed trenching and a shaft is to be sunk to a depth of 100 feet.

**Montreal River District.**—The important discoveries which have recently been made in the vicinity of Bloom, Miller, Everett, Le Roy and Gow Ganda lakes, have resulted in a great influx of prospectors and the blanketing of large areas of more or less promising territory. The situation regarding the proper location on the map and the issuing of applications and certificates of record is fast becoming so complicated that there is grave danger of endless litigation. This territory is unsurveyed and the staff of inspectors and assistants is totally inadequate to handle the situation. Twenty-seven claims were recorded in one day at the office of the recorder at Elk Lake. As no surveys have been made the recording office is forced to take the description of the licensee, with the result that a large number of the claims recorded are more or less improperly and incorrectly described and placed on the recorder's map. There is a strong feeling in this section that the force of inspectors should be greatly increased and the new territory, which is undoubtedly exceedingly promising, should be surveyed at the earliest possible moment.

**Temiskaming and Hudson Bay.**—In running a prospecting tunnel at the 100 foot level, a vein of calcite and native silver, five inches in width, was found. It will run 6,000 ounces or more. This vein is 20 feet from the northern boundary of the Trethewey and will run right into that property. The Trethewey will catch the Meyer vein also. This is being driven on now by the Nipissing Co. at the 80-foot level. Another 20 feet will bring the drift up to the Trethewey line. The values are high in this vein.

**O'Brien.**—At the 175-foot level in the No. 2 shaft, a cross cut being run southwest cut a five-inch vein of ore that will run 2,800 ounces. This is not more than 40 feet from the Chambers-Ferland line and running into it.

#### BRITISH COLUMBIA.

##### Rossland.

The ore body on the 1,650-foot level of the Le Roi Mine is showing up well under development. The shoot at this point varies from 15 to 20 feet in width and carries good values. The ore body on the 1,450 feet level looks promising but more development will be necessary to prove this ledge. The Le Roi profits for August were of a satisfactory character.

The members of the Canadian Mining Institute and their distinguished guests looked over the city and the adjacent mines and were entertained by a banquet here. The local mining men and citizens did all in their power to extend that hospitality to the visitors which is a thing apart from the hospitality shown by other districts.

A gallows frame is being built on the Idaho section of the Centre Star property and the shaft now doubt 35 feet on the ledge, will be sunk to a greater depth.

The lessees of the Blue Bird have shipped another car of hand-picked ore to Trail smelter, from which good returns are anticipated.

Active work continues on the various small properties and shipments will be made from several in the near future.

##### Boundary.

The party of foreign mining men and the members of the Canadian Mining Institute were greeted with a 21-gun salute from Granby Hill when they arrived in Phoenix on the 18th. The party was shown through the premier copper mines by A. B. W. Hodges, local manager, G. W. Wooster, treasurer, and other Granby officials. They entered the mine by the main outlet, the Victoria shaft, with its complete hoisting, crushing and shipping facilities. The compressor plant was viewed and later the party was taken into the depths of the hill on the underground electric railway, through No. 3 tunnel. The tourists were treated to an innovation by the management in one of the large stopes. This prodigious cave, 125 feet high and about the same distance wide, was viewed by the party from the brink of the

tunnel level. Away in a distant region of the stope Mephistopheles was seen rejoicing in a wealth of brilliant fire, the scene ending in a burst of fireworks. After a luncheon at the Granby Hotel the party left Phoenix for the Grand Forks smelter.

The coke situation in the Boundary is getting into much better shape and the Granby is once more running seven furnaces. As a consequence of this activity at the smelter the Granby shipments have increased in the last two weeks from 13,741 tons to 25,147 tons for the week ending Sept. 19th. The B. C. Copper Co. was not affected to any extent by the coke shortage, as their supply of coke is obtained from the International Coal & Coke Co., Coleman, Alta., and they have been able to maintain steady shipments; and, in fact, to increase their tonnage from the Oro Denoro property.

Work has been resumed on the Brooklyn and Rawhide mines of the Dominion Copper Co., but up to this date the smelter has not been blown in. The opinion has been expressed that with the management that is necessary in the Boundary for successful mining and smelting and with up-to-date mining and transportation facilities the Dominion Copper Co. could be made to pay as well as other Boundary concerns. The ore in the Phoenix mines of this company is in some portions even richer than the Granby ore and it looks as though in the end the Dominion Copper Co. could be made to pay good profits.

The Greenwood Tunnel scheme is still heard from occasionally. The promoters state that work will be commenced shortly; they also report that an application has been made for tramway rights, to be used in connection with the bore. At present the predominant idea seems to be the cutting of rich ledges that may or may not lie in the path of the proposed adit. The tunnel as a commercial enterprise is \$3,000,000 distant at this stage and a little nebulous.

A company is being formed to take over and develop the Greyhound group, near the B. C. Copper Co. mines in Deadwood camp. This is a promising group and those who know the property will be glad to see work once more going ahead there.

The B. C. Copper Co. is negotiating for the purchase of the Molly Pritchard and Athelstan Fraction, in Wellington district. They have secured an option on these claims from the owners and engineers of the company have been over the ground and examined the property. The ore on these claims is an arsenical iron ore carrying paying values in gold and silver.

The B. C. Copper Co. is securing property in the different camps, making sure of a steady ore supply for the future. The company already controls several meritorious mines just across the line in the State of Washington and has more recently bonded the Acme, near Kettle Falls, Wash., for \$50,000.

The Dykehead claim, near the Fife lime quarry of the Consolidated Co., has been bonded for \$50,000 and will be developed all winter. A 100-foot development tunnel is to be driven on the Bruce, Midway.

The returns from the last car of 21 tons of ore that was shipped from the Sally have been received. After freight and treatment charges, which were heavy owing to the long haul, were deducted (they amounted to \$80 per ton) the carload shipment returned the company \$3,175.

The Snowshoe continues to ship over 400 tons of fluxing ore per day to the Trail smelter.

#### Nelson.

There is much activity exhibited at Salmo. A telephone system is to be put into the mines on the surrounding hills. A deal is on with Minneapolis capital for the Relief Mine. The Arlington Mine, controlled by English capital, is producing ore steadily. The average value of the ore extracted is \$75 per ton. The ore body is a blanket lead and runs from two inches to a foot in width.

A rich strike is reported from the Nugget. A ledge has been exposed carrying rich values in gold.

The Silver King at Nelson is shipping to the Trail smelter. At the Fisher Maiden, high-grade ore is being sacked and a shipment will be made soon.

The North Star still continues to produce over 150 tons per week despite the gloomy reports that have been sent out from time to time that there was no more ore in the mine.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Halifax.**—Serious trouble is brewing in the ranks of the Provincial Workmen's Association. Delegates to the Ground Council have decided by a vote of 48 to 27 not to amalgamate with the United Mine Workers of America.

**Sydney, Sept. 25.**—The Dominion Iron and Steel Company has received an order for 9,000 tons of 80-pound steel rails for the Southern Pine Joint Railway, to be delivered by steamer direct to Couriche, via Suez Canal, India. The company will commence to roll this order October 13th. The order was secured in competition with the world, and had to be approved by the Viceroy of India.

### ONTARIO.

**Cobalt.**—(Special to The Canadian Mining Journal).—The recent discovery near the north boundary of the Trethewey Mine is one of great importance. The discovery was made under unusual circumstances. The Temiskaming & Hudson Bay Company has ceased driving on what appeared to be a worthless stringer approaching so closely to the Trethewey line that further operations seemed inadvisable. The Trethewey Company, after having conducted extensive surface operations at the north end of their property, entered into an agreement with their neighbors to have the underground work continued on the Treth-

ewey ground at the 100 foot level with the object of gaining information at depth with a minimum of cost to the Trethewey Company, and with advantage to the Temiskaming & Hudson Bay Company, which would gain information that otherwise it might not seek. The result is that in following the small stringer towards the Trethewey line a large and rich vein intersecting the line between the properties and trending about north-east and southwest, has been encountered. Should the present strike of the new vein continue, it will traverse practically the centre of the Trethewey property, and add enormously to its value. This company has recently installed a crushing and jiggling plant, which is working very satisfactorily. The result will be that instead of shipping 4 or 5 carloads per month of various grades, the shipments will be reduced to one or two carloads of high-grade ore, thus saving freight and treatment charges on about three-fifths of the mine product. This saving will amount to about \$2,000 per month, besides which the price to be realized for the ore shipped will be considerably enhanced, as high-grade ores meet with better terms from the Smelters than ores of lower grade.

**Cobalt, Sept. 19.**—It is rumored that Nipissing and La Rose are to combine in the erection of a concentrator to treat the output of both mines. Such a move would result in a saving of \$10 to \$13 in freight on the heavy low-grade ore shipments from La Rose.

**Sault Ste. Marie.**—Specimens, rich in gold, have been brought into town from the Golden Reed Mine at Michipicoten.

#### ALBERTA.

**Lethbridge.**—The Royal Collieries Company, Ltd., of which H. N. Galer, of Spokane, is president, expects to attain an output of 300 tons per day by the 15th of November. The seam on which the company is working is 4 feet 3 inches thick, and is reported absolutely clean. Marketing will present no difficulty.

#### BRITISH COLUMBIA.

**Fernie.**—On the evening of September 14th the Canadian Mining Institute excursionists returned to Fernie after inspecting the Coal Creek collieries. The evening was spent at the offices of the Crows' Nest Pass Coal Company. The smoker given by the company was signally successful. President G. G. S. Lindsay, occupied the chair. The entertainment was essentially Scotch. Reels, sword dances, bagpipes, etc., were the principal ingredients of the programme. The special train left at midnight for the west. The excursionists were met at Coleman by Manager J. D. Hurd and Superintendent Charles Sinister, of the C. N. P. Coal Company, who accompanied them as far as Fernie.

**Rossland, Sept. 16.**—Delayed by the burning of a railway bridge, the Canadian Mining Institute was a day late in reaching Rossland. The special train is expected to-day, however. The visitors will be given a banquet at the Hotel Allen, and will

leave at midnight for Trail. During the day they will inspect the mines near the city.

**Phoenix.**—A group of Boundary proprietors, including the Molly Pritchard and Athelstan fraction, the Jackpot, the Buttercup, all about three miles from Phoenix, are said to have been acquired by the British Columbia Copper Company.

**Rossland.**—Le Roi Mine is looking well at 1,650-foot level. The ore shoot is from 15 to 20 feet wide. On the 1,450-foot level the ore shoot is showing promise. The company's profits for August were above the average, and September will probably exceed August.

**Nelson, Sept. 20.**—Shipments of ore for the week ending September 19th were 3,000 tons greater than at any period of 1908, and were within a few hundred tons of breaking all records. Five thousand tons of zinc ore have been shipped lately to American smelters.

#### YUKON.

**Dawson City.**—An innovation in the way of electric elevators is to be introduced by Boyd & Jepperson, who operate on 82 below, Sulphur Creek. By sinking an incline shaft, in which the bucket line will be operated, the necessity of handling the overburden is done away with. The hydraulic of the pay will be done with a pulsometer and hot water. It will be possible to maintain a clean roof of even depth, and thus the handling of waste will be reduced to a minimum.

## MINING NEWS OF THE WORLD.

#### GREAT BRITAIN.

The Conciliation Board of the Federated Districts of England and North Wales have reduced miners' wages 5 per cent.

The Headquarters of the Institution of Mining Engineers has been transferred from Newcastle-on-Tyne to London.

A new colliery syndicate is being organized to acquire the minerals of Pentremawr and the southern portion of Bettwa Mountain, in Wales. From a quarter to half a million pounds will be invested, and the pit put down will, it is said, be the deepest in Wales.

#### RUSSIA.

The Russian platinum industry is suffering by reason of the fall in prices and a decrease in the demand owing to the substitution of other metals. The Government is being asked to come to the assistance of the producers.

The Russian copper industry is practically under the control of a trust known as the Mied Association, organized last January. Out of 1,100,000 poods probable production of copper, 90 per cent. is in the hands of the association.

#### NORWAY.

An attempt is being made to provide for compulsory arbitration, a measure introducing it being drafted for submission at the next session of the Storting.

#### GERMANY.

Messrs. Benzenberg & Hengstenberg are erecting a large briquette works at Ruhr Harbor. Petroleum pitch will be used as a binding medium for the working up of lean coal slack.

The Wurttemberg Government has issued a warning to investors against wild-cat coal-mining enterprises.

#### AUSTRALASIA.

A recent discovery of tin made by Chinese at the Gulf, Emavatile, New South Wales, is declared to be the richest ever

made in the locality. The lode is 15 feet long by 5 feet wide, so far as uncovered, and yields a ton of tin per day.

The Elmore concentrating process, which was tried some time since for the refractory copper ores of Fort Burke, Cobar, New South Wales, but discontinued as unsuccessful, is being given another trial there, under the supervision of one of the patentees.

The Victoria State Government is asking for an appropriation £100,000 for the encouragement of mining. Of this, £75,000 will be devoted to the direct encouragement of gold and coal mining.

A Government party sent to Derby, Western Australia, to investigate the iron deposits on an island near the coast report immense deposits in the cliffs rising 500 feet from the sea on an island in Yarnpi Sound. Preliminary assays show the ore to contain 79 per cent. iron.

#### SOUTH AFRICA.

The prospects of the tin mining industry of the Transvaal have improved greatly during the last few months. In the Bushveld about £43,000 worth of ore has been produced in the last six months, and many additions made to producing mines.

The wages of white miners in Rhodesia have been reduced about 20 per cent.

The Transvaal gold output for July was 584,455 oz., valued at £2,482,608, an increase of 9,482 oz. over the previous month. This constitutes a new record, being the largest amount of gold produced in any one month in the Transvaal.

#### UNITED STATES.

A new mining camp has been established 14 miles southeast of Cima, San Bernardino County, Cal., named Gold Valley, where a tent city has sprung up in a few weeks. A number of veins have been discovered, and though they are small, the ore is of high grade.

Colorado mining men have been holding a two days' session in the Denver Chamber of Commerce. Prominent among the

subjects discussed were the need of legislation for the punishment of fraudulent and untrue statements in mining properties, and the means requisite to bringing the mining advantages of the State before the world.

A commission, comprising the head of the Explosives Commission of Britain, the heads of the German and Belgian Mining Commissions, and Dr. J. A. Holmes, of the U. S. Geological Survey, have been in consultation with Indiana mining officials at Terre Haute, as to the prevention of mining disasters, as a result of the Hemenway bill appropriating \$150,000 to cover the cost of investigating mining conditions.

All the mines of the Boston & Montana Company at Butte, Montana, have resumed operations after a shut-down of three months.

#### PHILIPPINE ISLANDS.

The Government coal mine on Batan is being opened, and it is expected that shipments of 2,500 tons per-month can be made beginning with October. The Insular Coal Company is pushing work on its mine at Camansi, and will build a railroad to the port of Danao.

## STATISTICS AND RETURNS.

### INVERNESS RAILWAY & COAL CO.

Shipments, August, 1908.....	19,577
Shipments, August, 1907.....	23,153

Decrease, August, 1908.....	3,576
Shipments, eight months, 1908.....	172,243
Shipments, eight months, 1907.....	154,150

Increase, eight months, 1908.....	18,093
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### ACADIA COAL CO.

Shipments, August, 1908.....	26,393
Shipments, August, 1907.....	29,071

Decrease, August, 1908.....	2,678
Shipments, eight months, 1908.....	213,948
Shipments, eight months, 1907.....	202,045

Increase, eight months, 1908.....	11,903
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### INTERCOLONIAL COAL CO.

Shipments, August, 1908.....	17,595
Shipments, August, 1907.....	25,755

Decrease, August, 1908.....	8,160
Shipments, eight months, 1908.....	171,368
Shipments, eight months, 1907.....	181,571

Decrease, eight months, 1908.....	10,203
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### CUMBERLAND RAILWAY & COAL CO.

Shipments, August, 1908.....	24,213
Shipments, August, 1907.....	nil

Increase, August, 1908.....	
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Shipments, eight months, 1908.....	278,082
Shipments, eight months, 1907.....	213,409

Increase, eight months, 1908.....	33,673
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### COBALT ORE SHIPMENTS.

Following are the weekly shipments from Cobalt Camp, and those from January 1 to date:—

	Week end.	
	Sept. 12.	Since Jan. 1.
	Ore in lbs.	Ore in lbs.
*Cobalt Central .....	49,290	342,975
City of Cobalt .....	254,380	1,035,620
Drummond .....	660,011	1,637,790
La Rose .....	267,280	5,781,592
Nipissing .....	304,100	3,754,727
Nova Scotia .....	40,500	392,275
O'Brien .....	257,680	4,884,307
Right of Way .....	113,000	849,270
Temiskaming .....	102,940	748,620

\*Concentrates.

The total shipments for the week were 2,008,760 pounds, or 1004 tons.

Following are the weekly shipments from Cobalt Camp and those from January 1 to date:—

	Week end.	
	Sept. 19.	Since Jan. 1.
	Ore in lbs.	Ore in lbs.
Buffalo .....		850,950
*Coniagas .....	63,000	905,960
Cobalt Lake .....		341,683
Crown Reserve .....	60,000	242,000
**Cobalt Central .....		342,975
Chambers-Ferland .....	61,000	121,650
City of Cobalt .....		1,005,620
Drummond .....		1,637,790
Foster .....	58,900	297,300
Kerr Lake .....		756,174
King Edward .....		127,240
La Rose .....	189,250	5,970,847
McKinley .....		2,206,040
Nipissing .....	377,289	4,132,007
Nova Scotia .....	40,500	392,275
Little Nipissing .....		40,110
Nancy Helen .....		367,427
O'Brien .....	137,900	5,022,267
Peterson Lake .....		41,237
Right of Way .....	122,850	927,120
Provincial .....		143,120
Silver Leaf .....		258,030
Silver Cliff .....		52,000
Silver Queen .....		1,123,990
Townsite .....		211,700
Temiskaming .....		748,620
Temiskaming & H. B.....	60,000	1,160,500
Trethewey .....		1,910,476
Watts .....	80,590	561,680

The total shipments for the week were 1,199,770 pounds, or 600 tons. Total shipments from January 1 to date are 31,963,813 pounds, or 15,982 tons. The total shipments for the year 1907 were 28,081,010 pounds, or 14,040 tons, valued at \$6,000,000. In 1904 the camp produced 158 tons, valued at \$130,217; in 1905, 2,144 tons, valued at \$1,473,196; in 1906, 5,129 tons, valued at \$3,900,000.

The output of the collieries of the Crow's Nest Pass Coal Company for the week ended September 18th was 19,234 tons, or a daily average of 3,205 tons. For the corresponding week of last year the output was 21,905 tons, a daily average of 3,651 tons.

The output of the Crow's Nest Pass Coal Company collieries for the week ending September 25th was 16,643 tons, a daily average of 2,774 tons. The Michel mines were idle Monday, pay day. For the week ending September 27, 1907, the output was 19,439 tons, a daily average of 3,240 tons. For the same week in 1906 the output was 4,856 tons, daily average 809 tons.

**BRITISH COLUMBIA ORE SHIPMENTS.**

Nelson, Sept. 12.—The ore shipments from the various mines and the receipts at the smelters of the districts of Southeastern British Columbia for the past week and year to date were as follows:—

	Week.	Year.
Boundary .....	33,333	926,616
Rossland .....	4,013	191,947
East of Columbia River .....	2,027	68,754
<b>Total .....</b>	<b>39,373</b>	<b>1,187,317</b>

**SMELTER RECEIPTS.**

	Week.	Year.
Grand Forks .....	19,102	718,688
Greenwood .....	12,624	186,626
Boundary Falls .....	.....	21,872
Trail .....	6,269	203,331
Northport (Le Roi).....	1,140	57,978
Marysville .....	.....	5,730
<b>Total .....</b>	<b>39,135</b>	<b>1,194,225</b>

Nelson, Sept. 19.—Following are the shipments from the various mines and receipts at smelters of Southeastern British Columbia for the past week and the year to date:—

**Boundary Section.**

	Week.	Year.
Granby .....	25,147	743,835
Mother Lode .....	10,793	150,051
Oro Denoro .....	2,740	46,568
Snowshoe .....	1,556	4,150
Other mines .....	.....	22,248
<b>Total .....</b>	<b>40,236</b>	<b>966,852</b>

**Rossland Shipments.**

Centre Star .....	2,510	119,924
Le Roi .....	2,915	56,054
Le Roi No. 2.....	718	21,114
Evening Star .....	31	114
Other mines .....	.....	222
<b>Total .....</b>	<b>6,174</b>	<b>198,121</b>

**East of Columbia River.**

St. Eugene .....	1,047	17,593
Whitewater (milled).....	280	11,500
Poor Man (milled) .....	250	8,600
Queen (milled) .....	185	6,835
Bluebell .....	147	1,141
Silver King .....	292	499
Whitewater .....	21	1,263
North Star .....	67	2,789
Richmond .....	83	1,618
Arlington Erie .....	25	1,078
Rambler-Cariboo .....	21	889
Ruth .....	22	581
Reco .....	22	274
Monarch .....	22	274
Montezuma .....	22	86
Wellington .....	17	17
Spokane .....	13	13
Other mines .....	.....	17,133
<b>Total .....</b>	<b>21,536</b>	<b>71,290</b>
<b>Grand total .....</b>	<b>48,946</b>	<b>1,236,263</b>

**Smelter Receipts.**

Grand Forks .....	25,147	743,835
Greenwood .....	13,333	199,152
Boundary Falls .....	.....	21,872
Trail .....	7,413	210,744
Northport (Le Roi) .....	2,948	60,926
Marysville .....	.....	5,730
<b>Total .....</b>	<b>49,041</b>	<b>1,242,266</b>

The following are the figures of German consumption of foreign copper for the months of January-July, 1908:—

	Tons.
Imports of copper .....	94,501
Exports of copper .....	4,754
<b>Consumption of copper .....</b>	<b>89,747</b>

as against consumption during the same period in 1907 of 68,763 tons. Of this quantity 87,373 tons were imported from the United States.—Reported by L. Vogelstein & Co.

**COMPANY NOTES.**

**FINANCIAL STATEMENT OF THE CONSOLIDATED MINING AND SMELTING COMPANY OF CANADA, LIMITED, FOR YEAR ENDING JUNE, 30TH, 1908.**

**LIABILITIES.**

Capital—Authorized \$5,500,000.00	
Issued 53,552 shares of \$100 each.....	\$5,355,200 00
Sundry Banks—	
Bank of Montreal, Rossland—	
Loan and Overdraft.....	\$1,551,319 01
Accrued Interest.....	1,516 91
“Snowshoe Account .....	29,707 92
Canadian Metal Co's Account .....	125,000 00
	<b>\$1,707,543 84</b>
Contingent Liability at June 30th, 1908, on drafts against Matte Shipments .....	\$78,854.37.
Bank of British North America—	
Pay roll account .....	2,465 65
	<b>1,710,009 49</b>
Sundry Accounts Payable and Unpaid	
Dividends .....	56,147 15
Payments on account of lead purchased .....	31,457 99
	<b>87,605 14</b>
Reserve for Claims awaiting adjustment .....	20,000 00
Profit and Loss Account—	
Balance June 30th, 1907.....	55,586 00
As per Statement, year ending June 30th, 1908.....	43,415 93
	<b>99,001 93</b>
Less:	
Dividend No. 7, paid Nov. 5th, 1907 .....	66,940 00
	<b>32,061 93</b>
	<b>\$7,204,876 56</b>

ASSETS.

Mines, Mineral Claims, Shares in other Companies, etc. ....	\$3,916,787 60	
Expenditure on Richmond Eureka Group .....	24,444 33	
Lease on "Snowshoe" Mine.....	29,707 92	
Expenditure on Phoenix Amalgamated Group .....	25,052 54	
		\$3,995,992 39
Mining, Smelting, Concentrating and Refining Plants:		
Balance at June 30th, 1907.....	\$1,282,116 35	
Add Construction Account, June 30th, 1907, to June 30th, 1908...	315,750 40	
		\$1,597,875 75
Less:		
Sales of Machinery...\$	197 18	
Depreciation .....	132,843 20	
		\$133,040 38
		1,464,835 37
Smelter Product on hand and in transit to Refineries: Pig Lead, Bullion, Matte, Bluestone and Antimony .....	\$311,738 24	
Ores and Metals on hand and in transit to Smelter at June 30th, 1908; values of metal contents corrected to Market quotations—less estimate for refining cost:		
Ores on hand .....	\$475,209 26	
Refinery metals on hand .....	336,264 72	
Ore in transit to Smelter .....	17,189 09	
		828,663 07
		1,140,401 31
Mine and Smelter Stores and Material		334 000 59
Sundry Accounts Receivable .....	\$116,107 86	
Loan to Canadian Metal Company:		
Secured by first mortgage on Assets	125,000 00	
		241,107 86
Insurance and Taxes paid in advance		24,441 77
Cash: Head Office, Toronto.....	\$3,149 96	
Bank of British North America, Kaslo .....	484 90	
Eastern Townships Bank, Phoenix	446 41	
Imperial Bank, Cranbrook .....	16 00	
		4,097 27
		\$7,204,876 56

Managing Director's Report.

Trail, B.C., August 15th, 1908.

To the Directors of The Consolidated Mining and Smelting Company of Canada, Limited:

Gentlemen,—I beg to submit the results of the Consolidated Company's operations for the year ending June 30th, 1908, including Balance Sheet, Profit and Loss Account, Production, and General Report.

(To be continued.)

DIVIDEND NO. 12, KERR LAKE MINING COMPANY, OF COBALT, ONT.

New York, Sept. 8th, 1908.

The Board of Directors have this date declared a regular quarterly dividend of Three Per cent. (3 p.c.) upon the capital stock of the company, payable September 19th, 1908, to all stock-

holders on record at close of business September 15th, 1908. Transfer books will be closed from September 15th to 19th, 1908, inclusive. J. A. Jacobs, Sec.-Treas.

LA ROSE CONSOLIDATED MINES COMPANY.

Notice is given that a dividend of 3 per cent. for the quarter ending August 31, 1908, has been declared upon the outstanding capital stock of the company, and will be paid on the 20th day of October, 1908, to shareholders of record on October 2, 1908.

By order of the Directors, the transfer books will be closed between the 2nd and 20th days of October, 1908, both days inclusive.

Dated the 22nd day of September, 1908.

La Rose Consolidated Mines Company, per D. A. Dunlap, Secretary-Treasurer.

MARKET REPORTS.

Coke.

Sept. 25—Connellsville coke, f.o.b. ovens—  
Furnace coke, prompt, \$1.50 to \$1.60.  
Foundry coke, prompt, \$1.90 to \$2.00.

Metals.

Sept. 25.—Tin, Straits, 29.50 cents.  
Copper, prime Lake, 13.50 to 13.625 cents.  
Lake arsenical brands, 13.50 to 13.625 cents.  
Electrolytic copper, 13.40 to 13.50 cents.  
Sheet copper, 18 cents.  
Copper wire, 15.25 cents.  
Lead, 3.40 cents.  
Spelter, 4.75 cents.  
Sheet zinc, 7.50 cents.  
Antimony, Cookson's, 8.25 cents.  
**Aluminium, 32 cents.**  
Nickel, 45 to 47 cents.  
Platinum, \$23.50 per oz.  
Bismuth, \$1.75 per lb.  
Quicksilver, \$43 per 75 lb. flash.

Silver Prices.

September 10 .....	51 5-8	23 13-16
September 11 .....	51 5-8	23 13-16
September 12 .....	51 5-8	23 13-16
September 14 .....	51 5-8	23 13-16
September 15 .....	52 1-8	24 1-16
September 16 .....	52 1-8	24 1-16
September 17 .....	52 1-4	24 1-8
September 18 .....	52	24
September 19 .....	52	24
September 21 .....	52 3-8	24 3-16
September 22 .....	52	24
September 23 .....	52	24
September 24 .....	51 7-8	23 15-16
September 25 .....	51 5-8	23 13-16

The production of coke from Connellsville and Lower Connellsville regions, in tons of 2,000 lbs., up to September 5, 1908, was 6,124,278 tons. The largest number of ovens in commission was 18,248 on August 29th. A minimum of 12,610 ovens was recorded for the week ending January 4th. Comparing these figures with the returns for 1907, we find that the output of coke up to September 5th of that year was 13,802,526 tons; the maximum number of ovens, 33,136 in August and September, and the minimum, 31,242 ovens, for the week ending March 28th.