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CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of THE CANADIAN MINING JOURNAL were printed and distributed, or an average of 3,822 per issue.

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REVIEW.

Official returns indicate a pronounced improvement in industrial conditions. The demand for labor became active in April and has continued to grow. In the Northwest Provinces seeding was completed at least three weeks earlier than was possible last year. Everywhere, east and west, the weather conditions appear to give promise of good crops. Orchards are flourishing, trade is being pushed on a large scale, and a general tone of optimism prevails.

Directly and indirectly this favorable state of affairs will react upon mining. Collieries will be taxed to their limit to supply regular demands. The Western coal mines, a portion of whose product is consigned to the smelters of Southeastern British Columbia, will have no easy task in keeping pace with these requirements now that smelting operations have been resumed.

The extension of the lead bounty, the resumption of dividends on Granby, the admission of zinc-sulphide ores into the United States free of duty, the establishment of a zinc smelter, are incidental, but important circumstances. Along with these, the activity of the important metalliferous mines of Southeastern British Columbia is distinctly encouraging.

Prospecting and mining were never more extensively carried on in Ontario than at present. From Wabigoon and the surrounding districts come reports of a revival of gold mining. The Sudbury region is normally active. Cobalt is shipping increasing quantities of ore. The Montreal River and Lorrain regions are being developed as rapidly as circumstances will permit, and the adjoining portions of Quebec are coming in for a fair share of attention. The iron industry of Ontario, while it is by no means dormant, is not receiving the same impetus. As an essential and basic industry it now calls for more notice from the powers that be. Graphite and asbestos mining in Quebec are flourishing.

Nova Scotia's coal trade will presumably be larger than in previous years. At Sydney and Sydney Mines, the Dominion Steel and the Nova Scotia blast furnaces are in steady operation. The pig iron output of the latter company for May exceeded that of any similar period in its history.

A cursory survey of the whole Dominion convinces the observer that healthy and constant progress is being made.

Nothing will contribute more largely towards prosperity than an unshaken belief in our high destiny as a nation. The status of no industry warrants that belief to a greater degree than that of the mining industry.

LA ROSE FLOTATION.

Comment is called for on the launching of La Rose Consolidated. For many months street rumors have been current to the effect that this syndicate or that syndicate was about to purchase the famous mine from which the new company takes its name. A singular feature connected with La Rose mine is that some dozens of promoters claim to have been within an ace of handling it. All of these gentlemen may be speaking with an honest inward conviction of what they could have done, but the fact remains that they accomplished nothing.

Meanwhile a \$6,500,000 consolidation has been launched upon a rather unreceptive market. At date of writing only very light transactions have been recorded in New York and Toronto, and the stock is yet selling below par.

The times have changed. Had these properties been offered to the public a year ago there is no doubt that the stock would have been eagerly taken up. But time also has changed in respect of capitalization. Twelve months ago such a consolidation would have been organized at twice or thrice the present nominal capital.

La Rose mine is known to be rich. Its ore reserves are thought to be practically untouched. It is fairly well equipped with machinery. La Rose extension has no market value, beyond the consideration that it adjoins La Rose. It is totally undeveloped.

The University, for which a large price was originally paid, is an equipped and fairly well developed mine.

On the Violet a shaft has been sunk 150 feet and a small amount of drifting performed. Its value is unproved.

The Fisher-Eplett claims and the Silver Hill group add little positive value to the company's holdings. The Princess also may be relegated to a position only slightly better than the last named properties.

Hence the future of the venture will be the future of La Rose mine, as a mine, and not as a gaudy bait. It follows that the public have a right to full information as to what they are buying. If La Rose mine is as rich as it is reported to be, there is no need of resorting to the ordinary stock-jobbers' expedient of publishing sensational advertisements and impossible news items. If there is something to hide the stock should be left severely alone. If there is nothing to hide, a mining engineer's report should at once be made public.

This is the more desirable, as it is almost unbelievable that the owners of La Rose do not intend to work their mine on its own merits for themselves. In fact this item is the fly in the ointment.

If as a close corporation La Rose has not been a success, what guarantee is there to the investing public that, diluted with unimproved property and handled by market manipulators, the mine will pay dividends?

One conclusion is inevitable. The mine or mines must be placed under the supervision of a general manager, who not only must be a mining man of ripe experience, but must be so situated as to have an absolutely free hand. Also he must be, in character and attainments, a man in whom the public has unreserved confidence. Indeed, in a sense, this official is required as the representative of the public.

Of the present directorate's ability to make a success of the new venture there is much cause to be doubtful.

LEAD BOUNTIES.

The Hon. W. S. Fielding, Minister of Finance, has given notice of a resolution extending the period under which bounties on lead will hold good. The extension provided for covers five years, from June 30th, 1908.

The Act in force since June 30th, 1903, made provision for regulating the bounties by the standard price of pig lead in London. Whenever the London price rose to £12 10s. per long ton, a gradual diminution of bounties ensued automatically. When lead sold for £16 per ton, no bounty was paid. This fixed the minimum selling price of £16 for the producer.

Under the provisions of the new bill the standard price is fixed at £14 10s., beyond which point the bounties decrease regularly. Further, the payment of bounties in any fiscal year, until June 30th, 1913, is no longer to be limited to \$500,000. But the total of all sums paid under both Acts must not exceed \$2,500,000.

The subject of lead bounties was discussed at the Ottawa meeting of the Canadian Mining Institute. A resolution was then passed strongly urging the Government to renew the bounty which was to have expired on June 30th next. One of the chief arguments in favor of renewal lay in the fact that although \$2,500,000 had been appropriated for bounties extending over the first term of five years, 1903 to 1908, only about \$700,000 of this had been actually paid out. The comparatively low price of lead at which the bounty became inoperative and the steadiness of the lead market at a figure but slightly in advance of the point at which bounties vanished, combined to discourage British Columbian producers.

It was recognized that either the production of lead must cease or some stimulant be applied. It is claimed that when lead is selling in London at £18 per long ton the British Columbian producers need no help. When the price drops below this point they are to be assisted on an increasing scale until, when the metal sells below £14 10s., they received the maximum bounty. In other words, the fixed minimum price guaranteed to Canadian producers is now £18 instead of £16 as heretofore. At least this is the figure specified in the memorial submitted by the Canadian Mining Institute. Despatches received from Ottawa are not entirely clear upon this point, but we take it that it is the only reasonable interpretation.

Our Western lead miners are forced to contend against a United States import duty of $2\frac{1}{8}$ cents per pound on pig lead and a correspondingly heavy duty on lead ores. The expense in reaching other markets is high and, until the industry has attained greater proportions and firmer roots, help is imperative.

STANDARDIZATION.

Carrying out their praiseworthy work of standardization, the sectional committees of the Institution of Mining and Metallurgy are issuing circulars, on each of which pertinent and comprehensive questions are printed. Space is left for answers and members of the Institution are requested to fill in and return the forms.

Two of these forms have reached us recently. The first is that prepared by Sectional Committee "B." The letter accompanying the circular explains that Committee "B" has to do with recommending methods of reporting the results of assays and of metallurgical and other trials, of which assays form an essential part. The necessity of specifying if "fire" or "wet" methods have been used, or if the sample was assayed in an "air dried" or artificially desiccated condition, is alluded to.

Already six standard definitions have been accepted. The word "ton" is taken as representing a weight of 2,000 lb. avoirdupois (29, 166.6 oz. troy), and fractions of a ton are to be expressed in decimals, not in "hundred-weights" and "quarters." Gold and silver returns are to be written in terms of "fine gold" and "fine silver," and the word "bullion" no longer used in this connection. The return of the gold contents of ores, money value as well as weights, are to be reported. A value for the troy ounce of 85 shillings (or \$20.67) is to be taken as a constant. The centigrade thermometric scale is recommended for universal use. The word "gallon" shall represent the Imperial gallon measure of 10 lb. of water. For sieving tests the I. M. M. Standard sieves shall be used. Otherwise the widths of the apertures shall be stated.

Sectional Committee "E" was appointed to take up the standardization of mine accounts and cost sheets from the mining engineer's point of view. Definitions of capital expenditure, both before and after the producing stage has been reached, are asked for. In the same way expenditure on development and shaft sinking is the subject of set questions. Other and most important items included in the schedule of interrogations are contingent funds, depreciation, segregation of working costs, ore in reserve or in dumps, etc., etc.

It would be difficult to estimate the importance of this effort towards standardization, especially in reference to mine accounts. A clear understanding of the exact meaning of the term "capital expenditure" would be of great use both to the engineer and to the

investor. This and many other terms are used loosely, often with mischievous effect. Precise definitions, arrived at by means of circulars such as those before us, will help to establish sound relations between the investor, the engineer, the accountant and the assayer.

OBSTRUCTION.

This is the summer of our discontent. What with two Provincial elections just over and done with, a Federal election imminent, and a Presidential election approaching rapidly in the small Republic to our south, the air is electric with painful recriminations and adjectival amenities.

Possibly the very tenseness of the situation has got upon our nerves. But, whatever the cause, we cannot refrain from treading upon ground that we ordinarily take the greatest pains to avoid.

In our last issue we expressed our unvarnished opinion of the attitude of part of the public press towards the mining administration of Ontario. In doing this we, in no sense, became the apologists of the present Provincial Government. To be quite frank, we have often had cause to deplore the unmeasured praise poured upon the local Ministry's unwilling heads by newspapers of their own political color. So far as the Department of Mines is concerned, neither unqualified censure nor unstinted praise is deserved, nor should either be offered by any respectable journal.

But we wish just now to refer to certain pains and penalties that the mining community is suffering, because of the political situation at Ottawa.

The Geological Survey Branch of the Dominion Department of Mines begins early in each year formulating plans for the summer's work. According to press despatches, about fourteen parties were to have been sent out west this spring. The exploitation and development of Canada's mineral resources are dependent upon the works of these parties to a degree hardly realized by the public. To ensure efficiency and economy the parties, especially those whose instructions carry them far afield, must have all in readiness early in the spring. The principal outlay of the appropriation is made in the purchase of tents, canoes, supplies, and transportation. Therefore the bulk of the appropriation is needed early in the year.

It is a sad fact that the only lethal weapon in the possession of his Majesty's loyal Opposition at Ottawa is that double-bladed axe *obstruction*. By the exercise of certain prerogatives all votes of supplies can be blocked. And at present they are being blocked.

Whether this is "good" politics, "bad" politics, heroism, or original sin, we stay not to enquire. But we linger to notice that the work of the Geological Survey has suffered delay already and may be altogether hindered if the deadlock is continued.

Hence we most respectfully (but insistently) submit that the interests of the mining industry (an industry peculiarly susceptible to chills, fevers, and vapours) must not be sacrificed even for the good of a fighting Opposition.

All of which emphasizes strongly the fact that important branches of the public service, especially the two branches of the Department of Mines, should be removed entirely from the zone of political disturbance.

THE SUMMER EXCURSION.

On another page we present the provisional programme prepared by the Secretary of the Canadian Mining Institute for the visit of the British and European delegates next August. It is the wish of the committee appointed by the Council of the Institute that the programme be made final as soon as practicable. Hence members of the Institute and others interested in the event will do well to communicate with the Secretary at once if they have changes to suggest. The programme is submitted for criticism, but time is limited and preparations must be completed at the earliest possible moment.

By the courtesy of the Commissioners of the Toronto National Exhibition, a luncheon will be tendered the visitors on September 4th. To accentuate the occasion further, space has been reserved for a strong exhibit of mineral specimens, metallurgical products, and mining machinery. Intending exhibitors should write to Dr. Orr, whose office is in the City Hall, Toronto.

IS THIS A WORLD'S RECORD?

On May 14th, Nos. 2 and 9 collieries of the Dominion Coal Company, Glace Bay, N.S., recorded a coal output of 5,100 tons, from one shaft, in one day. This, we believe (subject to correction), is a world's record. We believe also that these figures will have been exceeded before we have sent this number of "The Canadian Mining Journal" to press.

Such records, unlike the high water marks of one day's production of pig iron from one stack, are authentic and indisputable. A blast furnace can be so handled as to be left with a full crucible on change of shift. The enormous daily outputs of American stacks are often obtained in this way. But the amount of coal actually hoisted to the surface from one shaft can be taken as a true measure of work done.

AN APOLOGY.

Our last issue contained a tabulated account of a hammer drill trial conducted in Cobalt some weeks ago. This account was forwarded by Mr. A. A. Cole, mining

engineer of the T. & N. O. Commission. It was Mr. Cole's express wish that this should be published without comment. Through an entire inadvertence a note was appended commenting upon one of the drills. Mr. Cole was naturally not responsible for this.

Our prompt apology is due Mr. Cole. Through his energy and courtesy we have been provided with much valuable information. We heartily regret that this mistake occurred.

DISCOVERY.

Dr. R. W. Raymond contributes to this issue of "The Canadian Mining Journal" an article that will be welcomed by all Canadians interested in mining.

The importance to be placed upon the discovery of valuable mineral "in situ" is the point discussed by Dr. Raymond. It will be noticed that the distinguished writer assumes a position that is constructively critical. Existing evils, he says in effect, may be much more tolerable than ill-considered change.

Dr. Raymond's utterances are always worthy of respectful attention and consideration. His long experience, his keenly analytical mind, and the unique advantages that his official position as Secretary of the American Institute of Mining Engineers affords him, contribute to lend value to his pronouncements.

No better beginning than this could be wished for a general and profitable discussion of Provincial mining laws. We shall be pleased to hear from our readers.

Editorial Notes.

The Mining Society of Nova Scotia has issued an invitation to the Canadian Mining Institute and the expected British delegates to visit Sydney in August next as the guests of the Mining Society of Nova Scotia. The invitation has been accepted. The Mining Society of Nova Scotia will take full charge of the excursion on its arrival at Sydney and arrange all the details for the entertainment of the guests. This is tantamount to a statement that the visit will be an unequivocal success.

Litigation over mining troubles brings to light the amazing ignorance of the legal fraternity as regards the commonest technicalities of the mining profession. More often than not a learned judge will listen respectfully to a harangue from a discredited "expert," and will fail to be impressed by the carefully prepared statement of a qualified mining engineer. Mining jurisprudence is a much-neglected subject in Canada. The sooner this is recognized the better. Very little study would put an intelligent lawyer in a position to discriminate between the wordy "expert" and the genuine mining man.

DISCOVERY BEFORE LOCATION.

Written for The Canadian Mining Journal by Dr. R. W. Raymond.

The law of the United States concerning the sale of mineral lands differs from that of Ontario in many respects. With us, a solid lode or placer location made on the public domain withdraws the located tract from that domain, and rests in the locator a possessory title, indefinitely continued so long as certain conditions of annual work are fulfilled, good against any subsequent claimant, and transformable, upon certain conditions and proceedings, into a fee simple, at the option of the locator or his grantee. To make the original location valid, however, it must be based upon the discovery of a mineral deposit within its boundaries. The complications and doubts introduced into the value of the title ultimately granted by the United States patent by the grant (and corresponding reservation) of "extralateral" rights must not be here considered. Apart from these, the whole purpose of the United States law appears to be to encourage the exploration and exploitation of the public mineral land, and the complete transfer to private owners, on easy terms, of the title of the United States, without reservation of royalty, or subsequent control of mining operations.

In view of this liberal policy, the requirement of a "discovery," as the basis of the possessory title, was included in the law, with the view of preventing the location and appropriation of mineral land by those who had not discovered valuable mineral deposits therein. But this provision has done little good and some harm, for the following reasons:

1. The fact and the value of the initial discovery is not authoritatively determined at the time. The fact of the location creates a legal presumption of the discovery, which must be overthrown by evidence to the contrary.

2. A subsequent discovery made by the locator before other claimants have intervened, may correct the lack of a valid discovery before location.

3. Our courts have held in some cases that signs of a mineral deposit sufficient to warrant mining exploration, though not presenting at first proofs of actual value, are sufficient basis for a location.

As I have elsewhere declared, I think that the requirement, under the circumstances of the preliminary discovery of a mineral deposit, is not only unnecessary, but harmful. So long as the possessory title depends upon annual work, upon the cessation of which the tract reverts at once to the public domain, this condition should sufficiently protect the United States against the schemes of those who would hold land without developing its value. Even if the location of land not containing known mineral deposits of value should come forward as purchasers, and ask for a patent conveying full title, I cannot see what harm would come from granting their request. The declared policy of the United States being to sell its mineral land at \$5 per acre to any citizen desiring to buy it, after spending a certain sum upon a tract of a certain size, and paying the expense of surveying, advertizing, etc., I do not understand why the Government should say "I will sell you this land at this price, if you have proved it to be worth a good deal more; but if it has never been shown to have any value at all, you cannot buy it."

I could understand this policy, if the United States made any difference in the price according to the

known value of the land. But that is not the case. A locator of about 20 acres can work on his location, without buying it, until he has shown it to be worth a million dollars. But that makes no difference to the government. He buys it for \$100, just the same. But if it is and has always been worthless, he cannot buy it at any price! The natural result of such a policy would be to leave the public mineral domain like a blanket full of holes, the portions showing mineral value on the surface having been located and appropriated, and the rest being left on the hands of the government. That such a result has not yet become evident, is due to the extreme liberality with which the requirement of a preliminary discovery has been construed and enforced—a liberality so loose that I am inclined to think it has practically nullified the requirement, except in certain cases, where it is appealed to as a technicality, to facilitate litigation. The evils, dangers, and abuses which this provision was expected to prevent can be better prevented in other ways. Meanwhile, so long as our government desires to sell and get rid of its public mineral land, its policy should obviously be to encourage as far as possible the exploration and sale of those which are apparently worthless.

Above all, it is wisdom as well as justice to make all titles definite and indefeasible from the beginning, and not to leave them dependent upon subsequent developments or opinions. Whatever be the initial requirement, its performance should be certified and recognized at the outset, beyond any later reconsideration, except in case of alleged fraud. It is both an outrage upon individual adventurers and a curse to the mining industry of any country, that the laws should permit the uprooting of mining titles upon such vague pretexts as the nature and value of the original "discovery," long after the innocent grantees of the original locator have entered into bona fide possession and risked their money in bona fide exploration and exploitation.

How far the foregoing considerations may be pertinent to the present mining law of Ontario, I will not here undertake to inquire. According to my impression, the provision of "inspection for discovery" was introduced into that law for the purpose of preventing "blanketing"—i.e. the control of large areas by individuals or companies. This is by no means an unmitigated evil. While it may be thought necessary to appease, by disposing of mineral lands in small parcels, the popular clamor raised by prospectors and small promoters, the final result in any premanently productive mining region is sure to be the consolidation of properties into aggregates sufficiently large to warrant the investment of adequate capital for regular and long continued operations. The right to sell is part of ownership; and to grant a small tract to an individual without leaving him free to sell it is not to grant it at all. If he could sell it to a "capitalist," he wouldn't desire it for himself. And so it comes to pass everywhere that capital ultimately gets hold of mining properties big enough to be successfully worked. Whether it is worth while in the long run to make the process so difficult and so dear that capital can not afford the risk of it, is a serious question, on both sides of which much might be said. Meanwhile, I must frankly say

that I do not think the requirement of a discovery is the best way to reach the objects, even of the advocates of that provision. Yet the change of a system in one particular may involve many complications in other

particulars; and, since I do not now mean to propose a new mining law for Ontario, I must not be understood as definitely advocating a specified change of that law in one feature only.

BREATHING APPARATUS FOR USE IN MINES.

By Professor Leonard Hill.

Section II. of a paper read before the British Federated Society of Mining Students:

The Fleuss-Siebe Gorman dress of to-day is the perfected form of the apparatus which Mr. Fleuss exhibited in 1880 to the Institute of Engineers of South Wales, and with which, in a form modified for use under water, he saved the Severn Tunnel from flooding. (Trans. Vol. XIII. p.p. 180 and 330.)

"On arriving at the Tunnel Works with his diving apparatus, he went down the shaft and some distance along the subway, but as he had never been underground before, and everything was strange to him, he could not penetrate as far as the door, which had been left open by the men when the spring was struck, and on returning to the surface he said he would go down again if they would allow him to make a second attempt. The diver (Lambert), however, then offered to go down in his dress and apparatus, and, after explaining to him the mode of using it, he did so. The diver had to cross over two trams which had been left on the road, remove some metals which were jammed in the door, close two sluices, and shut the door, all of which he successfully accomplished in about one hour and a half. The depth of the shaft was about 210 feet, in which there was about 39 feet of water when he descended, and he had to travel along the submerged subway from the bottom of the shaft and back again."

Subsequently to this the original Fleuss apparatus was used "for conducting some of the most dangerous of the exploration work at Seaham Colliery, after the fire which succeeded the unfortunate explosion which took place at that colliery in 1881." (S. Wales Institute of Engineers Trans XII., p. 575.)

Mr. H. H. Hedley, who made the report to the same Institute, says:

"The novelty of the apparatus and the principle on which it depended, which at first sight would seem obscure to any but a chemist or physiologist, might lead to the supposition that there would arise some difficulty in its ready use by uneducated or unskilled hands, but the result shows that these fears were groundless, and that there was no practical difficulty in its application. The men were enabled, by using the breather and Fleuss lamp, to penetrate into the workings, which were filled with gas (fire damp), to a considerable distance—in one instance upwards of 300 yards in advance of the bratticed air—and were able to report as to the state of roof, road, etc."

Mr. Hedley used the apparatus himself, and found a mouthpiece and goggles much more convenient and comfortable to wear than the mask: the mask, he says, became painful after a short time, owing to the pressure of the bands on his head.

These examples showed how the Fleuss apparatus of twenty-five years ago could be used effectively and safely, even after the briefest training.

The apparatus now exhibited has been perfected so as to satisfy the requirements established by exact

physiological investigation, and to give the greatest simplicity and strength with maximum comfort and safety.

The Equipment and Speed of Dressing.—The apparatus is carried in a strong leather and canvas equipment so arranged as to distribute the weight equally and comfortably, and at the same time, to give the wearer free movement of his arms. In the latest design the whole of this equipment is in one piece, consisting of a back-piece to carry the oxygen cylinders, and a breast-piece to carry the breathing bag and gauge; the back and breast pieces are connected by shoulder straps leaving a hole for the head. This equipment rests in readiness on a saddle, and the wearer catching it up can put it on in a moment. The equipment allows the wearer to be stripped to the waist, and covering little of the body permits free perspiration. Masks and tunics must not be used in hot moist atmospheres of mines, if heat-stroke is to be prevented. The inlet and outlet orifices of the breathing bag are closed by rubber corks. These can be withdrawn in another moment, and the flexible tubes leading from the mouth-piece inserted, together with the oxygen supply tube. The mouthpiece is placed in the mouth, the clip on the nose, and goggles on the eyes, and the man is ready. The whole performance can easily be done by the wearer himself in less than one minute. The oxygen bottles, of strong British make (in accordance with the recommendation of the Royal Commission), are carried in the small of the back, and are so slung from the shoulders as to give the minimum sense of weight.

Avoidance of Projections.—The back behind the shoulders is quite free, enabling a man to get along in a low mine road without the least danger of displacing unstable timber or rock. The wearer can crawl through a space measuring seventeen inches wide by seventeen inches high. The wearer knows that if his head and shoulders can pass in the crawling posture, the rest of his body, including the oxygen cylinders, can follow safely. The figure makes this clear.

It is most essential that the danger of the wearer displacing half fallen debris by projecting apparatus should be avoided, and it is equally essential that he should be able to creep through the minimum of space. Nevertheless in all other forms of apparatus the most bulky parts are placed on the back of the shoulders, and the wearer can have no knowledge of the proximity of these to the dangerous unstable structures which may surround him when exploring a seam after an explosion. The Fleuss-Siebe Gorman apparatus is arranged so that the head and shoulders can act like the vibracula of a cat's whiskers, which tell it whether it can pass through a hole or not.

The apparatus is made with the fewest possible connections, and these are all controlled by one spanner. Thus any man can learn to put it together in a few

minutes, and there is no danger of any of the parts being misplaced or broken.

Valves of Oxygen Supply.—The oxygen cylinders are controlled by valves which do not allow the cylinders to leak when not in use. A reducing valve has been added which delivers approximately two litres of oxygen per minutes at all pressures. This means a slightly wasteful use of oxygen when the wearer is not working, but waste is deliberately chosen in preference to the risk of deficient oxygen. The Royal Commission on Mines have reported strongly in this sense. A relief valve is placed on the breathing bag, so that the wearer can let out the excess in case the bag becomes overfilled and expiration impeded. In spite of

oxygenated air. Analysis taken when the Fluess-Siebe Gorman apparatus is in use show there is 50 to 80 per cent. of oxygen in the breathing bag.

Capacity of Breathing Bag.—The breathing bag is of ample capacity to yield a sufficient volume of air during the deep respirations of hard labor. It also acts as an efficiency elastic cushion to render the respiration easy and comfortable.

The Absorption of Carbonic Acid.—The caustic soda is placed within the breathing bag in the form of sticks. The bag can be opened and the sticks dropped in with the greatest ease and quickness, and the vulcanized india-rubber bag can be washed clean of the used soda under a water tap with equal convenience. There are



FIG. 1

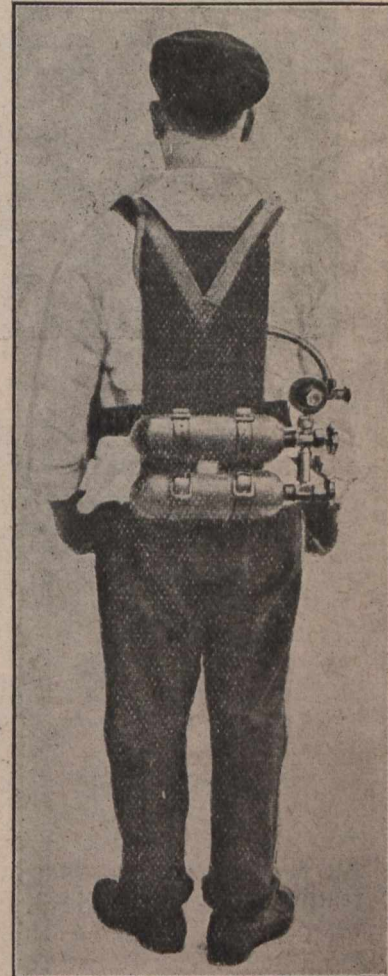


FIG. 2

THE FLEUSS-SIEBE GORMAN DRESS PLACED READY FOR USE BY THE WEARER.

the necessary waste, the oxygen cylinders contain a supply sufficient to last two hours. A bye-pass fitted with an emergency valve is added, so that the wearer can fill the bag at once on first putting on the dress, or obtain an immediate supply if at any time his bag is accidentally compressed (and the gas driven out of it round the mouthpiece), or if the reducing valve fails to act.

An experienced wearer could safely set the reducing valve at one litre per minute and obtain a larger supply when needed during great exertion by means of the emergency tap. By this means he could extend the available time of the oxygen supply to about three hours. For general use it is wiser to diminish the available time in order to gain absolute security from de-

exhaling and inhaling divisions in the bag to ensure the passage of the expired air through the soda. With each movement of the wearer the breathing bag is jolted and the carbonised surface is rubbed off the soda. A fresh surface is thus being constantly exposed for the absorption of carbonic acid gas. In other apparatus the caustic soda chambers are made of metal and are carried on the back of the shoulders, increasing the bulk, weight, and awkwardness of the apparatus.

Analyses show that the carbonic acid gas in the breathing bag keeps under 0.5 per cent. in conditions of hard labor when pure caustic soda (free from water) is used. The percentage may temporarily rise to 2 per cent. if hard work is done while the caustic soda is still cold, that is, before active chemical action has be-

gun (or even 2.32 per cent. as on climbing stairs in one of the experiments of the Royal Commission). If the wearer rests or shakes the bag, the percentage immediately drops again to below 1 per cent. There is no risk or noteworthy discomfort produced by breathing a percentage of CO_2 up to 3 per cent., and the advantage of carrying the caustic acid in this simple manner outweighs any risk of slight and temporary increase in depth of respiration; this is the only result of breathing from 2 to 2.5 per cent. of CO_2 . To overweight the apparatus or render it clumsy in order to obtain very

wearer depends, but one that exists in no other apparatus.

The Mouthpiece.—The mouthpiece allows the wearer free movement of his head, being connected to the breathing bag by strong flexible corrugated tubes. The inhaling and exhaling valves in the latest pattern are of mica, and being of the simplest design, do not stick or get out of order.

The dead space between mouth and inlet to bag is not greater than from 150 to 160 c.c.

The mouthpiece is attached by a small rubber band

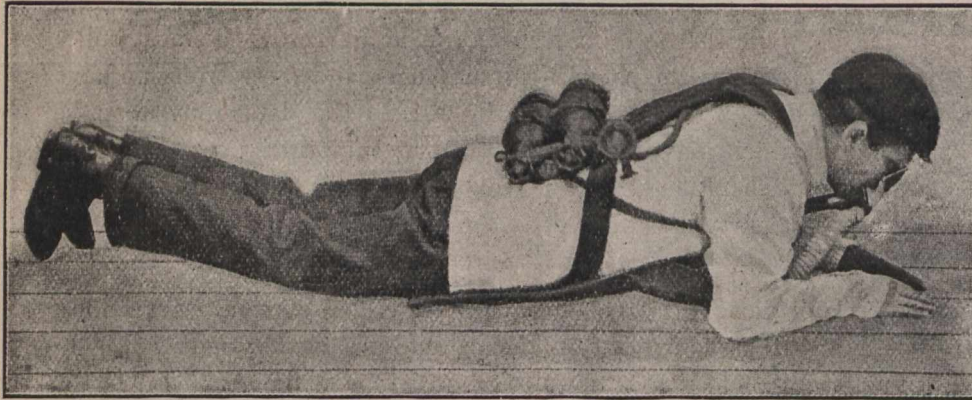


FIG. 3



FIG. 4

FIGS. 3 AND 4.—ILLUSTRATING THE DRESS IN USE IN THE EXPLORATION OF OBSTRUCTED MINE PASSAGES CONTAINING IRRESPIRABLE GASES.

low percentages of CO_2 is, in regard to breathing apparatus, a most mistaken policy.

The efficiency of the apparatus is shown by one of the wearers having performed 345,000 foot-pounds of work, on a single charge, in two hours.

The Gauge Visible to Wearer.—The pressure gauge is attached by means of a strong flexible tube to the front of the breathing bag, so that the wearer can tell at any moment the oxygen supply he has left, and beat a retreat at the right moment. This is an absolutely essential improvement, one on which the life of the

which fits comfortably round the outside of the mouth, and buckles behind the head. The band prevents the mouthpiece from being jerked out.

The rubber parts of the mouthpiece which come in contact with the gums are soft and comfortable. The mouthpiece can easily be slipped out and the orifice closed by the thumb, thus enabling the wearer to say a few words of direction, or drink from a flask before replacing it in the mouth. This is a point of no little importance.

The nose clip is made comfortably to fit any nose,

and cannot slip off. Mica goggles are supplied to protect the eyes, (in place of mouthpiece, nose clip and goggles, a half-mask can be worn if preferred), during work in smoke.

The report of the Royal Commission of Mines summarizes the data obtained as to the four points, (1) removal of carbonic acid, (2) supply of oxygen, (3) air tightness, (4) comfort and convenience, and gives the mark "Good" in all four to two forms of apparatus only, the Fleuss-Siebe Gorman, and the "Weg." The report, however, points out that in the case of the "Weg" dress, there is danger in the method by which the oxygen supply is delivered. This is shown by the analyses given on page 39, wherein the oxygen in the breathing bag is shown to have fallen, after exertion, below the danger limit, viz., to 10.6 per cent. The report says that this danger can be obviated "if the subject draws on the supply in the cylinders in slight excess of his actual requirements, and so washes out the apparatus during the whole period of use, and wastes some of the oxygen, and the conclusion reached is that the constant arrangement of an excess supply, as in the Fleuss-Siebe Gorman, is preferable. Such a supply relieves the strain of attention on the part of the wearer, and of anxiety concerning it, and sets him free to attend to his work. The Weg apparatus is "made only with a mask, and the construction of this, and its connections with the purifier and breathing bag by means of rigid tubes, necessitates the head-piece of each apparatus being made to fit only one individual." (Report of Commission.)

This seems to be a distinct disadvantage. The Fleuss-Siebe Gorman dress can be made to fit any man by adjusting the length of the straps. Its weight, fully charged, is only thirty pounds (as against the Draeger, thirty-nine pounds, "Weg." thirty-eight pounds), or less than the equipment of a soldier in full marching order. The oxygen capacity of the "Weg" apparatus is only 5.4 cubic feet. That of the Fleuss-Siebe Gorman 9 cubic feet.

It can be claimed, therefore, with some justice, that the Fleuss-Siebe Gorman apparatus is the most convenient, safest, simplest, lightest, and strongest on the market.

[Note.—Professor Hill has kindly promised to give a practical demonstration of Rescue Appliances at the Spring Meeting of the Society, and so add to the interest of this paper.]

INVESTIGATIONS RELATING TO GOLD AND SILVER BY THE UNITED STATES GEOLOGICAL SURVEY IN 1907.

(Abstract of advance chapter from Bulletin No. 340)

The Production of Silver.

Previous to 1859, the production of silver in the United States reached a maximum of only 38,500 fine ounces per annum. In 1859 the output rose to 116,000 ounces. In 1861 the figure attained was 1,546,900 fine ounces, and thereafter the increase was rapid, owing to the new discoveries in Nevada and Colorado. For 1876 the figures had almost reached 30,000,000 ounces. From 1876 to 1892 was the time of bonanzas in Nevada, Arizona, New Mexico and Montana, and in the latter year the maximum of 63,500,000 fine ounces was recorded.

It was during this period that, owing to the production of silver as a by-product from lead and copper smelting, a serious decline in price commenced. As far back as 1833 a steady price of about \$1.30 had been maintained. But from 1875 to 1892 the decline was continuous, and in the latter year the price fell to 87 cents per ounce. The failure of the old silver milling camps where pan-amalgamation was practised was inevitable. However, silver as a by-product continued to be put upon the market and in 1894 a production of 49,500,000 fine ounces was attained. The next year the production rose to nearly 56,000,000 ounces. Since that time the production has remained approximately constant.

Geological Conditions.

Native silver is almost invariably due to oxidizing surface processes acting on primary argentiferous sulphides. One class of silver bearing veins is contained in granitic rocks or is accompanied by consolidated porphyries at depth. The normal gangue of these veins is white massive quartz through which the sulphides are sparsely disseminated. Such veins are apt to be rich near the surface, where secondary sulphides and sulphantimonites have formed, but generally they are disappointing below the water level, where the primary ore is reached. Others of similar type contain more abundant sulphides, among which galena generally predominates and may be successfully worked by concentration even below the surface zone of enrichment.

Another class of silver veins cut through volcanic flows which have consolidated at or near the surface. It can be proved that many of these veins were formed at very moderate depths. The gangue is prevailingly quartzose, but usually very fine grained, chalcedonic, and drusy, and in many places it contains adularia. The quartz is characterized by primary argentite accompanied by very small amounts of lead, zinc, and copper sulphides. In dry climates oxidation and the secondary deposits of sulphantimonites have enriched the upper parts to an extraordinary degree.

A third class of silver deposits are found in limestones and here generally in connection with intrusive rocks—granite, diorite, monzonite, or other porphyries. Almost without exception these ores contain lead, and usually copper and zinc. In their primary forms the value of the base metals generally exceeds that of the silver. Both quartz and calcite appear in the gangue. Secondary silver sulphides or sulphantimonites are less common in these ores near the surface, but native, and especially horn silver form abundantly. Mechanical enrichment by the solution of the limestone aids the ordinary concentration by oxidation, and thus the upper parts of many such deposits are extremely rich. Oxidized iron and manganese ores, almost free from lead but containing silver, are among the end products of the oxidation of these deposits.

Very likely it will be found that the three classes of ores mentioned are simply diverse products of the same vein-forming action; their characteristics being dependent on the depth below the surface and varying physical conditions, or on the character of the rock affected.

Classification of Ores.

The gradations between ores that may be selected as types make classification difficult. Nevertheless it is possible to arrange them in certain groups, on a metallurgical basis. Hence the silver product is divided ac-

ording to its derivation from placers, dry or siliceous ores, copper ores, lead ores, zinc ores, and mixed ores. Ores containing 2½ per cent. or more of copper are designated as copper ores. Those containing over 4½ per cent. are called lead ores. The dry or siliceous ores contain either very small amounts of copper, lead, or zinc, or none at all.

Silver produced in the United States in 1906 was divided thus:

Sources of silver produced in the United States, 1906.

	Fine Ounces
Placers	171,058
Dry or siliceous ores	16,792,799
Copper ores	15,880,870
Lead ores	15,328,653
Zinc ores	98,423
Mixed sulphide ores	9,090,650
Total	57,362,453

About 30 per cent. of the total silver production is derived from dry or siliceous ore and these ores constitute about 39 per cent. of the total tonnage of deep mines.

Siliceous Silver Ores.

Dry or siliceous silver ores may be defined as those in which the value of the silver is equal to or greater than that of gold, and in which copper and lead are below 2½ per cent. and 4½ per cent. respectively. In other words, on the basis of 62 cents per ounce the ore contains at least 100 ounces of silver to 3 ounces of gold. In 1906 the United States produced only about 700,000 tons of dry or siliceous silver ore, containing approximately 12,000,000 ounces of silver, \$2,000,000 of gold, about 7,000,000 pounds of lead, and 80,000 pounds of copper. The silver ores clearly contain very little copper and three-fourths of this comes from Colorado. The silver ore is derived from 12 states, being produced at 219 mines in 103 mining districts. The average content is about 19 ounces of silver and \$1.85 in gold per ton.

The silver-lead-copper ores yield silver to the amount of 3,078,592 ounces. The ores average 8 ounces of silver, \$1.30 in gold, and 22 pounds of lead per ton. Their sources may be classified roughly thus:

	Ounces
1. Replacement deposits in limestone.	1,305,000
2. Fissure veins, connected with intrusive rocks (not always to be separated strictly from No. 1.)....	712,000
3. Fissure veins in Tertiary volcanic flows.....	900,000
Total	2,917,000

The silver-gold ores from which 7,584,630 ounces of silver and \$1,629,975 worth of gold are derived, average 28 ounces of silver and \$6 in gold. Their total tonnage is 270,000 short tons. They are mined in 8 states and constitute the output of 50 mines in 22 mining districts. The whole production of Arizona in this class is derived from fissure veins in volcanic flows, principally rhyolite or dacite. Briefly, the ores of this class appear to be eminently characteristic of veins in Tertiary volcanic flows.

The third class of the dry or siliceous silver ores may be called the pure silver ores. They consist of those which contain no reported lead or copper, and in

which the proportion of gold to silver is very small—less than 0.5 ounce of gold to 100 ounces of silver. Only about 1,500,000 ounces, or one-fortieth of the total production, are derived from these ores. They average only 15 ounces in silver and 25 cents in gold. Their principal sources are:

	Ounces
Replacement ores in limestone.....	574,000
Fissure veins in other rocks connected with intrusions.....	314,000
Fissure veins in volcanic Tertiary flows	466,000
Doubtful	149,000
Total	1,503,000

A large part of these ores consists of oxidized surface ores. Some of them are oxidized iron ores from the upper part of the deposits and really mined as flux.

The total production of silver in 1906 was 57,362,455 fine ounces. Of this, 40,398,596 fine ounces were recovered from lead, copper, or zinc ores, and 16,792,799 fine ounces from dry or siliceous ores.

Analysis of the distribution of production between the various classes of ores, brings out the well known affinity of silver for lead and emphasizes the slight degree in which copper and zinc are associated with silver ores properly so called. The selective action of limestone in the precipitation of silver, lead compounds is also emphasized.

SUMMER'S WORK OF THE GEOLOGICAL SURVEY IN THE WEST.

So far as can be learned at date of writing the following parties will be sent out by the Geological Survey to work in the districts mentioned:

Mr. D. D. Cairns will delimit the coal bearing rocks of White Horse coal area.

Mr. R. Graham will make a geological study of the Pacific coast and inlets from Kingscome Inlet northward. This will be a continuation of the work of last year.

Mr. R. G. McConnell will examine the geological features of Texada Island with special reference to ore deposits.

Mr. J. Keele, who was engaged last season in exploring the Continental Divide, near the head of Pelly river, and wintered there, will this season explore the Mackenzie slope of this district.

Mr. W. W. Leach will continue his exploratory work in the Bulkley valley.

Mr. John Macoun will investigate the fungi that cause the rapid decay of mine timbers in British Columbia. Assisted by Mr. Spreadborough, Mr. Macoun is also making a collection for the new museum to illustrate the flora and fauna of Vancouver Island.

Mr. V. Stefansson has been sent out on a joint expedition under the auspices of the Museum of Natural History, New York, and the Geological Survey, to the region about Coronation Gulf in the Arctic. The geography and mineral resources of the region will be examined. The condition of life among the Esquimo, who have not come into contact with whites, will be reported upon.

Mr. Owen O'Sullivan has left for Hudson's Bay to complete the instrumental survey of the coast.

Mr. A. W. G. Wilson has gone into the Nipigon region to complete the work for a report to accompany a map now being prepared.

STANDARDIZATION.

The Institution of Mining and Metallurgy.

[Editor's Note.—The invaluable work undertaken by the Institution of Mining and Metallurgy in the direction of standardizing the terminology of mining and metallurgy has an especial significance for Canadians. Mining has increased vastly in importance as a Canadian industry within the last decade. It is undeniably desirable that Canadian mining men should be familiar with and should conform to the best usages. With this in view we invite answers to these questions.]

Sectional Committee "B."—Bullion and Assay Values.

Your opinion is requested on the following matters:

(1) Do you approve that, wherever possible, assay values of gold and silver ores and products shall be reported in ounces and decimals, or pennyweights and decimals, rather than in ounces, pennyweights and grains?

Note.—For ores and products where the use of pennyweights rather than ounces would not be unduly cumbersome, it is suggested that the former be always used.

(2) Do you approve that assay values of alluvials shall be reported in grains and decimals of a grain of "fine" gold, or in pence at 2d per grain of "fine" gold) or cents per cubic yard or per ton? If reported per ton, should one cubic yard of ordinary damp alluvial, excluding boulders, be taken as equivalent to 3,000 lb.? If not, what do you recommend?

Note.—The value of 2d. per grain is suggested as convenient and sufficiently accurate. At 85s. per ounces, the value would be 2.125d. per grain. The figure of 3,000 lb. (1½ short tons) is commonly used and is suggested as a convenient factor.

(3) Do you approve that in cases where money values are given for assays of silver, copper, tin and other metals whose value fluctuates, the market price of a stated quality or brand of the metal, as taken for calculating such money value, shall be given, together with the assay value in ounces, etc., per ton, or in per cent. or other concrete quantity?

(4) Do you approve that in reporting assay values of cyanide or other solutions,

(a) Results shall be reported in ounces or pennyweights, etc., in a stated volume of such solutions?

Or do you prefer

(b) The use of the ton of 2,000 lb. instead of volume?

(5) Do you approve that in reporting assays of silver and gold products and ores, the assayer shall state on his certificate whether the slags have been "cleaned" and allowance made for cupel absorptions?

(6) Do you approve that all assay reports shall state the exact condition of the sample as to dryness, when assayed?

Sectional Committee "E."—Mine Accounts and Cost Sheets.

(1) Do you think that it is practicable to unify and state precise definitions of some or all of the many terms now used in mining accounts vaguely and with varying meanings, so that, for instance, "Cost of Ore Extraction" should mean the same thing and cover the same scope all the world over?

(2) Will you give as many instances as possible of material variations or differences in practice which in your opinion could or should be standardized?

(3) State your definition of Expenditure which can properly be termed Capital Expenditure:

(a) Before reaching the producing stage.

(b) After reaching the producing stage.

(4) Can you formulate a suitable rule to apply to the classification of expenditure, as to whether such should be charged direct—

(a) To Capital Account?

(b) To Working Costs? or

(c) To a Temporary Account (sometimes called a "Suspense" Account)?

(5) How would you deal with expenditure on development and shaft-sinking?

(a) In a mine in its initial stages of development.

(b) In a mine which has reached the producing stage.

(6) Would you differentiate between expenditure on the work of developing known ore bodies or deposits, as distinguished from work of a purely exploratory or prospecting character?

(7) Do you consider that estimates of the value (or cost) of ore in reserve or on dumps, or of the value of intermediate products or bullion on hand be taken credit for partly or wholly in accounts?

(8) Do you consider that forms for periodical mine reports, and statements of accounts, can be standardized and brought into comparative uniformity? If so, will you kindly submit examples?

(9) What terms would you use in preparing segregation of cost sheets and what would you include under each term? e.g.

(a) Cost of mine development?

(b) Cost of mining or stoping or ore extraction or any other similar expression. Should this term include cost of timbering, putting ore broken in skips, loading into cars, trucks, bins, or skips, cost of hoisting to surface, and of handling and delivery to mill or dump?

(c) Cost of reduction, milling, cyaniding, smelting, etc.?

(d) Cost of general charges and administration expenses. Should these be given under separate headings or should a proportion be allocated to each department?

(e) Cost of head office charges. Should these be included in working costs, and if so, should they be apportioned over other accounts or not?

(10) What would you include under Section (c) last mentioned? e.g., would you include the following items:

- Cost of delivery from main ore bins?
- Cost of coarse crushing in stonebreaker?
- Cost of further crushing in stamp rolls, etc.?
- Cost of roasting?
- Cost of amalgamating?
- Cost of grinding?
- Cost of cyaniding and treating sands?
- Cost of cyaniding and treating slimes?
- Cost of disposal of waste products?
- Cost of disposal of waste products?
- Cost of smelting and refining bullion?
- Cost of realization of bullion?

(11) How far would you segregate the items included under (9) and (10)?

(12) Do you approve of—

(a) Charging each department with its quota of power used? And if so

(b) On what basis or system would you allocate it to the various accounts?

(13) Would you make any allowance for depreciation? And if so,

(a) How would you charge it in accounts?

(b) What average percentage would you allow on buildings, plant, and various kinds of machinery?

(14) would—

(a) Provide for the redemption of shaft sinking and mine development in working costs? And if so,

(b) On what basis would you calculate it?

(15) Would you—

(a) Charge repairs and maintenance in your cost sheets to the various departments to which they apply?
Or

(b) Treat them as one item of cost?

(16) Would you set aside as a reserve fund to meet any of the contingencies to which mines are liable—

(a) A fixed proportion? Or

(b) A proportion of the annual profits? Or would you prefer to

(c) Write down the assets on which no depreciation is allowed?

(17) How should depreciation on stores be provided for, and to what account should it be charged?

(18) On what basis would you calculate yield, working costs and profits?

(a) Per ton mined?

(b) Per ton milled?

(c) Per ton treated?

THE USE OF PORTABLE AIR COMPRESSORS.

By Frank C. Perkins.

Compressed air is utilized very largely not only for drilling and in tunnel construction, but also for bridge building and other structural work where the pneumatic hammer and other air tools are utilized to special advantage.

It is often desirable to provide a portable air compressor for operating these tools and these devices are

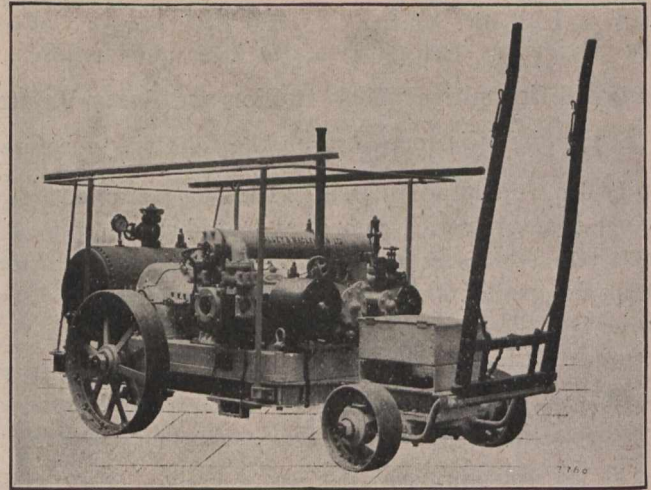


FIG. 1.

now constructed not only driven by steam and gasoline, but also by electric motors to great advantage.

The accompanying illustration, Fig. 1, shows a portable steam driven set of Scotch design and construction as utilized at His Majesty's Portsmouth Dock Yard. This two stage compressor and receiver constructed at Glasgow has a capacity of 200 cubic feet. It will be noted that it is of the horizontal type with water cir-

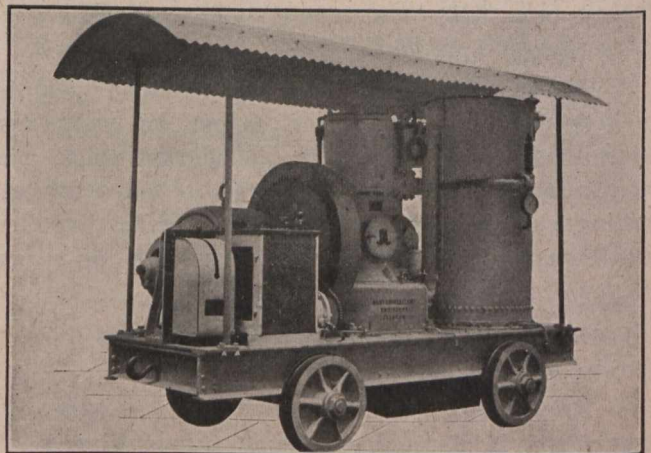


FIG. 2.

culating pump mounted on a truck with wheels for road service, and is easily arranged as a stationary plant by dismantling the wheels if it is to be used for a long time at any given point.

Electrically operated compressors of the portable type are largely used in ship yards where current is available, as at the plant of the Fairfield Ship-building and Engine Company Limited, at Glasgow.

The accompanying illustration, Fig. 2, shows an electric portable compressor plant of 200 cubic feet capa-

city utilized at this Scotch ship yard. It is of the vertical, two stage type, with fly wheel of large dimensions geared to the electric motor, the controller and air receiver with water circulating pump and water tank being mounted on a truck fitted with wheels for industrial railway service.

Where compressed air is used in mining and portable electric motor driven compressors are employed, it is frequently necessary that they shall be of low con-

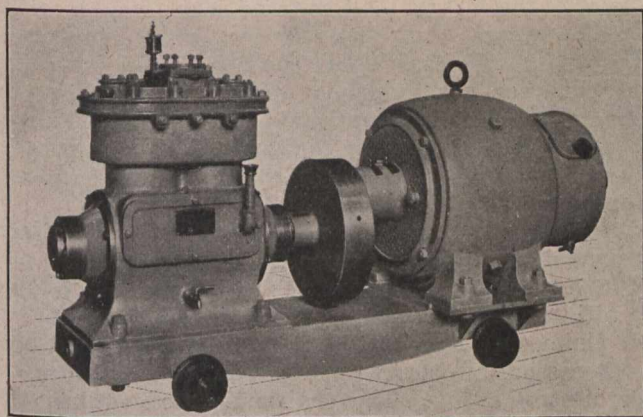


FIG. 3.

struction, as many times they are required for use in situations where the head room is scarce, and such a portable electric air compressor equipment may be seen in the accompanying illustration, Fig.3. This consists of a double cylinder, vertical compressor having a capacity of 200 cubic feet, geared to an electric motor of the enclosed type and mounted on a low truck with wheels of small diameter designed for use on the narrow gauge track used in mines.

THE GOLD ALLUVIALS OF THE RIVER DRAU IN HUNGARY.

By A. von Gernet, Member.

Paper read before the Institution of Mining and Metallurgy, April, 1908.

Gold has been produced by native diggers on the banks of the river Drau for several hundreds of years, and at the present time there are some 200 men earning their living at this work, which is being performed by most primitive methods, with an average yield of from 2 shillings to 3 shillings per day per man. Recently, a firm in Vienna obtained the rights to exploit the gold bearing gravel for a distance of 25 miles between Zakany and Visvar, and the author, who was engaged to study the proposition for the firm during the summer of 1907, obtained information which he thinks of sufficient interest to be placed before the Institution.

The river is shallow, wide and rapid, and consists of several channels having a maximum depth of 10 feet, forming a number of islands. The surrounding country to a width of from one to two miles, as well as the islands and the river bed, are formed of gravel, and at certain seasons, after heavy rains and the melting of the snow on the uplands, are covered by from 3 to 5 feet of water. At such times the stream runs at a speed of about 4 feet per second, and moves the gravel banks rapidly from one place to another, thereby

changing the aspect of the river by the formation of new islands and channels. The gravel generally is 25 feet deep and rests on a clay formation.

Gold occurs in small grains, the richest places being without exception those exposed to the strongest current and composed of coarse gravel. The top layer of 6 inches frequently carries a value of from 1 shilling to 1 shilling 6 pence per ton, the value diminishing in depth until at 2 or 3 feet down it is only 1 or 2 pence per ton. It is of interest to note that rich places, after being worked out, become enriched again at the next time of flood, which might last for a week or two only, and will then sometimes contain as much value as originally. Holes were sunk from 10 to 12 feet deep by means of a hand-operated dredging apparatus, and fairly uniform results averaging 1 to two pence per ton were ascertained. The same values were found when dredging in the bottom of the river bed itself.

Method of Determining Values.—It was necessary to ascertain whether panning small samples and counting colors could be relied on as a sufficiently accurate method of determining values. For this purpose a sluice-box with riffles, matting and expanded metal, capable of treating 40 tons of gravel per day, was established and kept going in various places, and simultaneously samples of the same gravel (20 pound each) were panned and the number of resulting colors were counted. The actual gold production of every lot treated was compared with the panning results.

Table of Results.

Gravel treated. Tons.	Gold produced. Dwt.*	Value per ton. d.	No. of colors per sam.	Ratio of colors per sample to pence per ton.
80	4.5	2.3	15	1:0.153d. per ton.
100	1.66	0.7	4	1:0.175d. per ton.
40	1.4	1.4	9	1:0.155d. per ton.
68	8.0	5.4	34	1:0.160d. per ton.
37	6.3	7.2	33	1:0.215d. per ton.
68	10.0	6.2	39	1:0.160d. per ton.
593	90.6	6.5	49	1:0.130d. per ton.
90	5.0	2.4	20	1:0.115d. per ton.
97	14.0	6.2	27	1:0.222d. per ton.
98	10.0	4.3	41	1:0.105d. per ton.
46	3.6	3.4	24	1:0.140d. per ton.

*Bullion, 1 dwt. = 42d.

The points of interest on which the author desires to lay stress are:—

1. The rapid local enrichment of the gravel produced by natural concentration.
2. The uniformity and reliability of results obtained by panning and counting colors.

It stands to reason that the ratio between value per ton and colors per sample will represent different figures on different alluvial fields.

BENDING OF THE LAND BY STORMS.

The tilting of the ground in storms has been studied by Prof. Omori, of Japan: In October, 1904, a cyclone, the centre of which passed over the sea to the east, tilted the ground at Tokio $3\frac{1}{2}$ seconds toward the area of low pressure; and, in January, 1906, a cyclone centre passing northeastward over the land near Tokio

gave a tilting first to the east and then to the westward as the low pressure moved onward, the total change of inclination being 2.87 seconds. The ground rose under low pressure while in the former case it sank—a differ-

ence explained by the fact that the rise of sea-level commonly more than compensates for lowered air pressure, so that the pressure on the sea bottom is actually greatest with low barometer.

THE SPRINGHILL BOARD OF CONCILIATION.

Failure to reach a unanimous conclusion marked the deliberations of the second Springhill Board of Conciliation.

The dispute between the Cumberland Railway and Coal Company, Limited, and certain of its employees was resolved into four separate claims advanced by Mechanics Lodge, No. 23, P. W. A.. The Board was composed of Judge Wallace, chairman; the Hon. J. N. Armstrong; and Mr. R. B. Murray, the last named was the men's representative. Judge Wallace and the Hon. Mr. Armstrong found in favor of the Company on all four counts. Mr. Murray found in favor of the men on all but one claim.

Both the majority and the minority reports are temperate in tone and the conclusions reached are carefully substantiated. However, Mr. Murray's dissenting report would have lost nothing if the last paragraph (which is not reproduced here) had been excised.

Beginning on May 13, when the first session of the Board was held in Springhill, sittings were continued throughout and the subsequent day. Deliberations were resumed in Halifax on May 18. The reports were made public on May 27th.

The following are the findings of the majority:

There are four classes of cases, "A," "B," "C," and "D," in dispute between Mechanics Lodge No. 23, P. W. A., and the Cumberland Railway and Coal Company, Limited.

Claim "A" is in respect to an advance of wages for repair work. There are two classes of men in the Mechanical branch, working on repairs, viz.,—those who labor underground, and those whose work is performed on the surface, the present rate of wage for the former class being 15 cents per hour, plus 22 per cent., and the rate for the latter class being \$1.20, plus 22 per cent. per day. The wage now asked for on behalf of this class of underground and surface work is a flat rate of \$1.85 per day of 8 hours for underground men, and 10 hours for surface men.

Undoubtedly the work in question is disagreeable and trying.

It is urged by the applicants, as a justification for the increase desired, that this class of work commands a higher rate of pay in some other collieries, and as proof of this contention the schedule of rates applicable to the Dominion Coal Company's employees was put in evidence. In reply, the Mechanical Superintendent of the Cumberland Railway and Coal Company testified that this class of men were paid at a higher rate at Springhill for the same number of hours, than the employees of the Dominion Coal Company. The tabulated statement marked in the written answer of the Company was also verified by the Assistant to the General Manager.

The applicants for an increased rate of pay seemingly regard this question of the rate of pay prevailing in other similar employment within the Province of Nova Scotia under similar conditions as affording a fair test

to enable the Board to determine what would constitute a fair wage. Applying that test, which is generally a fair one, to the issue before the Board, and examining the whole of the evidence upon that question, the Board finds that the applicants in this class are paid at least as high a rate for the number of hours as men of a similar class employed by the Dominion Coal Company.

The Board finds that the applicants in this class have not established their claim to the desired increase.

Claim "B" is on behalf of the fan-men at No. 3 mine. An objection was raised by the Company in regard to this claim, and also to the two following claims, that as the persons affected were less than ten in number, the Act did not apply. The chairman ruled against this objection.

The present rate of wage for the fanmen per day of 12 hours is \$1.20, plus 22 per cent. They ask for a flat rate of \$2.00 per day of 12 hours. The Board finds that the work which they have to perform is work generally given to old or infirm employees. One of the claimants has been sick for two years and could not perform any other work, and therefore applied for this work. The other claimant had a crippled leg and he requested a similar job. It was asserted on behalf of these men, that workmen doing similar work for the Dominion Coal Company get a better rate of pay, but the Board finds that the employees doing this work at the works of the Dominion Coal Company have also the responsibility for the air compressors and that their work is substantially different.

The Board therefore unanimously rejects this claim.

Claim "C" relates to Charles Ronney. It appeared that he is in the same class and is paid at the same rate as ten others. They are not skilled workmen, but might be described as handy men. While there may be only a slight difference between this claimant and some of the men in the class just above him, the Board finds that the applicant in this case has not established his claim for the increased wage.

Claim "D" relates to the cases of Wilson Demmings, car inspector. His wage is \$1.30 plus 22 per cent. per day. Applicants ask on his behalf a flat rate of \$2.00 per day, claiming that is the rate which such class of work commands elsewhere. This employee has now the benefit of an assistant at his work, and the duties of Mr. Demmings have not increased since the increase of pay given him. It was amply shown by evidence to the satisfaction of the Board that Mr. Demmings is a painstaking, industrious, and capable employee, but the Board cannot find that he has established his claim to the increased rate asked for by him.

The Board deems it proper to add to its findings this statement,—that the declaration in the "ultimatum" issued by the general manager of the Company last October, when the men returned to work, "that there cannot be any increase in wages in the district covered by the award now or later," would not in any way have interfered with a finding in favor of any of the

applicants herein if the evidence submitted to the Board justified such a finding.

The minority report, which it was decided to forward to the Department, read in part thus:

In the application for this reference there were four cases set out as being in dispute between the Lodge and the Company, these cases were designated in the application as follows:

First case.—Is in respect to an advance on wages for repair work.

Second case.—Is in respect to an advance on wages for No. 3 fanmen.

Third case.—Is in respect to an advance on wages for Charles Ronney, carpenter.

Fourth case.—Is in respect to an advance on wages for Wilson Demmings, car inspector.

Although the foregoing cases were not taken up by the Board in the order named, it is the intention of the writer to discuss and report on them in successive following, therefore the "repairs rate" shall be the first under consideration.

The evidence disclosed that in this employ there are at least two classes of repair work in connection with the mechanical branch, repairs to steam pipes and machinery underground and repairs to pipes and machinery overground, including of boilers. In the underground section, there seems to be about ten men affected, and in the overground one man only, Andrew McCarron claimed redress at the hands of the Board. For the underground men the witnesses George McLeod and John Campbell gave evidence which seemed conclusive, that their work was performed frequently in high temperatures, sometimes at 116 degrees, their hours were erratic, being subject to a call at any time during the night when their day work is over, and in addition to this, to use their own language "we are frequently employed on Sundays." The present rate of pay for these men is 15 cents per hour plus 22 per cent., their contention being that this rate is altogether inadequate for the class of labor they are called upon to perform. In view of their receiving no excess pay for their Sunday work or extra calls, as it appears is customary in other places in similar industries and on work where Sunday labor is necessary, and in view likewise of their having to work mostly under conditions and at a temperature which they claim are hazardous and must of necessity be prejudicial to health, the claim the Lodge is making in their behalf of 39 cents per day of eight hours, extra, surely cannot be considered an unreasonable one. The Company through Mr. Muirhead, contends, that these men are sufficiently paid already. This is natural and usually the plea put forward in such cases by employers, but it does not lessen the fact of the soundness of the men's claim notwithstanding. To emphasize the reasonableness of the Lodge's contention, they put in evidence a telegram from the general manager of the Company wherein an express promise was made, that under certain conditions, this matter of repair rates would be adjusted to the satisfaction of the men interested. The Company now repudiates that telegram, or as Mr. Stewart puts it for them "the whole thing is now off."

So convinced am I that the Lodge has made its claims and contentions good with respect to this underground repair work, I have no hesitation whatever in recommending that men at this class of work should be paid a flat rate of \$1.85 per day of eight hours. My

conviction is, taking all the circumstances into consideration, any jury in the land should award them at least this amount.

With respect to the other class of repair work, with which Andrew McCarron alone is interested, this man swears he is at present and has been for the past sixteen months employed in the class of labor known as overground repair work and tending engines and boilers at the machine shop and No. 1 mine, his duties also consist in cleaning boilers at Nos. 2, 3 and Aberdeen mines. His present rate of wage is \$1.46 per day and in the Lodge's application a request was made on his behalf for \$1.85 per day. His evidence shows that when he is occasionally taken from his usual work of repairs and boiler cleaning and put to tending engines and boilers, he has been paid the rate of wage which such latter work calls for and which is in excess of the pay he receives when at the former class of labor. Beyond a doubt the cleaning of boilers is hot and very dirty work and \$1.46 appears a very small day's pay for the performance of it. McCarron has frequently to be in charge of two or three men and receives only 6 cents per day more than they do. Is it not fair to assume that the man who directs should get more than 36 cents per week over the men who are directed?

The Company, through Mr. Muirhead, seem to have little to say with respect to this case. It was admitted the work of cleaning boilers was dirty but nothing was said by this witness that would indicate the claim made on behalf of McCarron was an unfair one. This may have been an oversight on Mr. Muirhead's part, but should not now be pleaded to the prejudice of McCarron. It may be safely inferred, however, that McCarron cannot be classed as a skilled laborer in the same sense as the underground repair men, nor could he, if called upon to do so, be able to perform the same grade of work as McLeod and Campbell and the others who have Winfield McInnes as their leading man. On that account and for the further reason of the trend of the evidence, I cannot uphold the Lodge's claim of \$1.85 per day for this man, but strike a medium and recommend that his pay should be increased from \$1.46 to \$1.65 per day of ten hours.

The second case concerns two men, Arthur Cooke and John D. Cameron. These men are employed as fanmen at No. 3 mine, they work on twelve hour shifts opposite to each other. From the evidence, it seems their work consists in the main in constant attendance on their engine and the principal feature of it is its monotony. The job under the law requires the holders to be possessed of certificates of competency. Cooke and Cameron's pay is at present \$1.46½ for twelve hours. The Lodge has asked on their behalf \$2.00 for the same time. The Company take very strong exception to this case, and claim that it is work suitable only for broken down or worn out men and was given to Cooke and Cameron "simply because they made application, and if they are able to perform other duties there is a good job open for them." Mr. Muirhead further stated that a boy of ten years could do equally as well the work that is necessary.

Taking this matter into long consideration and viewing it as I have from every aspect, and with a full knowledge it involves upon me, I am led to the conclusion, that in a spirit of fairness I cannot do otherwise but recommend that the prices for this class of labor remain as at present, but this recommendation is not to be treated as a precedent for future demands

by the Lodge or individuals employed at it, for an increased pay in respect to it.

The third case. This relates to a demand for an increase of pay for Charles Ronney, a carpenter, from \$1.40 plus 22 per cent. to \$1.60 plus 22 per cent. The evidence goes to show that Ronney has been engaged for fifteen years or more at the carpenter trade, he works side by side with two others who receive \$1.60 plus 22 per cent. and does exactly the same class of work as they perform. He swears he is equally competent as they, working at finishing houses, making trolleys, wood wagons, mine cars, etc., he swears also the work is all alike, that of one being no better or worse than the others. The witness Anthony Johnson, corroborates Ronney's testimony in nearly every particular and swears Ronney is a competent and efficient carpenter and conscientiously says that his present rate is inadequate for his services and not in accordance with other carpenters in the employ, who receive \$1.60 plus 22 per cent. per day, and further from his knowledge of Ronney's ability and because he does exactly the same class of work as the other two referred to he should receive the same wage as they. The Company make reply to this by stating that Ronney is not a tradesman and name him as a "handy man" and in the same class as ten others. Mr. Muirhead swears that Ronney is on a par with the ten men referred to and that they are not skilled workmen. Inasmuch as Ronney is not in Mr. Muirhead's department, not much credence should be given to the latter's evidence. It was evidently made in good faith but must of necessity be largely hearsay and not from a personal knowledge of the facts. That Ronney "is" a tradesman in the broad sense of the word can hardly be doubted, and to classify him with the box repairers on the bank heads is unfair. The telegram from the general manager herein before referred to contains this clause "Charles Ronney's claims will be considered when work is resumed as well, and if he is entitled to the wage he requests, the same will go into effect from the 16th inst (i. e., August, 1907)." The question then arises, has the Lodge proved that Ronney is entitled to the wage he requests, or should the mere ipse dixit of the Company be taken that he is little better than a wood butcher? It strikes me the only fair and tenable ground for me to stand on with respect to this third case is to recommend that Charles Ronney receive a daily wage of \$1.60 plus 22 per cent. and I so recommend accordingly.

The fourth case, as stated in the application, "is in respect to an advance on wages for Wilson Demmings, car inspector." Here is a man who has been in the employ for fourteen years, sober, painstaking, careful and industrious with the lives of the travelling public and valuable rolling stock committed to his care, a letting up of vigilance on his part would result in loss of life and property and yet his pay only amounts to the meagre sum of \$1.58½ per day. He swears that during all the time he has been car inspector, there has never been a case where an accident has occurred through any neglect on his part, he also swears he has tried on various occasions to get consideration by way of increased pay and they (the Company) gave him the impression they would consider it favorably. Demmings' evidence is reinforced in a most convincing way by that of George Watt, I. C. R. car inspector at Springhill Junction, who among other things says, that Demmings' duties are practically the same as the du-

ties of a car inspector on the I. C. R. For such work as he (Demmings) has to perform, they would receive \$2.00 per day on the I. C. R. for ten hours, the witness also testified that considering the duties Demmings is called upon to perform, the sum asked (\$2.00) is quite reasonable.

The Company, as in Ronney's case, set up the plea that Demmings is being sufficiently paid already, and Mr. Muirhead who, although he testified to having nothing to do with Demmings, not being in his department, sought to break down the weight of Mr. Watt's evidence by making a comparison of the work of the latter with that of Demmings, which is not the case in point at all. Watt is the head car inspector at the Junction and receives 24 cents per hour and extra pay for overtime and night work. The proper comparison should be with men under Mr. Watt who receive 20 cents per hour and for night work time and a half, and whose work is identical with that performed by Demmings.

The evidence tendered by the Lodge in support of this claim is to me so convincing that I have no hesitation whatever in arriving at the decision that they have made out a case. I accordingly recommend that Wilson Demmings shall have his present rate of wage of \$1.58½ per day increased to that of \$2.00 per day of ten hours.

THE DETERMINATION OF COBALT AND NICKEL.

By W. K. McNeil.*

So far as the Cobalt district is concerned, the principal minerals of which nickel and cobalt are essential constituents are:

Nicolite.—Arsenide of nickel, Ni As.

Smaltite.—Diarsenide of Cobalt, Co As₂.

Millerite.—Sulphide of nickel, Ni S.

Cobaltite.—Sulph-arsenide of cobalt, Co As S.

Erythrite.—Cobalt bloom, Co₃ As₂ O₈ + 8 H₂ O.

Annabergite.—Nickel bloom, Ni₃ As₂ O₈ + 8 H₂ O.

The following method of analysis has been found useful in the routine developed after a considerable experience in handling Cobalt ores.

Procedure.—Weight out 0.5 to 1 gramme of finely pulverized ore. The amount taken depends upon the percentages of nickel and cobalt present. Decompose by adding nitric, hydrochloric, and sulphuric acids. Not more than 3 to 5 c.c. of sulphuric acid is to be added, as it is used here as an indicator. If an excess is used it will interfere in later operations. Evaporate to white fumes, cool, dilute and filter.

The fifth and sixth groups are now precipitated by H₂S, after the solution is thoroughly reduced by SO₂ directly, or by adding sodium sulphite. Care must be taken to have the excess of SO₂ driven off and also to pass the H₂S through the solution for some time, especially for ores containing a large amount of arsenic, such as niccolite and smaltite. If the solution is kept hot while the H₂S is being passed in, the precipitation is much more rapid and complete. The H₂S may be passed into a cold solution and heat applied gradually. The solution should now be boiled to expel the excess of H₂S. Filter and repeat the precipitation as it is important that all arsenic be removed from the solution.

* Manager of the Canadian Laboratories, Toronto.

The next step is to remove the iron and alumina by first oxidizing with a small quantity of nitric acid or sodium peroxide, and adding ammonia slowly to the boiling solution. If care is taken to have the solution completely oxidized and the precipitant added slowly, the nickel and cobalt will not be carried into the precipitate to any extent. Wash the precipitate thoroughly with hot water and re-dissolve and re-precipitate. This may be repeated until the filtrate does not indicate cobalt or nickel.

Concentrate filtrates and add enough $(NH_4)_2 SO_4$ to have the total bulk of the solution in the proportion of about 3 grammes for each 0.1 to 0.2 grammes of cobalt and nickel present. If too much sulphuric acid is added in the first solution of the ore this operation is interfered with.

The nickel and cobalt are now precipitated by a current of 0.7 amperes (maximum) the solution being at the temperature of 70 degrees C. The time required is two to four hours according to temperature.

If the cathodes blacken it means that the current is too strong or that arsenic has not been completely removed.

After weighing the cathodes, dissolve off the deposited nickel and cobalt with nitric acid using as small a quantity as possible. Neutralize with KOH, make acid with acetic, and add a concentrated solution of potassium nitrate, stirring for some time. Enough acetic should be added to make noticeable the evolution of nitrous fumes after the addition of potassium nitrate. Allow the solution to stand in a warm room for 24 hours. Filter and wash the precipitate of $Co_2(NO_2)_6 \cdot 6KNO_3$ which should be yellow and crystalline with 10 per cent. solution of potassium acetate then with alcohol. It may be now treated with H_2SO_4 and converted to $3K_2 SO_4 + 2CoSO_4$ and weighed, or dissolved and electrolyzed under the usual conditions and with the usual precautions.

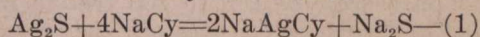
SOME FEATURES OF SILVER ORE TREATMENT IN MEXICO.

Part II.—Theoretical Considerations.

(Abstract of paper read by W. A. Caldecott, B.A., F.C.S. before the C. M. and M. Society of South Africa.)

The following discussion is rendered imperfect on account of the non-arrival of a parcel of Mexican silver ore, which was to be tested to develop and confirm the tentative conclusions arrived at from an examination of the properties of artificially prepared silver sulphide. It is probable that since the mineral silver sulphide is coarser and more compact than the artificially prepared compound its dissolving in cyanide solution is slower, thus allowing more time for secondary reactions to proceed.

The primary reaction in the dissolving of silver sulphide from its ores may be taken as



When, however, a certain amount of silver has been dissolved an equilibrium is established. How far the reaction has proceeded before this equilibrium is attained, depends upon the amount of soluble sulphide of any kind in solution and the amount of free cyanide present.

This is illustrated by the following table, showing results from a series of argentiferous sodium cyanide

solutions of the strengths stated, 100 c.c. of each of which was titrated with 0.1 per cent. sodium sulphide solution until a brownish coloration was just produced. A deduction of 0.05 c.c. was made from each reading, so as to give the amount of sodium sulphide that could be added without reacting upon the silver present.

Table A.

Per cent free cyanide	Silver present mgrms per litre	Na ₂ S required mgrms per litre	Equiv. sol. present (as Ag ₂ S) mgrms per litre	Ag.
0.50	490	5.3		14.7
0.40	392	4.4		12.2
0.30	294	3.1		8.6
0.20	196	2.0		5.5
0.10	98	1.0		2.8
0.05	49	0.7		1.9

An inspection of the foregoing table, in which milligrams per litre may be read as grams per metric ton, shows that the amount of silver sulphide capable of being dissolved as the soluble double alkaline cyanide is approximately proportionate to the amount of free cyanide present, but even with 0.5 per cent. solution the quantity of dissolved silver is less than 0.5 ounce per 2,000-pound ton. Further, the introduction, through presence of a free alkali or otherwise, of soluble sulphides into the argentiferous cyanide solution from any mineral or other source will result in the precipitation of silver already dissolved.

The fact that dissolved silver and other than very small amounts of sodium sulphide cannot exist simultaneously in the same solution serves to explain why working solutions do not show more than traces of sodium sulphide when sulphide ores are being treated. With solutions low in silver it is difficult to filter off the very finely divided precipitate formed on addition of sodium sulphide solution.

In practice, many ounces of silver per ton existing as sulphide can be dissolved. This is explained by the occurrence of secondary reactions, which show the conversion of soluble alkaline sulphide first formed, into other compounds which do not preclude the further solution of silver. These secondary reactions several of which no doubt proceed simultaneously, are:

- (a) $2Na_2S + 2O_2 = Na_2S_2O_3 + Na_2O \text{---(2)}$
 $Na_2S_2O_3 + Na_2O + 2O_2 = 2Na_2SO_4 \text{---(3)}$
- (b) $Na_2S + NaCy + O = NaCyS + Na_2O \text{---(4)}$
- (c) $Na_2S + PbO = PbS + Na_2O \text{---(5)}$
 $PbS + NaCy + O = NaCyS + PbO \text{---(6)}$

The foregoing reactions, when carried to completeness, all involve absorption of oxygen, whereby the utility of aeration may be accounted for, apart from its accelerating the solution of any metallic silver or gold present in an ore under treatment. Reaction (a) proceeds more rapidly than does (b), and since it does not involve destruction of cyanide and since it produces in the first stage sodium thiosulphate, (itself a silver solvent) it may be considered the most desirable result of aeration.

Apart from any re-formation of PbO, nearly as much lead as there has been silver present as sulphide is required to carry equation (5) to completion.

A study of the molecular weights involved in equation (1) shows that the silver requires nearly its own weight of sodium cyanide to discolor it, so that the consumption from this cause alone with 500 gm. silver ore would be nearly a pound of sodium cyanide per ton.

This feature of high cyanide consumption renders the field for cyanide regeneration more promising than with blanket gold ores. Although oxygen does not play the direct part in dissolving the silver that it does in gold ore treatment, yet its importance in permitting solution to proceed, and the present necessity for the tedious process of repeated agitation and aeration, appear evident.

A series of experiments demonstrated, by the trivial amount of silver in the precipitate, how effectual is the presence of lead in preventing precipitation of silver, and consequently in permitting the dissolving of silver sulphide to proceed in spite of the concurrent formation of solubel sulphide.

SUMMER EXCURSION.—CANADIAN MINING INSTITUTE.

The following is a provisional programme prepared by Mr. Mortimer Lamb, for criticism.

SUMMER EXCURSION. C.M.I. 1908.

Time Table.

- August 24. Leave Quebec in afternoon.
 25. Arrive Sydney, midnight.
 26. Visit Dominion Iron & Steel Company's works and Dominion Coal Company's mines (arrangements to be made by The Nova Scotia Mining Society).
 28. Stellarton, 7.20 a.m.
 29. Return, via St. John to Sherbrooke.
 30. Arrive Sherbrooke 5.30 a.m., and leave for Thetford by Quebec Central.
- Sept. 1. Leave Sherbrooke by C. P. R. at 3.30 a.m. arriving in Montreal at noon.
 2. Leave Montreal for Toronto 10.00 p.m.
 3. Arrive Toronto 7.00 a.m., leave for Niagara Falls.
 4. Reception and entertainment of visitors in Toronto by the Directors of the Toronto Exhibition. Leave Toronto 11.30 p.m. for North Bay.

5. T. & N. O. train for Cobalt.
 6. Leave Cobalt 5.00 p.m. (?) connect with train, at North Bay 10.35 p.m. Arrive Sudbury 12.50 a.m.
 7. Arrive Sudbury 12.50 a.m.
 8. Moose Mountain (?) Port Arthur (?).
 9. Leave Sudbury 5.35 a.m.
 10. Arrive Winnipeg 9.50 a.m., leave 11.50.
 11. Arrive Medicine Hat 11.40 a.m., and proceed to Lethbridge by special train. Leave for Frank in the evening.
 12. Visit Frank and Blairmont.
 13. Fernie.
 14. Special train leaving early in the morning for Moyie. Leave 1.55 for Kootenay Landing. Arrive in Nelson 7.15. Arrive Rossland midnight.
 15. Rossland mines.
 16. Leave Rossland 8.40 a.m. Arrive Smelter Junction 9.35. Leave Trail 7.20 p.m. Arrive Nelson 10.30 p.m.
 17. Visit Bonnington Falls, etc., and reception at Nelson.
 18. Leave Nelson 9.45 a.m. Arrive Grand Forks 2.50 p.m. Arrive Greenwood 4.25 p.m. (visits to the different mines in the Boundary district will necessitate chartering a special train).
 20. Leave Greenwood (?) 3.20 p.m. Arrive West Robson 11.05. p.m.
 21. Arrive Arrowhead 1.00 p.m. Arrive Revelstoke 2.45 p.m.
 22. Arrive Vancouver 1.30 p.m. Arrive Victoria 8.30 p.m.
 23-24. Meeting Victoria.
 25. Arrive Vancouver 8.00 a.m. Leave Vancouver 3.15 p.m.
 26. Arrive Banff 10.00 p.m.
 27. Leave Banff 10.00 p.m.
- Oct. 1. Arrive Montreal 8.25 p.m. Arrive Quebec 3.20 p.m.

BOOK REVIEWS.

A Treatise on Mine-Surveying, by Bennett H. Brough, Thirteenth Edition, revised. Pages XVI + 372. Price, cloth, 7s. 6d. Charles Griffin & Company, Limited, Exeter street, Strand, London. 1908.

As indicated on the title page, Mr. Brough's volume has passed through thirteen editions. This, in itself, is evidence that the book occupies an important place as a standard text book.

The first chapter is general. The importance of mine surveying in its relation to the industry is dwelt upon and a practical classification of mineral deposits, for surveying purposes, is given. For instance, under "tabular deposits" are included mineral veins, beds and seams. "Irregular deposits" comprise masses, stockworks, and pockets. The former class is defined as those in which two dimensions predominate.

The second chapter takes up the measurement of distances and describes the chain, the rod, steel-bands, needle surveying are treated in two chapters. The German dial, invented in the seventeenth century by the measuring wheel, pacing it. Needle and fixed

Balthasar Roessler, is the subject of Chapter VII. It is noted that the use of the dial is becoming much less common and the theodolite is gradually replacing it. It is still found useful in narrow workings.

The theodolite (or transit) and its use underground and on the surface are set out in Chapters VIII, IX, and X. Chapter X includes specimen field notes of the survey of an American mining claim.

In discussing mine plans, reference is made to the accuracy of the inspection plans required by law in the Pennsylvania anthracite districts. These maps are on a scale of 100 feet to an inch. The working maps are usually on a scale of 200 to 300 feet to an inch. Topographic and culture features are shown in different colors of ink. The survey lines are plotted with a vernier-protractor, or a protractor of very large size, and the results are checked by latitude and departure calculations.

In Belgium and in France mine plans are required by law to be laid down on a scale of 1 : 1000. In Prussia the scale varies from 1 : 500 for metalliferous mines to 1 : 1600 for collieries. Colliery plans in Great

Britain must not be less than 1 : 2500. In Pennsylvania the scale of plans for anthracite mines is 1 : 1200. The Swedish Mining Act demands that all plans and sections must be drawn on a scale of 1 to 800, and must be made in conformity with a Normal Map, drawn up by the Mining Department.

A chapter on magnetometric surveying, in which the various types of magnetometer are fully described, is followed by a section on photographic surveying and its application to mining work. The use of photographic methods in the Yukon, in the Kootenay mining district, and in the Crow's Nest coal country is cited.

Two appendices, the first giving 163 examination questions chosen from British papers and the second presenting a bibliography of the principal treatises published in mine surveying, conclude the volume.

Naturally this last edition is an improvement on its predecessors. Throughout the volume there is diffused much general information. Practice in foreign countries is given due notice.

Diagrams are interspersed lavishly through the text. The few half-tones that appear are not excellent.

Mines and Minerals of the British Empire, by Ralph S. G. Stokes, Late Mining Editor, "Rand Daily Mail," Johannesburg, S. A.—Demy, 8 Vo. Numerous Illustrations. Price 15s. net. Published by Edward Arnold, 41 & 43 Maddox street, London W. 1908.

In his tour of the British Empire, Mr. Stokes covered more than 35,000 miles. Only twice did he touch foreign territory. Only once was he within one hundred miles of any important mining field that was not on British soil. The journey was undertaken on behalf of the Mining World, of Chicago, and a group of British dailies. Much of the material now cast into permanent form appeared in the shape of articles during the author's pilgrimage. But by the co-ordination of these articles and the addition of supplementary information, Mr. Stokes has produced a readable and intrinsically valuable volume.

We welcome anything that tends towards establishing bonds of sympathy between workers in the various countries that make up the British Empire. Indeed, we hope some day to see an Imperial Mining Institute with branches all over the globe and headquarters in an airship. Until there are regular currents of communication and constant interchange of ideas between English speaking mining districts, progress will be uneven and often slow.

The fundamentals of Mr. Stokes' book are sound. To treat the mines and minerals of the British Empire as a whole is a large and bold idea. To complete the task creditably in one volume argues clear prospective, strong judgment, and much labor.

Not as a newspaper "copy-mill" does Mr. Stokes take up his work. Being a practising mining engineer himself, he has been able to observe and describe the things that most interest his technical brethren. As an experienced journalist he has given us his observations succinctly. Geological, mineralogical and other technical details are given their proper value in relation to economic, political, and social conditions. Herein, perhaps, lies the chief merit of the book before us and, therefore, the principal result of the journey.

It is out of the question to attempt a complete review of the ground taken up by the author. But it will be more profitable, because less wearisome, to single out a few characteristic sections and confine our attention to these.

Starting from South Africa, Mr. Stokes' pilgrimage led him through Ceylon, famous for its graphite and gems, through the Indian Empire where mica, manganese, coal, gold, iron, and almost the whole gamut of commercially important minerals are found, through the Malay States whence comes the world's principal supply of tin, and where, as in India, devices as old as civilization are used side by side with modern machinery. Thence his way was taken through the gold, copper, silver-lead and zinc fields of Australia, the gold, copper and tin districts of Tasmania, the gold and coal of New Zealand, and Canada from British Columbia to Quebec was covered last.

Amongst the serious gaps in his itinerary the author notes Mysore, Queensland, Klondyke and Rhodesia. We must add to these another omission, unmentioned by Mr. Stokes. Nova Scotia is given but incidental notice in the volume. It was not visited, nor is apology offered for the scant paragraphs with which its magnificent coal and its historic gold and iron areas are dismissed. This serious hiatus, due no doubt to hurry and lack of time, should have been specifically explained in the preface. We may pardon Mr. Stokes for not visiting the Klondyke, but it is hard to imagine a sufficient excuse for not including Nova Scotia in his itinerary.

Introductorily the magnitude and vital importance to the Empire's mining industry is emphasized by means of tabular statements and a few crisp paragraphs.

"The prospector's memorable decade of 1882-1891 (the first five years of which saw the birth of the Rand, Mount Morgan, Sudbury, Waihi, and Broken Hill)," is contrasted with the past decade.

"The influence of the mining industry upon the growth and welfare of the British Empire is most fully exhibited by the history of the several colonial territories which it has raised to the forefront of commercial nations from the obscurity of sterile wilderness." Applying this dictum to Canada we find that it needs modification. It is true that, but for the gold of the Yukon, that territory would be yet terra incognita. But in Nova Scotia, in Quebec, in Ontario, in Alberta and in British Columbia, the industries of mining, lumbering and fishing are carried on often in the same district. The conformation of Nova Scotia's coast line is such that but few of her important mines are more than a dozen miles from salt water and good harborage. The mines of that province and of Quebec are drawn to a considerable extent from the agricultural class. There is hardly a mining district in Ontario in which farming is not actively pursued. Throughout Alberta and British Columbia the same favorable climatic and physiographical conditions obtain. Canada is blessed with a total absence of those sterile wildernesses of which, in other countries, mineral wealth is the only saving feature.

The annual mineral yields of the British Empire aggregate the tremendous total of, roughly, \$1,000,000,000. "In whatever direction" writes Mr. Stokes, "and to whatever degree the popular conception of its financial aspect may be at fault, the mining industry unmistakably appears in a light that is favorable without

reservation as a field of employment for highly remunerated workmen, and the support of the most prosperous laboring communities in the British Empire."

Chapter I is a cursory view of mine labor in widely separated parts of the Empire. The Sudbury labor position is remarked upon as being "industrially sound, but political deplorable." It "reflects one of the ugliest features of Canada's liberal immigration policy." Day's pay for skilled labor ranges from \$2 per day, the rate obtaining in Bendigo and Ballarat, to \$5 per day in the Gold Coast mines of Western Africa. Canadian rates are uniformly higher than those of any other British country.

As we read chapter after chapter we come upon other themes most worthy of expansion. For instance, the financial assistance given to deserving mining ventures by the Victorian and Western Australian governments should indicate a line of action for Canadian administrations. Under the Mines Department Act the Victorian government advanced a company (that had already expended \$1,000,000, on plant and operations) the sum of \$40,000 for additional prospecting, at the same time demanding repayment of the first profits and securing itself by a mortgage on the lease and one of the company's plants. In Western Australia there are twenty-nine state batteries and twenty-four state cyanide plants. The treatment charges are so regulated that the year's current expenses for the whole state are approximately balanced by receipts. The system has its defects, but undoubted good has resulted in the speedy development of new districts.

The government of New Zealand, in 1901, reserved 8,000 acres of coal land near Greymouth (South Island) for state operation. These, under the direct control of the Minister of Mines, have been financially successful. The miners are registered as an industrial union and work is carried on under an agreement entered into by the union and the manager. The government has encouraged its employees to build homes for themselves on reserved portions of the township. However, Mr. Stokes assures his readers that the nationalization of the mining industry is "still far below the political horizon."

The marked increase in the scale of milling operations on the Rand gives food for thought. In December, 1898, there was not one plant milling over 50,000 tons per month. There was but one milling between 40,000 and 50,000 tons. But, of 62 plants, 42 were handling under 10,000 tons. Contrasting strongly with this is the record for December, 1907. In that month there was one plant of over 50,000 tons, four between 40,000 and 50,000 tons, and only 14 of 10,000 tons capacity. Whereas plants dealing with more than 20,000 tons per month constituted only 9 per cent of the total in 1898, they now represent 97 per cent.

In the columns of the "Canadian Mining Journal" the metallurgical progress of the Rand has been noted and analyzed on several occasions. Mr. Stokes makes clear presentation of the principal operating causes of this progress. All of his chapters on the Rand, indeed, are notable, but space will not permit of further notice here.

Of Canada Mr. Stokes shrewdly remarks that it has as yet failed to win a lofty place as a mining country, not because of mineral poverty, but because its energies have always been applied to the exploitation of its agricultural resources. The dissimilar methods of ore-

valuation adopted at Ottawa and by the provincial departments are commented upon.

"A particularly favorable feature of Canada as a mining country is the lack of excessive centralization; its productive fields are diverse in character and wide in distribution. Amongst the mineral occurrences are the greatest deposits of nickel, asbestos, and placer gold, and the richest silver field in the world."

Nova Scotia's gold mines are thus spoken of: "The cause of the field's retrogression is more freely attributed to inefficient mining methods, to the unsound influences of granting small mining areas, and to the lack of any laws compelling holders to operate their mines, than to the deficiencies of mineralization."

The free circulation of the careful and trustworthy maps and reports of the Geological Survey is the subject of favorable comment.

Mr. Stokes' chapters on Cobalt, Sudbury, Quebec and British Columbia will stand inspection even by a Canadian mining man. They are not beyond criticism, but they are clear, incisive and honestly descriptive.

We would willingly dilate further upon the "Mines and Minerals of the British Empire," but we must respect the reader and bow to the printer. It may, however, be permitted to conclude by offering Mr. Stokes our warm felicitations upon his courage and vigour in successfully attacking so large and imperial a theme. From those of our readers whose privilege it may be to read the book we invite comment and criticism. This we do because we believe that it will at once assume a niche in every well conditioned library.

Hints on Amalgamation and the General Care of Gold Mills—by W. J. Adams, E.M. Illustrated. Second Edition, Revised and Enlarged. &120 pages. Price \$2. The Mining and Scientific Press, San Francisco, 1908.

Ten years ago the first edition of this book was brought out. Years before, coming to California as a young mining school graduate, the author soon discovered that his technical education had only taught him chemistry and scientific mechanics in general. He lacked practical rules for the application of his knowledge. His real education then started at the bottom of the ladder in a gold mill. These rules, the result of "bitter experience, extending through many years," he set down in this little volume.

Now, ten years after the first writing, another edition has been brought out. Very few changes have been made in the text, but an appendix deals with the more salient changes in gold milling.

The book is written by a practical man for practical men. It will, no doubt, fulfil its mission.

A Dictionary of Spanish and Spanish-American Mining, Metallurgy and Allied Terms—by Edward Halse, A.R.S.M. 380 pages. Price 10s. 6d. Charles Griffin & Company, Limited, Exeter street, Strand London, 1908.

Griffin's Mining Series has long been known to mining men. This recent addition will prove quite as useful as its predecessors.

The impression exists that Spanish is an easy language to acquire. This impression is modified when the young engineer, who has neglected to include Span-

ish in his studies, finds himself obliged to pick up a working knowledge within the least possible time limit. To one in such a predicament and, indeed, as a useful companion to the practising engineer whose reading or whose engagements bring him in touch with mining in Spanish-speaking countries, the dictionary should be a boon.

As in German, French, and Italian, so in Spanish dictionaries, it is wonderfully difficult to find the tech-

nical terms that one needs. And if these terms happen to be colloquial variants of standard words, the search is all the more hopeless.

In this dictionary all provincial terms are referred back to standard terms. In some instances lists of synonyms and equivalents in French, German and in some instances, Portuguese, are given.

While Mr. Halse's dictionary is by no means the first of its kind, it is, perhaps, the most complete and useful.

INDUSTRIAL PAGE.

Underground Wire Rope Haulage.—The Broderick and Bascom Rope Company, St. Louis, Mo., U. S. A.—This most creditably done pamphlet tells of the successful application of underground rope haulage in the workings of the Coal Valley Mining Company at Sherard and Cable, Illinois. The illustrations are exceptionally good. The letter press could hardly be excelled.

An outline of the three general methods of wire rope haulage is followed by a description of the tail rope system in use in the Coal Valley mines.

At the Cable mine a tail rope system extending into the workings for a mile and a half was the means of immediately doubling the output at one-half the cost of the old operations. This was possible despite the heavy grade of the main tunnel.

A comparison of mule haulage and wire rope haulage, shows that the costs of installation are about the same. But there is a daily saving in favor of the wire rope system on an output of 1,000 tons per day, of \$130.

Bulletin 1062, Allis-Chalmers Company, Milwaukee.—The principle feature of the equipment of the Milwaukee Northern Railway is the fact that the motive power of the road is furnished by gas-engine-driven electric generating units of a size heretofore unknown for purely traction service.

The total completed trackage is 30 miles in length and 82 miles are yet to be completed.

The power house at Port Washington, Wis., is situated on the water front. Two buildings, one for the producers and one for the engines, generators, switch boards and protective apparatus, make up the power plant proper. Both buildings are of concrete, steel, and brick and are fifty feet apart. The gas supply main is run outside and along the entire length of the power house from the producer plant.

The generating units are three in number, each of 1,000 kw. capacity. Each unit consists of a twin tandem horizontal double acting Allis-Chalmers gas engine direct connected to a 405 volt 25 cycle Allis-Chalmers alternator. Both engines and generators were designed with large overload capacities, the engine being capable of developing upwards of 2,000 h.p., and the generator having a corresponding capacity. Each engine has four cylinders, 32 inches in diameter by 42 inch stroke, and operates at 107 revolutions per minute.

The valve gear is of the standard Allis-Chalmers cut-off type and the engine operates with constant compression, insuring smooth running under highly variable loads.

ranged that the time of ignition may be regulated by a single hand switch.

The engines, being twin tandem, will start from any position. All wearing surfaces are arranged for a continuous oiling system, and the cylinders are lubricated by carefully timed admission of the cylinder oil.

The distinctive features of the engines are the extreme simplicity of design, the solidity of construction, and the quiet operation.

The gas producers operate on the Loomis-Pettibone system. The gas is delivered into a holder of 30,000 cubic feet capacity. The normal rating of the present plant is 4,00 h.p., and it has a capacity of 25 per cent. overload for five hours' duration.

Hocking Valley bituminous slack coal, registering 11,500 B. T. U., is the fuel ordinarily used. The down-draft principle is used, the air being admitted through a charging door at the top of each producer. The volatile matter and distillates are thus drawn through the deep bed of incandescent fuel and gasified. Gas is obtained containing 80 per cent. of the heat units possessed by the fuel. Reverse runs of steam are occasionally made for the purpose of breaking up the fuel bed.

The electrical features of the equipment are briefly: Three phase current is generated in the power house at 405 volts and 25 cycles by direct coupled alternating current generators, each of 1,000 kw. normal capacity. These machines are of a special type developed by Allis-Chalmers Company for use with gas engines.

A New Coal Mining Machine For Low Veins. For several years the use of the Sullivan Continuous Cutting Electric Chain Coal Mining Machine has steadily increased, as operators in various fields of this country have learned to appreciate its advantages. The success of this type has been such as to warrant the development of a similar machine for mining coal, both in rooms and on long wall faces, in thin seams.

The Sullivan Low Vein Room and Pillar Mining Machine, designated as "class CE-6," is mounted upon a steel shoe or frame for convenience in transportation and for making its first cut. In making the first or rib cut, the machine moves forward out of this frame, which is cut away at the left-hand side. The rear or anchor jack is then set in the right-hand corner of the room, at the other extremity of the working face. The machine propels itself across the face on a feed chain stretched between these two jacks, cutting the entire room at a single operation. The accompanying illustration shows the machine in the above position, with the two jacks referred to.

It will be noted that the machine travels on a sheet steel plate, occupying the least possible space. No rollers or rails are required on which to run the machine while making this cut. It will also be noted that this is virtually an adaptation of the long wall principle to room work. The machine is not withdrawn from the

coal and moving it over by hand for the next cut; but as there is no frame or pan behind the machine, as in the case of the breast type, it occupies but one-half as much space as the latter in front of the coal, thus allowing props to be permanently set within six feet of the face, and reducing the distance which the coal and

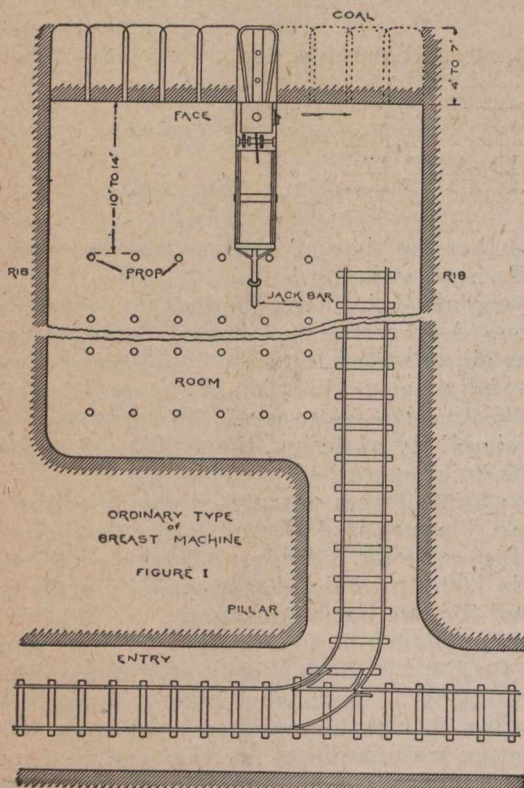


FIG. 1.

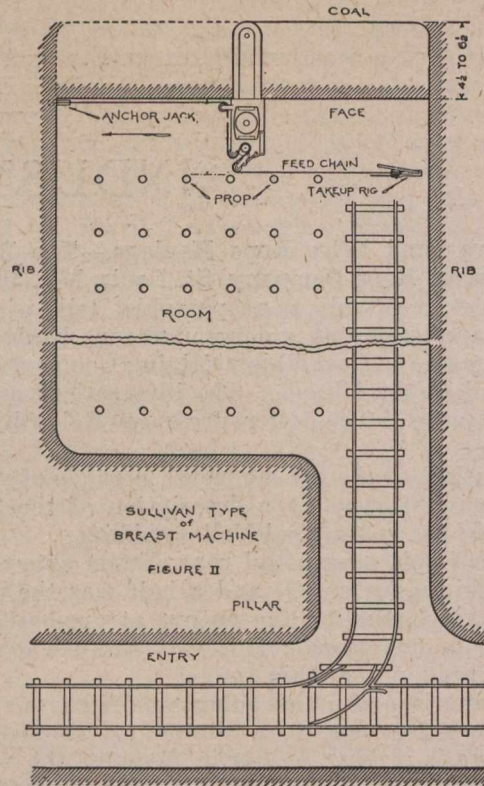


FIG. 2.

FIGS. 1 AND 2—SHOWING METHOD OF MINING COAL IN ROOMS WITH BREAST MACHINES AND WITH SULLIVAN COAL CUTTER.



FIG. 3.

SULLIVAN CONTINUOUS COAL CUTTER AT THE END OF THE FIRST OR SUMPING CUT.

coal after making the first or sumping cut, until the left rib is reached.

This method accomplishes notable economies in mining and in handling the coal. Not only is much time and labor saved that is ordinarily employed in backing the ordinary type or breast machine out from the

machine cuts on the bottom, at all times closely following the contour of the floor, no coal is left after it, to be raised by hand, nor are sprags or ribs left at the rear of the cut to interfere with blasting to the best advantage.

The machine has been carefully designed to secure

strength, durability and at the same time low height and compactness of the working parts. The motor is debris must be moved by the loaders. As the Sullivan placed horizontally instead of vertically, as is usual in the ordinary machines of this type, and is wound for 210, 250 and 500 volts, direct current, as required by

and the power truck 900 pounds. The motor develops 30 horse-power at 1,125 r.p.m.

This coal cutter has proven very satisfactory to operators on account of its high cutting speed, from 16 to 39 inches per minute, small bulk and ease of manipulation and carriage. It is capable of operating on

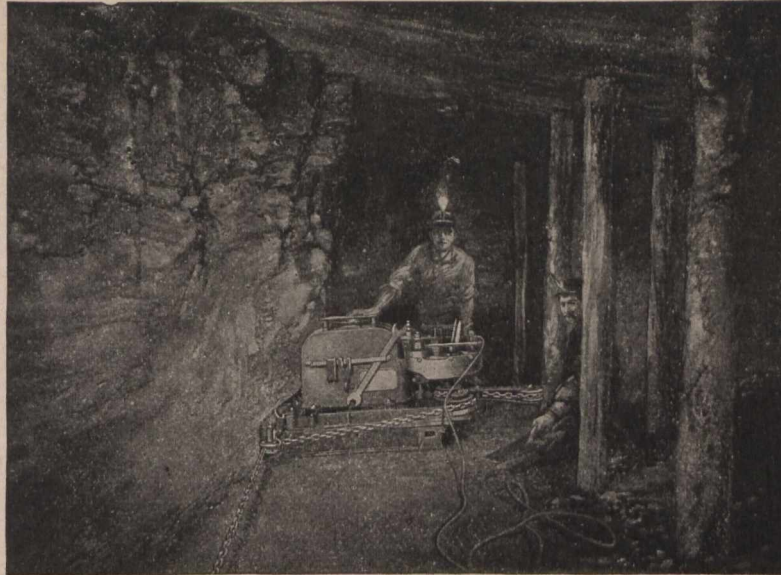


FIG. 4.

SULLIVAN ROOM-AND-PILLAR MACHINE, MAKING CONTINUOUS CUT ACROSS THE FACE OF A ROOM.

mine conditions. When cutting, the machine stands 21 inches high and occupies a space of five feet three inches between the coal and props. The kerf or height of mining is four and one-half inches, and the depth of cut ranges from 63 to 75 inches. The machines are moved from place to place in the mine on a special self-propelling electric truck. When on this truck the

itches of 30 degrees when rooms are driven across the pitch, and of 12 degrees when rooms are driven straight up the pitch. As indicating the capacity of this type, it may be mentioned that at the mines of the Gay Coal & Coke Company, Logan County, West Virginia, a Sullivan Class "CE" machine has undercut, on a long wall face, 377 feet to a depth of six feet one inch, in eight

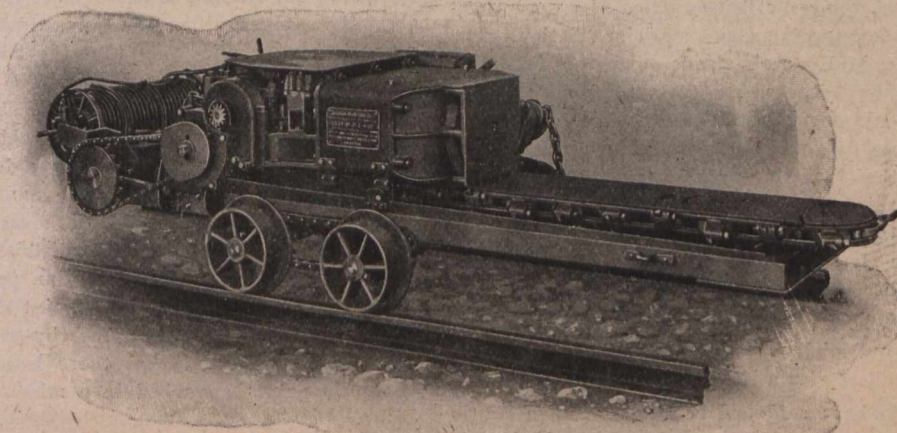


FIG. 5.

SULLIVAN LOW VEIN ROOM-AND-PILLAR ELECTRIC CHAIN MINING MACHINE ON POWER TRUCK FOR TRANSPORTATION FROM ROOM TO ROOM.

machine stands 30 inches above the rails, although if desired, a truck is furnished with drop axles, reducing the total height to 27 inches. The machine performs all operations under its own power, including loading and unloading from the truck, so that hand labor is reduced to the minimum. The machine weighs 3,100 pounds,

and one-half hours, thus producing over 500 tons of coal. While these machines naturally make a better showing in wide rooms, experience has shown that they are also much more economical than the breast cutter in narrow rooms and even in entries.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay.

Outputs of Dominion Coal Company for May:—

No. 1.....	49,399
No. 2.....	65,594
No. 3.....	36,271
No. 4.....	36,759
No. 5.....	49,623
No. 6.....	22,544
No. 7.....	3,749
No. 8.....	19,851
No. 9.....	34,770
No. 10.....	14,028

332,588

In its issue of the 1st inst., the "Halifax Herald" gives prominent place to a letter signed by H. C. McKenzie of Stellarton, throwing doubt upon the bona fides of the award of the Board of Conciliation under which the miners of the Dominion Coal Company are now working, and intimating that the members of this Board foisted upon the P. W. A. an arrangement which is really a decrease in their wages, while maintaining to the Government and the country at large that it was an increase of somewhere in the neighborhood of \$70,000 per annum. This same gentleman makes several statements supported by figures borrowed from the Annual Mines Report, which by the way covers an entirely different period from that covered by the award under discussion, and by a process of dwelling on the concessions given by the P. W. A. and a slurring over of the increases granted by the Coal Company, he succeeds in presenting just that sort of mischievous misrepresentation of facts that impresses the superficial reader. His statements are, however, utterly untrue in every instance, there being not even one that cannot be directly traversed and categorically contradicted. The facts are these. After allowing for the increased price of house coal, the increased price of powder and the decreased pillar rate, the net gain to the men is between \$6,000 and \$7,000 per month, or at the lowest computation \$80,000 per annum. We have these figures officially from the Coal Company's officials, and they are facts, not malicious fiction. The true inwardness of Mr. McKenzie's tirade comes out when he falls foul of the Lemieux Act, because, forsooth, it is "a creation of the present Government" and of the Grand Secretary of the P. W. A. because he voted for a certain political party. We often wonder whether there is anything in Canada, in business, religion, citizenship, or social intercourse, anything in heaven or earth that is not tainted with politics. It always creeps out, and in the most unexpected quarters. We feel inclined to echo the Gilbertian couplet, that:

It really is astonishing, how nature doth contrive
That every little boy and girl, who's into this world alive,
Is either a little Liberal, or else a little Conservative!

What W. S. G. would have said had he lived in Nova Scotia it would be interesting to know. We recommend Mr. McKenzie to read Psalm 80, sixth verse.

Some very interesting figures are to be found in an editorial in the "Colliery Guardian" of the 22nd inst. which are somewhat disconcerting to those who claim that a diminution of accidents could be effected by a curtailment of the hours worked, or put it the other way, that accidents are more numerous in the closing hours of work than in those of the commencement of work. The following figures are given by Mr. John Gerrard, for many years the Chief Inspector of the Lancashire Coalfield in England. The editorial makes the following re-

mark, which is somewhat apropos of the statements that have been made recently in the local press as to the hours worked in Nova Scotian coal mines. One writer to the local press stated among other wild and whirling words, that the Nova Scotian miner had the unenviable distinction of working the longest hours of any men "outside of the Siberian convicts." The Guardian says: "In Lancashire, the men usually begin to descend about 6 p.m., meals are mostly taken between twelve and two o'clock, at which hour, at a few pits, the men are allowed to ascend; not many, however, avail themselves of this facility to limit their work to eight hours, and the winding of men, in the majority of cases begins about three o'clock." The figures given by Mr. Gerrard are as follows:

NUMBER OF ACCIDENTS.

Hour of Shift	1901	1902	1903	1904	1905	1906	Total	Per cent. of Total
1	19	21	18	24	26	18	126	13.4
2	15	14	16	20	18	27	110	11.7
3	16	11	20	244	18	14	103	11.0
4	20	15	15	18	14	24	106	11.3
5	15	14	22	21	18	18	108	11.5
6	20	20	22	15	16	29	122	13.0
7	15	12	17	17	11	17	89	9.5
8	14	20	11	18	21	18	102	10.9
9	12	10	6	6	10	10	54	5.8
10	1	2	5	2	4	4	18	1.9

The conclusions arrived at from the study of these figures are that the most dangerous hour is the first in the day. This is what one would expect in a mine. The sixth hour appears to be one that has a large proportion of accidents, and after that the proportion decreases. It is therefore very apparent that the bulk of accidents in mines do not occur in those hours which the advocates of the Eight Hours Bill claim to be the ones most dangerous to life, because of the fatigued state of the workers, but they occur before the seventh hour. The Guardian also quotes extensively from some figures compiled by one of the leading indemnity associations in England, which show the same result as Mr. Gerrard's figures, and both of them agree in the peculiar fact that the hour from 11 to 12 a.m. is the one most prolific in accidents. The records of the indemnity company show that this hour is much more dangerous than the first hour of work. The Miners' Eight Hour Day Committee in their report state that they "have failed to obtain any evidence which would associate the number of accidents in any disproportionate degree with the hours in excess of eight spent underground by them, or the districts in which the longest hours are worked." The Guardian points out that there is a real danger if men work to a point at which their perceptive faculties begin to flag and thereby are rendered less acute in detecting danger, but that there is no real evidence to show that this point is reached in a mine within a period of eight hours.

The output of the Dominion Coal Company for May was over 330,000 tons, making their total output to date 250,000 tons in excess of the same period of 1907.

ALBERTA.

Lethbridge.

W. D. L. Hardie, general superintendent of the mines of the Alberta Railway and Irrigation Company has gone east on an extended trip. Mr. Hardie will visit the mines in Nova Scotia where new steel tipples have been erected recently to get in-

formation in that branch of engineering. The A. R. & I. Company contemplate the erection of a steel tippie at their No. 5 shaft which is at present being sunk.

Taber.

The Scranton Coal Mines Company Limited with headquarters at Spokane, are opening up a new mine on their property recently acquired. The vein which it is proposed to work is 42 inches thick and is a high grade lignite. Six men are employed driving a tunnel to the cove and the proposition is under the charge of Mr. W. J. Reynolds, mining engineer of Spokane.

In the Supreme Court before Mr. Justice Scott and jury, Joseph Tinsley of this town was awarded \$3,152.80 damages against the Canada West Coal Company of Taber, for injuries received in an accident in the mine in August of last year. The plaintiff had his leg broken by a run-away mine car on the tippie of the Canada West Coal Company's mine.

Coleman.

As already reported the strike at Coleman was short lived and there has been no further trouble. Forty new coke ovens will be erected as soon as possible and it is the intention of the International Coal and Coke Company to still further add to their ovens in the near future.

SASKATCHEWAN.

Saskatoon.

The prospecting operations which have been in progress all winter and spring at Eagle Lake have in the meanwhile been stopped. It will be remembered that these operations were carried on by the Provincial Government with a view to finding a cheap and convenient supply of coal for the settlers in the Eagle Lake district. Several trial shafts were put down and coal was found in almost every case, but the veins found were not thick enough to allow of economical working. The expense of timbering was very heavy as the coal vein was overlaid by a soft clay, which required very close timbering to hold up. All timber had to be hauled by wagon for about 90 miles as there is no growth of suitable timber on the prairie in the neighborhood.

It is supposed, however, that there are other veins of coal in this district and it is the intention to continue boring operations at some future time.

Bienfait.

The result of the meetings of the Board of Arbitration appointed under the Lemieux Act to investigate the grievances of the miners employed at the Western Dominion Collieries Company has been that an agreement has been arrived at between District No. 18 of the U. M. A. of A. and the Colliery Company.

A schedule of rates for all classes of labor, both above and below ground, has been agreed to, while contract miners' rates remain the same as at present. The company agrees to the check off system and full recognition of the Union. The question of the price of supplies has also been satisfactorily arranged. Judge Myers acted as chairman while J. R. Crowe represented the company and Frank Sherman the miners.

The investigation under the Lemieux Act, before Judge Dawson touching the miners and the Manitoba and Saskatchewan Coal Company, is still proceeding.

BRITISH COLUMBIA.

Hosmer.

Work is being steadily pushed ahead at the mines and everyone is looking forward to the 1st of January of next year at

which date the company's agreement with the Crow's Nest Pass Coal Company expires and coal can be shipped.

A large force of men are employed on the coke ovens, but, owing to a dispute with some of the men employed on the ovens, work was delayed for a short time.

Michel.

There has been considerable trouble at the Michel mines recently. A miner by the name of Marchant obtained a job from the pit-boss of No. 8 mine, and received an order for his tools, supplies, etc. When he presented himself for work he was told that his place had caved. Marchant then reported to the Union Committee, who interviewed Mr. Derbyshire, the manager, and Marchant was again refused work. A special meeting of the miners was then called and a vote taken to suspend work until Marchant was given a job. Immediately after this, President Sherman of District No. 18, U. M. W. of A., arrived in Michel and made inquiries why he had not been informed of the suspension of work. The Michel men told him they intended to fight the matter out their own way. The president then pointed out that they were breaking their agreement.

The following day summonses were issued against Chas. Garner, Jas. Douglas and Wm. Whitehouse of the miners' committee, for a breach of the Lemieux Act in inciting the men to strike. These three men were tried before a Justice of the Peace, and the cases dismissed on the grounds that the J. P. had no jurisdiction in this matter.

It was expected by the men that the Fernie miners would strike in sympathy, but these latter continued to work. Eventually another meeting was held and the men decided to place the matter in the hands of their district officers and return to work.

Mr. Hurd, the general manager of the Crow's Nest Pass Coal Company, insisted that the men return to work before he would consider their grievances and sent the District Union the following letter:

President of District No. 18, U. M. W. of A.

Dear Sir:—On the evening of May 15th, 1908, Jas. Douglas, president of the Michel Local, Chas. Garner, secretary of the same, and Wm. Whitehouse, member of the Grievance Committee, Michel Local, waited upon Mr. Derbyshire, superintendent of our Michel Colliery and requested that employment be given to Henry Marchant.

Upon being told by Mr. Derbyshire that no employment would be given to the said man, he informed Mr. Derbyshire that he would be given until Saturday evening to employ Marchant and if the same was not done there would be no work on Monday. Mr. Garner further said that the mine would lie idle till Marchant got the job.

Without notice further than the above the men refrained from work this morning, and apparently are out on strike. In this connection I am advised that Mr. Marchant is not an employee of this company and that he has not worked for this company for a period of five years and that the sole reason for refusing to employ him is that in the opinion of Mr. Derbyshire, he is not a competent miner.

I beg to call your attention to the terms of the agreement under which our mines are now working and made between this company and other members of the Western Coal Operators' Association and our employees, represented by the United Mine Workers of America, District No. 18, made May 4th, 1907, and represent that the action taken by the men at Michel is entirely contrary to the above agreement, and ask that you take the steps necessary to enforce the carrying out of the agreements in question on the part of the employees of this company whom you represent.

I assure you that these agreements were made in good faith by this company, and that expecting on our part to

carry them out in absolute good faith, we must look to the United Mine Workers of America, District No. 18, as sole representatives of our employees and the people with whom the agreements under which we are working were made, to do the same.

We are at all times ready to consider as provided in the agreements mentioned any grievances of our employees.

Yours truly,

The Crow's Nest Pass Coal Company.

per J. D. Hurd, general manager.

The following circular was issued by James Douglas and Charles Garner of the Michel Union of the U. M. W. of A.: "The Crows' Nest Pass Coal Company issued notices requesting the miners at Michel to resume work at once stating that they are now as before, willing to settle any trouble in the same liberal manner as heretofore. What stupendous magnanimity! The present suspension is simply a climax of a pin-prick policy pursued by the Coal Company's officials. Human tolerance has a breaking point. The company's officials have during the financial crisis humiliated and degraded the miners almost beyond endurance. They have cheated and told lies in the transactions between themselves and the Local Grievance Committee. Just now they have deliberately insulted the organization by an act of discrimination of the vilest and most flagrant kind.

. . . We are told that under the Canadian Labor Law, that we are liable. We claim that it does not cover our case and if it did we will break any law in the constitution that encroaches upon our liberties. What law shall state, what line of demarcation has been fixed to define where liberty ends and where slavery starts? If a man is to be called upon to give his name why not call upon him to furnish a certificate of good conduct from the minister with a guarantee of his being meek and humble.

The Coal Company would transplant Russian methods in Michel, they will be successful when the men are starved out. If this condition prevails much longer we will call upon our brothers at Coal Creek and Fernie to take action in sympathy with us. We believe, however, that when General Manager Hurd is made cognizant of the true state of affairs this matter will be settled satisfactorily to both parties.

(Signed) Jas. Douglas, President.
Chas. Garner, Secretary.

Michel Local Union, No. 2234.

The following circular has been issued by the Union officials for the district:

To the members of Michel Local Union, U. M. W. of A. greetings.

A circular having been issued by Jas. Douglas and Chas. Garner of Michel Local, setting forth their position we deem it advisable to state the position of the District Union upon the dispute at Michel.

The action of the men at Michel in suspending work without first giving the District officers an opportunity of endeavoring to settle the matter as provided by the International constitution of the U. M. W. of A., is a wilful violation of the constitution also a breach of their agreement with the Crows' Nest Pass Coal Company. On behalf of the U. M. W. of A., we request the men to resume work and observe that the matter in dispute be handed the District officers for settlement. We have always been ready to take up any matters in dispute at Michel when properly placed in our hands and are so to-day. We have been denied that opportunity at Michel.

We again call upon loyal members of our organization at Michel to resume work and place their disputes in our hands.

Yours fraternally,

F. H. Sherman, President.
J. A. McDonald, Secretary.

The Michel mines produce about 2,000 tons of coal per day and as most of the coal is used for coking any stoppage at the mines lays a lot of men off work.

After the above circular had been issued by President Sherman, the men returned to work, but again went on strike, owing to twelve men having been discharged. The company claim they were discharged because they were off for two days without permission which is in accordance with Article No. 10 of the agreement.

A mass meeting was called at Fernie in the Opera House, where the miners, acting on the advice of President Sherman, passed an unanimous resolution advising the Michel men to again resume work and place the matter in the hands of the district officials and stating that if the Michel men could not then get justice, they would be supported by the treasury of the Fernie members. The Michel men called another meeting and decided to abide by the advice given.

Rossland.

The ore shipments from Rossland for the week ending May 23rd amounted to 4467 tons, including a 35 ton shipment from Giant-California. The industry is in a healthy condition in this district and the mines are all looking well. The gross output of the Le Roi for April was valued at \$90,000 and the mine has much good ore in sight at the present time. Work at the Centre Star mines is proceeding along regular lines, their shipments running from 2,700 to 3,000 tons per week. Ore is being taken from the Danby Fraction, controlled by the Spitzee Company, and the St. Elmo has also been leased. There is some fairly good ore opened up in the St. Elmo, which is situated some 600 feet above Rossland on the side of Red Mountain. Development work continues to be done on the Curlew and in the course of the work they are taking out some good silver-lead ore.

Rossland has been favored by a visit from Dr. J. Bonsall Porter and Dr. J. A. Dresser, of McGill University, who have visited the camp with 35 of the McGill students.

The Le Roi No. 2, Limited, have located an ore body seven feet wide at a point 337 feet below their workings on the 900-foot level. This ore was located by means of diamond drill and carries 19 dwts. gold and 4.5 per cent. copper. It will be noted that this is a higher grade ore than generally found in either of the other two big mines. This discovery is of more than passing interest to the Le Roi No. 2 Company, as it tends to prove the presence of ore in their property at depth and with two big mines like the Le Roi and the Centre Star adjoining their claims and with plenty of ore at depth it would appear to even a layman that the Le Roi No. 2 will have lots of ore to mine for a long time to come. Ore bodies in the Josie have so far run narrow but there is no good reason why wide bodies of ore should not be opened up at more depth.

W. Y. Williams, consulting engineer for Granby, came up from Spokane to look over the California-Giant work during the week. The White Bear Company is to be reorganized and an assessment levied with which work will be resumed. Some of the shareholders may not feel altogether in harmony with another assessment but now that the mine is almost in a position where it can pay its own way and with all of the other deep mines of the camp making good discoveries of ore it would be a pity to let the proposition go by the board when a small assessment might put it on the upward path.

The receipts at the Trail smelter are running over 4,000 tons per week, including ore from the Rambler-Cariboo, St. Eugene, Snowstorm, Richmond-Eureka, First Thought, Crescent and Vancouver.

A meeting of the Mugwump and Monita Mining Companies is to be held in Rossland on June 23rd, for the purpose of winding up the affairs of these companies.

Phoenix.

Ore shipments to the British Columbia Copper Company's smelter were begun on the 18th of May and during the succeeding week 2,000 tons were shipped from the company's mines; 480 tons being shipped from the Denoro property. Things are getting in good running shape in the mines with the exception of a little shortage of first-class machine miners, while common labor is plentiful this class of mine help seems to be scarce, many of the best miners having left the Boundary during the recent shut-down and some of them have moved their families to other camps. Mr. E. G. Warren of the Greenwood Electric Company has been made general foreman of the Copper Company smelter. Mr. Warren is a good man and will no doubt handle his portion of the work in a satisfactory manner.

During the week ending May 30th, the ore shipments from the Boundary mines were: Granby 21,498, Mother Lode 3,510, and Oro Denoro 1,480 tons, making the total shipments from the district for the year to date 452,437 tons. The Granby smelter during the week treated 16,256 tons.

At the Granby smelter the wooden building covering the blowing engines is being replaced by a structure of steel and brick. The ore bins at the Gold Drop, which were on Snowshoe property have been removed and rebuilt at the Curlew. The remaining six furnaces will be connected up to the new flue dust chamber as quickly as possible, but the work will no doubt take two or three months yet.

The tunnel on the E. P. U. which is being worked by local people, has cut through some high grade gold and silver stringers, which would seem to indicate the approach to the lead. A strike of good ore has been made on the Buttercup in Wellington camp. The O. K. in Wellington camp and the Redona in Brown's camp have changed hands.

The McGill students have paid visits to the Phoenix and Greenwood mines during the week being shown all the points of interest. The work of making a geological survey of Phoenix camp is now in progress. This work will prove of invaluable assistance to the mining men of Phoenix.

An official announcement has at last been made that the Dominion Copper Company will start up its plant on June 15. One hundred men will be employed at the smelter and about two hundred at the mines. As the company has retained its staff of officials and there is plenty of coke, etc., on hand, it will not take very long to get things running. The financial condition of the company has been improved, which will greatly aid the local management in its efforts toward greater economy. It did not seem reasonable that the Dominion Company would find it advisable or profitable to remain idle with the other two big Boundary producers running full blast. There is no doubt but that the Dominion Copper Company will be in a position in the near future to produce copper at a much lower figure than they did during their last fiscal year while operating.

They can do it if the other big mines and smelters can and no doubt some future report will show this an accomplished fact.

A new company is to be formed in Phoenix to operate the Woodburn and Woodburn fractional claims in Wellington camp. The claims have a good showing of copper-gold ore and have good railway facilities. They are regarded by local men as very promising properties. Work on the Stenwinder in Fairview camp has about ceased and the miners are leaving the camp.

The Tip Top mine in Skylark camp has moved its plant to a new location on its property and will do some work on the copper showing they have on the property.

It is stated by the promoters that all arrangements have been completed with the Phoenix-Greenwood tunnel proposition excepting the bonusing of the project by the city of Greenwood. As there are obstacles in the way of this some delay may be incurred.

The news has been received in the Boundary district with some relief that the strike of the coal miners of Michel had been settled. It was feared for a time that a parallel to the strike situation of last year was about to occur. As it was one or two furnaces had to be blown out owing to a small shortage of coke.

Nelson.

The hopes of the Nelson mining interests are once more turned toward the Silver King mine on the hill above the city, where Mr. M. S. Davys, an enterprising local mining man is working the mine under lease from the foreign interests which control it. The proposition looks promising but some little development work is necessary to demonstrate the presence and permanency of the lead in the lower levels.

It is expected that the Krao will resume work early in June. Now that the Queen mine has been taken over by Minneapolis interests a strong effort will be made to interest outside capital in the Sheep Creek district. There are a large number of promising prospects in this district and twenty cars of ore shipped from there to Trail smelter during the season have averaged around \$100 per ton. Shipments from the Standard will be resumed as soon as the roads are in better condition for hauling. About 400 tons are on hand to be sent to Trail smelter as soon as it is possible to ship. On the Surprise work has been resumed on the crosscut which is already 2,500 feet. The news that zinc ore may be shipped to the United States duty free was received by the zinc miners of the Slocan with much gratification. This decision will not materially affect the Nelson Zinc smelter as it will no doubt get its full quota of ore from the nearby mines. The Whitewater mine has made a trial shipment of zinc ore to a Kansas smelter. The Fisher Maiden, in Slocan, which has not been worked for some time is to start work again in the near future. A majority of the stock in this company is held by Spokane interests.

GENERAL MINING NEWS

NOVA SCOTIA.

Halifax.—The agitation in the ranks of the Provincial Workmen's Association for affiliation with the U. M. W. is to be settled by a referendum vote to be taken on June 24th. The various lodges will appoint their own returning officers and Mayor Douglas of Glace Bay will act as general returning officer for the whole province.

Sydney.—The two coal areas at Little Bras d'Or controlled by G. A. Forbes, of Montreal, and adjoining the territory of the Nova Scotia Coal Company, have passed into the hands of R. S. Cottrell, of Sydney, and W. A. Mackay, of North Sydney.

Halifax.—The invitation extended by the Mining Society of Nova Scotia to the Canadian Mining Institute to visit Sydney next August has been accepted. The Institute members will be accompanied by British and European delegates.

Londonderry.—Work at the mines and smelter of the Londonderry Iron and Mining Company has not yet been resumed.

ONTARIO.

Cobalt.—On Thursday, May 20, a party, including Mr. A. A. Cole, mining engineer for the T. & N. O., left Cobalt to visit the unsurveyed country south of Lorrain. The Kelly claim was

visited. It was found that but little work had been done on this claim beyond surface trenching and a few shallow test pits. The party also visited the location on the southwest bay, known as "66." This will probably prove to be the best town site.

Thorold.—The smelter of the Coniagas Reduction Company is now in operation. Six cars of Cobalt ore are at Thorold ready for treatment.

Sudbury.—The Crystal Gold mine, near Wahnapiatae Lake, has been sold to a Toronto syndicate by P. Shannon of Pembroke. It is reported that mining will be started at once.

BRITISH COLUMBIA.

Rosland.—While loading holes in a slope on the 11 limit of the Centre Star mine, on May 25, Maurice Powers, an old miner and shift boss, was instantly killed by a premature explosion. Powers was using a new explosive called Mitchellite.

Nelson.—Premier McBride, who is also Minister of Mines, visited Nelson on May 23rd.

Phoenix.—Nearly six miles of diamond drilling has been done up to the first of May at the Granby mines, Phoenix. Probably no mine or group of mines in British Columbia has had so many bores made. The work goes steadily on by the Boyle Bros., the contractors, who have done it all for the Granby company for nearly four years. The following figures give exactly what has been accomplished by the Granby company in diamond drilling, the total up to May 1 being 29,117 lineal feet as follows: Previous to 1904, 4,150 feet; in 1904, 3,148 feet; in 1905, 8,419 feet; in 1906, 9,417 feet; in 1907, 3,983 feet. As boring was stopped in November of last year, when all mining and smelting in the Boundary took a complete rest, the total for 1907 was not very large. Then, again, this sort of work having been recommenced only a few weeks ago, the figures for 1908 will not likely equal those of 1907. For years the company has done its diamond drilling entirely by contract, while the Dominion Copper Company and the British Columbia Copper Company had their own diamond drills and did the work themselves. The latter, however, has been doing more and more of this work by contract of late, having a contract now in progress at its rich Lone Star and Washington mines near Danville, Wash.

Victoria.—The steamer Tees brought from the west coast a sample shipment of ore from the Klaskino Gold Mining Company's inlet. The shipment included half a ton of ore from the shaft. It has been sent to Vancouver for a mill test.

Vancouver.—The Guggenheims have finally abandoned work in Cariboo, and have given up the proposition to purchase the

Cariboo Consolidated Hydraulic Company. This decision was reached after a hundred thousand dollars had been spent carrying out the initial work for digging a series of ditches for securing a water supply. The Guggenheims also paid a similar amount to the contractors to be released from the contract to install a water system which in all was to cost half a million dollars. The principal shareholders in the original enterprise are Sir William Van Horne and R. B. Angus of Montreal, to whom the property has now reverted. Sir William Van Horne recently wired instructions to Mr. Hobson to go ahead with the season's work, and preparations are being made for a big clean-up.

Victoria.—Assayers certificates have been granted to W. W. Lindsay, Rosland, and to V. L. Vaughan-Williams, Victoria.

YUKON.

Dawson.—Reports of the discovery of gold and of a stampede come from Log Cabin Creek in the Forty-Mile district. Many applications for claims staked have been received by mail in Dawson. The creek is a tributary of Forty-Mile river, fifteen miles above the Yukon. No grants will be issued until more information has been received.

Dawson.—Reports from the dredging companies indicate that by May 16th all will be in readiness to start the dredges. It is estimated that a combined output of about one million dollars per month will be attained this season. The Lewes river dredge, on 6 below Bonanza, had got steam up on May 6th. The big dredge of the Bonanza Basin Company was thoroughly overhauled last autumn. Her equipment is now operated entirely by electrical power.

Three of the Yukon Gold Company's dredges, two on 104 and one on 96, Bonanza, were expected to be in operation on the 8th of May. They were merely waiting for power from the Twelve-mile station and water had begun to run freely in the flume there. The power station itself has been repaired and the foundations strengthened. The station is at an elevation of 1,800 feet greater than that of Dawson. Nevertheless the season is several weeks in advance of this locality. The second dredge on 90 will be ready early in June; the Arlington dredge not until July. Those at the Hillside and at 37 below will be even later.

If Black Hill Creek shows up well this summer as a gold producer a change in the route of the overland route to Whitehorse will result.

MINING NEWS OF THE WORLD.

GERMANY.

Dr. Hermann Wedding, professor of metallurgy at the Berlin School of Mines, is dead. He was the author of numerous treatises on metallurgy and an honorary member and Bessemer gold metallist of the British Iron and Steel Institute.

RUSSIA.

The iron ore production of Russia for 1907 was larger than in any previous year. Exchanging the manganese ore exported from Poti, it amounted to 262,100,000 poods, as compared with 236,400,000 poods in 1906. The amount exported was 605,000 poods in 1907, as against 33,300,000 poods the previous year.

The proposed trust of the Southern Metallurgical Works, preliminary arrangements for which have been effected, embraces mine companies which among them control 88.84 per cent. of the

southern and 45.04 per cent. of the total Russian metallurgical output.

SWEDEN.

Gold has recently been discovered in the reefs and sands of the Topdal and Toovisdal rivers near Christianssand. Prospecting over a large area has established the fact that the gold-bearing sands extend over a considerable tract of country.

UNITED STATES.

The American Petroleum Company of Los Angeles, Cal., has bought 1,200 acres of oil land in Coalinga district, Fresno County, Cal., for \$2,000,000.

Work has been resumed on the Neversweat and West Gray-rock copper mines, Butte, Montana, which leaves only one big

mine in the district still closed. A large amount of exploration work is being done. The amalgamated properties have greatly reduced the cost of copper production, which is believed not to exceed 10 cents per pound throughout the district.

Numerous rich strikes of gold are reported in Nevada County, Cal., the most important being in the Idaho-Maryland, one of the oldest quartz mines in Grass Valley, where a phenomenally rich ore body has been found on the 500 foot level.

Ground has been broken at Coaldale, Penn., for the erection of the largest breaker in that district by the Lehigh Coal & Navigation Company. It will have a daily output of 4,000 tons.

GREAT BRITAIN.

Returns received by the British Iron Trade Association give the production of Bessemer steel ingots for 1907 as 1,859,259 tons as against 1,907,338 tons in 1906. Of last year's output 1,280,315 tons were made by the acid process, and 578,944 tons by the basic process. The production of Bessemer steel rails in 1907 was 532,576 tons, as compared with 854,740 in the previous year.

The United Collieries, Limited, of Glasgow, have closed down six pits in Lanarkshire, owing to the low price of coal, throwing 900 men out of work.

The Dowlais-Cardiff Company, of Abercynon, Wales, recently established a record by raising 2,747 tons of coal during the day shift from a depth of 700 feet.

MEXICO.

Between 30 and 40 British mining companies are operating in Mexico with a capital of upwards of £7,000,000. France has £1,200,000 invested in similar enterprises, while the American capital employed in Mexican mining amounts to £25,000,000.

Construction work on the E. H. Harriman smelter at Mazatlan will shortly be started on a contract requiring the smelter to be completed by June of next year. The amount of capital to be invested is about \$3,000,000. The smelter will afford a market for many mining sections in the west of Mexico.

The Barrateros mine near Cosala, in Sinaloa, which is one of the oldest in Mexico, having been worked by the Spaniards 360 years ago, has been secured by Mr. George F. Beveridge, of Los Angeles, Cal.

The extent to which American mining machinery has been introduced into Mexico is indicated by the fact that at the Pinquico mine, Guanajuato, no fewer than 250 Westinghouse electric motors are in operation.

COMPANY NOTES.

THE CONSOLIDATED MINING & SMELTING COMPANY.

The fiscal year of Consolidated ends on the last day of this month, and the gross value of its output will be in advance of the previous year. The first nine months' output exceeded the total yield for the entire previous fiscal year by about one hundred thousand dollars.

The production of the company for the quarter ending September 30, 1907, the half year ending December 31, and the nine months' period ending March 31, 1908, shows as follows in detail:—

Quarter ending September 30, 1907:

Metal produced.	Quantity.	G. value.	P.C.
Gold, ozs.	25,120	\$514,960	38.85
Silver, ozs.	522,719	287,925	21.73
Copper, lbs.	1,201,426	209,365	15.79
Lead, lbs.	7,205,567	313,142	23.63

Total \$1,325,392 100.00

Six months ending December 31, 1907:

Gold, ozs.	54,840	\$1,124,219	39.40
Silver, ozs.	1,271,087	771,500	27.10
Copper, lbs.	2,348,359	353,308	12.40
Lead, lbs.	15,482,797	599,772	21.10

Total \$2,848,799 100.00

Nine months ending March 31, 1908:

Gold, ozs.	90,306	\$1,851,272	44.30
Silver, ozs.	1,761,431	1,042,847	24.95
Copper, lbs.	3,137,749	457,608	10.25
Lead, lbs.	22,807,389	827,059	19.80

Total \$4,178,786 100.00

The most interesting feature in these figures is the gradual rise in the percentage in value of gold produced to 44.30 per cent., which is accounted for by the larger and richer ore bodies being encountered in the low levels of the War Eagle and Cen-

tre Star. This increase in production of gold should be a most potent factor in adding steadiness to the earning power of the company.

At the annual meeting of the Silver Leaf Mining Company, held June 2nd, a statement was submitted showing that the organization and operating expenses for the year ended April 30th were \$59,040.95, while the net profits for the period were \$76,933.79.

The electors elected were: A. G. Browning, North Bay; Jno. L. Coffee, S. Cfl Smoke, D. M. Robertson, C. W. Irwin, J. B. Chapin, Toronto; George L. Walker, Boston; J. L. Stanton, New York, and H. D. Symmons, Niagara Falls.

At a subsequent meeting of directors the following officers were elected for ensuing year: A. G. Browning, president; J. B. Chapin, vice-president; O. E. Osler, Thomas D. F. Maguire, secretary.

ABSTRACT OF FOSTER CIRCULAR.

Mr. John G. Kent, president of the Foster Cobalt Mining Company, has issued the following circular to shareholders:

It is just one year ago that the present board of the company assumed office, and on the 28th day of June, 1907, they called a special meeting of the shareholders to consider the condition of the property and to authorize certain development work, and also to authorize the sale of the treasury stock of the company. At that time the company showed an indebtedness, approximately, of \$30,000, with 100,000 shares of stock in the treasury. There was also presented to the shareholders a statement of the physical condition of the property, prepared after inspection by Mr. Frank C. Loring, mining engineer.

During the past twelve months the property has been developed along the lines indicated in Mr. Loring's report, with the result that not only has this development been provided for, necessary buildings erected and appliances purchased, but there remains a substantial cash surplus sufficiently large to continue aggressive development for at least another twelve months.

In common with all mining experiences, the year's work has not been without the usual disappointments. Some ore bodies running high in silver, months ago, have not maintained their high silver value with the continuity which was hoped for, but, as will be seen by extracts from Mr. Loring's present report, there is every reason to expect a recurrence of high values at present and lower levels.

The treasury stock remaining on hand, unsold, is 84,412 shares.

Feeling assured that the shareholders of the company would be glad of information at this time, your directors again commissioned Mr. Loring to make a report of the property, and the following are extracts from this report:

"Vein No. 5—Between levels 1 and 2 there are probably 600 tons of ore, carrying more than ten per cent. cobalt per ton. So far as development shows, this ore is low in silver, not more than 40 ounces. Possibly, however, at any point between these two levels, rich silver ore may be encountered.

"On vein No. 8, an underhand stope is being mined from first level downward. From this stope the same rich ore which was mined above this level is being taken out. As to the depth this rich ore will continue, it is impossible to say.

"On vein No. 1, second level, should the copper sulphide ore there exposed continue to any great extent, it could be profitably mined for the copper contained, and the silver contained therein.

"On vein No. 1, at surface near lake, ore may continue down for some distance, and several carloads may be extracted therefrom. It is, however, impossible to predict what quantity of high grade ore can be expected.

"Therefore, so far as ore that can at present be marketed profitably is concerned, ore reserves consist of:

"Ore high in cobalt, low in silver, on vein No. 5 between levels 1 and 2;

"Ore high in cobalt, low in silver, on vein No. 8 above second level;

"Ore rich in silver, having a present length of about 30 feet below first level, vein No. 8;

"On vein No. 1, at surface, ore extending southeasterly from lake for a distance of about 80 feet, and probably extending into lake. The depth and extent of this ore body is unknown, but may yield a considerable quantity of high grade ore.

"All development work, timbering and buildings, have been done and constructed in a substantial and miner-like manner, giving evidence of skill and intelligence in operation, and for the best interest of the shareholders.

"Development work, especially on veins Nos. 1, 5 and 8, gives additional proof that these veins are strong and will continue to great depth, and there is more reason than there has ever been before for continuing development to far greater depth, with a strong probability that ore bodies high in silver will be encountered at some point. I, therefore, recommend vigorous and extensive additional exploration in depth, especially on veins 1, 5 and 8.

"It should be borne in mind, however, that this work is necessarily expensive, consequently ample provision should be made

by maintaining large cash reserves, that any possible contingency or delay in the encountering of rich ore bodies may be provided for.

"(Sgd.) FRANK C. LORING,

"Mining Engineer."

"Toronto, Ont., May 29, 1908."

Your directors feel that they have every reason to proceed with the development of the property along the well-defined lines already followed, and while still refraining from making definite predictions as to the values to be recovered, they have every reason to feel the greatest encouragement from results already obtained, and that the prospects are very favorable.

Reports which are absolutely untrue have been circulated in some quarters regarding the mine. Your directors cannot meet such incorrect statements every time they are made, nor can directors of any mine be expected to reply to all the misleading paragraphs which appear from time to time regarding most of the Cobalt properties.

The facts concerning "Foster" are given above, and it is hoped that the shareholders will feel, as the fact is, that the above report is not only true, but conservative in every respect.

Shareholders are invited to inspect maps and details of workings on file at the head office of the company.

The directors of the Dominion Coal Company met in Montreal on May 27th and declared the regular quarterly dividend of 1 per cent. on the common stock, payable July 1st.

On June 2nd the directors of the Granby Consolidated Company decided to resume dividends, and declared 2 per cent., payable June 30, to stockholders of record of June 12.

The Granby Company during 1906 paid quarterly dividends of 2 per cent. and 1 per cent. extra in January, May, September and December, and in 1907 in March, June and September.

Dividends stopped then, for the bottom dropped out of the copper market. This is the way Granby stock fluctuated during 1907:

	High.	Low.
January	140	130
February	151	130
March	146	120
April	136	125
May	139	125 $\frac{1}{4}$
June	125 $\frac{1}{2}$	117 $\frac{3}{8}$
July	127 $\frac{1}{4}$	121
August	115	99
September	100	80
October	92	60
November	90	70
December	80	70

The directors did not make a statement, but it is presumed that the stock is now on an 8 per cent. basis.

STATISTICS AND RETURNS.

The Transvaal gold output in May, as estimated by Kaffir houses in London, was 580,00 ounces, fine. The April output was 565,832 fine ounces; that of May last year 524,477.

If it proves correct, says The Post, this May estimate of the Rand will match all records. The total of last December was 583,526 ounces, but included a large amount "taken from reserves." Value of the May output calculated on the basis of the above estimate, compares as follows:—May, 1908, \$12,325,

000; April, 1908, \$11,924,000; March, 1908, \$12,210,000; February, 1908, \$11,510,000; January, 1908, \$11,900,000; December, 1907, \$12,393,000; May, 1907, \$11,139,000; May, 1906, \$9,795,000; May, 1905, \$8,843,000; May, 1904, \$6,679,000; May, 1903, \$4,973,000; May, 1902, \$2,943,000.

Shipments from the collieries of the Cumberland Railway & Coal Company for the month of May were 24,710 tons.

For the month of May the output of coal from the four collieries of the Nova Scotia Steel & Coal Company was about the same as the preceding month. The output from No. 4 is gradually increasing, having almost doubled the output of April. Following are the figures from the different collieries:

	Tons.
No. 1	21,298
No. 2	23,784
No. 4	1,116
No. 5	7,390
Total	53,588

The output of pig iron at the blast furnaces was the largest since the company's existence, 6,064 tons.

May was a busy month at the Dominion Steel Works, and the output exceeded the big figures of April. The May output was as follows:

Pig iron	21,864
Ingots	5,650
Blooms	20,045
Rails	12,316
Rods	3,765

Dominion Coal's May output was 332,588 tons, against 327,269 tons last year.

This makes the company's output 242,899 tons ahead of a year ago for the five months:

	1908 Tons.	1907 Tons.
January	314,108	252,248
February	285,649	225,988
March	346,529	212,831
April	298,745	316,384
May	332,588	327,269
Total	\$1,577,619	\$1,334,720

Following are the weekly shipments from Cobalt camp, and those from Jan. 1 to date:

	Week end May 30.	Since Jan. 1
Coniagas	62,030	505,580
Drummond	56,260	148,600
La Rose	60,000	2,181,652
McKinley	66,540	1,373,560
Nipissing	184,220	1,548,110
O'Brien	254,810	2,357,130
Silver Queen	110,310	634,510
Trethewey	124,850	997,456

The total shipments for the week were 919,020 pounds, or 459 tons.

Cobalt ore shipments for the week ending May 25th totalled 905,780 pounds, or 452 tons.

The total shipments for the year to date are 13,210,228 pounds, or 6,605 tons. The shipments by mine follow in pounds:

	Week ended May 25	From Jan. 1
Buffalo	451,000	510,810
Coniagas	62,640	444,550
La Rose	140,000	2,121,652
McKinley	63,120	1,307,020
O'Brien	275,450	1,106,220
Right of Way	61,060	242,240
Silver Leaf	63,820	196,620
Trethewey	192,690	872,606

Following are the weekly shipments from Cobalt camp, and those from Jan. 1 to date:

	Week end June 6	Since Jan. 1
Buffalo	42,900	653,710
Coniagas		505,580
Cobalt Lake		246,455
Crown Reserve	44,000	84,000
Cobalt Central		56,380
City of Cobalt	113,510	452,110
Drummond		148,000
Foster		238,400
Kerr Lake	101,650	404,320
King Edward		127,240
La Rose	120,000	2,301,652
McKinley		1,373,560
Nipissing		1,746,120
Nova Scotia		227,555
Nancy Helen		140,420
O'Brien	183,840	2,540,970
Right of Way		242,240
Provincial		143,210
Standard		39,730
Silver Leaf		196,620
Silver Cliff		52,000
Silver Queen		634,510
Townsite		85,100
Temiskaming & H. B.		599,000
Temiskaming		325,390
Trethewey		997,456
Watts	65,590	246,020

The total shipments for the week were 866,500 pounds, or 433 tons. The total shipments from Jan. 1 to date are 14,995,748 pounds, or 7497 tons.

The following are the shipments from the various mines in the districts of Southeastern British Columbia and the receipts at smelters for the past week, ending May 23rd and year to date:

Ore Shipments:

Boundary—

Mine.	Week.	Year.
Granby	20,766	522,760
Mother Lode	2,000	2,000
Oro Denoro	480	480
Crescent	30	58
Other mines	434
Total	23,276	425,732

Rossland—

Centre Star	2,647	68,380
Le Roi	1,580	31,538
Le Roi No. 2	316	12,320
Other mines	500

Slocan-Kootenay—

Whitewater (milled)	280	5,740
Poorman (milled)	250	4,380
Queen (milled)	185	3,690
Second Relief (milled)	145	2,100
St. Eugene	81	8,720
Richmond	76	681
Rambler-Cariboo	42	587
Vancouver	20	521
Other mines	15,077
Total	1,079	41,496

Smelter Receipts—

Granby	20,766	422,720
Greenwood	2,480	2,480
Trail	4,088	109,205
Northport (Le Roi)	1,740	33,693
Marysville		5,730
Total	29,074	573,828

The following are the ore shipments for the past week, ending May 30th, and year to date, from the mines of Southeastern British Columbia, and the receipts at the smelters of the district:

Ore shipments:

Boundary—

	Week.	Year.
Granby	21,489	444,470
Mother Lode	3,510	5,510
Oro Denoro	1,450	1,930
Other mines		522
Total	26,449	452,432

Rossland—

Centre Star	2,956	71,336
Le Roi	1,500	33,038
Grant	18	18
Other mines		12,822
Total	4,474	117,214

Slocan-Kootenay—

St. Eugene	212	8,942
Whitewater (milled)	280	6,020
Poorman (milled)	250	4,600
Second Relief (milled)	145	2,245
Queen (milled)	185	3,875
Fern (milled)	200	200
Richmond	48	729
Silver Cup	39	239
Hewitt	22	199
True Fissure	53	125
Ymir	21	125
Other mines		15,755
Total	1,455	42,931
Grand Total	32,378	612,575

Smelter Receipts:

Granby	21,489	444,470
Greenwood	4,960	7,440
Trail	4,283	113,488
Northport (Le Roi)	1,650	35,343
Marysville		5,730
Total	32,382	606,471

Rossland, B.C., June 6.—Following are the shipments from the Rossland mines for the week ending this evening:—Centre Star, 3,860 tons; Le Roi, 1,610 tons; Le Roi No. 2, 385 tons. Total for the week, 5,855 tons, and for the year, 126,892 tons.

The output of the Crow's Nest Pass collieries for the week ending June 5th was 20,899 tons, or a daily average of 3,483 tons. Same week last year, 21,696 tons; daily average, 3,616 tons. Same week, 1906, 20,523 tons.

month of April amounted to 19,948 tons, being a decrease of 598 tons, as compared with the corresponding month last year; while the total output, from July 1 last, amounts to 225,000 tons, an increase of 12,528 tons.

The output of coal from the Crow's Nest Pass collieries for the week ending May 29th was 10,212 tons; daily average, 1,702 tons; same week, 1907, 21,504 tons; daily average, 3,584 tons; same week, 1906, 20,835 tons.

MARKET REPORTS.

Coke.

June 5—Connellsville coke, f.o.b. ovens—
Furnace coke, prompt, \$1.5 to \$1.60.
Foundry coke, prompt, \$2.00 to \$2.25.

Pig Iron.

June 5—Pittsburg—
No. 2 foundry, \$15.40 to \$15.90.
Bessemer, \$16.90 to \$17.15.
Basic, \$16.15 to \$16.40.
Malleable, \$15.90 to \$16.40.
Southern No. 2, \$15.15 to \$15.40.

Other Metals.

June 5—
Tin, Straits, 28.35 cents.
Copper, prime lake, 12.87½ to 13 cents.
Lake arsenical brands, 12.85 cents.
Electrolytic copper, 12.85 cents.
Sheet copper, 17 cents.
Copper wire, 14.75 cents.
Lead, 4.40 cents.
Spelter, 4.67½ cents.
Sheet zinc, 7.50 cents.
Antimony, Cookson's, 8.70 cents.
Aluminium, 33 to 35 cents.
Nickel, 45 to 47 cents.
Platinum, \$22.50 to \$25 per ounce.
Bismuth, \$1.75 per pound.
Quicksilver, \$45 per 75 pound flask.

Silver Prices.

	New York. Cents.	London. Pence.
May 25	53¼	24 9-16
May 26	53⅝	24 11-16
May 27	53	24 7-16
May 28	52⅞	24⅞
May 29	53	24 7-16
May 30		24 7-16
June 1	53	24 7-16
June 2	52¾	24¼
June 3	52¾	24 5-16
June 4	52⅝	24¼
June 5	52⅞	24⅞
June 6	52⅞	24⅞

MARKET NOTES.

A cut of \$4 a ton in bar steel went into effect on June 3rd in Cleveland. The new price goes into effect at once, but will effect only manufacturers' stock. The cut is based upon the Pittsburg rate of \$1.60 per hundred pounds. The new price is \$1.40 per hundred. This reduction will probably induce a better coke trade.

A considerable quantity of lead is held in stock. It is therefore hard to judge the actual position of the metal. It is doubtful if the price would hold if the reserves were placed on the market.

The small stocks of copper in the hands of manufacturers should result in higher prices in the near future. Demand is still lower than normal.