

# THE ENGINEERING AND MINING JOURNAL

AND



## CANADIAN SUPPLEMENT.

MAY 18, 1901.

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A considerable part of the following pages is given up to British Columbia, and naturally so, as it is in that Province that the mining industry is most active. There is, however, a prospect that Western Ontario will see much prospecting and mining work accomplished during the season which has just opened. The iron industry in Nova Scotia, which is stimulating the coal production also, is referred to elsewhere. In later numbers of the "Supplement," we expect to record substantial progress throughout the Dominion.

The work on the steel plant, in which the pig iron made in the Sydney furnaces in Cape Breton is to be worked up, is progressing well, and before many months those works will be turning out rails and other finished steel products. Meantime contracts have been made to dispose of a large quantity of pig iron in Great Britain, thus providing a market for the furnace products until the steel works are ready to take them. The Dominion Steel Company is starting on its work with every indication of future success. The current year will see a very large increase in the iron production of Canada.

The British Columbia delegates to Ottawa, as shown on another page, made a strong representation of the needs of the Province in respect to smelter capacity. The silver-lead mines, they claim, are laboring under serious difficulties in the disposition of their ores. They have been dependent chiefly on the smelters on the other side of the international boundary; but at present the American Smelting and Refining Company is not in the market for British Columbia ores, and they have no sufficient outlet for their product. Their object in visiting Ottawa was to secure Government aid in establishing smelting works, such aid to come preferably in the form of a bounty on ores treated. Another point urged—and in this the delegation was clearly in the right—was a reform in the tariff on lead, which at present operates against Canadian producers.

With regard to subsidies for a smelter or smelters, if the policy of subsidizing industries is to be followed at all, the lead producers of the West have as fair a claim as the iron-masters of the East. The "Engineering and Mining Journal" has never been a believer in the subsidy policy; but the Kootenay silver-lead people certainly made out as fair a case as could be expected. Canada is for the present committed to the plan of assisted industries, and there ought to be no sectional discrimination. We believe, however, that British Columbians would do

better by relying on themselves for the development of the great resources which they control, than by presenting petitions at Ottawa.

The meeting of the Nova Scotia Mining Society last month was an interesting one and active debate was called out from the members present. Probably the greatest interest was excited by the able plea for the establishment of a Provincial assay office made by Vice-President George W. Stuart. He advocated an office to be run by the Mines Bureau somewhat on the lines of that maintained by the Ontario Government; but went somewhat further, and suggested that mine operators should be required to pass all gold through the office. Such an obligation would doubtless be opposed, though on the question of an assay office the feeling of the meeting was evidently with Mr. Stuart, whose long experience in Nova Scotia mining gives his opinions much weight.

The President's address was, in part, an excellent summary of Nova Scotia mining progress during the past year. In the second part he paid particular attention to operators and promoters who have been using Nova Scotia mines as the basis of schemes to extract money from investors, chiefly in New England. While the existence of such schemes is to be regretted, it can hardly be avoided as long as there are people with money who are willing to be deceived; and such exposures as those made in Mr. Libbey's address constitute an effective method of dealing with their promoters. These operators are found chiefly in the United States, Boston being their headquarters; and their field being mainly among small investors in the New England States. President Libbey's exposure of their methods is timely and will, we hope, do much good.

The Sudbury delegation which recently presented its memorial to the Government at Ottawa, made out a strong case against the proposed export tax on nickel ores and matte. While the wish to keep the refining of nickel and the treatment of matte in Ontario is natural, it is not difficult to see that the attempt to force it by means of an export tax would result disastrously for Canadian interests. The practical prohibition of the export of nickel matte—which the export tax would amount to—would probably result in the closing down of a large part of the Sudbury mines, for a time at least. While the Canadian mines are a prominent source of nickel supply, they are not the only one. Already New Caledonia ores have been brought to the United States in considerable quantity, and this could be increased readily, the long distance being more than balanced by the cheap ocean freights. The output of the New Caledonian mines could be readily enlarged to meet a greater demand.

The Ontario Government would do much better by waiting for the development of the suggested new processes for refining nickel. It is very probably that one or more of these may prove successful, and its establishment in Ontario may help to solve the question and render an export tax useless. Meantime the imposition of the tax is likely to do Ontario more immediate harm than good—as an illiberal policy generally does.

### CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials will only be published when so requested.

Letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

#### Water Power in Ontario.

Sir: There is one point in connection with mining development in Western Ontario to which I have not seen sufficient attention called, and that is the cheap power which can be obtained, almost anywhere in that territory. The numerous streams from which water-power can be obtained, and the lakes which form natural storage reservoirs, present opportunities which ought not to be disregarded in calculations for the future. There is no region on this continent so well adapted for the cheap generation of electric power and its transmission to mills and reduction plants.

Toronto, May 10, 1901.

J. B.

#### Subsidies for Mining.

Sir: Recent developments at Ottawa seem to me—and, I believe, to many others—to indicate that the policy of subsidy and Government help in Canada is not doing us the good which its advocates have claimed. The tendency it has cultivated is, when we are in difficulties to run to the Government for aid, instead of trying to fight our own way out. Now this is a most demoralizing tendency, especially for a young and growing nation like Canada. We have the natural resources, though we need more capital than we have to develop them. It seems to me that outside capital is not to be attracted by the confession that we can do nothing without a subsidy, as much as it would be by an exhibition of independence and ability to do for ourselves. I do not say anything of the political evils which are the certain result of a subsidy policy. I certainly think that our Canadian miners and manufacturers can and ought to show themselves above such confessions of weakness.

Ottawa, May 10, 1901.

T. L. J.

## CADWALLADER CREEK MINING CAMP, LILLOOET MINING DISTRICT, BRITISH COLUMBIA.

Written for the Engineering and Mining Journal by Wm. M. Brewer.

The mining camp named after this creek was first discovered in 1897, through rich float which was found in the creek by prospectors for placer mines. The creek itself is a tributary of the south fork of Bridge River. Placer mining has been carried on on the tributaries of Bridge River, together with the South Fork, to a greater or less extent ever since the Cariboo excitement in 1860. One of the first trails which was constructed into the Cariboo District crossed Bridge River near the mouth of Tyauchon (pronounced Tyaxon) Creek. Because of this fact, more or less prospecting was done at that time on the streams emptying into Bridge River above Tyauchon Creek, which resulted very satisfactorily, so far as the yield of placer gold was concerned, near the mouth of the South Fork of Bridge River.

After the discovery of gold-bearing quartz on Cayoosh Creek, near the town of Lillooet, about 1892, several stampedes were made by prospectors into the country north and west for a distance of about 100 miles in each direction. A syndicate obtained a lease to hydraulic-mine the ground near the mouth of the South Fork of Bridge River. This work attracted attention to a vein of gold-bearing quartz, the outcrop of which could be followed for about 1,500 ft., and which had been located a few years previous, but had not been developed because of its inaccessibility and the high cost for packing in supplies or ma-

the outcroppings of a vein of gold-bearing quartz, of free milling character, have been exposed either on the first bench above Cadwallader Creek or some little distance below the rim-rock of the mountain, which forms the watershed of Cadwallader and the South Fork of Bridge River. The claims on which these outcrops have been exposed are the Pioneer, Countless, Little Joe (at other points than the natural exposure referred to), Blackbird, Hiram, Alhambra, Lorne and Woodchuck, as well as on other claims situated between the western boundaries of the Lorne and Woodchuck and the eastern boundary of the Forty Thieves Group. These claims are located from west to east, and adjoin each other in the order named. The distance intervening between the western and eastern boundaries referred to is about 3 miles, and the mineral locations mentioned comprise the Cadwallader Creek mining camp proper; the locations westerly from these belonging to the South Fork of Bridge River Camp.

The geology in the vicinity of these camps, so far as can be observed, is much less complicated than is usually the case throughout British Columbia. There have apparently been no serious convulsions from eruptions, consequently no faulting or irregularities are observable, and the quartz veins, so far as work has been done, show no breaks in the walls. On the Little Joe it has been determined by underground workings that the walls of the vein on both the foot and hanging sides, are absolutely unbroken for about 780 ft. This claim has been opened on three levels by drifting, to a depth of 200 ft. On the third level a crosscut tunnel about 300 ft. long was run and intersected the vein at the point which it should have done according to the sur-



HILLSIDE, AT LITTLE JOE CLAIM, SHOWING LEVELS OF WORKINGS.



BEN D'OR STAMP MILL.

chinery. The original locaters arranged to have the ground restaked and in 1897 bonded several claims which comprised the Forty Thieves Group. The bondholders commenced the work of running a crosscut tunnel which if continued far enough ought to have intersected the vein at considerable depth. However, the work was suspended before the anticipated result had been reached.

While this work was going on prospectors followed up the stream to the mouth of Cadwallader Creek, which empties into the South Fork, and up that creek nearly to its head. All the ground for a distance of about 7 miles in length from the Forty Thieves Group and about a mile wide was staked, and assessment work performed on the various mineral claims. The prospectors found it very difficult to discover rock in place, because the surface is covered with the residue of decomposed gneiss or granite from 10 to possibly 100 ft. in thickness, except in two or three places through the zone referred to.

The natural exposures of outcrop yielded exceptionally rich specimens of quartz carrying free gold. Such occurred on the Little Joe Claim, one of the Ben d'Or Group, the Ida May Claim, the Lorne and the Woodchuck. Elsewhere in the zone the prospectors in order to make a bona fide discovery were compelled to run open cuts through the decomposed material, or else to utilize the water from a chain of lakes situated on the divide between Cadwallader and Sucker creeks. The latter is a tributary of Bridge River, emptying into that stream about 2½ miles below the mouth of South Fork. The water from these lakes was brought over the brow of the hill by ditches and used to ground-sluice the overburden which covered the bed-rock on the benches and hillsides. The results from this work have been very satisfactory, for the reason that between the Forty Thieves Group and the farthest claim up Cadwallader Creek, wherever it has been possible to bring the water and the work has been done systematically,

vey. The strike of this vein is nearly east and west, and the dip 65° toward the north. Taking the same course toward the east, apparently the same vein has been exposed in open cuts for a distance of about 1,200 ft. These cuts are located at intervals in that distance and are six in number. The last exposures are on the Countless Claim, which adjoins the Little Joe on the east. Still easterly on the Pioneer, adjoining the Countless, apparently the same vein has been exposed. To the west from the Little Joe, on the Alhambra and Lorne claims, a series of parallel veins having their strike northeasterly are being developed by drifting.

From the exposed outcrops on the Ida May Claim to the west of the Little Joe, and on the Blackbird and Hiram, situated westerly from the Ida May, the theory would be warranted that this is the main vein of the camp, and that it has followed the ramifications and curves of the rim-rock of the first hill back from the creek. Judging from the conditions in the underground workings in the Little Joe Claim, the possibilities are that further exploitation will determine that the fissure maintains its continuity for a very considerable distance.

During 1898 the Little Joe, together with some fractional claims, was grouped as the Ben d'Or Group. These were purchased by a Vancouver syndicate, a 10-stamp mill erected and systematic work commenced. Since then the mill has been run about 300 days. Because of the lack of heating apparatus, the mill being run by water power, and because during the winter months the water was too cold for amalgamation, it has not been possible to run all the year. Nearly 6,000 tons of ore have been crushed, which have yielded about \$70,000 in free gold, besides the value in the tailings, which assay \$11.57 per ton, and which have been saved for treatment by cyaniding.

The conditions in the drift on the lowest level warrant the assumption that this vein will maintain its continuity to undetermined depths.

The walls are unbroken, a good gouge of talcose material separates the quartz vein filler from each wall, and the quartz itself maintains its continuity. Of course the thickness of the quartz is variable, but the average is sufficient to permit stoping without regular timbering. This condition makes mining more economical than would be the case if the stopes were wider and square-set timbering had to be done, or if the vein was narrower and the walls had to be shot into to permit stoping.

A local syndicate purchased the Ida May mineral claim and performed some 300 or 400 ft. of development work during 1898. This work resulted in exposing a second vein on that claim, some 200 ft. nearer the creek than the main vein. Although the quartz of the upper vein assays an average of about \$20 per ton, yet for some reason work was suspended after about 250 tons of ore had been mined and put on the dumps. The work performed on this property is unique; a tunnel was run some 50 ft., which, although really a crosscut, was expected to run in ore because the dip of the vein at that particular point was flatter than on the Little Joe. Work on this tunnel was abandoned when it was found that the vein was dipping at a higher angle, and another tunnel was started immediately under the first on an incline into the mountain. The consequence, of course, was that this tunnel was filled with surface water, and there being no pumping plant the miners were driven out. During a recent visit made by the writer, he found this lower tunnel full of water and impossible to examine. From near the mouth of the upper tunnel a drift had been started and run some 65 ft., in almost a semi-circular course. For this there was no justifiable reason, because apparently the vein maintains its continuity along the line of strike with the walls well defined, a good talcose gouge parting, separat-

intersect the vein being drifted on higher up the mountain. On the Lorne Vein No. 1 drift has been run 176 ft.; No. 2, 140 ft., and No. 3, 170 ft. On the Arrastra Vein—the second on the Lorne Claim—No. 1 drift has been run 88 ft. and No. 2 161 ft. On the Woodchuck Vein No. 1 drift has been run 53 ft.; No. 4 tunnel, the crosscut, has been run 146 ft. On this claim Nos. 2 and 3 drifts, which were run by the original owners, have been discontinued by the present operators, because it was considered more desirable to crosscut the vein at the deeper level of the crosscut tunnel. The development work being done by this company is especially noticeable because of the permanent and workmanlike manner in which the tunneling is being done. It is unusually good work for outside mining camps. The 5-stamp mill when erected will be run by water power, the water being carried from a lake on the divide between Cadwallader and Sucker creeks, by means of a pipe line which will give a head of about 200 ft. on to a Pelton wheel.

The water power developed to run the Ben d'Or mill is obtained by damming Cadwallader Creek, which is a stream about 50 ft. wide at low water, having a strong fall. The water thus used is returned to the creek from the penstock at the mill, and between that point and the mouth of the creek the fall is so heavy that several other water powers can be developed.

The altitude of the main outcroppings on the Lorne Claim is 4,200 ft. above the sea level, on the Woodchuck about 3,900 ft. above sea level. This is also about the altitude of the outcroppings on the Hiram, Ida May, Little Joe and Countless claims.

This mining camp is reached from the coast by the Canadian Pacific Railroad to Lytton or Ashcroft, thence from either of these stations



OVERSHOT WHEEL FOR ARRASTRA, AT LORNE MINE.



ARRASTRA, AT WOODCHUCK MINE.

ing the quartz from the walls and the average thickness of the vein being about 2 ft. 6 in.

On the Blackbird claim the vein has been exposed in open cuts. This is also the case on the Hiram, assessment work only having been performed on these claims. The Alhambra Claim, westerly from the Hiram, was purchased during the fall of 1900 by a New York syndicate for \$30,000, cash. At the time of this deal the claim was merely a prospect, no work other than exposing the outcrop of a vein with its strike northeasterly having been done. During the present year development work is being performed by drifting under this outcrop, and during the writer's visit he examined this work, which has resulted in determining that the vein had maintained its continuity between good walls to the level of the drift, and that it would apparently maintain continuity to deeper levels.

The Lorne and Woodchuck groups of mineral claims were bonded during the autumn of 1900 for \$225,000, after five arrastras had been run on the surface ores during five months previous. The yield from the arrastras on the Lorne Group was as follows, according to the Government assayer's certificate from Seattle:

	Single Arrastra.	Double Arrastra.
June and July .....	\$794.63	\$2,975.53
August .....	427.93	2,265.70
September .....	601.53	1,581.28
October (total yield) .....	.....	2,068.70
Total .....	\$1,824.45	\$8,891.21

The grand total was \$10,715.66. The yield from the double arrastra in which was treated the Woodchuck ore was not obtainable by the writer, but is reported by the Mines Exploration, Limited, the company which bonded the properties, as being satisfactory. This company, since taking possession of these groups of claims, has purchased the machinery for a 5-stamp mill, which will be erected and running during the present summer. At the time of the writer's visit the machinery was all on the ground, and the mill building in course of erection. Development work performed by this company has been in running a series of levels drifting on two veins on the Lorne and one on the Woodchuck, in addition to a crosscut tunnel run on the Woodchuck to

by stage to Lilloet, thence up Seton Lake by steamer to Mission Landing, at the foot of Mission Mountain, thence by a good pack trail on horseback cross the mountain to Bridge River at Jack's Landing, across that stream by ferry, thence up the river to the mouth of Sucker Creek, crossing the river again there by ferry, thence 9 miles by good trail to the Ben d'Or stamp mill.

An ample supply of timber is found on the adjacent mountains for fuel and mining purposes. The snowfall is variable, from 1 to 4 ft. during the winter.

THE ONTARIO GOVERNMENT ASSAY OFFICE.

The laboratory report of the Ontario Government Assay Office located at Belleville and conducted by the Bureau of Mines for the assistance of prospectors and development of mineral lands, shows a total receipt of 101 samples sent in for examination during the month of April. The assays and analytical determinations aggregated 217, each checked off by a duplicate in order to avoid error before issuing certificates. Of these 33 were for gold, 16 silver, 2 nickel, 3 copper, etc. Eleven samples of iron ores from different parts of Ontario were received for partial or complete examination as to smelting quality, on which 15 determinations were made. Twenty samples of raw and briquetted peat were received for analysis as to quality for fuel purposes, on which 120 determinations were made.

The Bureau of Mines required 169 determinations on which no fees were collected, 48 being done for private parties. The custom work for the public is done at actual cost, fees collected from all this source amounting to \$33.50. Twelve samples for identification, or report as to probable commercial value, as well as for qualitative examinations, were received, on which fees amounting to \$2 were collected. No charge is made for such examinations on samples brought personally to the laboratory. The office supplies, free of charge, canvas shipping bags, and manilla mailing envelopes for small and crushed samples, to those requiring the use of such.

The May "Bulletin of the Assay Office" gives the following statement of work done for 2½ years past:

	1898 (6 mos.)	1899.	1900.
Assays and analytical determinations.....	406	1,651	2,215
Identifications and qualitative examinations.....	45	304	187

The present functions of the office are thus stated:

1. Doing general laboratory assay and analytical determinations for the Bureau of Mines in connection with surveys, reports of the Government geologist and other reports of commercial interest.
2. Making reports on the metallic iron content of average samples of iron ore taken at the different smelters from shipments taken from Ontario mines, for the purpose of checking claims on the Iron Mining Fund.
3. Acting as an intelligence branch of the Bureau of Mines reporting developments in Eastern Ontario; also assisting in collection of samples for Government exhibits such as those installed at the Glasgow Industrial Exposition and at the Pan-American Exhibition at Buffalo, N. Y.
4. Issuing laboratory reports at actual cost to the public on samples received for examination such as identification or probable commercial value, qualitative examinations, assays and analytical determinations. Fees must be paid in advance and each report is the private property of the party ordering the examination made on the samples, the pulp of which is held by the office for future reference by the sender. The rules of the office do not allow the publication of any report without permission of the client for whom it was made.
5. Answering inquiries from owners of mineral lands as to uses or market values, or from dealers or manufacturers seeking raw material.
6. Distributing samples of economic minerals to bona-fide prospectors who may be in doubt as to character of certain ores.

#### ACROSS THE PITCH VERSUS UP THE PITCH.

By O. E. S. Whiteside.

Summing up the arguments advanced in a paper read in 1899, and arriving at a general conclusion, I would say that across the pitch is to be preferred in seams containing any amount of refuse that ought to be gobbled inside the mine; and up the pitch for seams containing little or no refuse, or where the whole product of the seam is to be shipped to the surface, and more especially if the seam is a thin one. In some instances there will be exceptions to this rule, however. If it is absolutely necessary that pillars be left standing, it is possible that a fairly dirty seam should be worked up the pitch; while, on the other hand, if it is impossible to get miners used to that class of work, it would then be necessary to work a very clean seam across the pitch, even though it were a thin one.

A seam containing in descending order: Mining, 6 in.; coal, 2 ft.; slate, 1 ft. 6 in.; coal; 4 ft.; mining, 6 in.; total, 8 ft. 6 in.; and pitching at 35° to 50° ought, according to the general rule, to be worked across rather than up the pitch; while one containing in descending order: Coal, 3 ft. 1 in.; mining, 3 in.; total, 3 ft. 4 in.; ought to be worked more profitably straight up the pitch.

In the first example it would be much better, in the majority of cases, to adopt a system lending itself readily to the gobbing of waste inside, and this could not be done either so well or so cheaply if worked up the pitch. In the second example the very small amount of waste gives ample mining, and is easily taken care of while driving to the rise, and, furthermore, being so thin it would be impossible to get a breast-car of any size in to work it, by the other system, without shooting rock. This could not be the case in any dirty seam containing enough coal to be workable.

Coming to the work in the broken, the first requisite to the successful continuation of across the pitch work is to follow up immediately by pulling the pillars. If the coal is hard and does not contain many slips, and there does not happen to be another seam close by, these pillars may stand for a considerable period; but before the boundary is reached, even in a very small mine, they are sure to commence dropping coal on the low side, and once this starts it is a very short time before a great deal of coal is buried and lost, and the pillars left in very bad shape for pulling. If the seam is a thick one the effects are more marked, and, if a thin one, the roof and floor come so close together in the breasts worked out that, in order to get a breast-car in on the low side of each pillar, rock work has to be resorted to. This, in conjunction with the opening of old chutes caved in, may make the pillars cost more than the work in the solid, while the percentage of waste will be greatly increased if the broken work does not immediately follow the solid. Pulling the coal advancing requires little or no extra expense on chutes already in for the solid work; the roads are easily gotten in to the back end of each pillar; and the pillars are in an easy and safe condition for mining, but it is of course absolutely necessary that air holes be kept to the surface, or return air way in advance of the pillar pulling, and in troubled ground like that generally met with in the class of mining here referred to, these are often expensive items.

Throughout these operations the pillars should be pulled in regular steps, the upper ones in advance of the lower, but not far enough to produce falls of rock that would cover the ends of the lower pillars and thus shut off the ventilating current. The coal from the breasts is of course all dumped into what is termed the outside chute, but that from the pillars should be put in the inside chute. The track for the breast-car is laid on the high side of each breast on top of the gob and just below the pillar, and, when the end of the pillar is reached, the coal is attacked and taken back, the distance to push the coal becoming less and less until the pillar is completely out.

In the highly inclined seams of Pennsylvania and the Pacific Coast, the miners are exceedingly skilled at this class of work, and many of them prefer to drive up the pitch, no matter how steep the inclination may be. In the State of Washington they also invariably drive to the

rise partially for this reason, and partially on account of the fact that many of their seams (containing enough dirt to recommend across the pitch work) are so soft, and at the same time lively, that across the pitch pillars cannot be kept in, even while the solid work progresses.

In several instances in the State of Washington they have adopted a system for seams pitching from 45° to 90°, which is neither across nor up, but half on and locally termed the "chute and pillar," or "diamond" system. The gangways are driven first in the direction of the strike, and the chutes straight up the pitch, far enough to form gangway stumps, and connected at the top by horizontal cross-cuts. From here up these chutes are continued not straight up the pitch but half on, so that, on a seam pitching at 90°, the pitch of the chutes would be 45°. These angle-chutes, as they are termed, are connected at intervals by angle-cross-cuts driven at right angles to the angle-chutes, their pitch being also 45° on a seam pitching 90°, but in the opposite direction to the pitch of the chutes. All these places are driven narrow and generally so as to form square pillars diagonally across the pitch, thus getting the name diamond system. While the newer angle-chutes are being driven, the older ones immediately behind are being widened out and clogs placed on both sides, the work being started at the top and continued downward, and the pillars immediately behind these are being pulled and the upper ones first. The chutes are either driven to the surface or to a counter-gangway and the timber needed is lowered down them. Under certain conditions this system is an excellent one, and the coal gotten out very cheaply; but it can only be used advantageously when the breakage of the coal is of little account and where it is not necessary or feasible to store waste inside the mine.

If the coal is to be converted into coke, and the refuse of such a nature as to be best taken care of by means of a washing plant, it is an exceedingly profitable system. It is very much safer for the miner than up the pitch work, and there is no extra labor in the cross-cuts shoveling coal, their pitch being the same as that of the chutes, all the coal mined gravitates to the gangways. The size of the pillars and the number of cogs necessary are mere matters of detail to be determined by local conditions, such as the strength of the walls, the thickness of the seams, etc.

#### ROPE DRIVEN VERSUS DIRECT DRIVEN COLLIERY FANS.\*

By Francis T. Peacock.

There is a difference of opinion among mining engineers and mine managers as to whether a colliery ventilating fan should be coupled to the engine direct, or driven through the medium of a belt or cotton or hemp ropes, and the writer wishes to call attention to some of the conditions which should determine a selection of the type to be used. The following may be taken as the principal features requiring careful consideration:

1. Colliery ventilating fans must generally run continuously, night and day, including Sundays, unless of course duplicate plants are installed, enabling one to be stopped for repairs, if necessary, which, however, entails double outlay.

2. Taking into consideration the continuous running required of this machinery, it is of the utmost importance that the speed of driving engines should be very moderate, to insure freedom from breakdown. Considering the hours worked during the week, mill engines run only one-third the time of fan engines; or, in other words, each year the work done by ventilating engines represents three years' work, as compared with mill or factory engines.

3. Ventilating engines should be of the simplest design with ample wearing surfaces, as being less liable to get out of order; consequently the ordinary slide valves provided with adjustable cut off valves, variable while the engines are running, are particularly adapted for fan engines.

4. The engines should be arranged in duplicate, so that if a breakdown occurs in one, the other may be quickly coupled on to the fan; meanwhile the disconnected engine can be overhauled and again put into good working order.

5. Both fan and engines should be of ample size to effect the required ventilation easily when the steam boiler pressure falls below normal, which even in the best regulated plants will sometimes occur.

6. Assuming that the fan is so designed that it will easily perform its rated duty at a certain speed, the designer must consider whether it is better to install a larger fan and drive it by means of direct connected engines, or to install a smaller fan, and drive by means of ropes or belt. This question, however, applies more to fans of high water gauges and large volumes.

7. The plant should be an efficient one in steam consumption, and this fact is now recognized, even at coal mines, where fuel is at its cheapest.

The direct driven type of fan is often preferred on account of its lower first cost. While it may be considered as satisfactory for low water gauges and small volumes, it has a number of disadvantages for large installations, which become serious for high water gauges, among which the following may be mentioned:

To give the required periphery speed to the fan, the engine must either be provided with an abnormally short stroke, or must be run at an abnormally high piston velocity. A direct driven fan must often be larger in diameter for a given duty than would be the case if the fan were geared in order to reduce the number of revolutions and obtain the necessary periphery velocity. This means a heavier fan, additional foundations and additional weight on the bearings. There is generally considerable vibration in the shafts of ventilating fans, caused in some cases by improper balancing of the fan, and by reason of each fan blade as it passes the opening to the outlet or chimney, being suddenly released from pressure or load. Taking the work of one day of 24 hours, and a moderate sized fan with 8 blades running at

\*Paper read at the Montreal meeting of the Canadian Mining Institute.

\*Paper read at the Montreal meeting of the Canadian Mining Institute.

80 revolutions, a load of several hundred pounds, is, as it were, instantaneously removed from the blades 921,600 times. The breakages of large fan shafts, which have occurred in Europe, after their elastic limit has been reached and the loosening of bolts or rivets in the fan proper, are attributable to this vibration.

In direct driven installations, there are usually three shaft bearings, one on each side of the fan proper, and one for engine crank shaft. There is a difference, not only in the dead weight, which these bearings have to support, and consequently a difference in the amount of wear, but they tend to wear in different directions, and in consequence it is a most difficult matter, if not practically impossible, to keep all bearings in proper alignment, and prevent knocking. This feature is not improved by reason of the natural deflection of the fan shaft, which is also liable to affect the alignment of engine crank shaft, and consequently the crank pin. A single engine is not economical, as compared with a compound condensing engine, and before the introduction of the rope driven fan in England, it was customary in large or important installations to equip the fan with a direct driving tandem compound engine on one side, and a single engine on the opposite side of the same end of fan shaft, with its own connecting rod connected at crosshead end, the crank end being suspended ready to attach to the crank pin in case of an accident to the compound engine. The fan is in this manner provided with two separate engines, with the exception of the crank pin. If this should break off, or become loose, the fan must stop.

Direct driven fans, in addition to the lower first cost, require less room and a smaller engine house. This, however, is not always important, for the reason that the engine house may often with advantage also contain other machinery.

Belted fans are objectionable, except for very small capacities or temporary installations, on account of their liability to give trouble and annoyance with belts stretching or breaking, when applied to this class of continuous running machinery.

The rope system of driving ventilating fans, now long in use in England, has taken the place of the direct driven system, especially for high water gauges and large volumes. Rope driven fans have the following advantages: The engines can be run at a very moderate speed, and long strokes can be adopted, thus considerably lessening the frequency of change of direction of the reciprocating parts, consequently adding length of life to the machinery and minimizing the liability to breakdowns or stoppages. The fan being driven through the medium of separate endless cotton ropes (usually  $1\frac{1}{2}$  or  $1\frac{3}{4}$  in. diameter) any vibration in the fan itself, and the somewhat impulsive action of the engine is practically dissipated through the elastic medium of the cotton ropes. Assuming the installation is geared at about  $2\frac{1}{2}$  to 1, the engine passes over its dead centers only  $\frac{2}{5}$  as often as in the case of a direct coupled engine, and in the case of twin or side-by-side compound engines, with cranks set at right angles, the driven pulley receives only a comparatively light impulse at each four points in a revolution, instead of a heavy impulse at each two points in a revolution, all of which conduces to very smooth running, long life and a minimum cost for repairs.

The fan shaft runs in its own bearings, independently of the engine. It is sometimes found that after a fan is installed and has been running for some time it is very desirable to change the velocity. Such a change, within certain limits, can readily be effected in rope driven fans by changing the diameter of the driven pulley on the fan shaft.

When the engines are of the twin or side-by-side compound type, and they are provided with a system of valves to allow of the high pressure or low pressure side running alone or independently and of live steam being admitted to the low pressure cylinder, which is provided with a relief and reducing valve, we have two crank pins and practically two engines, so that if an accident should happen to one the other will temporarily drive the fan. If the plant is properly designed, so as to easily perform its rated duty, one side of the engine will drive the fan to so nearly its full capacity that little or no inconvenience results.

It may be considered an objection that some power is wasted in rope transmission. Experience has proved that by careful selection of the best makes of cotton ropes, and proper attention, they will run continuously for years without giving trouble. If one of the ropes should give way (which is a very rare case if the load which each rope is designed to carry is not too great, and ordinary care is taken), the fan can be run by the remaining ropes until another rope can be spliced and applied.

With reference to the power wasted in transmission, with pulleys of proper size there is practically no slip of the ropes in the grooves, and with well designed and well finished grooves the power required to pull the ropes out of the grooves as they leave the pulley is so small that it can be practically neglected. One of the advantages of a well designed and well constructed rope driven installation is, that on account of the moderate speed of the engines and comparative freedom from vibration, less expense is required not only for repairs and adjustments, but also in the smaller amount of lubricating oil used.

#### ABSTRACT OF OFFICIAL REPORTS.

##### Ymir Gold Mines, Limited.

The report of this company for the year 1900 shows very good results. The manager's report says: "The new battery of 40 stamps was put in operation a little before July 1st, but during June the whole mill was hung up for practically three weeks in order to connect the new and old parts and rearrange shafting and various parts of the plant. During July and August the old battery was being extensively repaired, and during the latter month we suffered from an accident to the engine, at a time when the water for power was at a very low stage. Again in November the heavy countershaft through which the water and steam power systems join, was broken. All of these, together with other delays, such as are caused by freezing and accidents to the flume

line, have made our mill record one not to be looked upon as an example of what we may hereafter expect."

The total work done in the mill was equivalent to 80 stamps running 216 days 10 hours. The ore crushed was 42,660 tons, an average of 2.46 tons per stamp per day. The ore taken from the mine was 43,065 tons; of this 83 tons were crude galena, 42,660 tons were passed through the mill, and 322 tons were on hand at the close of the year. The concentrates made were 2,950 tons.

The products of the ore smelted were 1,301,986 lbs. lead, 46,859 oz. silver and 15,584 oz. gold. The total value was \$379,612, or \$8.88 per ton. The working expenses were \$4.84, leaving a profit of \$4.04 per ton. The expenses were as follows:

	Amount.	Per ton.
Mining .....	\$91,328	\$2.1367
Milling .....	38,452	0.8996
Tramway .....	4,597	0.1076
Transport, etc. ....	8,662	0.2027
Salaries and office. ....	9,397	0.2198
Contingent and general. ....	12,125	0.2837
Freight and smelting. ....	42,319	0.9901
Total .....	\$206,880	\$4.8402

The report, as issued from the London office, says: "It is with much satisfaction that the directors are able to refer to the fulfilment of the scheme for doubling the output of the mine without having had recourse to any increase of the capital of the company, the profits made having been more than sufficient to defray the whole of the expenses in connection therewith. Owing principally to delays in the delivery of the material, it was found impossible to have the new 40-stamp battery ready for operations until the latter end of June, and it was not for some two months later that the complete mill of 80 stamps was able to commence work.

"The accounts presented show that after writing off £5,606 for development, depreciation, interest on loan raised for the new plant, and charging against the year's revenue the whole of the heavy administration and other charges consequent upon the additional machinery, etc., including extensive repairs to the old battery, a net profit of £30,928 remains, which, added to the £10,031 brought forward from the 1899 accounts, makes a total of £40,959. As the greater part of this profit has been reinvested in the mine it was not available for distribution, and consequently the balance is carried forward, and an interim dividend of 1s. per share was declared at the end of January on account of the profits for the current year. The carrying out of the important additions to the battery and mine necessitated a complete reorganization of its working arrangements during the continuance of mining and milling operations, occasioning unavoidable delays, which not only increased the working expenses, but reduced the output. Under these circumstances the directors regard the result of last year's work with gratification.

"At the end of the year the Ymir shaft had reached a depth of 258 ft. below No. 3 level, or about 650 ft. below the surface. Crosscuts were made at the 4th and 5th levels where the width and value of the vein has been proved to be well maintained. At this date also the 1,000 ft. adit level had penetrated the hill 596 ft. and is advancing at the rate of 125 ft. per month, and should therefore reach the vein by the end of the current year, some four months before it is possible to work out the reserves above No. 3 level. The engineer reports the vein above No. 3 level to be wider than he had originally calculated upon, thus increasing his estimate of the ore reserves. Considerable time and attention had been devoted to the question of applying the cyanide process for the treatment of the mill tailings. Tests upon a fairly large scale have been made with a satisfactory result, and a small plant for treating 10 tons daily should now be in operation."

**UTILIZING PEAT.**—For effecting a high utilization of raw peat, says the London "Colliery Guardian," Herr Georg Gercke, of Hamburg, constantly forces it through pipes of any suitable section that are heated by a furnace through which they pass, and which is fired by the peat thus dried. The water contained in the peat passes off as steam under pressure, so as to serve to drive the plant for feeding the raw peat forward, cutting the stream into lengths so as to form blocks and leading them away.

**BURMA PETROLEUM.**—Although no large fortunes have yet been made in Burma out of petroleum, the industry is a progressing one, and pays the companies engaged in it large profits, says "Indian Engineering." The greater part of the yield comes from four blocks in which three companies are interested. The yield at Yenangyaung, the chief oil-field, was over 22,000,000 gallons last year, as compared with a little under 15,500,000 gallons in the previous year. At Yenangyat, first worked we believe after the annexation, the yield rose to over 10,000,000 gallons, an advance of about 4,000,000 gallons on the previous year's working. Three new blocks were leased last year and 142 new blocks have been demarcated by the Survey of India Department, so that there is still room for new comers in what seems a progressive and remunerative industry.

**KINGSTON SCHOOL OF MINES.**—The complete equipment of the milling laboratory at this school will appear from the following list of appliances now installed: One 7 by 12-in. Blake crusher, one pair of 12 by 7-in. rolls, one No. 0 Krupp ball mill, one 12-in. cone grinder, one 5-stamp mill, with 850-lb. stamps; one Frenier spiral sand pump for elevating sands; one No. 2 Heald & Sisco centrifugal pump connected to an agitator tank; on 17-ft. Wilfley concentrator; one 4 by 12-ft. Frue vanner, one 3-compartment Hartz jig, one 2-compartment Evans jig; one 16-ft. revolving buddle; 4 different types of hydraulic classifiers; one 3-compartment spitzkasten; one Wetherill magnetic separator; one 10-in. centrifugal machine for slime treatment in cyaniding gold ores; one Johnson filter press for the same purpose; a cyanide leaching plant to treat 1,000 lbs. at a charge; a barrel chlorination plant for gold ores, capable of creating 500 lbs. of ore, with a reverberatory furnace for roasting the ore; an automatic sampler, and a chemical laboratory for determining the results obtained in milling. There are also various types of rock drills, air compressors, etc.

## THE BRITISH COLUMBIA COPPER COMPANY'S MINES.

Written for the Engineering and Mining Journal by E. Jacobs.

The only New York organization operating in the Boundary District of British Columbia is the British Columbia Copper Company, Limited, which owns a group of mineral claims about 3 miles northwest from the neighboring towns of Greenwood and Anaconda, in what is known as Deadwood Camp. Included in this group are the Mother Lode, Primrose, Sunflower, Tenbrock, Offspring and Don Julio claims. The Mother Lode was staked under the old law which restricted the size of mineral claims to 600 ft. in width and 1,500 ft. in length, and which gave extra-lateral rights, similar to those obtaining in the United States. This claim was located on May 28th, 1891, and as it was the first location made in Deadwood Camp its locators were able to place their posts so as to take in the whole of the outcroppings of ore. That they used their opportunities to good purpose is to-day evident, for notwithstanding that a comparatively large amount of drifting and cross-cutting has been done on two levels, at no point are these workings less distant than 200 ft. from a boundary line of the claim. The other claims in the group were fractions, although in area two of them are each nearly as large as the Mother Lode. They are all adjoining claims, acquired at different times and together comprising a group favorably placed for convenient and advantageous working.

The surrounding hills are but thinly timbered, and the copper-stained blow-out, about the center of the claim, could be seen from far away, so that the prospectors had easy work in making this location. In some respects the Mother Lode is representative of most of the large copper-

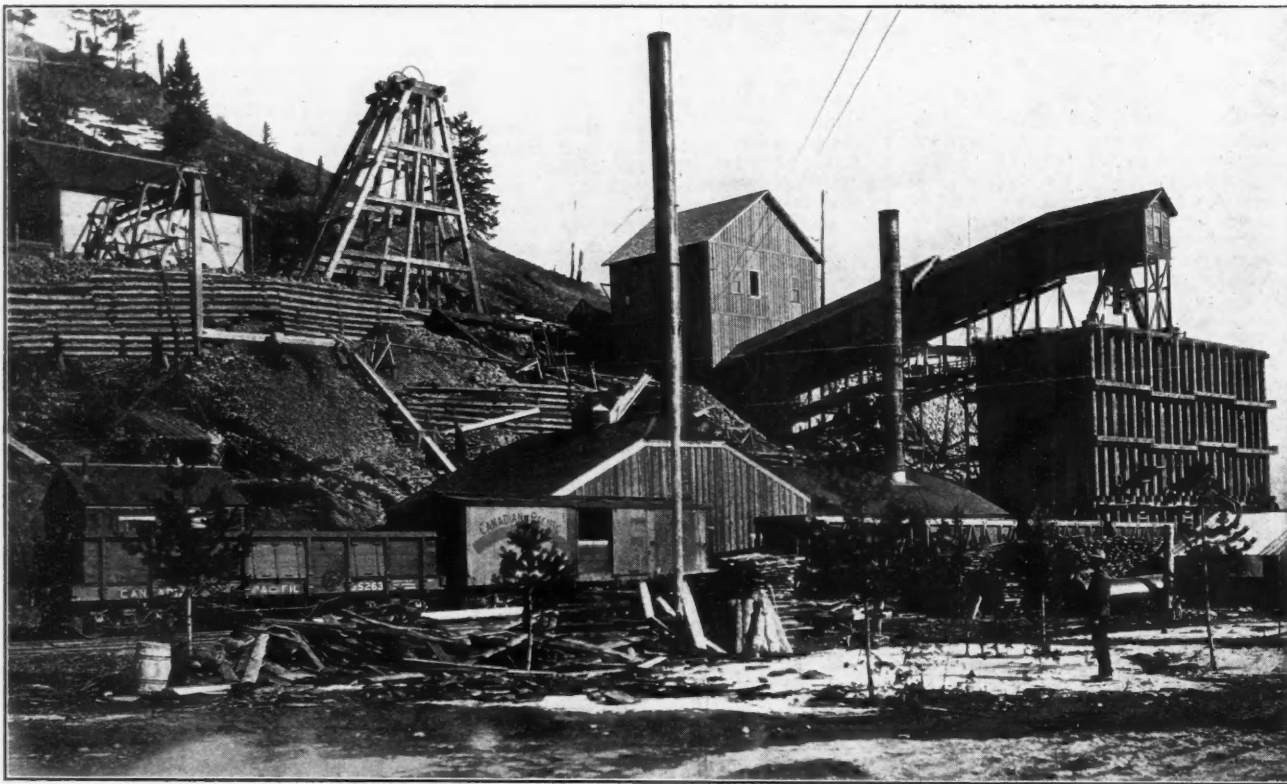
able that these intrusions afforded means of ingress for the ore-carrying solutions from beneath, consequently the presence of a porphyry dike is generally considered a favorable indication in this district when prospecting for ore.

Although the croppings on the Mother Lode assume somewhat of a crescent shape, the general trend of the lead is north and south. The ore bodies pitch to the east at an angle of 55° to 65°. The ores themselves may be classed into three general groups: 1. A calcite carrying copper pyrites and iron pyrites, these sulphides sometimes being massive and sometimes scattered in small crystals throughout the rock. Some quartzite is also often present. 2. A silicate of lime, iron, magnesia and alumina, carrying both copper and iron pyrites, massive or scattered, and frequently also quartz, garnets or serpentine; often all three together. Occasionally, too, a small quantity of zinc blende occurs in this class of ore. 3. An excessively hard magnetic oxide of iron, with silica and copper pyrites; not often much iron pyrites.

All these ores carry gold and the calcite and silicious varieties, small quantities of silver as well—about 1 to 2 oz. There has been found near the lime wall on the 200-ft. level ore with calcitic gangue carrying galena and zinc blende, and assaying well in silver, but not in sufficient quantity to regard it as a separate class. The several varieties of ore above described blend into one another more or less, but this general classification holds good. The following partial analyses further illustrate the differences between the several classes of ore:

	Calcites.	Silicates.	Magnetites.
Silica .....	20.10	44.23	27.33
Iron oxides .....	12.00	16.83	51.12
Alumina .....	1.31	7.46	.....
Calcium and magnesium oxides.....	34.00	16.03	10.26

These ores, from their composition, have been found to make excellent



BRITISH COLUMBIA COPPER COMPANY'S SURFACE WORKS.

gold ledges occurring in the Boundary Creek District. The croppings are in places soft oxides of iron from decomposition of ore-bearing rock and in others unaltered magnetic iron oxides, very solid and compact, carrying copper pyrites and gold. In still other instances they are calcite with copper pyrites, iron pyrites, more or less quartzose material, carrying gold. These croppings differ from those on the Knob Hill, recently described in the "Journal," in which specular iron ore occurs, while a fine-grained magnetite is more generally characteristic of the Mother Lode outcrops.

The lode is large, its length, traceable by continuous croppings, being some 1,100 ft. north from the main shaft to where it disappears under heavy drift, while a recent surface exposure on the Primrose, about 700 ft. from the shaft in the opposite direction, suggests the probability of its extending at least that distance southward under the intervening drift. Its surface width varies on the Mother Lode from 80 to 160 ft. The footwall, as disclosed by development work, is for the most part limestone, and the hanging wall a diabase. On the footwall side there is not as a rule a marked transition from ore-bearing to barren rock, but the ore often grades into the country rock outside of what is more or less defined as the ledge or ore body, so that it is difficult to tell within a few feet where the pay ore will run out. On the other hand, the ore gives place to the barren country rock on the hanging wall side with comparative abruptness, fading away completely within a foot or two. The chemical composition of the hanging wall and of the ore lying against it—leaving out the pyrites—is substantially the same. According to the best geological authorities who have examined the district the ore bodies are altered limestone. Here, as at the Old Ironsides, Knob Hill and B. C., porphyry dikes intrude, and it is considered quite prob-

able that these intrusions afforded means of ingress for the ore-carrying solutions from beneath, consequently the presence of a porphyry dike is generally considered a favorable indication in this district when prospecting for ore.

As a rule when copper increases in the ore gold increases too, though not in any given ratio. Nevertheless the presence of iron pyrites seems to be a requisite for gold, for samples of solid copper pyrites with no iron pyrites seldom yield much gold. Thus, a sample assaying 15 per cent. copper gave as well \$16 gold, while an exceptionally rich mass of chalcopyrite with no iron pyrites returned 28 per cent. copper and only \$1.50 gold.

The work done to date in development of the Mother Lode Mine is, approximately, 5,500 lin. ft. The main shaft is down 325 ft., and about 520 ft. of sinking and raising have also been done. Drifts and crosscuts at the 200 and 300-ft. levels total about 4,650 ft. The ore-body opened up on the 200 level varies from 80 to 100 ft. in width, and crosscuts at intervals show this ore to be continuous for at least 350 ft. to where it goes underfoot and out of the level. This big shoot has also been met with at the 300 level, where the north drift crossing it diagonally, has exposed 100 ft. of ore and is not yet through it. A second ore shoot has been encountered on this lower level and provided by crosscuts to be from 18 to 20 ft. in width and at least 200 ft. in length. Three stopes have so far been opened at each of these levels, and from them about 300 tons of ore are being hoisted daily, this quantity being supplemented by another 100 tons daily from a surface opening or quarry in the big outcrop. Arrangements have been made for deepening the shaft to 500 ft., the intention being to run levels at 400 and 500 ft. depth. Two more, but smaller, quarries are being opened on the surface, and it is estimated

that these will increase the surface output to an aggregate of 150 to 175 tons per diem.

It may be of interest to mention that the smaller of the two ore bodies on the 300 level is an iron ore, chiefly magnetite, but with some lime and silica, while the larger body at both levels is a calcareous ore carrying a larger proportion of silica and, of course, much more lime. These together form an ideal ore for smelting, containing constituents that make it self-fluxing. The ore being generally low grade the profitable operation of the mine is dependent chiefly upon the great quantity of its product, the copper content of which would not pay by itself. It is, however, enriched by gold and silver, these constituting about two-fifths of the total values. The mine is a remarkably dry one, but little water coming in.

The power plant in use at the Mother Lode Mine is large enough for present requirements of the mine and perhaps for future needs for some time to come. In hoisting and drilling power and ore-sorting appliances it is the best in the Boundary. The plant installed in 1898 included two 60 H. P. boilers; an 18 by 24-in. Ingersoll-Sergeant straight-line air compressor, rated for 10 drills; five machine drills; air receiver; 7½ by 10-in. hoisting engine and two auxiliary hoists; an electric light plant, etc. A recent addition is the largest air compressor the James Cooper Manufacturing Company, Limited, has yet supplied for use in British Columbia. The new equipment includes a cross-compound condensing Corliss-valve Ingersoll-Sergeant engine, with compound air and intercooler, high and low-pressure steam cylinders, 22-in. and 40-in. respectively, air cylinders of the piston inlet type high and low-pressure 19¼-in. and 32¼-in. respectively and 48-in. stroke, the machine having a capacity of 30 to 40 drills and weighing 166,000 lbs. Steam is supplied to this engine by two horizontal return tubular boilers, each 100 H. P.

#### AURIFEROUS BLACK SANDS OF VANCOUVER ISLAND, B. C.

Written for the Engineering and Mining Journal by W. M. Brewer.

Several years ago it was discovered that along the northern beach of Vancouver Island in the vicinity of Cape Scott the sands carried fine particles of gold. Panning tests demonstrated that the colors were very fine and so minute that it was with the greatest difficulty any could be saved. Placer miners tried the diggings and gave up discouraged. In the winter of 1898-99 a party of Englishmen with capital at their command passed a month prospecting along the beach and brought away several sacks of the sand which they sent off for assay. The results "nil in gold," confounded them, because they could save colors in almost every pan they washed. They followed the example of the placer miners, though, and abandoned all idea of attempting to work the sand.

Later in 1899 a placer miner discovered good paying panning sand on the beach near the Ucluelet Indian village on the west coast of the island, and about 150 miles southeast from Cape Scott. The exact location of the beach is Wreck Bay, which is so situated that it receives the full force of the tides of the Pacific Ocean. Consequently the landing is, except to the Indians and men thoroughly experienced in handling canoes and small boats on surf washed coasts, extremely dangerous except in calmest weather. For several months but little attention was paid to the discoveries, as the gold was flaky and very difficult to save. The values appeared to occur in pockets and streaks. Prospectors told of washing out as high as \$2.50 to the pan, and one man panned out \$60 in a few days, still failed to cause any excitement.

There was no disputing the fact that gold occurred in the sands, but



ROBINS ORE SORTING BELT, BRITISH COLUMBIA COPPER COMPANY'S WORKS.

for 125 lbs. working pressure. There are at present only three air compressors of larger capacity than the above-described engine at work in the Province, two of these being at the Black Bear Mine and one at the Center Star, all at Rossland. The hoisting engine was made by the Jenckes Machine Company, of Sherbrooke, Quebec. It is a double-cylinder Corliss-valve first motion hoist, cylinders 22 by 42 in., diameter of drums, 6 ft. Two 80-H.-P. boilers supply it with power. Two platform cages with safety clutches and shield roof have also been installed. The Robins ore-sorting plant—the only one in the Province—comprises a 36-in. picking belt 111 ft. long with return conveyor 41 ft. long, and a 12-in. fine-ore conveyor 110 ft. long, a 16-in. waste conveyor 556 ft. long. A No. 5 Gates rock crusher with a capacity of 40 tons per hour and a 70-H. P. Nagle engine complete this sorting plant. Additions to the electric light plant are a 250-light Westinghouse dynamo with a full complement of arc and incandescent lights (the arc lamps supplied by the Manhattan General Construction Company, of Newark, N. J.); and a 25-H. P. Armington & Sims engine to run the dynamo.

The mine buildings are lighted by electricity. Mr. Frederic Keffer, general manager in the Province for the British Columbia Copper Company, has been in charge of the mine from the time its development was commenced in 1896. Some 130 men are employed at the mine, which is connected by rail with the company's smelter at Greenwood. A description of the smelter and its records of ore smelted, supplied by the smelter manager, Mr. Paul Johnson, have from time to time been published in the "Engineering and Mining Journal." The expenditure on mine and smelter to date has exceeded \$600,000, but returns are now coming in from the smelter, which has been in operation about three months.

**PEAT IN ITALY.**—One of the largest peat bogs in Europe—that of Campo Costo in the Abruzzi, Italy, 17 m. thick and extending over 800 hectares, has been acquired by Signor Giuseppe Barbanti, of Bologna, for a group of capitalists.

the general opinion of those who visited the beach was that the difficulties to be surmounted before the sand could be successfully worked on a commercial scale were practically insurmountable. However, the locators did not lose faith, and during the past summer they have been rewarded.

Messrs. Sutton and Graham secured some gold-saving machines early last spring, leased the holdings of the original locators and within a short time had taken out nearly \$12,000 gross from a narrow strip of the beach. The high tides during the autumn interfered with further work and operations have been suspended until the spring of 1901. In order to work satisfactorily it was necessary to construct quite a long flume at a cost, it is claimed, of about \$10,000, but as the ground acquired for mining purposes consists of several leases, each one of which may contain 80 acres, the lessees feel confident that they will be well repaid for the capital invested in the flume.

The success of the operations at Wreck Bay naturally incited prospectors to explore the coasts of the island during the calm summer days last year in canoes and small boats, in search for more occurrences of deposits of black sand which carried gold. The source of the gold formed a subject for discussion around camp-fires and elsewhere and so far as most of the occurrences are concerned the question of deposition has never been settled.

As a result of the efforts of prospectors during the summer months it was found that near Clo-oose, an Indian village a short distance northwesterly from Carmanagh Point Lighthouse, auriferous black sand formed a beach of limited extent at low tide. Other locations where similar occurrences were found were near the mouth of the Jordan River about 40 miles northwesterly from Victoria, where the beaches are of limited extent, the principal one being about 2½ miles in length and about 200 ft. wide at low tide in the summer. It is claimed that on the northeast coast of the island in the vicinity of Hardy Bay the beaches also contain black sand which will pay to work.

The writer recently visited the beaches near the Jordan River to de-

termine if possible the source of the gold and also the value, as nearly as could be done, of the sand per ton, as well as the average thickness of the sand, and the apparent possibilities of working the beaches on a commercial scale. Never having visited any of the other occurrences along the coast he had no precedents to follow, nor theories formed as to the deposition of the gold. The conditions which he found surrounding the beaches he prospected convinced him that it is very doubtful if the deposition in all of the deposits is from the same cause.

Along the beach between the mouth of the Jordan River and Sandstone Creek,  $2\frac{1}{2}$  miles easterly, the bed rock is a hard blue clay, except in Sandstone Creek, where it is a conglomerate which underlies sandstone belonging to the Tertiary period. The clay forms the coast line and reaches to a height of from 25 to 100 ft. This is overlaid by wash gravel very much stained by iron oxide and suggesting the theory that it may have formed an ancient bed of the Jordan River. Tests of this gravel by panning yielded black sand in appreciable quantities, but no gold visible to the naked eye.

There is ample evidence that slides occur annually, and only last year the writer was reliably informed that about 2 acres of this clay and gravel slid down on to the beach. It is also a notable fact that beach sand carries better values at the point where this slide occurred than at some other points. Therefore, the natural conclusion is that although the gravel does not carry gold in sufficient quantity to yield visible colors in the pan, when tested indiscriminately, yet where nature has concentrated the material the gold content is sufficient to enrich the concentrates which, owing to their specific gravity, sink down into the sand of the beach. These concentrates in the form of black sand apparently work down slowly on the inclined plane of the clay bed-rock into the sea and portions are thrown back by each coming tide.

At other beaches visited by the writer between Sandstone Creek and Victoria black sand was easily discernible lying in the ordinary beach sand after the tide had run out, but no gravel beds or any other indication occurred in the vicinity to suggest the source of this sand. As no panning was done on these beaches the writer cannot state whether the black sand found there carried gold or otherwise.

The Jordan River rises in a chain of mountains of slate formation. These slates have been tilted and contorted by lateral pressure until their dip is nearly vertical and the fissures caused by folding are filled with quartz. The quartz laminations have lenticular structure and are usually of limited extent, but nearly always assay low gold values, and occasionally free gold specimens are found.

When these conditions are taken into consideration it would appear almost certain that the occurrence of placer gold in the sands on the beach near the mouth of the Jordan is accounted for. More especially when the fact is considered that prospectors have found coarse heavy particles of gold along the bed of the river about three miles above its mouth.

The size and number of the boulders which constitute the river bed, as well as the difficulty of controlling the water during operations, have prevented placer miners from working this river in the past. The Sooke and Leach rivers, which rise in the same chain of mountains and empty into the Strait of Juan de Fuca about half way between the mouth of the Jordan and Victoria, were mined 30 years ago and even to-day a number of Chinamen work regularly every season with (to them) satisfactory results.

The gold found on the beaches examined by the writer was usually in small but well-rounded particles easily saved by panning. A small proportion of it was flaky and harder to save, but apparently practically all can be saved by the use of a long line of sluice boxes with a wide copper plate at the discharge end, over the surface of which the sand should be evenly and thinly passed, thereby allowing an opportunity for every particle of gold not caught in the riffles of the sluice boxes to come in contact with the mercury on the plate.

Because of high tides no thoroughly systematic test of the beaches could be made to determine the value of the sand, but a conservative estimate would place it at about 50c. per ton. By employing Oriental or other cheap labor this sand should be treated for not to exceed 20c. per ton, and if water could be used and hydraulic mining followed the cost would be less. The thickness of the sand on the clay averages about 2 ft. and during the summer months the width of the beaches examined is reported as not less than 200 ft. Consequently it will be seen that where several leases, each having a length of 1,500 ft., are worked as one proposition on a large scale and no large investment necessary to commence operations, a very fair margin of profit should result.

#### THE PROPOSED EXPORT TAX ON NICKEL.

On April 11th a large and representative deputation of mine owners and mining engineers visited Ottawa and had an interview with Sir Wilfrid Laurier, the Premier, with the object of securing the disallowance of the Act, passed last year by the Ontario Legislature, reserving the right to impose a prohibitive license tax on the export of nickel and copper ores and matte produced in Ontario.

The deputation comprised: Hiram Hixon, Mond Nickel Company, Whitefish, Ont.; B. T. A. Bell, Ottawa; George R. Smith, general manager Bell's Asbestos Company, Black Lake, Que.; J. Roderick Robertson, general manager London & British Columbia Gold Fields, Limited, Nelson, B. C.; William Blakemore, Montreal; Dr. Frank D. Adams, Montreal; Leopold Meyer, Catarqui Mining Company, Madoc, Ont.; P. Kirkegaard, general manager Canadian Gold-Fields, Limited, Deloro, Ont.; S. H. Fleming, Ontario Graphite Company, Brougham, Ont.; J. R. Blaikie, president Board of Trade, Sudbury; James Stobie, mine owner, Sudbury; W. A. Allan, Russell Blackburn, Ottawa; James D. Sword, Rossland, B. C.; S. S. Fowler, Nelson, B. C.; J. M. Clark, Toronto; Francis T. Peacock, Montreal; A. P. Low, J. C. Gwillim, Ottawa; and others.

Addresses were made by Messrs. Clark, Stobie, Blaikie, Smith, Hixon, Adams and Bell. Mr. Hixon's address, which embodies substantially the plea made to the Government, was as follows:

"I wish to call your attention to the widespread and mistaken ideas about the extent and grade of the Sudbury nickel copper ores. It has been reported by unreliable and incompetent parties that there were hundreds of millions of tons of nickel copper ore in sight and that the grade was much higher than is the case. These statements have given rise to the desire that the public should share in the fictitious wealth and are one cause of the mysterious legislation which we wish disallowed. In my capacity as Dr. Mond's agent it has been my duty to traverse the nickel copper country and sample the ore deposits. From my personal knowledge I can state that if there was one-tenth part as much ore as has been reported there would be much larger deposits than actually exist. The average yield for the whole district will not exceed 3 per cent. of the combined metals, about one-half nickel and one-half copper, which would be 30 lbs. of copper and 30 lbs. of nickel per ton. The net value of the copper and nickel in the ore after mining is at the present market price of the metals 10c. for copper and 20c. for nickel, showing the following results: 30 lbs. of copper at 10c., \$3; 30 lbs. of nickel at 20c., \$6; total net value one ton mined, \$9; less cost of mining, \$2.50; remainder, \$6.50; proposed tax, \$7.

"I do not wish to say that we do not have ores that contain more nickel and copper than these figures, but taking the average of all the ores of the district the yield of marketable metals would not exceed 3 per cent. There are a few deposits being worked which yield ores containing 6 to 7 per cent. combined metals and it is only natural that these should be mined first, but I submit that the average yield of the district will not be above 3 per cent. From these average results it will be seen that the imposition of the tax would amount to confiscating the properties."

Mr. James Stobie, one of the oldest and most successful prospectors and property owners of Sudbury, who has been associated with the copper-nickel mining industry since its inception, cited instances where large foreign investments in nickel lands had been stopped by the intimation of this taxation.

#### LEAD SMELTING AND REFINING IN BRITISH COLUMBIA.

On April 15th a large deputation from the Kootenay District of British Columbia interviewed members of the Government with the object of securing a bonus in aid of lead-refining in Canada. The deputation comprised J. Roderick Robertson, general manager, and S. S. Fowler, mining engineer of the London & British Columbia Gold Fields, Nelson; H. E. Croasdale, Nelson; George Alexander, managing director, Kootenay Ore Company, Kaslo; A. W. Goodenough, Kaslo; D. Heap, Last Chance Mine, Sandon; G. F. Ransom, Slocan Sovereign Mine, Sandon; A. B. Clabon and J. Ferguson McRae, Rossland; G. G. Henderson, H. Bentley and C. P. Hill, Fernie; Mayor Carlson, F. E. Archer, W. V. Papworth, G. O. Buchanan, Kaslo; J. H. W. Smythe, Greenwood; W. H. Adams, M. L. Grimmett, C. Cliffe and J. Vallance, Sandon, and B. T. A. Bell, Secretary Canadian Mining Institute. The members of Parliament from British Columbia were also present. A number of speeches were made, and the following memorandum showing the urgent need of legislation in favor of the silver-lead industry of British Columbia was presented:

"The mining of lead in British Columbia has grown into a most important industry. The production in 1900 amounted to 60,000 tons of silver-lead ore, containing silver to the value of \$2,295,099, and about 30,000 tons of metallic lead of the value of \$2,690,577, or a total of \$4,985,676. At the first of the present year it was estimated that an output of more than 100,000 tons of ore, containing 50,000 tons of lead, would be reached in 1901. This is an expectation, in consequence of events that have since occurred, which will, however, be greatly disappointed.

"The bulk of all of this class of ores hitherto mined in British Columbia has been smelted in the United States, and the portion of it that has been smelted in Canada has also gone to the United States to be refined. At the beginning of 1901, the American Smelting and Refining Company, a trust which has absorbed nearly all the smelters and refineries in the United States, gave notice that it had withdrawn from the British Columbia market, and that until further notice it would make no contracts for the treatment of British Columbia ores. The capacity of the smelters in operation in British Columbia, and of the independent smelters in the United States, is totally inadequate to treat the normal output of the British Columbia mines, and many of the mines have in consequence closed down, and others have lessened their output. It is still possible to have bullion that has been smelted in Canada refined in the United States, but the refining charge has been greatly increased, and there is no tendency observable toward an increase of the smelting capacity in the districts now suffering. Nor is there likely to be, while the danger of the imposition of excessive rates for refining continues.

"It is the opinion of this delegation that for the relief of the distress at present existing, the surest and best remedy is the establishment, in some accessible situation within Canada, of a lead refinery, and that inasmuch as the establishment and successful operation of such a refinery would require the employment of a large amount of capital, not only in the construction and equipment of the refinery, but also in the purchase, treatment, transportation and marketing of the product, and inasmuch as the investment would be exposed to the danger of destructive competition from the American trust, whenever it chose to reopen its works to Canadian lead, your memorialists respectfully submit that the Dominion Government should grant a bounty, to be paid for a term of five years, at the rate of \$5 per ton upon pig lead, the product of ores smelted and refined in Canada.

"We submit that the transfer to Canada of the industry of working up as far as possible our stock of raw lead into manufactured forms, and the opening of an outlet through Canadian channels to the world's market for the whole of the product, is a matter of importance to the Dominion at large; that the production of silver and lead in British Columbia is capable of great expansion; that the employment of labor afforded will attract to the mining districts a large population of consumers upon a lavish scale of supplies and products of Eastern Canada; and that in all respects the measure of development liable to follow the



removal of the obstacles that now retard the industry will amply justify such expenditure of public funds as the granting of our request would involve.

"Your memorialists respectfully request that the rates to be charged for refining, by any refining company proposing to take advantage of any bonus provided by the Government, be made subject to approval, and revision by the Governor-General in Council, and that full power be reserved by the Government to withhold the payment of money claimed to have been earned by any refining company if it be at any time made to appear to the satisfaction of the Governor-General in Council that any excessive charges have been imposed, or unjust discrimination practiced by such refining company, as against any Canadian product treated by them or offered to them for treatment.

"The inequality of the duties levied upon lead products coming into Canada has been repeatedly brought before the Government by special delegations and by the Board of Trade, and dealt with by the convention of the Liberal party in the platform upon which Mr. Gallier, the present member of Yale-Cariboo Kootenay, was elected. It appears that the schedule of lead duties stands as it was framed many years ago when there was no production of lead in Canada. It is inconsistent with itself and with the tariff upon other goods of a similar class, and it operates to discourage the manufacture of lead in Canada, so that while we are producing and sending abroad a large quantity of lead in crude forms the Canadian market is supplied with the manufactured article from abroad. We ask the Government to revise this tariff and put it upon an equitable basis, which in our opinion would be reached by an increase of the duty upon pig lead from 15 per cent. to 20 per cent., and upon dry white lead from 5 per cent. to 25 per cent.

"This delegation respectfully urges upon the Government the consideration of the Mint question as brought before them in the memorandum of the Premier of British Columbia of January 28th, 1901. We strongly believe that the requirements of Southern British Columbia demand the construction of railways through the rich and undeveloped portions of Southern British Columbia, and that permission to build, and financial assistance where necessary, should be given to any responsible company intending to build a railway, whether crossing the International boundary or not, subject in all cases to Government control as to rates, and subject to such regulations as will afford protection to Canadian industries as to coal and coke supply, where such railways are designed to tap coal deposits upon which such Canadian industries are dependent for their fuel."

#### MINERAL INDUSTRY OF BRITISH COLUMBIA.

Written for the Engineering and Mining Journal by W. M. Brewer.

(Continued from page 513, Canadian Supplement for April.)

##### Nanaimo.

This mining district embraces a very large portion of the eastern side of Vancouver Island, together with Texada Island and that portion of the mainland lying between the west shore of Jervis Inlet and the head of Seymour Inlet, and extending inland about 100 miles. So far as the mineral resources along that portion of the coast are concerned, but comparatively little is known, although considerable prospecting has been done during the past two or three years. During the period of active operations at the Dorothy Morton mine, in what is known as Shoal Bay Camp, prospecting along the coast and for a few miles inland was very active, but since the shutting down of that mine in the fall of 1899, prospectors lost their confidence, and during the past year have practically suspended the work of exploration.

However, the property owned by the British Columbia Exploration Syndicate, at Estero Basin, Frederick Arm, promises to turn out satisfactorily. Development work has been pushed steadily during the past year with such satisfactory results that there is a strong probability that these properties will prove valuable. At the present time a long crosscut tunnel is being run with the expectation of intersecting the ore body at considerably greater depth than it has already been proven. In the upper workings a strong body of chalcopryrite developed, and apparently it maintains its continuity to considerable depth. With the exception of this work practically nothing has been done on that portion of the coast during 1900.

On Texada Island the progress made during 1900 has determined the value of the Copper Queen, Cornell and Marble Bay mines. On the former a depth of 500 ft. has been attained and on that level the ore body on the contact between limestone on the foot-wall and felsite was 4 ft. in thickness. Cross-cutting into the felsite demonstrated that that rock was 15 ft. in thickness, and did not form the permanent hanging wall of the ore body, because the crosscut intersected an ore body 12 ft. thick beyond the felsite, and having limestone for its hanging wall. At the present time stoping is in progress between the 500 and 400 ft. levels. The product is a bornite ore carrying an average gold value of about \$9 to the ton, and the copper contents running as high in some instances as 40 per cent., but averaging 15 per cent.

In order to develop the property further, a winze has been started in ore on the foot-wall side. This mine has been a producer of high grade ore, but of variable quantity from the surface down, averaging about 10 tons per day. The company has never extended the drifts beyond this one ore shoot, although the contacts in the breasts of the present drifts are well defined, and the indications are that other ore chutes might be found if the ground was thoroughly exploited.

The Cornell Mine has been producing a considerable tonnage of ore during the entire year, from the 80 and 160-ft. levels. Recently the main working shaft was sunk an additional 100 ft. The ore reserves above the 160-ft. level are still quite considerable, although they are not blocked out by such definite boundaries as to enable one to make any exact measurement. The most encouraging feature on this mine is the fact that while on the 80-ft. level a limestone horse occurs, which has been crosscut into a distance of 80 ft., yet on the 160-ft. level ore and felsite occur under the limestone. On the latter level the limestone forms the hanging wall of two ore bodies at the western end of the

workings. Stoping on both these bodies determined that about 25 ft. above the floor of the level the ore and felsite extended the entire distance between the foot-wall of the north body, and the foot-wall of the south ore body, the limestone having dipped at an angle of about 45° toward the east, between the 80 and 160-ft. levels. On the 80-ft. level, while the northern contact is well defined, yet it is barren, but on the 160-ft. level what is apparently the same contact carries ore of variable thickness, from a few inches up to 8 ft. About 300 ft. east from the main shaft are located what are known as the Glory-hole workings on this mine, from which the ore was stoped from the 80-ft. level to the surface, the ore body being about 50 ft. long, and an average of 15 ft. thick. Although these workings are connected on the 80-ft. level with the main shaft by a drift, yet no ore is found. On the 160-ft. level, what is known as the North ore body occurs along this contact and has apparently maintained its continuity with variable thickness from the shaft toward the Glory-hole workings. At the present time a drift is being run toward the Glory-hole, the face being about 140 ft. from that ore body.

The character of the ore in the Cornell is chalcopryrite, and although the values do not run as high as in the Copper Queen, yet the product from the two mines, as mixed for smelting, carry an average value of about \$25 per ton. The 50-ton smelter on these properties was blown in July 15th, 1899; recently an additional stack was added, increasing the capacity to 125 tons per day. Up to the present time about 10,000 tons of ore have been smelted from these two properties, and have yielded in the aggregate about \$250,000 to date.

The Marble Bay Mine has only been developed to a depth of 200 ft.; on that level a larger body of ore was opened than was found on the 70 and 140-ft. levels. Stoping is being done between the 200 and 140-ft. levels, and between the 140 and 70-ft. levels. The character of the ore is very similar to that in the Copper Queen, but the average gold values are somewhat higher. During the past year this property has yielded in the aggregate about \$30,000. The management proposes sinking an additional 60 ft. at once, in order to open out virgin ground, before the present stopes are exhausted.

During the past year some very promising prospects have been discovered, and developed to a limited extent, near the extreme north end of the island; in these the character of the ore is bornite and chalcopryrite. Some prospecting has also been done on other portions of the island, and on the west coast, about a mile southeast from the iron mines, a very promising prospect has been opened by the Puget Sound Iron Company, the owners of the iron mines.

That portion of Vancouver Island which is included in the Nanaimo Mining District embraces all the coal-fields of the island, except a limited area on the west coast, on Quatsino Sound, which is included in the Alberni Mining District. This district has been a producer of coal since 1836, and up to and including 1899 the total product was 14,511,684 tons, valued at \$43,916,576. Of this production, a very large proportion is exported, chiefly to the San Francisco market.

The Vancouver Island collieries are under the control of two companies, one known as the Dunsmuir, the other as the New Vancouver Coal Company. The properties of the former embrace an enormous area, and include all the coal lands on the east coast of Vancouver Island, with the exception of a few square miles, controlled by the latter company.

The first-named company has bunkers and wharves at Ladysmith on Oyster Bay, and at Comox Harbor, where it has also a plant of coke ovens. Coke has been manufactured there since 1895, and the total production has been about 75,000 tons. The market for this coke existed at the Kootenay smelters, until coke was made from the Crow's Nest Pass coal. Since that time the demand for Vancouver Island coke has been confined to the Texada Island Smelter, and a limited quantity which is exported to the United States. During the present year the export trade for Vancouver Island coal has averaged about 60,000 tons per month up to the end of October. The probabilities are that when the November and December exports are added the total average will almost reach the one million-ton mark.

**ELECTRIC RAILWAYS OF CANADA.**—The statistics prepared annually by George Johnson, Dominion statistician, on the electric railways of Canada show that at the end of December, 1900, the number of miles increased to 681, or 49 miles over the number in 1899. The 35 electric railways in Canada carried 118,129,862 passengers in 1900, an increase of 14,097,203. The car mileage run was 30,924,355 miles, an increase of 1,277,508 miles over 1899. The amount of paid-up capital invested in electric railways on December 31st, 1900, was \$20,633,000, and the bonded debt was \$12,619,422. The number of cars in active service in 1900 was 1,642, an increase of 98 over the previous year. The employees numbered 4,493, showing an increase of 164 over 1899. The total receipts for the year were \$5,422,540, and the expenses \$3,268,001.

**NIAGARA POWER FOR TORONTO.**—The "Canadian Engineer" states that the Niagara Falls Power Company (the Rankine syndicate) will now proceed with the power development on the Canadian side, under the charter of the Canadian Niagara Power Company, and a contract has been let to A. C. Douglass, of Niagara Falls, N. Y. The plan is to develop 25,000 H. P., of which about 10,000 H. P. will be conveyed to Toronto; some will be applied to local use, and about a third will be held for use on the United States side. The intake canal will be cut from the head of Cedar Island, and run to the power-house site within the park. The tunnel by which the water will be discharged down into the Niagara below the falls will have a capacity for the development of 100,000 H. P. The machinery used will be of much the same type as that on the American side, and cables will be used across the river so that an interchange of current can be made in case of accident or a fluctuation in demand on either side. The outlay required for this development is \$1,500,000. Mr. W. M. German, who is connected with the Ontario Niagara Power Company, a Canadian concern, which has an agreement with the Ontario Government till May, 1902, to develop power there, says his company will also soon start operations, and will not forfeit its charter.

## PERSONAL.

Mr. Joseph Boyle has been in Los Angeles, Cal., on his way back to Klondike from England.

Mr. A. Laidlaw recently resigned as manager of the Standard Pyritic Smelter, at Greenwood, B. C.

Mr. N. J. Coyle, of Coyle Brothers, the American railway contractors, of Hazleton, Pa., has gone to Newfoundland.

Mr. George McGillivray, of San Francisco, is going to Dawson, N. W. T., to accept a position with a hydraulic mining company.

Mr. George A. Walkem, of Kingston, Ont., has been appointed manager of the Vancouver Engineering Company, Vancouver, B. C.

Dr. Robt. Bell, of the Canadian Geological Survey, has had the degree of Doctor of Science conferred on him by McGill University.

Sir W. C. Van Horne and Messrs. James Ross and R. B. Angus, of Montreal, have been looking over industrial enterprises at Sydney, Cape Breton.

Mr. J. B. Hobson, manager of the Cariboo Consolidated Hydraulic Gold Mining Company, is at Bullion, B. C., and has started the mine up for the season's run.

Messrs. James and William Patterson, of New Zealand, have been in Vancouver, Nelson and other British Columbia cities looking over the opportunities for gold dredging.

Mr. William Thompson, mining engineer of London, Eng., after visiting the properties of the Cariboo Goldfields Company on William Creek, B. C., is on his way to England.

Mr. William M. Brewer for some time past representative of "The Engineering and Mining Journal" in British Columbia, is making a short visit to New York on professional business.

Mr. Joseph Luce, of Salt Lake City, recently returned from Mexico, has gone to British Columbia to report on mining property for London investors, and will be gone several weeks.

Messrs. Arthur Keen and Windsor Richards, of Guest, Keen & Company, of England, iron and steel manufacturers, after spending several days in the Birmingham, Ala., district, went to Nova Scotia, via Chicago, Pittsburg and New York.

Mr. William T. Jones, master mechanic of the Edgar Thomson Works of the Carnegie Steel Company, has been appointed master mechanic of the plants of the Dominion Iron and Steel Company in Nova Scotia, and is now at Sydney.

Prof. A. B. Coleman, of the Canadian Geological Survey, has arranged to spend the summer exploring in the Ontario iron regions for the Ontario Bureau of Mines. He will commence work in the vicinity of the Helen Mine, in the Michipicoton region, and endeavor to trace the direction and extent of the iron veins. He will then explore the Mattawin and Atikokan regions.

Mr. A. P. Low, late of the Canadian Geological Survey, is going to Labrador for a Philadelphia syndicate. He is one of the few men who have any scientific knowledge of the great mountains of iron ore to be found in Labrador, and is paid \$10,000 a year, and 30% interest in the stock, to secure his exclusive services. He will be accompanied by Mr. M. W. Hopkins, civil engineer, of Hamilton, and will be away for nearly two years.

## SOCIETIES AND TECHNICAL SCHOOLS.

McGill University.—The staff and students of the Summer School of Mining, in connection with McGill University, left Montreal May 1st by the Canadian Pacific for British Columbia. The party, which consists of 25 persons, went direct to Banff.

Mining Society of Nova Scotia.—The annual meeting was held in Halifax, April 10th. There was a good attendance. The following gentlemen were elected to membership: F. W. Green, Halifax; J. W. Pilcher, Canadian General Electric Company, Halifax; Marland L. Pratt, Crow's Nest Mining Company, Boston; C. J. Coll, Acadia Coal Company; L. F. S. Holland, Waverley Gold Mining Company, Waverley; Todd C. Woodworth, San Francisco; Sydney Smith, San Francisco; C. N. Crowe, Bridgewater; A. B. Kenyon, Mt. Uniacke; A. J. Moxham, Dominion Iron and Steel Company, Sydney; William Bolase, New Egerton Gold Mining Company, 15 Mile Stream; E. F. Harvey, St. Johns, N. F.; Sydney Wood, St. Johns, N. F.; Otto Collings, S. H. Holmes, Halifax; J. C. Mahon, Halifax; D. Forbes Angus, Intercolonial Coal Mining Company, Montreal; C. H. Porter, Halifax; F. A. Huntress, Halifax; Fred W. Hart, Halifax; L. J. Hesslein, Halifax; E. Howard Hughes, Montreal.

Mr. Harry Piers, curator of the Provincial Science Library and Museum, was elected an honorary member.

President W. L. Libbey in his address, after calling attention to the increasing value of the mineral output of Nova Scotia, spoke of the many new mining companies formed in the New England States to work in Nova Scotia and handled certain fake schemes without gloves.

## INDUSTRIAL NOTES.

The James Cooper Manufacturing Company, of Montreal, Quebec, is erecting an extensive new iron foundry at Lachine, for mining machinery. The works will cost \$250,000, and employ 300 hands.

The Norton Emery Wheel Company, of Worcester, Mass., has recently finished what is called the largest solid emery wheel ever made. It measures 60 in. in diameter, is 10 in. wide and weighs 2,127 lbs., net.

The Lidgerwood Manufacturing Company, of Brooklyn, N. Y., has secured an order for 5 electric hoist equipments which will be shipped to India for erecting purposes at the Cauvery Falls transmission line plant, Mysore.

The foreign shipments of wire during April through Eastern ports by the American Steel and Wire Company aggregated nearly 3,500 tons, an increase of nearly 20% compared with April. Australia was the largest customer, taking 1,209 tons.

The Truro Foundry and Machine Company, of Truro, N. S., has a contract from the Dominion Coal Mining Company, Glace Bay, C. B., to complete two 8-ft. sheaves fitted with adjustable bearings, to be used in their water shaft. The Truro foundry is also building a 100-ton cyanide plant at Cariboo Mines for the extraction of gold from tailings.

The Atlas Pipe Wrench Company of New York and San Francisco is to make a complete exhibit of pipe wrenches at the Pan-American Exposition at Buffalo. All sizes of the wrench will be on exhibition and a practical demonstration of the same will be given by an expert workman. The quality of the steel used and the finish and workmanship will be shown by wrenches in various stages of manufacture, from the bar steel to the finished product.

The Canadian Government is making extensive improvements in the waterways and seaports of the Dominion. Two large and modern steel-hulled dredges are now building from the designs of Mr. A. W. Robinson. One of these is for British Columbia, and the other for the St. Lawrence. Mr. Robinson has also been commissioned to examine the projected harbor improvements in Halifax, N. S., and St. John, N. B., with a view of designing a large self-propelling dredge to suit the conditions there existing.

At Sydney, C. B., the construction work on the bloom mill of the Dominion Iron and Steel Company is about completed and work on the open hearth furnaces is under way. As soon as the latter are completed, the rolling mills for heavy plates will be started. The open hearth furnaces will be located south of the blast furnaces, the rolling mills between the blooming mill and the open hearth furnaces. The Montreal Rolling Mills will be located directly south of the present machine shops. The second battery of blast furnaces is ready for operation.

The Vancouver Engineering Works, Limited—the English company formed to acquire the business of Messrs. Armstrong & Morrison at Vancouver, B. C.—has a capital of £40,000, in £1 shares, and the articles of association state that the object of the company is to acquire from the Vancouver Agency, Limited, the engineering works now carried on by Armstrong, Morrison & Company on the harbor of Vancouver City and to carry on the business of marine, mining, hydraulic, electrical and general engineers, shipbuilders and repairers. The first directors are Messrs. C. F. Jackson, C. Lancaster and C. A. Mather.

Eighteen Fairbanks hopper scales have been installed at the new steel elevator of the Great Northern Railroad at West Superior, Wis. The scales are each capable of weighing 120,000 lbs., or a car-load of grain. Specifications for the scales were given the Fairbanks Company at St. Johnsbury, Vt., on April 6th, and modified drawings were completed that evening. April 10th the first set of castings came from the foundry and the first scale weighing 4,300 lbs. was shipped west on April 15th, and the last 5 scales of the 18 were shipped on April 25th. The scales had to be completed on short notice, as the scales originally put in the elevator were condemned by the Minnesota authorities.

At a recent meeting of the National Tube Company the following men were chosen directors: President, F. J. Hearne; E. C. Converse, member executive committee United States Steel

Corporation; William N. Cromwell and William J. Curtis, general counsel for the tube combine; Charles Steele, representing J. Pierpont Morgan & Company; Wm. B. Schiller, first vice-president; Wm. H. Latshaw, second vice-president; J. D. Culberston, third vice-president; A. S. Matheson, fourth vice-president. The following directors retire: Henry Aird, Robert Bacon, J. R. De La Mar, John Don, John Eaton, William S. Eaton, William P. Hamilton, A. F. Luke, Daniel O'Day, Francis L. Potts, Joshua Rhodes, William B. Rhodes, F. R. Tobey and J. N. Vance.

## TRADE CATALOGUES.

The Central Canada Chamber of Mines, of Winnipeg, Man., is sending out printed matter in the hope of calling attention to the gold mines of Western Ontario. It is to be regretted that, although the chamber may have good intentions, some of the printed matter, reprints of articles in a Manitoba paper, is full of absurd and ridiculous statements which are likely to do more harm than good.

The Northey Manufacturing Company of Toronto issues several pamphlets describing the pumps it manufactures. The company's power-pump catalogue contains 60 pages. It describes vertical triplex power pumps, which are made in a variety of styles and sizes; also horizontal single and duplex pumps and Northey centrifugal pumps. The catalogue also contains tables showing theoretical horse-powers required for raising water to different heights, friction of water in pipes, etc.

## GENERAL MINING NEWS.

## BRITISH COLUMBIA.

An important amendment to the Mineral Act deals with the recording of claims in the names of free miners by agents. Heretofore prospectors carried about the numbers of free miners' certificates held by friends and freely used them for the purpose of recording locations in excess of the limitations of the act. The amendment proposed sets out that before making any such records as agent a power of attorney must be filed in the office of the mining recorder for the division in which the claim is situated, and no such agent shall locate or record more than one claim each for two principals on each separate vein or lode.

Another amendment provides that work done on trails, to the satisfaction of the gold commissioner or mining recorder, may be counted on certificates for work.

## Atlin District.

Atlin Mining Company.—The company's hydraulic plant has all been delivered at McKee Creek, and the work of constructing the flume is in full swing. Fifteen men are now employed on the work, and Mr. Featherstonhaugh expects to have everything ready to start piping on June 1st. A great deal of difficulty was experienced in hauling the heavy pipe from Caribou owing to the bad state of the trails.

Freight Rates.—The White Pass & Yukon Railway Company and the steamship lines running to Skagway recently agreed on freight rates from British Columbia and Puget Sound points through to Atlin and Dawson, and have issued joint rates to hold till October 10th. The new tariff is based on weight and not on measurement, as was the rule last year. The rates are lower than last year, and range from \$90 to \$290 per ton, according to classification (though mining machinery, exclusive of hydraulic pipe, is \$65 per ton of 2,000 lbs.). It is understood that all the lines, via Skagway, interested, are to be subject to a differential of 10% in favor of the all-water route via St. Michael.

Pine Tunnel Syndicate.—Negotiations are pending with Eastern men to organize a joint stock company to work ground on Pine Creek by hydraulic methods and dredging. O. T. Switzer has charge of the negotiations. The provisional agreement with the underwriters is for 40% of the capital stock of the company, to be paid to the trustee, Mr. Brownlee, for the property.

## Boundary District.

Boundary ore shipments.—The tonnage shipped by Boundary District during April to May 2d, inclusive, so far as ascertained, is approximately as follows: Old Ironsides and Knob Hill Group, 1,245 tons; Mother Lode, 5,210 tons; B. C., 160 tons. Shipments for the current year to April 30th are as follows: Old Ironsides and Knob Hill Group, 73,522 tons; Mother Lode, 19,020; B. C., 14,862; Athelstan, 550; Carmi, 1,000; sundry shipments, 1,000; total to date, 109,954 tons. Last year's shipments amounted to 97,593 tons.

Blue Bell.—John Dorsey is also developing this claim at Summit. Drifts have been run north 50 ft. and south 35 ft. An 8-ft. winze has been sunk at the end of the north drift. Mr. Dorsey has gone to Chicago to complete arrangements for taking up the bonds. Since work was started a double compartment shaft 6 by 10 ft. has been sunk, with levels at 50 and

100 ft. Mr. Dorsey thinks of installing a small compressor and hoist.

**Dominion Copper Company.**—At the Brooklyn shaft house the two 80-H. P. boilers and the Bullock diamond drill—all of which were supplied by the Bradley Engineering Company, of Spokane, have arrived and the two large hoists as well. The compressor comes from Montreal. The work of extending the south drift at the 250-ft. level of the Brooklyn, to connect with the Idaho workings, goes on. The workmen are now in about 630 ft. and probably 100 ft. below the creek bed. Three shifts are working at each mine. The Idaho shaft is down about 80 ft. At the Rawhide Contractor Gillis has 15 men busy sinking.

**Granby Smelter.**—During the week ending May 11th the Granby Smelter treated 4,527 tons of ore. Total treated to date, 140,692 tons.

**J. S.—John Dorsey,** representing the Lake Shore Copper Mining and Development Company, has made a payment of \$4,000 to James Jarrel and W. B. Bower on a \$27,000 bond on the J. S. claim in Summit Camp.

**Rock Creek Consolidated Placer Mining Company.**—This company's boom dam is in operation. The large discharge gate is automatically opened every 20 minutes and the reservoir, 300 by 100 ft., with a depth of 12 ft., is let loose. A second company, known as the Amalgamated Rock Creek Placer Mining Company, owning claims on Baker Creek and the south fork has been organized and will shortly have a boom in operation on Baker Creek.

**Standard Pyritic Smelting Company.**—E. J. Wilson, superintendent of the company's smelter, recently returned from Quebec. Certain changes at the smelter are to be made and it is not definitely settled when the smelter will be in operation. H. E. Price, brother of the president of the company, has succeeded Mr. Laidlaw as manager in the district, with headquarters at Greenwood.

**Vancouver-Boundary Creek Development and Mining Company.**—Robert Wood, of Greenwood, and others, have merged their mining properties into this company, with a capital of \$500,000, divided into 2,000,000 shares at 25c. each. The company has the Sally group on the West Fork and in Penticton Camp the Okanogan, Klondyke, Torpedo and Penticton claims. In the west fork of the Kettle River District the company has the Rob Roy, Sally, Highland Queen, Excelsior, Maple Leaf No. 2, and half interest in the Rosalie.

**Cariboo District.**

**Cariboo Consolidated Hydraulic Gold Mining Company.**—J. B. Hobson, manager, is now at Bullion, the camp of this mine, where he had planned to explode 175,000 lbs. of black powder in the various tunnels of the mine, making available for sluicing some 2,000,000 yds. of pay dirt.

**Forty-third Mining Company.**—A pack train of 30 animals arrived at the property in the Omeca Division of this district, some weeks ago and work has begun, though the spring has been exceptionally late.

**East Kootenay District.**

Most of the principal properties about Peterborough will be worked extensively this season.

The Silver Crown group, Silver Belt group and Shamrock will be developed extensively during the coming season.

**Carbonate King and Carbonate Queen.**—These claims near the Paradise Mine will be worked this season.

**Crow's Nest Pass Southern Railway Company.**—The political excitement at Ottawa caused by the projected railway from Crow's Nest Pass to the American boundary line subsided quickly. The outcry was led apparently by men favorable to the Canadian Pacific Company, which now enjoys a monopoly in handling Crow's Nest Pass coal. The Railway Committee at Ottawa, however, finally passed the bill to incorporate the Crow's Nest Pass Southern Railway Company by a unanimous vote. This was done after the Minister of the Interior submitted an agreement that the Dominion Government had entered into with the Crow's Nest Pass Coal Company and the Crow's Nest Southern Railway Company, providing against discrimination against Canadian consumers, the penalty being \$3 per ton. The agreement shall terminate when effective and satisfactory competition has arisen. The Geological Survey of Canada in its summary report for 1900 gives a description of the coal fields of Crow's Nest Pass by J. McEvoy, who estimates the actual area to be approximately 230 square miles, and the coal in the Crow's Nest deposits at 22,595,200,000 long tons.

**Dutchy.**—H. E. Neave, the mining engineer, of many years' experience in South Africa, has bonded this group, a promising copper property situated on Dutch Creek. Mr. Neave represents an English syndicate.

**McDonald Mines.**—A strike of importance is reported on the Iron Cap Claim of this group, situated on McDonald Creek, a tributary of

Horse Thief Creek. It is understood that 7 ft. of high grade ore have been struck. The final payment on the group was made recently and it is now owned by a New York syndicate represented by Thomas Starbird, of Peterborough, B. C. So soon as the Government wagon road is completed to the mouth of McDonald Creek from Peterborough, it is the intention of the management to begin shipping.

**Paradise.**—Development work on a large scale will soon start up on this mine.

**Spring Creek.**—This property has made a shipment of 1,000 tons to Peterborough Landing.

**St. Eugene Consolidated.**—The mine is partly closed, owing to the fall in demand for lead ores, but about 20 men are busy on contracts which have several months to run.

**Vancouver Island.**

**Copper Canyon.**—This group of 3 claims near Mount Sicker and the Anoka group of 3 claims nearby are reported bonded by P. J. Pierson, of Mount Sicker, to W. A. Dier, of Victoria. E. E. Smith, of New York, is interested in the deal. The ore carries gold, silver and copper.

**Leonora.**—The shipments from this mine, Mount Sicker, to the Tacoma Smelter in May, via Ladysmith, amounted to 1,336 tons.

**Wreck Bay Placers.**—Wreck Bay black sand placers on the West Coast of the Island are reported to be giving high returns.

**West Kootenay District.**

**Rossland Ore Output.**—The shipments for the week ending May 11th reached a total of 9,740 tons. The shutting down of the smelter at Northport for repairs made a little difference, as it was unnecessary to force matters in order to keep up the supply. The smelter will resume operations soon. The shipments of the week and year to date are approximately:

	Week.	Year.
Le Roi .....	4,640	76,628
Center Star .....	1,920	39,288
War Eagle .....	900	13,830
Le Roi No. 2 .....	1,140	12,892
Great Western .....	800	5,431
Iron Mask .....	80	1,873
Velvet .....	.....	563
I. X. L. .....	.....	139
Evening Star .....	.....	74
Spitzee .....	.....	60
Giant .....	.....	52
Portland .....	.....	24
Totals .....	9,740	150,854

The ore output for the week ending May 4th broke all records, the total being 11,660 tons, or more than 2,000 tons over the best previous week, that ending March 9th. The shippers were Le Roi, 6,960 tons; Centre Star, 1,710; War Eagle, 810; Le Roi No. 2, 1,280; Rossland Great Western, 800; Iron Mask, 100; I. X. L., 20; total, 11,660 tons.

**Slocan Lake Ore Shipments.**—Shipments of ore from Slocan Lake points, up to and including April 27th, from January 1st, 1901, were: From New Denver—Hartney, 120 tons; from Bosun Landing—Bosun, 220 tons; from Silverton—Alpha, 40 tons; Hewett, 526 tons; Emily Edith, 40 tons; from Enterprise Landing—Enterprise, 140 tons; from Slocan City—Arlington, 1,855 tons; Two Friends, 40 tons; Black Prince, 100 tons; Bondholder, 50 tons; Chapleau, 15 tons; Speculator, 20 tons; Phoenix, 20 tons; total, 2,686 tons. The shipments for the year are valued at over \$250,000.

**Ainsworth Camp.**—Great activity is reported in Ainsworth Camp. The Highlander Mine employs men on development work. The King Solomon has so far progressed that it is expected to join the regular shippers shortly. The Fourth of July is making arrangements for an active season's work. P. Larsen is arranging to start a new tunnel at the Eden Crescent on Coffee Creek.

**Center Star.**—Work is proceeding as usual.—The directors recently passed a dividend, and indicated their intention of doing so for some months. Mr. E. B. Kirby, the manager, reported that the workings lately have been in barren ore.

**Cleveland & British Columbia Company.**—This company is developing its 2 claims near Porto Rico siding, 4 miles north of Ymir. The Ocean Wave claim has a vein 7 ft. wide on the surface. Development is being prosecuted by a crosscut tunnel which after being run 168 ft. strikes the vein at a depth of about 100 ft. The ore is mainly a white quartz heavily mineralized with iron pyrites.

**Enterprise.**—Work has started on the concentrator to be erected this summer at this mine on Ten Mile Creek, owned by the London & British Columbia Gold Fields. The contract for the erection of the plant, which includes a compressor, has been let to George McFarlane, of Nelson. It is expected that the concentrator will be in operation by September. About 25 men are now employed at the mine.

**Hewitt.**—E. A. Brown, of Sandon, has, it is said, secured the contract for erecting the aerial

tramway at this mine near Silverton. It will be 2,400 ft. in length, with a capacity of 50 tons per shift. It will run from the foot of the hill to the No. 3 and No. 6 tunnels. In place of buckets 2 conveyers will be used, each with a capacity for carrying 15 sacks of ore. The company will erect a large ore house at the foot of the tramway.

**Highlander.**—This mine at Ainsworth is doing considerable development work. The big tunnel has been going ahead at the rate of 5 ft. per day. The first ledge is reported cut. It is of soft material. The second lead, 100 ft. further in, has been shown by drill cores to be 100 ft. wide, of which 15 ft. are mineralized. When the main ledge is cut an upraise 1,000 ft. long will be run to surface.

**Ivanhoe.**—This Slocan mine has closed down save for development work, as a result of the slump in lead ore values. It has been shipping from 80 to 100 tons a week, and is the property of the Minnesota Silver Company. Its mill and tram were built last summer at a cost of \$60,000. It is stated that the mill will be reopened in July.

**I. X. L.**—Some very rich ore is being extracted. Driving is in progress in the lower tunnel to catch an ore body that was located in No. 3½ tunnel, 80 ft. above. John S. Baker, of Tacoma, is managing director.

**Le Roi.**—According to a local paper, the delay in completing the needed additions to the Northport Smelter has caused the Le Roi management to incur a very large temporary overdraft, the amount of which is due to the Bank of Montreal. Until this has been practically cleared further dividends are not expected. On March 1st the overdraft was \$775,000, but it was covered by matte in transit to the refinery, and by ore waiting treatment at the smelter, worth together some \$1,085,000. Mr. Whitaker Wright, the paper says, as the above facts indicate, completely misled the stockholders at the December meeting, when he assured them that the Bank indebtedness was then cleared, adding that a period of steady dividend payment might thereafter be expected.

**Le Roi No. 2.**—The shaft on the No. 1 has reached a depth of 840 ft.

**Maybe.**—At this claim near Ferguson a 200-ft. tunnel is being driven.

**Minnesota Mining Development Company, Limited.**—This company has been organized at Rush City, Minn., for the purpose of developing 3 silver claims located near Comaplex. K. A. Ramberg is president, A. J. Stone vice-president and general manager, E. J. Boyle secretary and J. B. Martell treasurer, with the main office at Rush City.

**Nettie L.**—At this mine near Ferguson 25 to 30 men were at work all winter and about 800 tons of ore were shipped. The ore carries silver, gold and lead. It has to be rawhided about 2 miles, when it is put on sleighs and carried 18 miles to Thompson's landing, transferred to steamer and again rehandled and put on the rail for the Trail Smelter. The freight and treatment charges average \$30 per ton. Shipping is temporarily suspended from bad roads. The main shaft is down 150 ft.

**Rossland Great Western.**—On the 800-ft. level considerable ore is being stoped, and a station is being cut south of the shaft for an electric pump. Ore of good grade is being taken from the stopes on the 200-ft. level. The new 40-drill compressor is at work. The motor is the largest of its kind in Canada. It is a 600-Kw. (900 H. P.), running synchronously with the generator at Bonnington Falls. It is operated by a 2,200-volt alternating current and has a starting motor of 30 H. P. for which currents are supplied by transformers of the 3 to 2 pattern. The big motor runs at the rate of 350 revolutions per minute and is coupled to the driving shaft and rope by a double ribbed Frisbee clutch. The driving shaft is coupled to the compressor by the Dodge system of rope transmission. The rope drive consists of 16 strands, of 1¼-in. rope. The driving shaft is supported in self-oiling bearings throughout of exactly similar construction to the motor. It is the largest S. K. C., 3-phase motor ever installed in Canada or in the United States, and was constructed by the Royal Electric Company of Montreal. The compressor is of the Rand cross-compound type with Corliss valves. The cylinders are 36 by 48 in. and 22 by 48 in. The air is taken in from outside the building through a wooden box 30 in. square and in the low-pressure cylinder is compressed to about 20 lbs. per sq. in. It then enters a large inter-cooler and goes to the high pressure cylinder with a temperature of about 60 degrees Fahrenheit. In the high-pressure cylinder the pressure is raised to about 90 lbs. per sq. in. and delivered to the mains, whence it is used for pumping, hoisting and operating rock drills. This is the largest electrically-driven compressor in the Dominion. The motor complete weighs 80 tons. The compressor complete weighs about 70 tons, and the fly-wheel alone 20 tons. The compressor was built by the Canadian Rand Drill Company at its works at Sherbrooke, Que., and was installed by Mr. Charles Sangster, the

erecting engineer for the Canadian Rand Drill Company in British Columbia.

**Spitzee.**—A contract has been let to unwater the shaft. When this has been done the intention is to resume the work of deepening it.

**Tamarac.**—The first shipment of ore from this mine at Ymir has been sent out. Car-loads will be sent to the Silica Reduction Works every few days until the 400 tons contracted for is made up. In the north drift the ore is reported to be 10 ft. wide and carrying fair values.

**Tribune.**—This claim near Ferguson has shipped 150 tons of ore since last July. Laid Brothers have a lease.

**Velvet.**—The foundation of the compressor plant is repaired. The road leading from the mine to the Red Mountain railway is to be put into shape so that ore can be hauled over it.

**War Eagle.**—The 40-drill electric compressor at this Rossland mine is repaired. The tramway is working in a satisfactory manner. The management is reticent as to developments in the mine.

#### Yale District.

**Coal Lands.**—There is reported to be something of a boom in coal lands near Princeton, and many locations have been taken.

**Nickel Plate.**—It is reported that a miners' strike is on at this mine, in the Similkameen. The Nickel Plate is located in Camp Hedley, up Twenty-Mile Creek, about 4 miles from Similkameen City. The cause of the strike is due to a cut from \$3.50 to \$3 per day in wages. All but a few of the 25 men employed walked out. The mine is owned by the Marcus Daly estate.

#### NOVA SCOTIA.

##### Cape Breton.

**Dominion Iron and Steel Company.**—The second blast furnace of this company at Sydney was blown in May 9th. The new furnace has a capacity equal to that of the first. It is 90 ft. high and 18 ft. in diameter at the bosh.

**Nova Scotia Steel Company.**—This company's property is reported bonded to a syndicate of English-American capitalists. The company is employing 400 men on its coke oven plant under J. D. Fraser. Over 200 tons of coal daily are being shipped to New Glasgow.

The price asked for the company's property is said to be \$5,000,000, of which \$2,500,000 are for the Sydney mines property, which the present company bought from the old General Mining Association for \$1,500,000, the balance being divided between the works at Trenton and Ferrona, and the Wabana iron mines, Newfoundland. It is stated that the Nova Scotia Steel Company is treating with the syndicate through a firm of brokers at Montreal. It is stated that the present directors of the Steel Company will remain in the new corporation. The deal is consequently rather the strengthening of the present company by a very large amount of American capital than the total sale of the property. It is regarded as practically certain that the deal will go through. It looks as if the company is preparing to make extensive shipments from Wabana this summer.

#### ONTARIO.

**Ontario Metal Production.**—The Ontario Bureau of Mines has prepared a report showing the output of the metalliferous mines and works of the province for the 3 months ending March 31st, as follows:

	Quantity.	Value.
Iron ore, tons.....	36,503	\$44,100
Pig iron, tons.....	28,694	438,659
Nickel, lbs.....	1,805,691	100,858
Copper, lbs.....	1,690,391	75,625
Arsenic, lbs.....	236,084	12,040
Gold, oz.....	3,150	54,520
Silver, oz.....	20,077	12,046

Total tons .....\$827,860

For 1900 the total value of these products was \$2,541,191. Thus the output for the 3 months past is 30% above the 3 months of 1900. The largest increases are in iron ore and pig iron; nickel and copper remain at about the same level of production; arsenic shows a decided increase, while gold and silver have fallen off. The report says: "The quantity of iron ore smelted into pig iron at the 3 furnaces of Ontario, all of which are in steady operation, was 48,663 tons, of which 21,083 tons were from Ontario mines and 27,580 tons were imported ore. The proportion of native ore smelted during the quarter rose to 43% of the whole, as against 23% in 1900. In addition to the ore 3,480 tons of scale and mill cinder were smelted. The total quantity of nickel and copper ore mined during the period was 72,036 tons, being a proportional increase as compared with the whole of 1900 of 31%. The new nickel-copper and copper mining companies are beginning to raise considerable quantities of ore, but not much of it has yet been smelted. The quantity of gold ore crushed was 10,174 tons. On the whole the outlook is for a decided increase during the present year in the quantity and value of the product of Ontario's metalliferous mines and furnaces."

#### Iron—Wabigoon Range.

Prospectors who have taken up a big area along this range are said to have exposed some fine iron ore. The range is due north of Barclay Station and is only half a mile from the main line of the Canadian Pacific Railway.

#### Algoma District.

**Consolidated Lake Superior Company.**—It is stated that this company and the Ontario-Lake Superior Company, both enterprises of F. H. Clergue, are to be consolidated with a total capitalization of \$117,000,000. The Consolidated Lake Superior Company is the parent concern of the steel, pulp and mining enterprises at Michipicoton and the "Soo," while the Ontario Lake Superior Company controls the Algoma Central Railway, being built from the Soo to Michipicoton and Hudson Bay, and the Central Algoma Steamship Line. The important point in the pending amalgamation is the vast increase in the joint capitalization from \$65,000,000 to \$117,000,000.

#### Hastings County.

**Canadian Goldfields.**—The company recently took out an immense piece of rich mispickel ore that will weigh 3,000 lbs., at its Deloro Mines, which has been sent with the company's special exhibit to the Pan-American Exposition. The arsenic works are running at full capacity and turning out a good quality of the product. The company has 150 men in its employ at present.

#### Lake of the Woods District.

**Mikado.**—The result of the last semi-monthly clean-up is a good-sized gold brick. Before leaving on his trip to the old country Manager McMillan stated that the workings of the mine are looking well. Resident Director Deacon is now at the mine.

**Sultana.**—A gold brick of 180 oz. (\$3,200) was brought in from this mine recently as a result of 10 days' run of the 20-stamp mill. The workings on the Crown Reef have been joined on the fourth level with the older workings. Some particularly rich ore was met with near the point where the connection was made. The general average, however, is said to be over \$10.

#### (From Our Special Correspondent.)

**Carlton.**—Mr. Higbee, of Rat Portage, manager of the Higbee Mine, while at St. Paul recently put through a deal on this property on Flint Lake, a few miles from the Gold Banner. The price is \$7,000. The Carlton Brothers are to put up camps and do some surface work.

**Mikado.**—Mr. McMillan, superintendent of this mine, has gone on a trip to Scotland, and during his absence Mr. Deacon, the local director of the company, will be in charge. The stampede to the Sturgeon Lake country, north of Bonheur, on the Canadian Pacific Railway, continues. Men are arriving at Ignace station almost every day, bound for that district. A wagon road from the railway tracks to Sturgeon Lake is badly needed.

Rumors are rife with regard to a number of prospects at present idle, but on which work is to be resumed "in the near future."

**Sakoos.**—The main shaft is down about 225 ft. Seven machine drills are at work. The shipment of ore has ceased for a time, the railway track having been put out of commission by the spring freshet, but trains will soon run again. The Keewatin stamp mill requires about 50 tons of ore a day to keep it going, and this will require 8 drills at the mine. The vein runs from 18 in. to 5 ft. wide. Additional drills will be put on when the drift starts at the 300-ft. level, and also at the 400-ft. level.

#### Rainy Lake District.

**Ontario Gold Mining and Milling Company.**—This company is making shipments from the Sakoos Mine, which it took over from Messrs. Watson and Munroe. It has been worked continuously ever since the first shaft was started. The main shaft is now 35 ft. below the second drifts which are being run at the 200-ft. level, and the 3d levels will be opened up at 300 ft. Seven machine drills are working in the shaft and in the different stopes, and the open cut down to the 100-ft. level is nearly completed. A lot of ore is accumulating on the dumps, as shipments have ceased for a time, since the spring freshets injured the track. To keep the 20-stamp mill at Keewatin steadily at work would require about 50 tons of ore a day, which, when the levels are run and stopes started, would keep about 8 drills busy. The vein varies from about 18 in. to 5 ft. wide, with occasional lenses of considerably greater width, and the values keep very constant. In the lower levels there are specimens of ore taken out from time to time showing visible gold.

#### YUKON.

**Mining Developments.**—Late reports from Dawson City indicate that there has been some new ground opened up during the winter; this has been the case particularly on Gold Run Creek. The work on Hunker Creek is reported to have been generally satisfactory and the clean-up is expected to be as large as last year.

Along Sulphur Creek work is more scattered. Upon perhaps the best claim along the creek, No. 37 above, 25 men with a steam thawing plant were busy during the winter. Upon No. 38 above, 10 men and a steam thawer have been busy. Along Dominion Creek work has hardly been as brisk as in former winters, as claim-holders there find it possible to work in summer; still a large number of steam thawing outfits have been busy, and good sized crews of men. Creek No. 7 above discovery has been worked vigorously with good results. A steam plant upon No. 2 below upper has been taking out 1,200 buckets of dirt a day, No. 3 below upper will be worked by a steam plant all summer. Upon No. 31 below upper several shafts are down and the ground will be worked all summer. Upon the Barrett & Colman claim, No. 32 below upper, 2 shifts have been busy and 2 very large dumps are the result. A fine steam plant with self-dumping buckets is used. No. 10 above upper is said to be the richest claim on Dominion. Machinery for summer work is in place. The hillsides on the right limit of 4, 5, 6 and 7 have been prospected, with fair results.

#### MINING STOCKS.

(Full quotations of the Toronto and Montreal Exchanges will be found on page 639.)

May 16.

(From Our Special Correspondent.)

Interest is lacking in our mining share markets, owing partly to the attention that was drawn to the railroad and industrial stocks through the activity on the New York Stock Exchange. It is clearly evident, though, that with the break in the Northern Pacific "corner" that boomed Wall Street speculation our industrial share market will gradually assume its usual quiet. In fact, there is already an improvement in mining stocks, though we cannot look for much activity until the big mines in British Columbia resume dividends. So far this year only 6 mines—Center Star, Ymir, Payne, North Star, Arlington and Bosun—reported dividends aggregating \$350,500, which is equal to about 3% on their total issued capital stock of \$9,850,000. Of these dividends the Center Star alone paid \$105,000, which is at the rate of 12% per annum on its \$3,500,000 capital stock.

Dealings in Center Star shares were good, but prices have been off, fluctuating between 38c. and 24c., and later recovering to 36c. Payne on comparatively small sales softened from 38c. to 20c. North Star, though it was not noticeably dealt in was held at 70c. against offers of 40c. War Eagle was without support, as no dividends have been paid since February last year, and it is uncertain when a declaration will be made; the shares slumped from 35½c. to 14c. Cariboo-McKinney did not fluctuate as widely as its colleagues, as stockholders were not willing to trade at the market price of 34c. White Bear did a large business, as it is one of the favorite cheap-priced stocks.

Large transactions were also reported in Golden Star of Ontario around 7c. Republic of Washington, which is controlled in Montreal, attracted attention on the local exchange, selling at 28½c. and later down to 15c.

Crow's Nest Coal shares are not on the market, although quotations were \$86@870. These prices are of little account, for just as soon as stock appears the quotations go up, as brokers are anxious to keep it on the market, for there are comparatively few high-priced Canadian securities obtainable.

While the tax on nickel engaged legislative attention, a bill to incorporate the Algoma Iron and Nickel Steel Company was passed. Its maximum capital stock has been increased from \$30,000,000 to \$40,000,000. This is Clergue's Company, and much is expected of it, though it will be some time yet before we shall see the finished products.

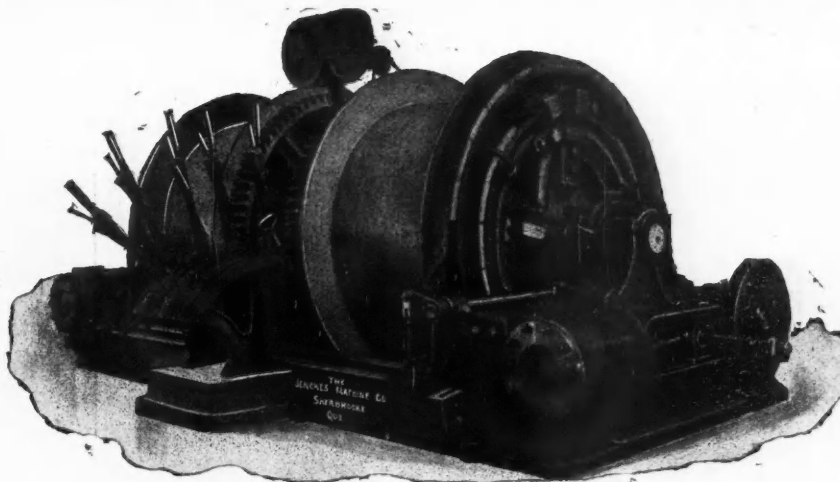
Our local newspapers are publishing oil advertisements, similar to those appearing in periodicals on your side of the Canadian border. These companies claim to own oil producing land in California, and clothe their misstatements by saying that Rockefeller, Carnegie and many other multi-millionaires owe their fortunes to oil investments.

When we consider the time and expense of opening and operating a real oil well, we seriously doubt the validity of a company's stock that sells at 10 to 25c. per share and upon which it pays dividends of 2% per month, or 24% per annum, before enough oil is produced to pay even office expenses. Undoubtedly many of these "get rich quick" shares will be bought by people who really cannot afford to lose the money. Moreover, the promoters of these wild-cat companies hint that there is a possibility of the big Standard Oil Company buying them out at a handsome figure. It is very unfortunate that legitimate mining enterprises find money so scarce here, while a scheme like the oil craze will attract capital. Everybody expects to make a fortune in oil, but it is almost certain the majority of small investors will meet misfortune. We shall see.

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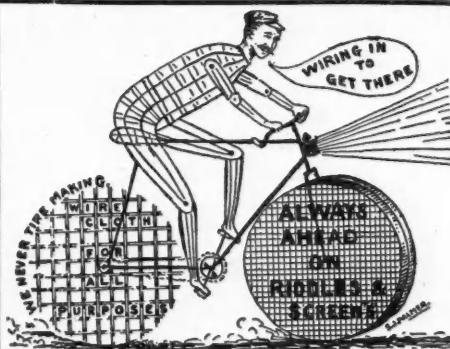
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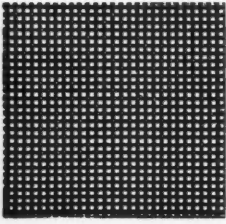
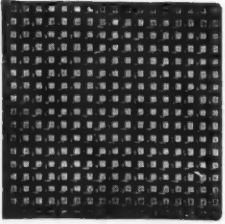
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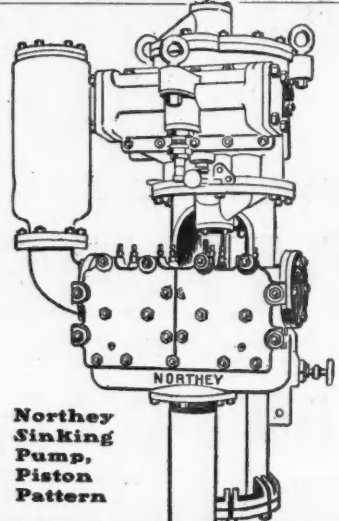



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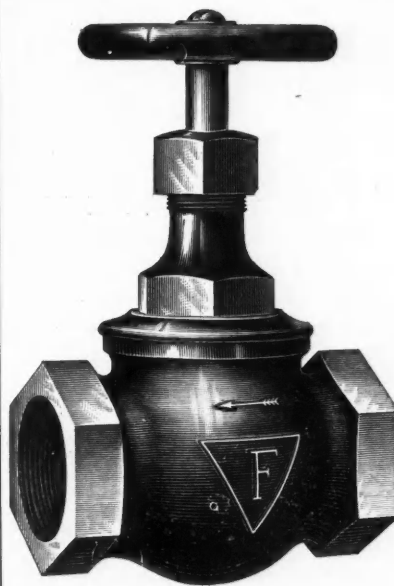
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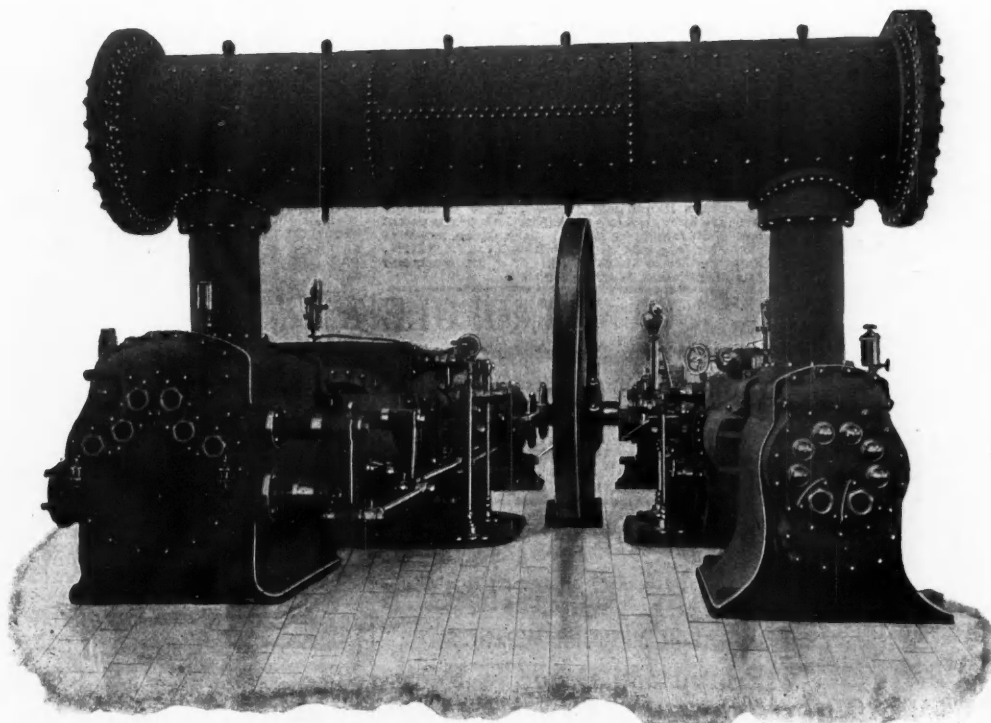
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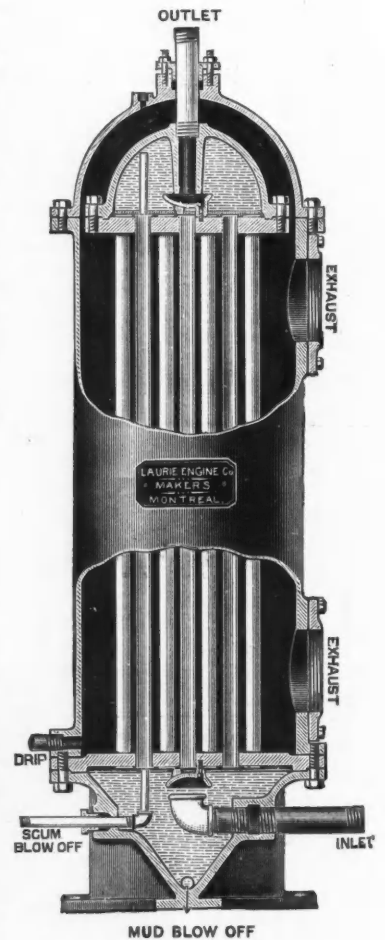
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