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# MINING RECORD

ESTABLISHED 1895

VOL. XII.

JANUARY, 1905.

No. 1

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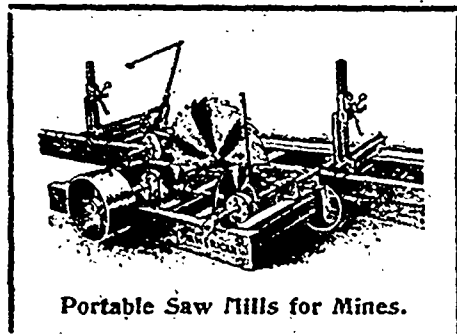
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# MINING RECORD

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No. 1

## BRITISH COLUMBIA MINING RECORD

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### VALE.

WITH this issue the present editor, who has been associated with the active management of the MINING RECORD for the last seven years or more, takes regretful leave of his readers, arrangements having been recently concluded by which the work will in future be carried on by Mr. E. Jacobs. We do not think it necessary to introduce Mr. Jacobs to the readers of the MINING RECORD, for he is already widely known as an exceedingly well-informed and conscientious mining journalist. In fact, we question whether any man in the province has a better general knowledge of mining conditions in British Columbia; while, too, he enjoys in a large measure the respect, esteem and trust of the representative mining men of the country to whom his many excellent qualities, his sterling honesty, reliability and independence of character are appreciated at their full worth. Since the establishment of the RECORD in 1895, it has been run on "straight" lines. The steadfast aim from the start has been to get at the truth at all hazards. In this process and by attempting to follow out this policy we have made some enemies but many friends. In saying farewell, it is a satisfaction to believe that, in this regard at least, a change

of management will mean no change in the manner in which the RECORD will continue to be conducted.

### THE MINING INDUSTRY IN 1904.

PROBABLY, since the inception of mining on an industrial footing in British Columbia, no year has been less, in a sense, eventful than the period we now propose to briefly survey. Yet this is not to say that there has been a cessation of progress, or that industrial conditions have been less generally favourable, for the contrary is true; but rather it is difficult to refer to developments in any particular direction as being in themselves specially worthy of remark. But this again is perhaps merely indicative of the improvement that has undoubtedly taken place in the direction of greater industrial stability, for while on the one hand there has been less speculative activity and consequently less incentive to prospecting effort, attention has been more earnestly directed towards the development and operation of mines already established than possibly at any previous time. While too, claim owners having shown a disposition to treat with capital in a more reasonable spirit than formerly, a greater proportion of promising prospects in the several districts have been acquired and operated during recent months on working-bond terms. A further matter of congratulation is the better understanding now existing between capital and labour in the mining districts, the year having passed without friction of any sort. In the matter of mineral production, although full returns are not yet available, there can be no doubt that this year a very considerable increase, both as regards tonnage and values, has been made, as a result of increased copper-gold output from the Boundary district, and also of the greater activity, attributable to the Government bounty on lead, in the silver-lead districts. The problem which a year or so ago appeared to present some difficulties, in respect to the fuel requirements of Kootenay smelters, has long since been successfully solved by the increase of coal and coke output from the East Kootenay collieries, which are able now not only to supply all local demands but are extending their American markets. Other features of the year have been the steady improvement of zinc mining conditions; the inauguration

of lead refining on a commercial scale and manufacture of lead in British Columbia; the establishment of concentrating plants at Rossland; the more general adoption of the leasing system; and, lastly, the arrangements carried out by companies operating in both the quartz and placer mining districts, by which interests have been consolidated with the view to greater efficiency and economy of working.

As the present issue of the *MINING RECORD* is chiefly occupied with reports from our correspondents wherein the work of the year is reviewed in detail we shall here content ourselves with the briefest recapitulation. Considering first mining in the Coast districts, the situation may be said to show some improvement although there they have been untoward features, such for example, as the closing of the Crofton smelter and the suspension of operations at one or more properties in Mount Sicker district. This, however, is more than offset by the exceptionally good showing made by the Tyee Copper Company and the successful development of a new copper prospect at Ladysmith in this section. On the West Coast of Vancouver Island mining development has been more actively carried on than for some years past, and, according to our advices, in some cases results have been decidedly promising. On Texada Island development work was continued until quite recently at the Copper Queen and Cornell mines, while steady production has been maintained by the Marble Bay, which has been operated at a considerable profit. Perhaps, however, the most important incident in connection with Coast mining is the preparations that have been in progress for extensive operations at the Britannia mine where since the summer the work of installing machinery and plant has been under way. It is expected, meanwhile, that the mine will be ready to commence heavy production by April or May next. The Vancouver Island collieries have been more or less steadily worked during the year, though operations at Nanaimo were restricted by the destruction of the head-works by fire last summer. Preparations are now being made to work the recently re-opened Departure Bay mines on an extensive scale with the expectation of maintaining a daily output of 2,000 tons. Production returns will probably show a decrease in the 1904 coal output.

Reports from the northern placer districts have been generally favourable, the gold yield from Atlin having, according to apparently reliable authority, materially increased this year. The outlook for successful gold dredging in the district is distinctly bright, the work done during the season having been sufficient to demonstrate the suitability and advantages of this method of mining as applied to conditions in the Atlin district, where scarcity of water and the high costs of labour constitute the principal difficulties to successful mining endeavour. The season, however, this year was a fairly long one, and nearly all the hydraulic companies did well. More attention was also directed to quartz development and some promising new discoveries are reported. In Cassiar operations

were chiefly confined to the equipment of two hydraulic mines, while little beyond assessment work was done in the Omineca district.

Some mining has been carried on at points on the Fraser river, a stamp-mill having been installed at Siwash creek, near Yale, where a promising occurrence of free-milling quartz is being developed. At Lillooet a powerful steel dredge was launched in the early summer, and dredging operations have been since conducted with some measure of success. Satisfactory returns were also obtained from a dredge working on the Fraser near Lytton.

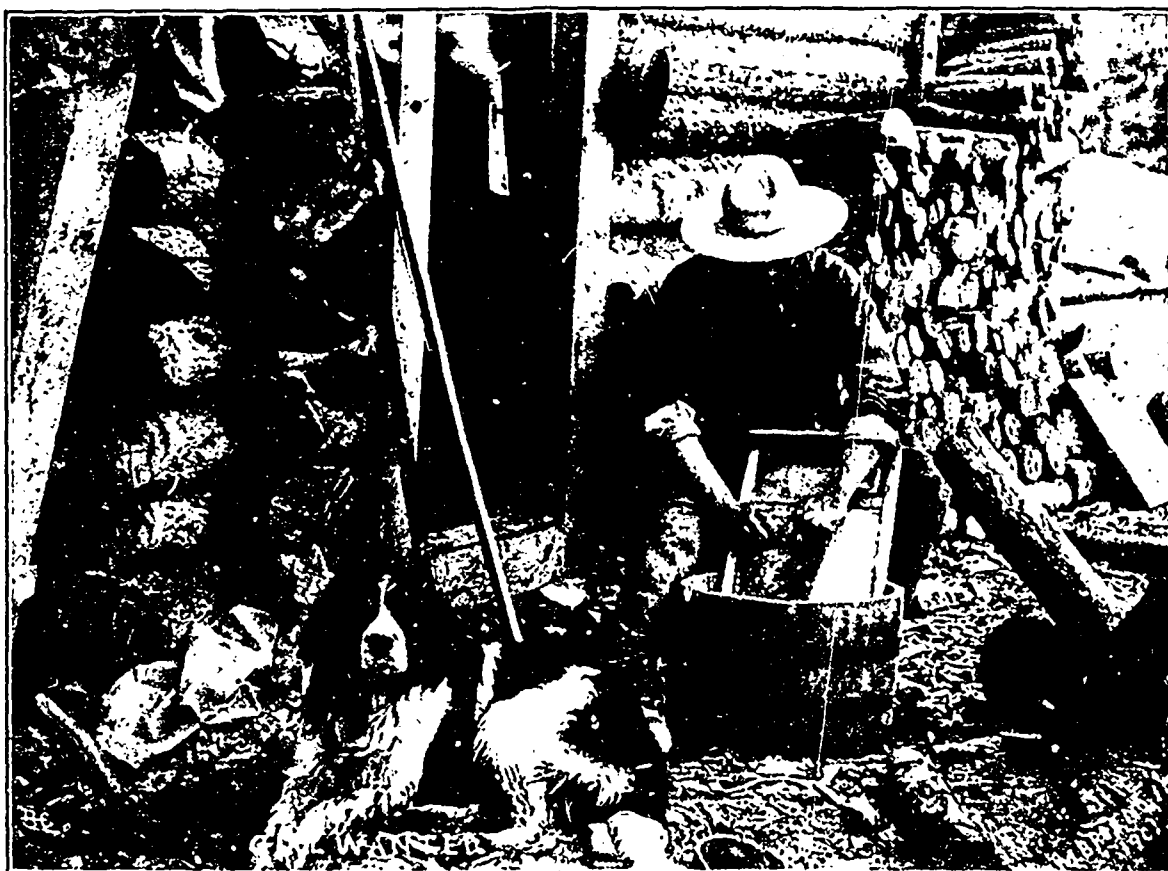
The considerable precipitation in the winter of 1903-04 justified the belief that this season at least an adequate water supply might be depended on for mining purposes in the Cariboo district. Weather conditions subsequently, however, were far from favourable, and the summer being an exceptionally dry one, only sufficient water was available to continue working at the principal hydraulic mine at Bullion for eighty-eight days, during which period a recovery valued at between eighty and ninety thousand dollars was realised, sufficient only to defray operating costs. To render the company independent of weather conditions in the future a further expenditure of half a million dollars is required for the extension of the present water system. A number of the smaller hydraulic mines at Barkerville, Keithley creek and other sections have distributed profits during the year, and a slight increase of yield from the district is anticipated. At the deep level mines at Slough and Lightning creeks pumping work has been continuously carried on. One of the companies engaged in these operations, the Cariboo Consolidated, was re-constructed during the year, while additional capital will also probably be provided for the Slough creek undertaking, this depending, however, upon a favourable report by an eminent engineer who recently examined the property.

Mining in the Kamloops district has been stimulated of late by the successful operation of the Iron Mask mine, which during the summer was equipped with a concentrator and other plant and has since made regular shipments. On Coal Hill a local syndicate has been engaged in developing a coal prospect, and at Jacko Lake some mineral development has been undertaken. In the Nicola district much attention has been directed to coal exploration work, boring having been carried on in several directions by the C. P. R. and other interests. With the exception of the extensive operations at the Nickle Plate mine, Camp Hedley, no new developments of importance are reported to have taken place in the Similkameen during the year. There is also little to remark in connection with mining progress in the Revelstoke district.

More capital has perhaps been invested this year in the Lardeau in the acquisition and development of mineral claims than in any other district of the province, with the possible exception of the "high-grade" section of the Boundary. The results of operations have been generally satisfactory, production costs having been considerably reduced, while it is now af-

firmed that the method of concentration adopted at Five Mile has proved quite successful. A tolerably good showing has also been made by the free-milling quartz mines at Camborne, though in the case of one of the principal producing properties work was delayed by the destruction of plant by bush fires during the summer. The difficulty of securing capital, in part ascribed to the unreasonable valuations placed on properties by claim-owners, has limited development operations in the Poplar Creek section, which as yet has failed to justify last year's high expectations. The Government bounty on lead resulted in stimulating in some measure mining activity in the Ainsworth division, and about 2,000 tons of concentrates was ship-

infinitely more encouraging than it was (say) eighteen months ago. At the same time it would be absurd to deny that the result of the year's work in the district is not disappointing in view of the earlier expectations. The explanation is that in many instances mine development had been neglected, and consequently much dead work was required to be done at a number of properties before a steady production, for which the bounty offered encouragement, could be again maintained. Further, where lead occurs in the Slocan there is also associated with it a considerable proportion of zinc and a method of separating these minerals though possibly found has not as yet been generally adopted. But, as we have said, substantial progress



An Atlin Miner engaged in domestic pursuits. A correspondent suggests that this photograph might aptly illustrate "The Atlin clean-up."

ped by the Highland mine during the first six months of the year. Production, however, ceased at the end of August. The great drawback to mining in this section is the cost of transportation, consequent upon conditions which may, and it is hoped will ere long, be improved. In this district large deposits of zinc-bearing ores have been developed and favourable freight rates would result in the production of a considerable tonnage of ore of this character.

There can be no question that the lead bounty has exercised a most beneficial effect in removing the depression under which mining in the Slocan has suffered during recent years, and the situation now is

has nevertheless been made, as evidenced not only by greater activity in mine equipment and development and in the leasing and working of properties long idle, but in a very considerable increase of production of both silver, lead and zinc ores and concentrates.

The profitable operation of the Hall smelter and notable developments in the Ymir section are matters chiefly worthy of remark having reference to the industry in the Nelson district. Tonnage production from the neighbourhood of Ymir, where eight mines are now making regular shipments, has increased very materially this year, while activity has been general throughout the district, a number of new discoveries

having been reported and at several properties stamp mills have been erected and machinery installed.

The year at Rosslana has been relatively uneventful though in several directions progress has been satisfactory. Thus during this year the Rosslana Power Company's large concentrating mill for the treatment of the lower grade ores of the War Eagle and Centre Star mines was completed, as was also an Elmore plant at the White Bear, and a mill at the Velvet-Portland. Promising new ore discoveries are also reported to have been made at depth in the case of two of the more important mines. An unusually dry summer, causing a shortage of water, interfered considerably with milling operations, but though these, as yet, have failed to yield results equal to anticipations, there is full warrant for the belief that initial difficulties will in due course be overcome and that the very considerable tonnage of low-grade ore, already developed in the district but at present unmarketable, will, by economical concentration treatment, be thus turned to commercial account. Production from the district shows an immaterial decrease compared with the 1903 returns.

Progress in the Boundary district has been most marked, whereof the considerable tonnage increase is but partly indicative. During the year the big copper mines at Phoenix and near Greenwood have been worked on the same extensive scale, while new ore bodies have been developed and important additions have been made to mine and smelter equipments. In this connection it is to be noted in passing that Americans have now secured controlling interests in the most considerable mining undertakings in the district. During the summer a consolidation of several copper mines in Phoenix and Deadwood camps was effected, but the concern is unfortunately heavily handicapped from the start by an excessive capitalization upon which it will be difficult to make adequate return. The feature of the year, however, has been the successful exploitation of the rich gold-silver claims in the camps surrounding Greenwood, the ores from which yield values averaging very nearly a hundred dollars to the ton. The profitable operation of the Providence is no doubt responsible for the attention that has been lately paid to developments in this direction. Recent development work on half a dozen or more new mines of this class has proved exceptionally encouraging, in every instance promising results having been obtained.

Industrial developments in East Kootenay have been exceptionally gratifying. In the spring the St. Eugene resumed operations, as a result of the encouragement afforded by the Government bounty, and a special concession by which permission was granted for the exportation of the product. Since operations commenced, valuable new discoveries of ore are reported to have been developed and a production of approximately 15,000 tons, valued at from \$30 to \$36 per ton, has been made. Shipping operations were also continued from the North Star, notwithstanding that the ore bodies were supposed to have become ex-

hausted; while the necessary capital having been provided the work, which is now nearing completion, was resumed of erecting a lead smelter for the Sullivan mine, at Marysville. The general improvement of conditions and increase of coal and coke output from the Crow's Nest collieries and the opening of, by the withdrawal of the Government reserve on the coal and oil lands of the Falthed Valley are also not the least important features of the year's developments in this section of the province.

Dividends during 1904 were paid by eight public companies, the Crow's Nest Pass Coal Co. having distributed \$172,524; the Tye Copper Company, \$133,000, the St. Eugene, \$64,000; Le Roi No. 2, \$57,000, and the Slocan Star, \$50,000. In addition, however, a number of smaller properties, both lode and placer, owned by syndicates and individuals were profitably worked.

#### MOUNT SICKER DISTRICT.

(From Our Special Correspondent.)

#### TYEE COPPER COMPANY, LIMITED.

THE operations at the Tye mine have been most successful this year. From the 1st of January to the 31st of December, 1904, the Tye Copper Company's smelter at Ladysmith has been in blast 267 days of 24 hours each, and has smelted 57,450 tons of Tye ore and 7,953 tons of Custom ore, making the total ore smelted 65,403 tons. The product from this was 6025.688 tons of copper matte, containing 5,120,870 pounds of copper, 179,769.19 ounces of silver, 11,088.830 ounces of gold, the total value, less refining charges only, being \$831,902.41.

From October, 1902, which was the date that shipping ore to the Ladysmith smelter commenced, to this present month of December, 110,000 tons of ore have been shipped and there is still a large tonnage of ore standing in the mine and several hundred feet of unexplored country from the eastern slopes to the east boundary line of the Tye Company's property.

Heavy development work has been carried on throughout the year, and the main shaft, which has now attained a depth of 600 feet, is in very favourable formation. Development work at this point has just commenced, and it will give a depth of 800 feet when the drift is carried to the eastern line. The main shaft will soon be carried down to the 1,000 foot level.

The development work of the past year has demonstrated that, instead of the ore being carried in disconnected lenses, it is in one immense ore body. Taking the Lenora and Tye as geologically one mine, this means an ore body of at least 2,400 feet in length, and which, to the shallow depth already explored, will probably yield a quarter of a million tons of ore.

The great length and size of this ore body strongly favours the presumption of ore being found to great depths and so points to the permanency of the mines.

A hoisting engine, boiler and compressor has been installed on the "X. L." which is part of the Tye



Company's property and a two compartment shaft has been sunk to the depth of 150 feet. Extensive cross-cuts and drifts will be run from this shaft to thoroughly explore the ground, which is southwest from the Tyee mine and on the direct run of the lode.

The Tyee Copper Company has paid dividends to the total amount of 20 per cent. during the present year. It would have been quite possible to have more than doubled these dividends, but the directors are following the wise and conservative course of accumulating a large reserve fund. Besides the dividends and reserve fund, a large sum has been expended on capital account, in adding to building and machinery at both mine and smelter, thus increasing the efficiency of the works. All of this has been paid for out of profits.

VANCOUVER ISLAND MINING AND DEVELOPMENT COMPANY, LTD.

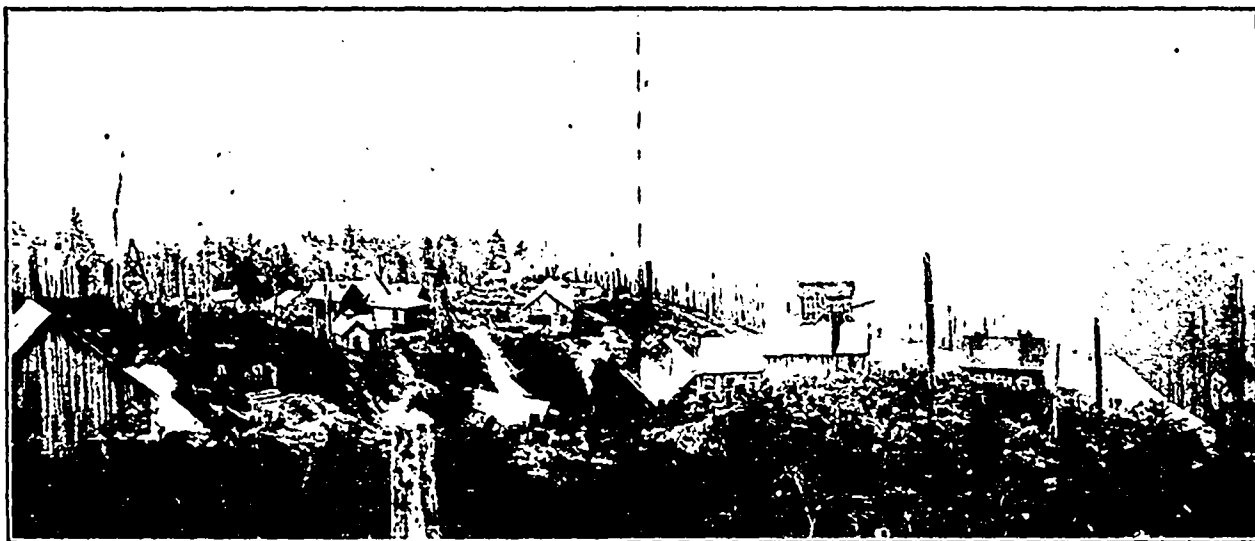
This London Company owns a large tract of mineral land to the east of the Tyee. A complete mining

heavy sacrifice at the present time to obtain the same, owing to the fact that strong companies are working each side of them on the lode. When work was discontinued, ore was showing strongly on the floor of the 500-foot workings, and which was apparently rising up from the as yet unexplored depths of the Richard III. and Tyee mines.

THE ALBERNI MINING DISTRICT.

(By Leonard Frank.)

There has been during the past season a greater activity in development of mining properties in our district than for some years past. The results have been generally satisfactory, and on several properties the continuity of ore bodies at great depth has been demonstrated. This is one of the chief reasons the management of the Nahmint Mining Company have decided to at once resume operations on a large scale on their property on the Alberni Canal. Mr. Cable,



The latest view of the Tyee Copper Company's mine, Mt. Sicker.

outfit has been installed on the "Westholme," comprising hoisting engine, boiler and compressor plant, and a two compartment shaft has been put down. By the end of the year, this shaft will have reached a depth of 500 feet. The rock is hard diabase, and the last 200 feet has been sunk in rather under eight weeks, which is about record work for this class of rock. At the 500-foot level cross-cuts were driven north and south for a total distance of 860 feet. This work disclosed a wide mineralized zone, portions of which showed concentrations of copper. Another cross-cut will be driven from the 500-foot level, to see if this mineralization has increased with depth.

RICHARD III. MINING COMPANY, LTD.

The Richard III. mine suspended operations last spring because of insufficient working capital, and the directors do not consider it advisable to make any

the mine manager, has a force of about twenty men at work, and all machinery is again in operation.

*Constitution.*—Much work has been done on this copper-gold claim. A tunnel has been driven on the lead for about 140 feet, and 130 feet of this is in ore. The mine is located on Coos Creek, about three miles from New Alberni, and only one-quarter mile from tidal water.

On Copper Mountain, opposite the Constitution mine, are two very promising properties, on which a good amount of work has been performed.

The S. and S. claims have done 50 feet of tunnelling, cross-cutting 12 feet of good ore.

The *Copper King* group, which adjoins the former, has also worked with satisfactory results.

*Happy John Group*—Extensive work has been in progress at this mine since May 1st. Some 175 feet



of tunnelling has been done and good ore has been met with in both tunnels. This property adjoins the



View of the Happy John mine, Alberni District.

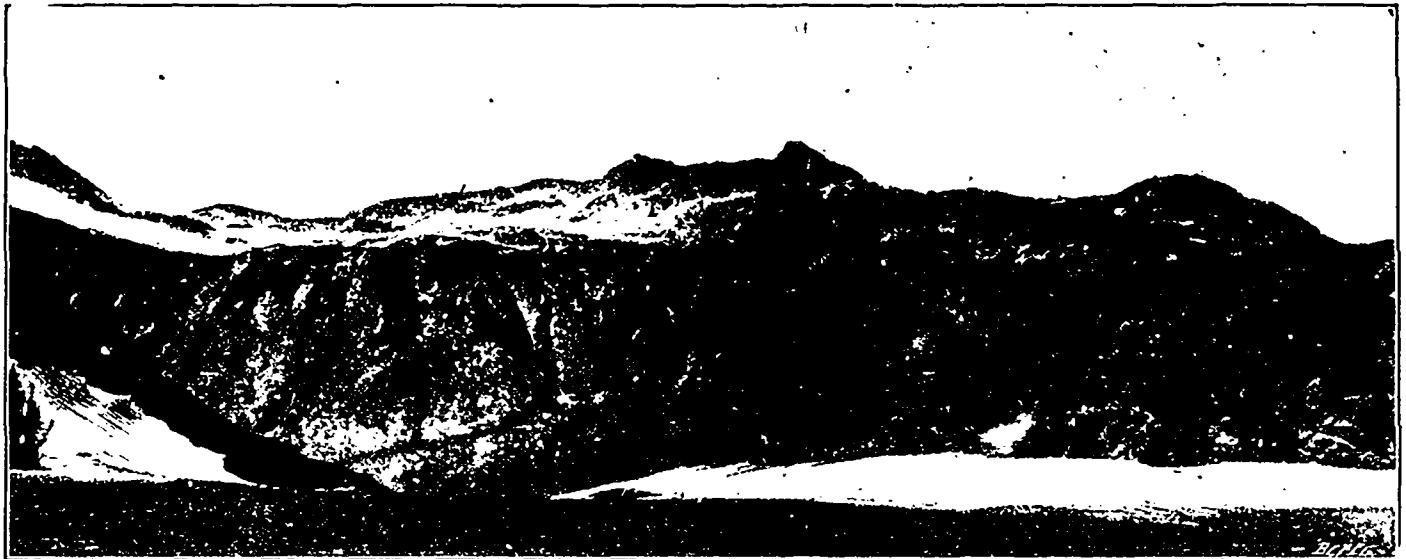
Monitor mine to the west, on the Alberni Canal. Some very important discoveries have been made recently

mines and located on the same mountain range. The first work done was an open cut in 18 feet of ore. Later on the owners decided to drive a tunnel from the beach to encounter the lead. This has been successfully carried out and several shipments of ore has been made to the smelter.

The *Northern Cross* and *Mansfield* mineral claims adjoin the *Southern Cross* and have some excellent showings of high grade chalcopyrite. Some work was recently done on the claims.

*Cascade*.—This property is situated about one and a half miles further up the harbour and close to salt water. The Company have this year built a ground-tram, bunkers and a wharf, and have made a shipment of high-grade copper ore, which netted \$22,40 after deducting freight and smelter charges. A tunnel is now being driven to cross-cut the ore body.

*Ivanhoe Group*.—Two miles above the *Cascade*, at Snug Basin and the head of Uchucklesit Harbor, is the *Ivanhoe* property. The owners are driving a cross-cut tunnel to encounter the ore above; 140 feet



A Panoramic View of the "Big Interior" Mine, a short description of which is included in Mr. Frank's article.

on the latter property, a well defined lead of good copper ore having been found a few months ago at the water's edge that is distinctly traceable throughout the property. This is one of the best showings yet found in this neighborhood, and it is to be hoped that work may be resumed in the near future on this promising property.

*Gladys M. C.*—Across the canal, opposite the Monitor, in an easterly direction, is situated the Gladys claim. The owners have made three open cuts in high-grade chalcopyrite ore in close proximity to deep tidal water. The strike of this lead seems to be a continuation of the late discovery on the Monitor property.

*Southern Cross*.—The most extensive work in this part of the district has been carried on for the last two years at this mine at Uchucklesit Harbor in a westerly direction from the Happy John and Monitor

has been driven, but they expect to drive another 25



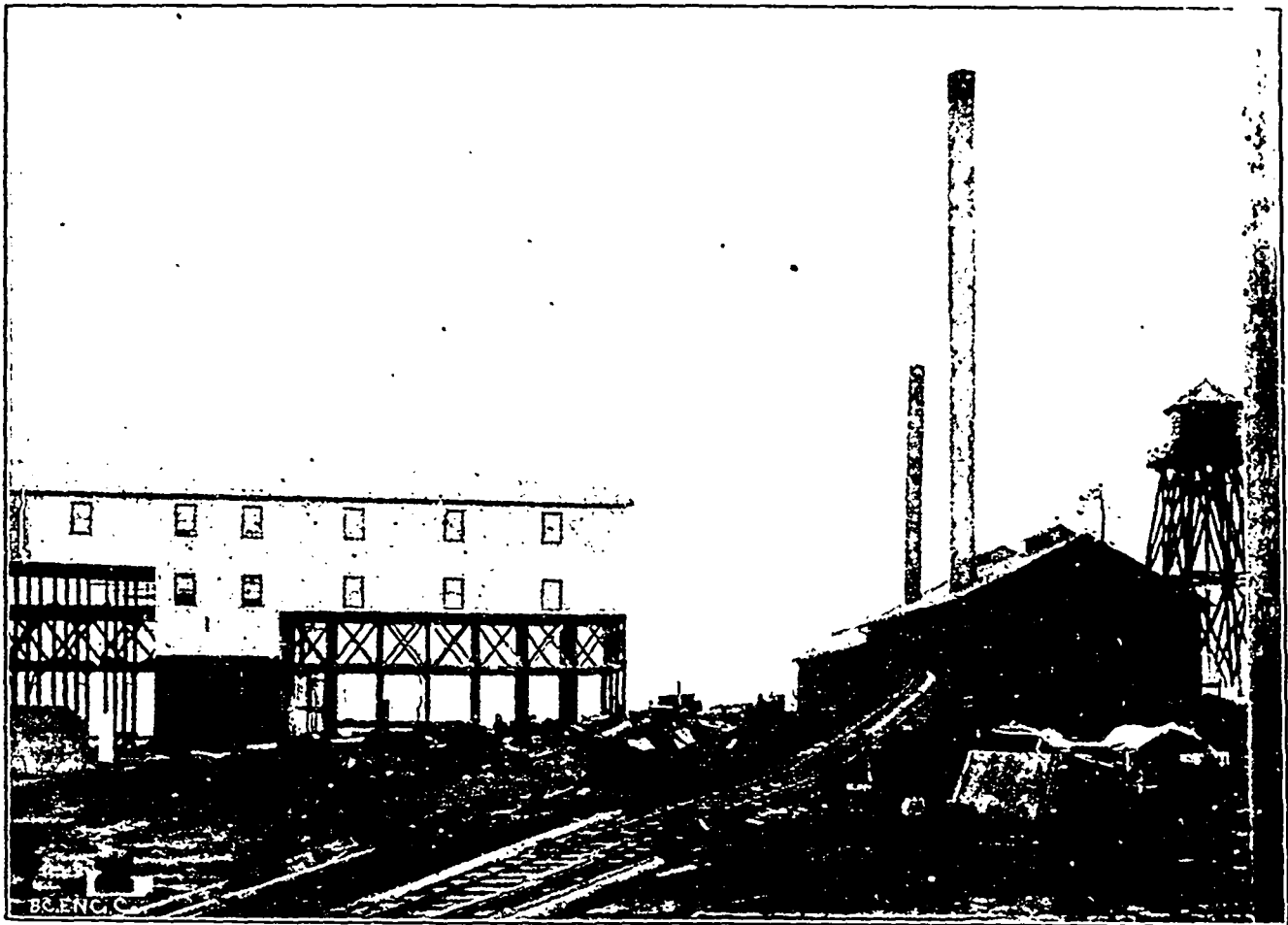
Prospect Shaft at the Cascade mine, Alberni District.

feet before the ore is reached. There are also a number of other prospects which have been developed this last summer, among them being the *Copper Spoon*, situated at Sproat Lake, near Alberni, where, I understand, a tunnel has been driven on the lead for a considerable distance, the ore carrying gold and copper.

At Taylor River and the head of Sproat Lake, about four miles inland, is the *Silver Star* property, on which underground work has been carried on. This claim is a gold-quartz undertaking. The ore assays about 50 in gold and silver.

ings are most remarkable, being exposed the distance of nearly a mile, and crop out in steep cliffs for nearly a mile in length. The ore body is of a horse shoe shape, forming a basin which was covered with snow on the two occasions the writer visited the property. The photograph which accompanies this description was taken in October.

From present indications, meanwhile, particularly as there is available near at hand abundance of water for power purposes, the property is capable of developing into an important productive mine, but capital is required to take the work in hand.



Head Works, Departure Bay Mine.

*The Big Interior Mine.*—This property is located almost in the centre of Vancouver Island, at the headwaters of Bear River and is reached via Alberni and Great Central Lake. The altitude of the mine is about 5,000 feet above sea level. The owners cut a trail from the headwaters of Great Central Lake to the workings last year, and built a cabin on the lower and upper end of the lake. The trail from the head of the lake to the mine is about ten miles long. This year they have done sufficient development work to prove that the very considerable showings of low grade ore are not merely superficial. The ore show-

#### COAL MINING ON VANCOUVER ISLAND, 1904.

(By John Matthews.)

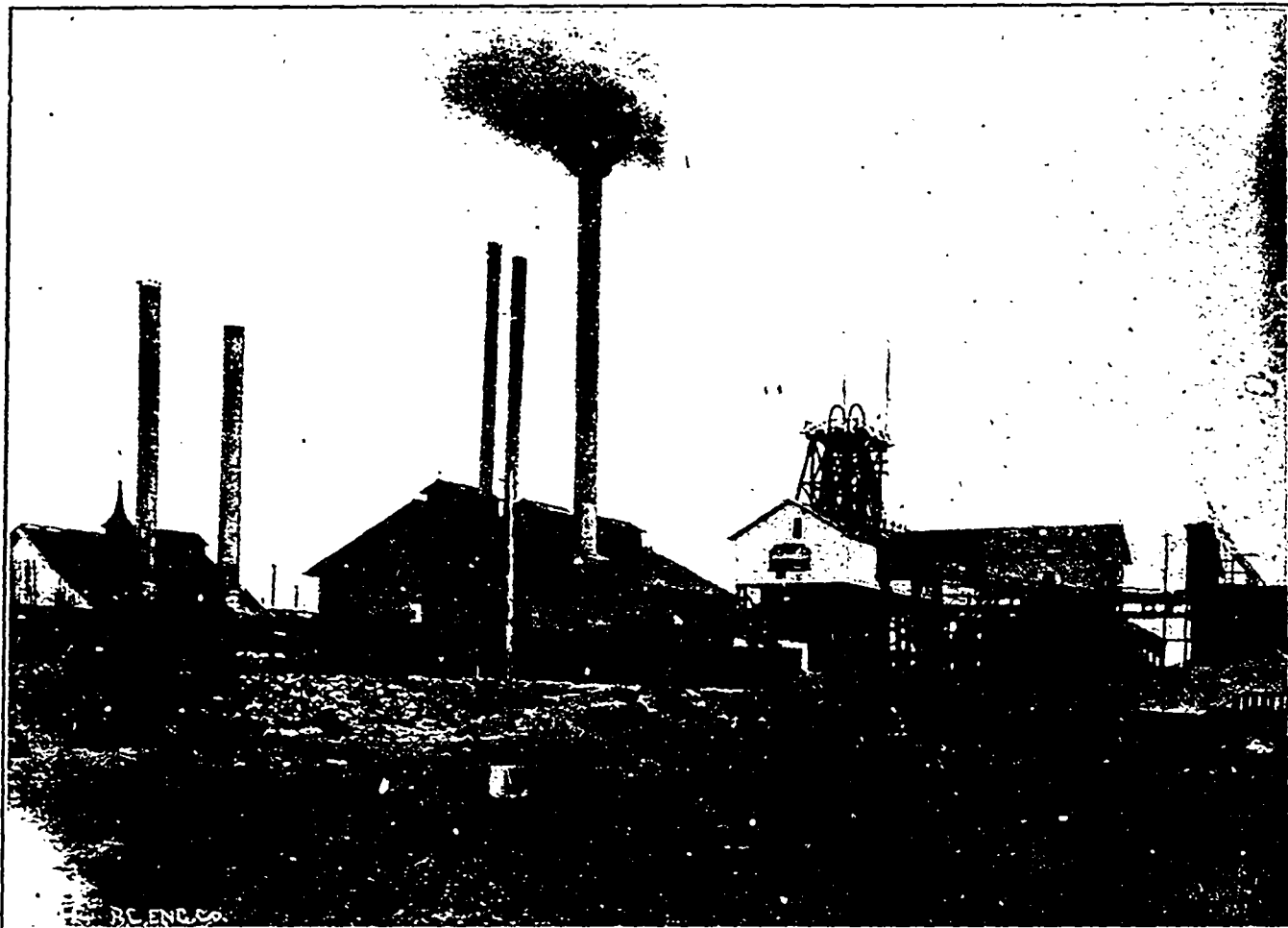
##### THE COMOX MINE.

**T**HE year 1904 has been a most prosperous one. The mines are being steadily developed, and the No. 4 mine, or (No. 4 slope) has been restored to something like its old condition. It will be remembered, it was necessary to flood this mine some three years ago, in order to suppress a fire. The pumping out of the water has been going on continuously since,

and the deeper parts of the mine recovered; it will, however, take at least another year to complete the work. Meanwhile the work is so far advanced that the management is enabled to employ about four hundred and seventy men in this mine which has now a daily output of about 1,000 tons. The other mines of the company, Nos. 5, 6 and 7, are looking well. Notably No. 7 slope, which is down about 2,000 feet.

making the yard, putting in side tracks, enlarging pit-head, etc., preparing for a large output.

It has been a year of comparative freedom from accidents in and about the mines. The mines are being steadily developed: the output increases monthly, and more miners are being put to work. The best of relations exist between the company and the men and the outlook for the future is decidedly bright.



New Pithead, No. 1 Shaft, Nanaimo.

This is the mine from which the anthracite coal is mined, and for which, as predicted, a good home market has been found in Vancouver and Seattle, the demand at present being greater than the supply. This state of affairs will not, however continue longer than a few months, for the area of this coal is very extensive and the production will be greatly increased in the very near future. This mine also supplies a very high grade of steam fuel which produces great heat, little ash, and only a little smoke of a light color. The coal is therefore specially adapted for use on naval vessels or where a very high grade coal is required. The output of this coal is quite limited at present, but will be greatly increased during the next few months. There has been much work done during the year developing the underground workings, installing large pumping plant, and completing the work of

#### MINING IN CASSIAR.

OPERATIONS in this district during 1904 were confined chiefly to the equipment of two mines. The Berry Creek Company purchased and partly installed machinery for a plant of 1,000 miners' inches capacity, including two No. 6 Giants. This machinery was transported from Wrangel to the mine at a cost of \$240 per ton. Work at the mine was restricted to the opening of a new pit, called No. 4, at the lower end of the workings, and making two new cuts through rock in pits Nos. 1 and 3. The company acquired this year additional water rights on the second tributary to the North Fork of Dease Creek, which it is estimated will furnish in the dry months at least 300 miners' inches.

As this season there was no washing of bottom

gravels in which the osmiridium is found, no experiments for saving this metal could be carried out. Punched screen, canvas and cocoa matting for one concentrating table are now on hand at the mine, and experiments should be undertaken next summer as soon as washing commences.

The manager, Mr. A. Hamfield, in his annual report to the directors concludes as follows: "It is hardly necessary here to state that the mine has never before been in such good condition to produce—as it will be next spring when washing operations commence. There will then be available 1,000 miner's inches of water, 6 giants to take care of it, and 5 cuts through which to wash the gravel. Flumes, sluice-boxes, bridges and cartracks will also be in good order. The average of the banks is at present not extremely high, and there will be none, or at least very little, frozen ground or boulder-clay to contend with next season. In all the pits there is pay gravel and in two of them the paystreak on bedrock shews very good. There is therefore all reason to look forward to a successful season's operations next year. I might state that the Cassiar district did attract considerable attention last year from a hydraulic standpoint, all the possible ground of this description being located, and preparations are now being made by the different companies to do some work on their holdings."

#### ATLIN CAMP IN 1904.

(By J. H. Brownlee.)

**T**HE output of gold from the Atlin district in 1904 is estimated at over \$600,000, an increase above the 1903 production of over \$100,000. The encouraging feature is the fact that the 1904 gold was taken out at a greater percentage of profit than heretofore. This applies more particularly to the companies operating hydraulic plants.

The operators are now adopting better mining methods with gratifying results. This was particularly noticeable on Pine Creek this year where reduced labour costs and a better water supply were responsible for the improved results. There is now more pay gravel exposed in the benches of Pine, Spruce, McKee, Boulder, Beech and Otter creeks than at any time in the history of the camp, and consequently the output from all these creeks should show a further increase next year.

The past year has been one of successful exploitation of new creeks. A syndicate of placer miners have prospected to bedrock on Ruby creek, and so successful have been the operations that preparations are being made to work the creek next summer on a larger scale. Successful development has been carried on at the upper end of Boulder, while the largest amount of gold from dredging operations has been taken from the lower portion of the same creek. Extensive prospecting has been carried on by the Bull Creek Hydraulic Syndicate, covering the entire season of 1904, and with most gratifying results. Prospect-

a tributary of Bull creek. Several thousand dollars have been expended in exploiting O'Donell river, 25 miles from Atlin. This ground, and also Bull creek and Dixi creek, were examined last summer by an eminent California mining engineer, who will carry on more extensively prospecting next year for an American company. All of this ground is held under lease, as is also Gold Bottom creek, on which shafts were sunk last winter with gratifying results. It is not overestimating to say that the enterprise of the miners of Atlin district in seeking and prospecting new ground have added fully 5,000 acres to the known auriferous areas of the camp. For the most part this ground will be worked by steam shovels or dry land dredges next year.

1904 was an unusual year for dredging in Atlin, and considering the difficulties encountered in digging cement gravel, disintegrating it and saving the gold, the first dredge installed must be considered a success. It is a proven fact that the ground on which the dredge is working is very rich. A second dredge of similar type is being installed on Upper Spruce Creek by a company allied to the one operating on Gold Run. Both dredges will be operated from the same power plant and practically under the same management. To sum up, conditions in the district are steadily improving, the gold production is increasing and the prospects for the future are decidedly bright.

#### ATLIN DISTRICT.

(By H. W. Ebbs Canavan.)

**T**HE work of the Pine Creek Power Co., Ltd. on Pine creek this year has been very exhaustive.

The company employed a large force of men and worked a large area of the benches on the south side of Pine creek below discovery. Dynamite was used successfully to loosen the gravel and the returns although not made public are said to show a large increase over those of former years. The company let a contract for the construction of several hundred feet of ditch to replace a flume that previously was the cause of much trouble. This work will materially increase the company's water supply and enable hydraulicing to be carried on next season on a much larger scale. The North Columbia Mining Co., Ltd., under the management of Mr. J. M. Ruffner of Cincinnati, purchasers of the Leeks and Stewardlyke leases and valuable quartz properties in the district confined operations this year to opening up a new pit on the north bank of Pine creek, using the water from the Weeks big ditch. Power was used most effectively in this pit to loosen the yellow dirt, which appears to be a continuation of the Gold Run yellow channel shown to carry large values. Considering the amount of preliminary work required to be done before commencing active operations the result of the company's work is highly satisfactory. The company owns a large area of ground known to contain two distinct pay-streaks or channels and with further development the gold recovery per year should yield large profits. The company also prospected the Stevendyke

property during the season with a view to working more extensively next season.

The McKee Creek Consolidated, the purchasers of the holdings and plant of the Nimrod Syndicate in Atlin district this year, hydrauliced the benches of McKee creek. This company is under the management of the Samslow Brothers, who report a most successful season's work, which yielded a return of some \$70,000, the largest return yet obtained on McKee creek.

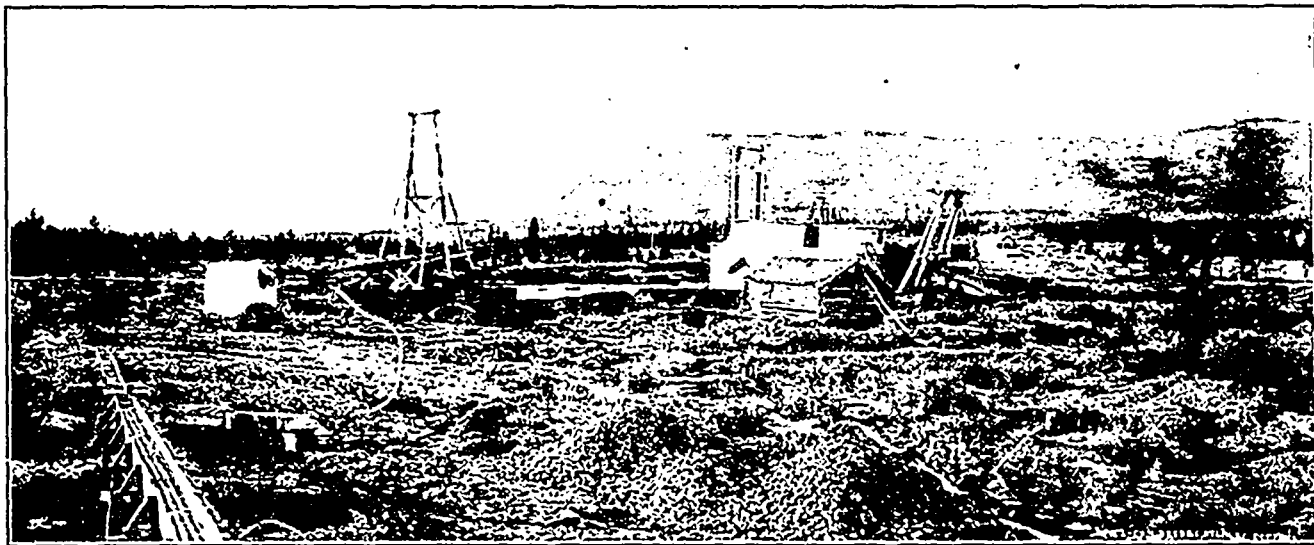
The Spruce Creek Placers Co., Ltd., opened and worked one pit on lower Spruce creek, reaching the Spruce creek pay channel with encouraging results. Owing to pending litigation regarding the ownership of water this company's work was curtailed, but the matter in dispute having been adjusted the company will be enabled next year to work on a more extensive scale.

During the year active work was carried on by placer miners drifting on the Spruce creek benches,

Mr. Williams during the season with excellent results.

Altogether the past season in Atlin has been a successful one as the increased output of the district will show. The fact also that nearly all the companies are acquiring more ground and increasing the size of their plants is indicative of the confidence of operations in the future of the district. With the installing of more dredges and steam shovels the large areas of ground known to contain good values will be made productive. A new strike has meanwhile been reported on Consolidation creek, some distance from Atlin toward Teslin. Should this discovery prove as promising as reported, another large auriferous section will be opened up.

Next season several new companies will commence dredging operations in Atlin as a result of favourable reports made during the past season by eminent California experts who inspected the areas. It should also be noted that arrangements were made this year for the shipment of several hundred tons of magnetite



Dredging in the Atlin District. A photograph taken this season.

while also a large number of creek claims were profitably worked during the season.

The Willow Creek Mining Company under Mr. Frank Brockett employed a small force of men during the season, fair returns having been received. It is proposed next season to make additions to the plant and to thus increase working capabilities.

On Boulder creek placer mining has been actively carried on by individual miners and Black and Grant, who have a lay upon the ground of the French Company, employed between forty and fifty men for the greater part of the season in drifting operations, which are being continued this winter. Weekly clean-ups are said to yield from five to seven thousand dollars. Other operations on Boulder creek have proved equally remunerative and work is to be prosecuted throughout the winter.

Active work on Birch creek was carried on under

from the beds at Atlin by a local syndicate who have contracted to supply the requirements of a firm in San Francisco, should the first shipment prove satisfactory.

#### LILLOOET DISTRICT.

(From Our Special Representative.)

**T**AKING the several mining sections of Lillooet, the year's operations were as follows:

*Cayoosh Creek.*—Two shifts of men were employed driving a cross-cut on the Ample, one of the claims of the Ample-Bonanza property, which last year was purchased from its former owners. A large ledge of low-grade ore was encountered, after which work was suspended for the winter. Fourteen men are at work on the Bonanza, opening up the ledge. The company proposes removing the Golden Cache 10-stamp mill to the Bonanza, where it would be used

to crush the ore from that property, which is largely free-milling.

There are at present eight men employed cleaning out and enlarging the tunnel near the falls on Cayoosh Creek for the purpose of diverting the stream and exposing its old bed for placering. About 15 years ago a lot of gold was taken from the gravels of this creek, but bedrock was never reached, owing to difficulties experienced in dealing with the water.

*Bridge River.*—(On the properties along the South Fork of Bridge River occur chiefly narrow ledges carrying free gold and sulphurets. These have been worked mostly for the free gold, no concentration having been attempted, and on only one group of claims has a stamp mill been erected, the other claims having worked arrastras. Owing to lack of funds, the Lorne, Woodchuck and Ben d'Or groups have been idle, as well as other crown-granted claims. In numerous instances, owners of claims have done only assessment work on them, while waiting for capital to be obtained for opening up this part of the country.

As to placer mining here—last year an old channel of the South Fork was discovered and it was worked by nine or ten men with satisfactory results.

There has been a considerable amount of work done on the North Fork of Bridge River. Last summer a company bonded the Royal group of claims and, after investigating the outcrops by means of shallow prospect shafts, continued a cross-cut tunnel to strike the ore body at depth. The ledge was reached and, as far as can be judged, it carries satisfactory values in gold, silver and copper. Until this property shall be further opened up, the best process for treating the ore can not be determined. The same company worked on some hydraulic leases on Bridge River, near the North Fork, but results were not satisfactory, boulders in the river being large and numerous, thus preventing good work being done.

*Birkenhead River.*—In this section of the district, which was prospected some years ago and then abandoned, owing to the discovery of free gold on Bridge river, the ore is principally of the pyrrhotite class, carrying small percentages of copper and some gold. During 1904 a few men prospected in there, but the development work done is not yet extensive.

*McGillivray Creek.*—The Anderson Lake Mining Company has been working on a group of crown-granted claims on McGillivray Creek. The ledge opened up is about 10 feet wide and the ore free milling. Some very rich rock has been taken out, but on the whole the property is a low-grade one.

*Dredging.*—A dredge was operated last summer by the Iowa-Lilloet Company on Fraser river, below Lilloet. No particulars of results have been received, but they are understood to have been profitable.

*General.*—No information is available relative to the Clinton section of the district, but operations were restricted to placering and haulicing. Lilloet district suffers from want of capital, induced largely by certain regrettable failures in mining enterprises undertaken years ago, and from lack of transportation facilities. While the foregoing states the more prom-

inent features of the year's mining, there are, besides, numbers of Indians and Chinese, and some white men, placering on the bars in McGillivray creek, Bridge river and Fraser river, especially at times of low water. Although individual returns are generally small, in the aggregate the quantity of gold thus obtained is considerable.

#### KAMLOOPS DISTRICT.

(By Chris Outhett, A.R.C.Sc.)

**P**RODUCTION from the Kamloops district during the year shows considerable improvement, due in the early part of the year to the Copper King, which shipped 500 tons of ore to the Crofton smelter and latterly to the Iron Mask, which, since the middle of September has shipped high-grade ore from the mine and concentrates from the mill.

Owing to delay incidental to delivery of some of the heavy machinery, the Iron Mask mill did not commence crushing until the favourable working season was past, hence a greatly increased output of ore and concentrates is anticipated during 1905 from the property.

#### CONCENTRATION AT THE IRON MASK.

The description of the milling process which follows should interest the readers of the *MINING RECORD*, as the process is one of water concentration applied to chalcopyrite associated in some degree with magnetite.

The ore is received from ore-bins at shaft head over an aerial tramway, dumped over a grizzly and the coarse stuff crushed by 16 by 10 Jenckes-Farrel crusher into the mill ore-bins. The ore is fed from the ore bins to the coarse rolls by two automatic feeders, thence passes through intermediate rolls to be elevated to two series of trommels. The sized materials from these are concentrated on Hartz jigs. The tailings from the finer sizes are run to waste. The tailings from coarse jigs and oversize from trommels are re-crushed by fine rolls and returned to the elevator. The fines from trommels pass through three wet magnetite separators where the processes of separating the magnetite and the sands from the slimes are carried out.

The sands are concentrated on three Buss concentrating tables and the middlings from these upon Overstrom concentrating tables. The slimes are run to a series of settling tanks, the products of which are concentrated on six Luhrig vanners arranged in pairs.

The 250-h.p. tandem compound condensing engine in addition to supplying power for mill, drives a belt-driven air compressor for mining purposes; also a two-stage cable-driven centrifugal pump supplying water for mill. The company has a pay-roll of about 65 men.

#### THOMPSON RIVER CLAIMS.

The Homestake, Jamieson creek mountain, North Thompson river, has recently been bonded to Californian parties represented by Mr. Gender, who is acting as superintendent. This property contains six quartz veins all of promise, the veins carrying galena

and pyrites with gold and silver. The widest vein on the property is being developed by a tunnel.

On the Truth, Mr. G. Macdonald proposes continuing work throughout the winter on a tunnel to drain and enable work to be carried on at the bottom of the old shaft by the present owners. Some good ore has been met in the tunnel and when the work under way is accomplished should make a valuable property. Messrs. Buxton & Co., owning the Erin, adjoining the Iron Mask, are doing work on this group of claims with very encouraging results. Negotiations for the sale of the Copper King to Mr. Dickie and others failed on consummation.

A very satisfactory feature of the year's work is the success of the local syndicate in their exploration of the coal measures south of the town. Five thousand dollars was first subscribed and later provision was made for an additional sum of like amount. A shaft has been sunk to a depth of 380 feet which passed through coal seams, interbedded with clay and sandstones for one hundred feet. Drifts and headings are being opened out on the best seams with good results.

The dredge on Tranquille creek has worked throughout the season. Whilst the results of the dredge are not obtainable the fact that it has been operated for several successive seasons is significant.

The Cinnibar properties at Savonas were not operated during 1904, with the exception of assessment work performed thereon.

## MINING IN THE REVELSTOKE DISTRICT.

(By E. A. Hagen.)

THE close of the year marks the greatest activity in placer mining that has been seen in the Big Bend for some years. Eastern capitalists have taken up the deep lead diggings on French Creek recently worked by Mr. A. E. Bradley, who took out several thousand dollars worth of gold from there last spring. Between 15 and 20 men will be employed on the ground this winter under the management of Mr. S. L. Fowler, M. E. Meanwhile an American company has purchased from Mr. W. Cowan the French Creek Hydraulic property on the Big Bend. This ground was taken up some years ago by a Chicago company, who spent \$100,000 in installing a first-class hydraulic plant. There is, however, a large area of gold-bearing ground on the creek, and this will be worked next spring with every prospect of good results. The Revelstoke and McCullough Creek Hydraulic Company have two giants installed on McCullough creek, where the prospects are good, and have taken in supplies to enable them to start work early in the spring.

The Camp Creek Hydraulic Company has run a new flume and exposed part of the old channel of Camp creek, which shows good prospects, and they are looking forward to good results with the first supply of water in spring.

Negotiations are in progress for the purchase by American capitalists of a gold property on Carnes

creek, the ground having been already carefully examined and reported on by an American expert.

The Prince Mining & Development Company, who have shown much persistence in the development of the copper ore bodies in Standard Basin in the Big Bend for the past six years have recently developed a most promising ore body. A cross-cut run 95 feet west of the intermediate tunnel below No. 2 tunnel on the Standard group goes for eighteen feet through solid ore, and as the dip of the lead is 35 degrees, the company have probably an ore-shoot 12 feet in width at this point. They have now developed this ore-shoot for a depth of 85 feet and a length of 125 feet, and it has averaged six feet in width. The ore is chalcopryite and pyrrhotite, the former predominating. It is self-fluxing, and has improved in value with depth. There are strong outcrops of copper ore all over Standard Basin, but these can only be seen when the snow is off, and owing to the high altitude of the basin—about 7,000 feet—this is only possible for a short time each season. The ore is associated with diorite dykes which outcrop strongly through the schists. These schists are of two kinds, greenish and graphitic, and are traversed by narrow beds of dark limestone.

On the Keystone, Silver Shield and Silver Bell properties there are considerable bodies of ore carrying galena and zinc.

South of Revelstoke, the demand for zinc ore has resulted in a move to develop the "Big Lead," on Arrow Lake, one of the largest bodies of zinc ore in the province and traceable for a great distance. Prof. Brock, of the Geological Survey, examined this ore body two years ago and was favorably impressed with it.

## THE CAMBORNE SECTION.

On Fish Creek a large body of ore has been developed on the Mammoth, by American capitalists, within the past few months, and it is proposed to commence production this winter. The Goldfinch property, which was the first gold-producer on the creek, has been shut down. The mill was crushing ore from the surface outcrop, while no systematic plan of development was adopted for providing reserves for the stamps. The cable tramway was also seriously damaged by the forest fires. The Oyster-Criterion has likewise suspended operations to admit of the installation of an additional ten stamps. The mine has during recent months been a steady producer. Recently Mr. Cochrane, of Alberta, succeeded Mr. Pool as manager.

During the year the Eva has been well developed, and this work is still being actively carried on. The tramway, which was largely destroyed by forest fires, is being rebuilt, and the mill, it is expected, will ere long be again in operation. The prospects of the mine are said to be most promising.

The Silver Dollar, a new property, has come into prominence this season as the result of successful development work carried on by the Elwood Tinworkers Company of Elwood, Iowa, to whom it was bonded last winter. A body of galena, carrying gold values,



between three and four feet thick, has been opened up during the year, and it is proposed to shortly install a compressor plant.

On the Beatrice a great deal of development has been done this year, but it was only quite recently that definite results were obtained, when a shoot of grey copper ore, fourteen inches wide, was opened up. There is much ore in sight in the old workings, and tenders are being called for shipping 200 tons of ore this winter. The owners propose putting in a concentrator to handle the ore. The mine could also make shipments of zinc ore.

The Lucky Boy, at Trout Lake, continues to steadily ship galena ore carrying high silver values. This mine has paid from grass-roots.

At Ferguson the new mill of the Ferguson Mines, Limited, has now been running for some months, turning out large quantities of bullion, separated and refined by a chloridising plant which saves the gold and silver and allows the lead and zinc to go to waste. The ore is brought in by cable tramways from the Nettie L. and Silver Cup mines.

#### AINSWORTH DIVISION.

(From Our Special Representative.)

**I**NCLUDED in Ainsworth mining division are numerous mining properties about Ainsworth, Woodbun creek, Kaslo, South Fork of Kaslo creek, and on upper Kaslo river towards what is generally regarded as the Slocan proper, although the Slocan district is frequently taken to include the greater part of the Ainsworth division lying west of Kootenay lake.

The lead and zinc questions affect the Ainsworth division vitally, just as they do the Slocan division, only, perhaps, in greater degree, for the reason that in many of the mines of the latter, silver values rule much higher than in those of the former. The granting of the lead bounty was, therefore, of even more importance to Ainsworth than to Slocan, notwithstanding that much of the activity that has marked the year in the Slocan was, and still is, directly attributable to the benefits derivable from the bounty.

But it is to the placing of the zinc producing industry upon a basis that will admit of the mines having ores in which zinc is often a large, and sometimes a predominating, constituent, being profitably operated, that the Ainsworth division looks for the assistance requisite to restore it to activity and a measure of prosperity. Not only has this district, or rather that portion of it that is tributary to the Kaslo & Slocan Railway, the serious difficulties of producing a marketable zinc product and of finding a profitable market for it when produced, but its transportation facilities are such that costs are increased by the necessity for more frequent handling of its products than is the case where transshipment from the narrow-gauge K. & S. railway to steamers and from the latter to a broad-gauge railway is not required. For instance, ore or concentrates, whether loose or sacked, loaded on cars along the Nakusp & Slocan railway, which is broad-gauge, are delivered to either local or

Eastern points without further handling until unloaded at reduction works, or if consigned to Europe, at the point of transshipment to ocean-going vessels. That sent by the K. & S. railway has to be sacked, unloaded at Kaslo, placed on steamers and then again handled at some point where it is transhipped to a broad-gauge railway. It will be readily seen that this involves two additional handlings, which in the case of low-grade products, sometimes causes an increase in freight charges that these may not be able to bear. The K. & S. railway was built with a view to handling the high-grade, hand-sorted or concentrated silver-lead ores which at the period of its construction were the only ones that could be profitably produced and marketed. Since then it has become practicable to produce lead in larger quantity, and zinc as a by-product. Large bodies of zinc ores, some developed in past years and others recently opened up, have become available, but where these are tributary to the K. & S. railway only, it is not as a rule practicable to extract and market them with profit under existing transportation conditions. The Great Northern Railway Company, which now operates the K. & S. railway, has been urged to standardize the gauge of this railway so as to remove this serious obstacle to the profitable development of the lead and zinc industries of the district under notice, and it is earnestly hoped that this will be done ere long. Whatever the outcome of the efforts to overcome this difficulty, there can be little doubt that it is one that in some measure hampers the low-grade mines, both in connection with the shipment of their products and the delivery of machinery or supplies coming in from outside points.

#### ABOUT AINSWORTH.

There are in this neighborhood numerous mineral claims, either crown granted and lying idle or on which simply the annual assessment work necessary to hold them is done. The Highland mine, owned by the Highland (Kootenay, B. C.) Mining Company, Ltd., produced 14,105 tons of concentrating ore, and 156 tons that were shipped as crude ore. The production of concentrates was about 2,000 tons. The ore is very low grade in silver. During the first half of the year this mine was the largest shipper of lead in the Province, and it then employed 60 to 70 men. Shipments ceased at the end of August, and the mill was closed down. Since then about 25 men have been kept at development work, which would not have been undertaken, nor would there have been any production of ore here, but for the aid received from the bounty on lead. Development work underground totalled 1,206 lineal feet, beside which some 300 yards of open cut work were done on the surface.

The Highlander, owned by the Highlander Mill & Mining Co., did some development work, but shipped no ore. Its prospects are reported to be good, with large bodies of ore available, but no reasons for the suspension of work have been given. The Black Diamond and Little Donell did 545 feet of cross-cutting and drifting, but did not ship ore.

Mr. H. Giegerich did some development work on

the No. 1, which is situated about four miles from Ainsworth, in the dry ore belt, and a few men had the upper workings on lease, taking out some rich silver ore. Sinking is to be resumed next season. The mine in past years shipped a considerable quantity of high-grade silver concentrates.

#### WOODBURY CREEK.

English Bros. have been working on the Baltimore for some time and have made a test shipment of five tons of ore which contained 414 ounces of silver and 6.6 per cent. lead. The vein varies from five to eight feet in width, is in granite and is a dry ore with a rich paystreak.

On the Pontiac a cross-cut tunnel is being driven. It is now in about 300 feet and should soon reach the wet-ore lead. A dry-ore vein, about three feet in width and giving high assay values, has been crossed by the tunnel. One car of good ore, taken from the old workings, was shipped last spring. It is intended to ship regularly when the lead now being driven for shall have been cut.

A foreign company known as the King Solomon Mines holds a large number of mineral claims at the head of the creek, but little is known of its operations during the year. It is stated that it had 35 claims surveyed for crown-granting.

#### SOUTH FORK OF KASLO CREEK.

Important work is being done on this creek, chiefly on the Cork, situated four or five miles up the creek from the K. & S. railway, and owned by a French company known as the Silver Star Mining Company, represented locally by Mr. P. Maris. One tunnel, started well up the side of the mountain, was driven 250 feet, and then another was driven about 1,000 feet, this cutting the ledge at about 240 feet deeper. A raise connecting the two tunnels was made in ore. The ore body has been cross-cut for 70 feet without reaching either wall. Estimates of the ore in sight vary from 150,000 to 250,000 tons. The ore differs in both character and average value from the ordinary ores of the Slocan, the deposit being much larger and the silver values lower, while lead and zinc are present in about equal parts. A small air compressor has been installed, this supplying power for the machine drills. A 100-ton concentrator is nearing completion, and it is expected that this will be ready for operation within a few weeks. The concentrator has been built just below the mouth of the lower tunnel. Water for power and other purposes is plentiful.

The Province group is owned chiefly by Kaslo people. It adjoins the Cork and its ore bodies are similar to that being developed in that mine—large quantities of concentrating ore with bunches of clean ore scattered throughout. Prospecting has been by means of a cross-cut tunnel, drifts, and two winzes in ore. The workings give a depth of 130 feet below the surface and in one place 30 feet of ore has been exposed. The company is endeavoring to make arrangements for driving a 1,200-foot cross-cut tunnel, to give a vertical depth of about 380 feet, and for installing a concentrator.

The Montezuma group has much ore in which zinc is the chief mineral. There is a 120-ton concentrator on the property, which has not been worked for some time, owing to the difficulty of marketing the zinc. It is expected that conditions will shortly be favorable for production at a profit.

The Bismarck group of five claims lies near the Province and Cork. On it there occur veins containing galena, running high in silver and carbonates, with lead and zinc values low. Four men have been kept at work all the year doing development. About 160 tons of ore in 1904 were produced in the course of development. In November a strike of eight feet of carbonate ore was made between No. 1 and No. 2 tunnels. The net value returned from the smelter for 404 tons of ore previously shipped was \$43.70 per ton, which after the deduction of freight and mining charges of \$10, left \$33.70 per ton clear. It is estimated that there is a considerable quantity of similar ore available in the mine.

The Bell group was recently leased and the lessees are now taking out ore. On the Gibson there is a six-foot ore shoot and two cars of ore are sacked ready for shipment. The Silver Bell was worked in the summer and a small lot of ore was shipped. Some high-grade silver ore was shown up on the Sturgis group, which was worked all last summer. There are good showings on the St. Francis and Vera, while work done on the Pos has opened up about 50 feet of concentrating ore.

#### WHITEWATER.

This mine was operated in a small way under lease. The output of ore to the middle of December was exactly 100 dry tons, and lessees expected to ship one car more before the year closed. The consolidation of this property with the adjoining Whitewater Deep has been under discussion, but as the negotiations have been carried on in England, little definite information concerning the prospects of this proposal being carried out are obtainable in British Columbia.

*Whitewater Deep.*—Owned by the Earl Syndicate, Ltd., a British Company. A small quantity of ore was shipped during the year and 275 feet of development work was done, making about 3,000 lineal feet of underground work done to date. The ore is silver-lead; the assay value of that shipped was: Silver, 115.7 oz.; lead, 40.5 per cent., and zinc, 15.7 per cent. The mine is equipped with an eight-drill compressor plant run by water power (Pelton wheel), with air line, machine drills, etc. Further development of the property during 1905 is contemplated.

*Wellington.*—This mine was not worked last year. It is noted for the high silver value contained in its ore, which is an argentiferous zinc ore, running at times from 1,000 to 1,500 oz. silver to the ton.

*Echo and Alameda.*—The Echo group of three claims and the adjoining Alameda group of two claims, all five crown-granted, had only development work done on them during the past year. One car of ore running 120 oz. silver and 60 per cent. lead was shipped. The property is now considerably developed, but it is like others in the district, the working of which

owners think undesirable so long as the zinc ore, frequently occurring in the ore bodies, cannot be transported at a low rate and the zinc prepared for market by magnetic separation at a cost admitting of an adequate return being obtained. Much of the ore is high in both silver and lead, but if production were proceeded with under existing conditions the zinc would, to a large extent, be lost. So soon as present difficulties in treating and marketing the zinc ores shall have been overcome, which it is believed will be ere long, operations will be resumed here, the mine being sufficiently developed to allow of a comparatively large tonnage being produced.

*Jackson.*—The work on this property, which is owned by the Jackson Mines, Ltd., during 1904 consisted, in addition to development work, which is now in an advanced stage, of extensive alterations and additions to the concentrating mill, in order to provide it with facilities for producing a separate zinc product as well as silver-lead concentrates. Heretofore the zinc had here been treated as waste, only silver-lead concentrates having been produced. Large shoots of high-grade zinc ore occur alternately with galena, and extensive bodies of both ores are in sight in the mine. This property is another that is awaiting the establishment of favorable transportation and marketing facilities before production on a large scale can be undertaken profitably.

*Cowboy.*—Messrs. D. W. Moore and J. Whittier have been working this claim under lease and bond. The ore is of good grade, as shown by a trial shipment of one carload made recently.

#### BEAR LAKE.

Several properties in the neighbourhood of Bear Lake, which is near the summit of the divide between the Ainsworth and Slocan divisions, came into prominence last year. The Empress, Silver Glance and Jo Jo, the last-mentioned being at the head waters of the North Fork of Carpenter Creek, are in a dry ore belt yielding very rich silver ores. The Lucky Jim, on the other hand, is one of the largest zinc properties yet discovered in the Slocan or Ainsworth districts.

*Empress.*—Very little information concerning this claim has been received. It was reported in district newspapers that two cars of ore, each bringing in unusually high values, were shipped during the last quarter of the year, and that two more would probably be sent out shortly. One lot of 12½ tons is reported to have returned \$3,332 net.

*Silver Glance.*—Dr. Arthur, of Nelson, has had four to six men employed on this property for some time. About 200 feet of development work was done during the year, bringing the total development up to about 1,000 feet. Production was limited to 24 tons, which paid for the season's development. Work is being continued and the prospects are promising.

*Jo Jo.*—This property is being worked under lease. Some fine specimens of free gold were found on it last year. The lessees have shipped 25 tons of ore, which had to be packed out to Three Forks. Values in this ore were chiefly in silver. A cross-cut tunnel

is being driven 200 feet to tap the vein at a depth of about 100 feet.

*Lucky Jim.*—The Lucky Jim group includes eleven claims, now owned by G. W. Hughes, of Sandon. The property was worked in the early days of the Slocan by Dr. Kilbourne, and later by Braden Bros. The latter leased the concentrator at the Pilot Bay smelter in 1897 and shipped about 6,000 tons of Lucky Jim ore to it for treatment, but as the zinc could not then be separated from the lead concentrates, its presence in quantity was such a detriment in marketing the ore that operations were not continued. In 1899 the representative of a smelting company of Manchester, England, shipped 1,800 tons of zinc ore to Europe, but the death of the shipper prevented his enterprise from being carried to a successful issue. Last summer Mr. Hughes purchased the property from Braden Bros. As it is situated near the K. & S. railway, with which it is connected by a gravity tramway, he was able to ship ore without difficulty, so he sent a quantity to the Kootenay Ore Sampling Company's works at Kaslo, and by the time the winter came on had 1,040 tons of zinc ore, averaging 54 per cent. zinc, stored there awaiting a purchaser at a price that would be acceptable to seller. Since then he has been sending both zinc and silver-lead ore to the Payne concentrator, near Sandon, this having been leased by the former foreman of the works. Shipments of silver-lead concentrates totalled about 200 tons, while some 800 tons of zinc concentrates were also made. The big body of zinc ore occurring in the Lucky Jim is believed to be the largest deposit of such high-grade zinc known to occur in British North America. The quantity sent to the Kaslo sampler (more than 1,000 tons) was taken from a 45-foot drift at about 50 feet from the surface. The face of the drift shows a width of about 18 feet of ore. The galena ore occurring in the same vein is a different shoot. Work is to be continued here throughout the winter with a force of twelve men.

#### SLOCAN DISTRICT.

(From Our Special Representative.)

**M**UCH more was expected of the Slocan for the year under review than has been achieved.

The fault, though, does not lie with the district so much as with the lack of knowledge of actual conditions among those who looked for the granting of a bounty on lead being followed by an almost immediate transformation from general idleness among many of the mines to universal activity throughout the whole district. That the most productive part of the district is largely a silver, rather than a lead, producer, does not seem to be widely realized, yet such is the case. Much of its richness has been, and no doubt still is, contained in the frequent occurrence of shoots of ore rich in silver. Where there is much lead there is, in most cases, also much zinc, and herein lies a grave difficulty not yet surmounted. The separation of the zinc from the lead is being brought about in a few instances, for since the successful operation of

the magnetic separation works in conjunction with the Payne Mining Company's concentrating mill has demonstrated that zinc could be profitably saved as a by-product, several other companies have set about similarly equipping their mills. Yet this branch of the mining industry is as yet in its infancy, for there is not yet a general adoption of similar means for saving the zinc and thus adding it to the valuable products of the mines. The erection of suitable zinc separators to treat custom ores will probably soon be an accomplished fact, for already works at Kaslo are well advanced and others at Rosebery, on Slocan Lake, are being built.

There are yet to be satisfactorily disposed of the questions of transportation and the finding of a market that will give the shipper a more adequate return for his zinc than he has received in the past. But, to get back to one of the causes for disappointment that certainly has been expressed by many, it is to the revival of activity among the mines that produce silver rather than lead that expectation must turn for a larger realization of hope and a justification of confidence in renewed prosperity for the Slocan. The prevailing higher price of silver will, doubtless, be of very great assistance to the Slocan, for it must be remembered that every advance of one cent per ounce means, on an average, an additional return of \$1 per ton of product shipped. Official figures show that the general average silver content of nearly 200,000 tons of product the district shipped during nine years—1895-1903—was 160.74 oz. per ton. There is this position to face, though—that numbers of the smaller properties have been practically gutted in past years; that their owners in many cases are without sufficient capital to do necessary development work, and that they will not sell their holdings at anything like a price considered by possible purchasers as a reasonable one. Yet, notwithstanding all these obstacles to a speedy return of general activity and resultant prosperity, the outlook for the district is better today than it has been for years, and a larger mineral production than ever yet reached may be confidently anticipated for the year now being entered upon. It would not be just, though, to fail to acknowledge that the granting of the lead bounty has had, and is having, an important part in bringing about the improved conditions and prospects, for to it can be directly traced the making of large additions to plant and other equipment of mines and mills in the district, and in not a few instances a resumption of work on mining properties previously idle.

There are other encouraging indications looking to progress, among which may be mentioned, in passing, the leasing of mines, with or without option of purchase, and the recognition by several large companies of the necessity, now that in most cases the deposits of rich ore nearer the surface have been or are fast being exhausted, for driving long tunnels to tap the veins at considerable depth. The Rambler-Cariboo Mines, Ltd., has set an excellent example in this respect, and has been deservedly complimented on its enterprise in undertaking the driving of a 4,300-

foot tunnel, estimated to cost \$60,000, to cut its vein at a depth of 1,400 feet—a greater depth than yet reached by any mine workings in the Slocan district. It is encouraging to have assurance that other companies, either singly or in co-operation, are planning to similarly provide for the more extensive and permanent opening up of their mines, for with production being carried on at much greater depth, as it can be profitably done after much pumping in this wet country and hoisting from comparatively great depths shall have been done away with, more extensive operations will be practicable and the establishment of the mines upon a permanent dividend-paying basis may be regarded as a reasonably certain result.

Without following any particular order in dealing with them, the following information relative to most of the mining properties worthy of notice is given:—

*Slocan Star.*—The Slocan Star group, situate near Sandon, is one of the most important and valuable mining properties in the district. No reply to applications to the company for information was received, so that particulars of the year's development can not be stated. From other than official sources, though, it has been ascertained that the chief underground work of the year was done on the Silversmith claim of the group. During the summer some 60 men were regularly employed. The concentrating mill was remodelled and zinc saving appliances were put in. The mill was operated until water ran short towards the end of the autumn. It is reported to have made about 2,500 tons of zinc concentrates, which have not yet been shipped. Its shipments of clean ore and silver-lead concentrates totalled by the middle of December, 2,573 tons, which total was probably added to by the time the year closed. Latterly some 35 men had been employed. Two dividends were paid in 1904, together \$50,000, or ten per cent. on the company's authorized capital of \$500,000. The total of dividends paid to date is \$600,000, which total is \$100,000 in excess of the amount of the capital. It has recently been announced that the company will next spring install its own zinc separating plant.

*Ruth.*—The usual large amount of development was carried on by the Ruth Mines, Ltd., during the year, chiefly on its Hope claim, on which a 600-foot tunnel is being driven on the Hope vein. A few men were also employed in developing this vein at other levels. It is understood that the Hope and Ruth old workings are being connected to facilitate the taking of the ore out of the mine. Shipments to December were 575 dry tons, but no stopping or regular production was undertaken during the year. The mill remained closed, pending the completion of arrangements to make it possible to market the zinc ores, which in this mine, as in others, occur intermittently with the galena ore. About 1,000 tons of zinc concentrates of good grade resulted from the last run of the mill on galena. Under former conditions this would have been run into the tail race and treated as waste, but now it is saved for magnetic separation, which will make it salable. The Ruth mines are now developed to a point which assures permanent opera-

tion after the marketing of zinc ores has been made practicable. The mill has been thoroughly adapted to the concentrating of zinc as well as lead-bearing ores, and the quantity of both in sight in the mine is large.

*Ivanhoe.*—The Minnesota Silver Company's Ivanhoe mine employed from 75 to 100 men during the greater part of the year. The cable of its aerial tramway was renewed and a 200-ton concentrating mill was erected by the company at Sandon. This plant is stated to be making about 4 tons of silver-lead concentrates and 7 tons of zinc concentrates daily. Shipments to December were 1,340 tons silver-lead and 1,273 tons zinc concentrates. No information was supplied by the company in time for inclusion in this

trate can be produced by water concentration only. Tests have shown that such concentrates will carry 15 to 20 oz. silver and upwards of 50 per cent zinc. The company is arranging to equip the property with an aerial tramway next spring, and will either build its own concentrator or ship its concentrating ore to one of the concentrating mills already erected in the district. In past years the mine has produced approximately 3,000 tons of clean silver-lead ore. Up to the present only about one-ninth of the area available for exploitation by tunnel has been developed, so it is believed to be capable of a large production under favorable conditions as to treatment of its ores and market for its products.

*Payne.*—The Payne Consolidated Mining Company



Portal of Cross-cut Tunnel being driven by Rambler Cariboo Mines, Ltd., about half way between McGuigan and the Company's mine, on Dardanelles Creek, Slovan Mining Division. The Tunnel, which is now in about 1,400 ft., will be about 4,300 feet by the time it cuts the vein at a depth of more than 1,400 feet, or 600 feet below the bottom of present 800 ft. main shaft, with which it will eventually be connected by a raise. It is 7 ft. by 7 ft. 6 in. in the clear, with water box 1 by 2 ft. under car track.

review, but it is known that large reserves of ore are being opened up in the mine, and it is expected that shipments will be on a larger scale shortly.

*Washington.*—This property is owned by The Washington Mine, Ltd., a close corporation having a nominal capital of \$200,000, with its stock held by about half a dozen shareholders. It lies between the Payne mine and McGuigan Basin, and has in sight from 40,000 to 50,000 tons of concentrating material which it is estimated will yield about 2,000 tons of lead concentrates and 8,000 tons of zinc concentrates. The lead concentrates will average about 100 oz. silver to the ton and 65 per cent lead. The zinc is of an unusually clean character, being practically free from iron. It is believed a very high grade zinc concen-

worked 75 to 100 men regularly until a few weeks since, when operations were suspended, excepting the employment of a few men engaged in taking out ore from the lower levels and the leasing of portions of the older workings of the mine, pending the making of financial arrangements for the development of the mine below the No. 8 level on which a great deal of exploration work has been done. An ore shoot of considerable extent and value has been opened up on this level, east and west of the cross-cut from the main tunnel for a distance of about 300 feet. The ore shows up very strongly under foot, giving promise of permanence. A station has been cut in the east drift and a winze sunk in the ore 15 ft. So satisfactory was the showing of ore that the manager, Mr. A.

C. Garde, has recommended that this ore body be explored by sinking from the No. 8 level to a depth of about 200 to 300 ft., after which, should results warrant it, a long cross-cut tunnel, starting from a point lower down the Payne Mountain, on the Sandon side, should be driven for the purpose of cutting the vein at a depth of 600 ft. below No. 8 level, and providing means for economically handling the ore by avoiding the necessity for hoisting, shorten the haul to the mill, and draining the mine without pumping.

Total production at the Payne during the year was 2,096 tons, as follows: Crude ore shipped, 175 tons; silver-lead concentrates, 601 tons; separated zinc concentrates, 926 tons; separated iron concentrates, 394 tons. The tonnage of ore concentrated was 32,821 tons. The crude ore shipped and the silver-lead concentrates averaged about 134 oz. silver and 67 per cent lead; the average value per ton of the concentrates for the year was about \$100. The separated zinc concentrates run about 50 per cent zinc and 12 to 15 oz. silver per ton, and the iron concentrates 37 per cent iron and 7 to 10 oz. silver. Development work during the year consisted of 711 ft. of sinking and raising and 748 ft. of cross-cutting and drifting; total, 1,459 ft. Total development work to date is about 21,000 lineal feet.

The magnetite zinc separating plant—the first in Canada—installed at this mine by Mr. Garde has a capacity of 200 to 300 tons finished product per month, according to percentage of zinc contained in material treated, the galena having first been extracted by ordinary water concentration. The plant has been found thoroughly effective in raising the grade of the zinc product from an average of about 25 per cent zinc contained in the raw material to 50 per cent and higher. The decided success of this plant has influenced several other companies operating in the district to alter their concentrators so as to save the zinc and to install similar magnetic separating plants.

*Majestic and Unexpected.*—Situate on Payne Mountain and is under lease. Did about 430 ft. of underground work during the year, and traced the lead on the surface for about 400 ft. Constructed a pack trail from the Payne wagon road and shipped some 60 tons ore running about 70 oz. silver to the ton and 75 per cent lead.

*Mercury.*—Not much work was done on this property, which is supposed to be on the Payne vein. Only 20 tons of ore (of very high grade) were shipped.

*Mountain Con.*—Situate at the head of South Fork of Carpenter Creek, in the granite. The property is under option for \$67,000 to M. S. Logan. Several years ago it was under bond to the Nimrod Syndicate, which after paying \$8,000 on account of its option and spending \$10,000 on the property, let its bond lapse. During 1904 the owners, McLeod and Thompson, did some 525 ft. of development work and shipped 220 tons of ore. The smelter returns are stated to have been about \$40,000 for this ore. One car netted \$5,100. Among recent improvements is a short aerial tramway.

*Noble Five.*—This mine has remained idle, and there

is no immediate prospect of its resuming work, its compressor plant having been removed during the year.

*American Boy.*—The buildings at this mine were last year destroyed, and after having been replaced were partially wrecked. These misfortunes and litigation together delayed operations until October, in which month work was resumed with eight men. Shipments thereafter to the end of the year were about 90 tons of a good grade of ore.

*R. E. Lee.*—Situate above the American Boy, on the divide between Washington Basin and Noble Five Mountain. Working several men, but shipped only one car of ore—about 18 tons.

*Reco.*—About 45 men are employed at this mine, taking out ore from Nos. 1 and 2 levels on what is known as the Reco big vein. No work had been done on this vein for about seven years until last winter, when a large shoot of rich ore on a parallel vein having been worked out, attention was again turned to one of the other veins, there being three known veins occurring on the property. All last summer ore was packed down from the mine to the railway, and now 10 tons a day are being rawhided. The year's shipments to December 31st total 1,045 tons. It is intended to continue rawhiding until the snow goes, by which time, it is anticipated, the Reco Company will have a cash balance of probably \$100,000 available for distribution among its shareholders.

*Goodenough.*—Did not work during the year, but acquired adjoining claims and will shortly resume operations.

*Blue Bird.*—Adjoins the Reco. Has worked 6 to 8 men all the year, and has shipped 61 tons of rich ore, returning \$2,000 to \$3,000 per car.

*Chambers Group.*—Not now working, but was under lease for five or six months. A small shipment of ore was made.

*Sovereign.*—After shipping 40 tons of ore, work was stopped on this property.

*Sunset.*—This mine has paid \$66,000 in dividends during the last three years, of which \$12,000 were distributed between its few owners this year. Shipments early in the year totalled 313 tons, since when development only has been done in the lower levels by a few men.

*Last Chance.*—Fourteen to sixteen men have been worked all the year. A shaft has been sunk 215 feet, with encouraging results and about 410 tons of silver-lead ore shipped. Litigation has impeded operations, but the legal difficulties are now disposed of.

*Monitor and Ajax Fraction.*—Only one car of ore was shipped by this mine, which is situate at Three Forks, and not much development work was done, the company having been giving its attention to putting in a line of flume and power plant for the mine and to the erection of a zinc enriching plant at Rosebery, on Slocan Lake. The construction of the buildings for these works has been well advanced, but the machinery has not yet been received. It is unlikely much more progress will be made until next spring.



*Idaho-Alamo.*—About 1,250 lineal feet of development work were done on this property during the year, bringing the total up to, approximately, 15,000 feet. Nearly 10,000 tons of ore were extracted, of which 200 tons were shipped as crude ore and the balance was concentrated, yielding some 800 tons of silver-lead concentrates. During eight months to August 31 the concentrates averaged 68 oz. silver, 53 per cent lead and 11 per cent zinc; values during the remainder of the year were 120 oz. silver, 55 per cent lead and 10 per cent zinc. The crude ore shipped assayed about 100 oz. silver, 45 per cent lead and 9 per cent zinc. The shoot of ore lately being mined gave about 7 ft. of fine milling ore. Additions to equipment included an automatic aerial tramway 6,800 ft. long, and a double carrier oscillating tramway, 1,800 ft. long.

*Cinderella and Medford.*—This property, which is owned in England, was operated under lease. From it were shipped 175 tons of silver-lead ore, running 85 oz. silver per ton and 73 per cent lead.

*Silver Bell and Hustler.*—Another leased property which includes the Adirondacks claim, the group being situated in the basin above the Idaho. Shipments were about 60 tons of ore.

*Rambler Cariboo.*—The development work the Rambler Cariboo Mines, Ltd., is doing is about the most important work of its kind in progress in the Slocan. A cross-cut tunnel, the portal of which is at a point about half way between McGuigan and the mine, on Dardanelles Creek, is being driven to cut the vein at a depth of more than 1,400 ft. It is 7 ft. by 7 ft. 6 in. in the clear with water box 1 ft. by 2 ft. under the car track. By the middle of last month the distance driven was 1,327 ft., progress made having been at the rate of about 220 feet per month. The main shaft has been deepened 100 ft. to the 800-ft. level, at which depth a cross-cut has been run 47 ft. and some 239 ft. of drifting done. Before this tunnel was commenced it was estimated that it would take two years to complete and that its approximate cost would be \$60,000. Shipments made during 1904 totalled about 400 tons of crude silver-lead ore and 414 tons of concentrates. The crude ore ran about 150 oz. silver per ton and 50 per cent lead. The ore milled was concentrated about 12 into 1 and the concentrates averaged 112.5 oz. silver, 28.5 per cent lead, and 12.9 per cent zinc. The zinc-bearing tailings were being stored.

*Antoine.*—Only about 200 tons of ore were shipped by the Antoine Consolidated Mines during 1904 pending the construction of a long tunnel, surveys for which are completed, and which, like other necessary mining work in the district, is awaiting the provision of means for marketing the large quantities of zinc ore that under conditions heretofore obtaining have been lying useless or have been treated as waste. The ore in this mine contains about 200 oz. silver per ton and 65 to 72 per cent lead. A trial car of zinc ore, running high in silver, was taken out, but was not sold, owing to difficulties in realising anything like a fair value for its silver contents.

*Red Fox.*—This property, which adjoin the Anto-

ine, was worked this winter, and shipped two cars of ore.

*Soho and Tom Moore.*—These mines form part of a group of 12 claims owned by the Soho Consolidated Mines, Ltd., and situate in McGuigan Basin. Development work was done last year, chiefly cross-cutting and drifting of a tunnel on the property, and the installation of a power plant and tramway.

#### NEW DENVER AND SILVERTON.

While nearly all the mining properties that will be noticed under this head are in the Slocan mining division, several of them are situate so near the dividing line between that and the Slocan City division as to make it probable they should be included in the latter.

The year's output from this section was between 1,300 and 1,400 tons.

*The Mollie Hughes* was worked under lease. The Capella, which has produced some of the highest grade silver ore yet sent out from the district, worked four men, but no record of its shipments has been supplied. The Marion also worked and shipped some ore. No information has been received of the Hartney group. The Bosun remained idle the year through. The Emily Edith was lately leased for three years, with option of purchase, to M. S. Davys, of Nelson who started work on the property in December. The Lorna Doone shipped two cars of ore, and the lessees are continuing work at this mine. The L. H. had some development done on it.

*Hewitt.*—This mine was worked all the year under lease and bond to Mr. M. H. Davys, whose lease has another year to run. Work was chiefly the opening up of known ore shoots, from which shipments were made totalling 452 tons to the middle of December. The ore is dry and averages about 115 oz. silver, 4 per cent lead and 11 to 12 per cent zinc. A raise is being made and new ground is being opened up.

*Comstock.*—This Silverton mine is owned by Messrs. Davys and Hunter, who did 288 lineal feet of underground development work in it during 1904 and shipped about 300 tons of ore averaging 80 oz. silver and 55 per cent lead. Footage of development work now aggregates 4,528 lin. ft. Its continued successful operation is confidently anticipated.

*Wakefield.*—Another leased mine, worked during the year by Mr. T. R. Lane. Production is given as 420 tons of silver-lead and 160 tons zinc, this tonnage having been shipped. The mine has been considerably developed in past years, and it has its own concentrating mill with which the mine is connected by an aerial tramway. It is regarded as a prospective steady zinc producer, its estimated daily capacity under existing conditions having been placed at about 50 tons of zinc of a shipping grade. Its first shipment of zinc was made in 1902, when one car was sent out, followed by six cars in 1903. Its production of silver-lead has, of course, been very much larger.

*Fisher Maiden.*—The output of the Fisher Maiden group for 1904 is stated to have been about 100 tons of dry ore. Development was continued and a wagon



road built a mile to connect with the main road up Four-Mile Creek. This property will probably be continuously worked in 1905.

*Rockland.*—The Rockland group of five full claims is situated on Eight-Mile Creek, between four and five miles from Silverton. It is a copper property and is being operated by the Rockland Copper Co., Ltd., of Philadelphia, with Mr. J. W. Hamilton as mine manager. Prior to 1904 about 400 ft. of tunneling had been done. Last year's work included the erection of boarding house, blacksmith shop and other mine buildings, and getting in timbers and supplies for the winter, the intention to keep about a dozen men at work. A cross-cut tunnel is being driven, the calculation being that at about 480 feet this will tap the ledge at a depth of, approximately, 400 ft. The ore showing, so far as developed, gives a width of nearly 80 ft. Assays of ore from a depth of 100 ft. have given an average of 2 per cent copper and \$10 in gold. Some copper returns have been as high as 49.6 per cent, from specimens assayed. Carbonate ore, high in copper occurs near the surface.

#### SLOCAN CITY DIVISION.

The output of ore from this division totalled about 2,300 tons, of which tonnage more than half was contributed by the Ottawa, with the Enterprise coming next with a total of 751 tons.

*Ottawa.*—The manager of the Ottawa group was lately quoted in the district newspapers as having made the statement that ore shipped from this property had returned not less than \$49,000 in excess of expenditures on development, improvements, surveys, etc. The average grade of the 1,203 tons of ore shipped was high, and it is claimed that the ore shipped by the present owners has paid the purchase price of the property as well as the cost of developing it and making the requisite surface improvements. With silver advancing in price, there will be an increased output to whatever extent shall be found practicable. The ore now accessible is being extracted, and work is being pushed to open up other shoots or levels. Further particulars can not be given, no information having been supplied on request for it.

*Enterprise.*—This mine was operated by W. E. Koch, under lease from the Enterprise (B.C.) Mines, Ltd. About 400 ft. of development, chiefly drifting, was done during the year and 751 tons (dry weight) of ore were shipped by the middle of December, with a probability of adding another car before the month ended. The ore returns showed a little higher general average value than that received in 1903. The opening up of lower ground, by driving a 300-ft. cross-cut tunnel to cut the lead and then drifting is contemplated.

*Arlington.*—This property was inoperative throughout the year. The question of determining the most suitable process for treating its large bodies of ore that can not be profitably shipped in their crude state, has been engaging the attention of the owners of the mine, but as yet nothing definite has resulted in the direction of installing reduction plant.

*Black Prince and Two Friends.*—The Black Prince, Two Friends and Bank of England groups are now consolidated and being operated by the Pioneer Mining Company, Ltd. The year's development work on these properties consisted of 285 ft. of sinking and raising and 1,070 ft. of cross-cutting and drifting. This development blocked out a body of dry ore estimated at about 1,200 tons, of which as much as possible will be shipped this winter. From 30 to 35 men have been employed, but a recent report states that the working force has been reduced by one-third. The bunkhouse accommodation was doubled last year, an assay office built, and 3½ miles of sleigh road built to connect with the Springer Creek wagon road near the Arlington mine. A deep-level adit is being driven, the expectation being that this will reach the ore shoot by next spring. The average value of Two Friends ore shipped is given at 190 oz. silver per ton and 25 per cent lead and that of Black Prince ore as 132 oz. silver and 6 per cent lead.

*Kilo.*—While the Kilo only shipped 40 tons of ore, of a gross assay value of about \$75 per ton, it has a large quantity—estimated at about 15,000 tons—of milling ore blocked out, the average value of which has been placed at \$17. Some 200 ft. of drifting, etc., were done last year.

*Nepawa.*—No information was received concerning operations on this property, which appears on the published list as having shipped 71 tons of ore.

*Nansen.*—Four men were employed and three cars of ore got out ready for shipment. Further production is anticipated this winter.

There were 15 to 20 other properties that shipped a little ore and others on which more or less development was done. Among these were the Hampton, Highland Light, Republic, Cripple Stick, Port Hope, Sapphire, Argentite, Edison, Club, Graphic, Colorado, Blandfield, Emmett, Lady Franklin, Hittle-Nolan group, and several others. The Chapleau is again being worked, and high-grade ore will shortly be shipped from it. Next year this property will probably make an excellent showing.

#### YMIR DISTRICT IN 1904.

(By Percy Gleazer.)

THE close of the year 1904 marks a period of exceptional activity in the Ymir district. All the principal mines are working with full complements of men, and the average output is higher than at any previous time in the history of the camp. Ymir, as is well-known, is a free-milling camp, and the bulk of the ore produced in the district is treated in the local stamp mills. At the present moment ore is being treated at stamp mills at the Ymir, Wilcox, Queen, Second Relief, Fern and Porto-Rico mines, whilst ore is being shipped in crude form from the Hunter V. and Arlington mines. The total output now is at the rate of 13,500 tons per month from these eight mines.

*Ymir Mine.*—The past year has been one of encouraging results to the Ymir Company, following as

it does, several years of disappointment. During the earlier months of the year, under the management of Mr. G. H. Barnhardt, sufficient profits were made to pay off a large indebtedness incurred during the previous year. In September last, Mr. S. J. Speak, formerly of the Transvaal mines, became manager, and just recently has been able to express a more confident view of the future of the property than has been possible for a long time. Important developments have occurred at three different portions of the mine. In the upper or No. 1 level, a fine body of high-grade ore was discovered in the footwall, and considerable shipments of this ore have been made to the smelters, the ore being sacked and delivered crude, instead of

will place it on its old footing among the principal dividend-payers of the province.

At present forty out of the eighty stamps are being used only, but this is only because of the lack of sufficient water for power.

*Hunter V. Mine.*—The property which of all others in the district has gone most ahead during 1904, is the Hunter V., owned and operated by the B. C. Standard Mining Co., of Nelson. The works at the mine now consist of two large quarries from which the ore is mined at a rate which is probably unequalled for cheapness in the province. The product is a silver-bearing lime, varying in value from about \$3.00



Filter Press at the Cyanide Plant of the Ymir Gold Mines Ltd.

being concentrated as is done with the lower-grade stuff. On the 600-foot level, in the east drift, another body of ore as high in grade as any of the stuff milled in previous years was discovered within about six feet of where work in that direction had been discontinued. The theory of the eastern trend of the pay-ore is believed to be fully confirmed, and it is now confidently believed that the drift on the 1,000-ft. level has still not progressed sufficiently to the east, but that about 60 ft. further the pay-ore will be encountered as rich as that now being worked in the 600, or in any of the upper levels which have been the main source of supply for the mill in previous years. It is needless to say that the encountering of pay-ore on the 1,000-ft. level, of which there are now indications enough to warrant every confidence, assures the future of the mine, and

to \$13.00 per ton, although there are streaks far richer carrying native silver in considerable quantity. On an average, however, the ore is low-grade, but the fact of the preponderance of lime in its composition, makes it a very desirable smelter flux, and it therefore commands a very cheap rate of treatment. During the year the rate of output has varied considerably, as the different smelters were enabled to make use of it. At present the output averages 200 tons per day, and is distributed between the smelters at Trail, Nelson, Northport and Granby. The aerial tram over which the ore is brought to the railway track is now running night and day to handle this output, but its capacity can be brought up to 400 tons per day, which is its maximum capacity, by simply putting on more buckets. The company contemplate the installation

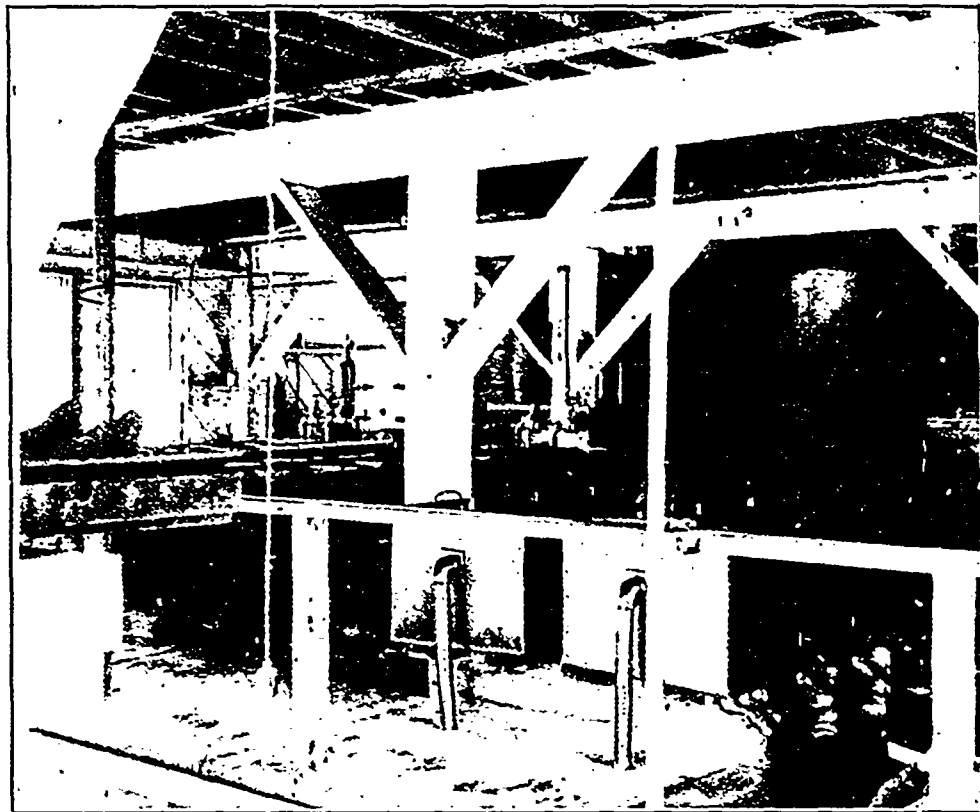
of a large Blake crusher, to break up the ore before running it down the tram.

*Wilcox Mine.*—The Wilcox mine, owned and operated by the Broken Hill Mining & Development Co., has also had a very successful year. Although the present equipment consists only of a four-stamp mill, considerable bullion has been turned out, and a large amount of development accomplished. Several new bodies of pay-ore have been encountered, and the mine has now a large quantity of high-grade milling ore in sight. A second aerial tram has been built, connecting the No. 3 tunnel with the mill. About September last, Prof. Arthur Lakes of Denver, Colo., made an examination of the property, and issued a

mill. He has had many successful runs and is understood to have cleaned up a large profit from his operations.

The Arlington mine at Eric, which is owned and operated by the Hastings (B.C. Exploration Co., has been shipping regularly throughout the year. On an average about four carloads of high-grade ore have been shipped each month, and as each of these carloads gave net returns of over \$1,000, considerable profits have been made.

The Second Relief mine and stamp mill have been in operation all through the summer, and it is claimed that there is now ore in sight to last the ten-stamp mill for six years. The property was owned by Finch



Zinc boxes at the Ymir Mines Cyanide Plant.

very favourable report, stating that there was practically no doubt as to the future of the mine, and the possibility of good profits. Acting upon this report the directors have purchased an additional ten-stamps, with two Frue vanners, and a large Blake crusher, which is now being installed. Even with the small plant in use up to the present, a good profit has been made on the ore treated, and there is no doubt that with additional treating facilities, the Wilcox mine will shortly be paying dividends.

The Queen mine at Salmo, which is owned by Turner, Scully and Waldie, has been operated during the year by the last-named under lease and bond. Mr. Waldie has also a lease over the ten-stamp mill belonging to the Yellowstone mine which adjoins the Queen, and has been treating the Queen ore in this

and Campbell of Spokane, who are reported, however, to have recently disposed of it to a syndicate of Missouri capitalists for the sum of \$100,000.

The Foghorn mine was shut down for about three months of the year, but is now in operation again with much improved prospects. A strike of high-grade ore was made on the surface about two months ago, and this ore has now been encountered in the cross-cut tunnel, at a depth of about 500 feet below the surface, which gives the property an immense quantity of backs. The Golden Monarch Co., which owns the property, has in contemplation the erection of a large concentrating mill.

G. H. Barnhardt, late manager of the Ymir Mines, is now working the Porto-Rico mine under lease. A tunnel has been run on the 400-ft. level which has

opened up new reserves of ore and the ten-stamp mill is now in operation.

The Fern mine with its ten-stamp mill has also been leased, and has just been put in operation.

#### PLACER MINING.

The year 1904 has witnessed the revival of placer mining in the Ymir district. As far back as 1885 the gravels in the neighbourhood of Hall Creek and the Salmon river were worked as placer by the Colville Indians. Later the Hall brothers who staked the Hall mines, operated the same ground and took out considerable gold. Gangs of Chinamen have also

portion of this ground, proposes to install an hydraulic elevator, which although not the cheapest method of saving the gold, will give complete assurances as to exact value of the ground. If these values turn out as high as expected, that is, up to the hand tests which have been made, the syndicate will put in a large dredge.

Along the Salmon river a number of placer miners have been operating creek diggings throughout the summer, with very profitable results.

Glancing forward at the prospects for 1905, it may safely be said, that the future never looked so rosy as it does now. The Hunter V. will continue or increase its present output, and the Ymir and Wilcox



Steel Leaching Tanks (with Tailings Distributors) at the Ymir Mines Cyanide Plant. Size of each tank, diameter 32 feet; depth, 6 feet; Normal charge 135 tons dry weight.

worked the ground at intervals. All this work was done with very primitive appliances, and only the most conveniently situated portion of the ground was worked. During this year, however, some 320 acres of the flat situated at the junction of the Salmon river and Hall creek, has been leased from the Government, and a syndicate has been formed by Mr. E. Fellows of Portland, Ore., to operate the ground by modern methods. Exhaustive tests, taken all over the area leased, indicate a general average value of 50 cents per yard, outside of the values contained in the black sand. So far, however, bed-rock, where the values may be presumed to be higher, has not been reached. The syndicate which has been formed to operate a

mines will both double their present outputs. The Rand syndicate, which owns the Dundee mine, are due to start up on or about the first of the year, and the Dundee mine is one which has always been regarded as the coming surprise of the Ymir camp. Its possibilities are known to be second to none of the others. The Foghorn with its deep development and large reserve of ore is another potential heavy shipper, while the shippers described above may be relied on to maintain their production. The new placer enterprise is expected to be the harbinger of many others of a similar nature, and from this source alone, the camp may look forward to considerable activity. There is fortunately a total absence of the booming element, but it is inevitable that the quiet work which is being successfully accomplished all around the town of Ymir, will ultimately attract incoming capital.

## ROSSLAND DISTRICT.

(From Our Special Correspondent.)

ON the whole the results of the year's operations in Rossland camp have not proved as satisfactory as it was earlier anticipated. The total production of ore has been less than that of last year by about 20,000 tons, while the concentration of the lower grade ores of the district, though in a measure successful, is not yet admitting of the profitable treatment of nearly so large a tonnage as was expected it would do.

*Le Roi*.—The development of this mine at depth, and the opening up of what appears to be a big body of good grade ore are important features. Last year the existence on the 1,350-ft. level of a big body of ore of a payable grade was discovered. Prospecting on the 1,450-ft. level has since been similarly successful, for within the last two months a fine shoot of ore has been found at the latter depth.

Cables sent from Rossland to the London office of the Le Roi Mining Company in November were as follows: "Have discovered small vein of ore in north cross-cut, 450-ft. level. Unable at present to state if it is continuation of the north vein. Have discovered fair ore body of shipping grade at 900-ft. level south vein, thus proving the continuation of the south ore shoot on this level." Later a cabled advice was: "We have found good ore at the 1,450-ft. level; the average width is about 3 ft. of good shipping ore." Development at the 1,450-ft. level continued to be so satisfactory that on December 4 the London office was advised that the newly-discovered ore body had been by that date developed about 30 ft. in length and that its average width was about 5 feet and its average value about \$20. No further information had been made public up to the time of writing, but it is understood that developments continue to be promising, and that the occurrence of a large ore shoot on the deepest level of the mine is being proved. In view of the fact that when, in February, 1903, Mr. S. F. Parrish took charge his predecessor informed him that the mine was almost worked out, his success in finding shipping ore at the 1,350-ft. level, and the later developments down to the 1,450-ft. level, must be regarded as eminently satisfactory.

There were no additions to machinery at the mine during the year other than renewals necessary to keep the plant in good working order. The output of ore from January 1 to December 1 was 121,767 dry tons, and the estimated production for December about 10,000 tons. An idea of the improved conditions under which the mine is being operated can be obtained from the following. In November, 1904, 10,182 tons of ore were shipped to the company's smelter at Northport, containing 4,853 oz. gold, 5,070 oz. silver, and about 280,000 lb. copper. The estimated profit on this ore, after deducting cost of mining, smelting, realization and depreciation, was \$34,000. Expenditure on development work during the month was about \$11,000.

During the latter half of the year changes were

made in the officials of the company. On September 1, Mr. A. J. McMillan became general manager; Mr. J. W. Astley, general superintendent; Mr. A. I. Goodell, general superintendent of the smelter at Northport; Mr. W. S. Rugh, chief accountant, and Mr. James H. Trevorror, mine superintendent.

At the company's smelter the only important addition of machinery made in 1904 was of a Vezin sampler, the latest improvement in ore sampling appliances, which was installed in March. Ore receipts for the year, including customs ores were, approximately, 144,000 tons, of which 140,000 tons was gold-copper ore from Rossland mines, and the remainder silver-bearing lime ore from Ymir camp. The tonnage smelted in 1904, including ore on hand at the opening of the year, was about 177,000 tons. Improvements were made and economies effected at the works, these together resulting in a reduction in the cost of smelting.

A series of tests were made with the object of determining the suitability or otherwise of the lower grades of Le Roi ores for concentration. The question of the profitable utilization of ore that it will not pay to ship to the smelter as crude ore has been and is still having the careful attention of the management, but it is unlikely a large expenditure of money on concentration plant will be made until after it shall have been conclusively shown that concentration will give profitable results.

*Centre Star and War Eagle*.—Development work done at the Centre Star during 1904 totalled 2,701 lin. ft., including 201 ft. of sinking and raising and 2,500 ft. of cross-cutting and drifting. This brought the total of development to date up to 26,450 lin. ft. A recent statement attributed to one of the directors of the company was to the effect that there had lately been encountered in the deepest workings of this mine at this mine a better shoot of ore than any previously met with at depth. This ore body was described as being 53 ft. in width and carrying good enough values to make it shipping ore. The mine is regarded as being in an excellent condition, as to both quantity and grade of ore opened up. There were not any important additions to plant and machinery during the year, equipment previously put in having been adequate. During eleven months to the end of November there were produced 74,774 tons of ore which, with an estimated production of 6,024 tons in December, made the year's output 80,798 tons. Shipments to the Trail smelter totalled 75,508 tons, while 5,290 tons were sent to the Rossland Power Company's mill for concentration.

At the War Eagle development consisted of 286 ft. of sinking and raising and 2,110 ft. of cross-cutting and drifting, being a total for the year of 2,396 ft. The aggregate footage of development work in the mine is now 28,535 lin. ft. Production of ore during 11 months was 55,830 tons; estimated output in December, 4,930 tons; total for the year, 60,760 tons. Of this total 56,863 tons went to the Trail smelter and the remaining 3,897 tons to the concentrator. There was not any expenditure of consequence on new plant,

machinery, buildings, etc., mine equipment having been amply provided in earlier years. As the War Eagle Company's annual report has not yet been made—its financial year ending December 31—there is no information yet available regarding underground operations in 1904. The Centre Star and War Eagle mines have now reached an aggregate output of ore of about 611,000 tons and it is interesting to note that the average gross smelter value is stated at \$14.40 per ton, this giving a total gross assay value of about \$8,800,000.

*Le Roi No. 2.*—Ore production at this company's mines totalled 20,923 tons in 11 months, while the estimated tonnage for December was 1,750 tons; total, 22,673 tons. Mill heads totalled 11,976 tons, from which about 600 tons of concentrates were made. In connection with concentration at the company's 50-ton mill, it may be mentioned that a scarcity of water unfavourably affected the output, necessitating the running of short shifts and consequent reduced tonnage treated. Oil concentration was discontinued, for the reason that, on the small scale here operated, the tailings did not contain sufficient value to leave a margin of profit. No tailings process yet brought to the notice of the management has been considered equal to making the treatment of these tailings profitable. Development on the mine was continued westward, in which direction the company has a considerable area of unexplored ground from which it is thought a large quantity of ore will yet be obtained. Operations were extended to the Thompson-Vernon group, which is held under option of purchase. Here a lot of exploration work was done in shafts, tunnels and surface trenching, but no ore was shipped from this property. The Le Roi No. 2 ore was shipped to Boundary smelters for treatment, as, too, was most of the concentrate made.

*Select-Portland.*—As a result of the consolidation of the Velvet and Portland companies, operations were resumed at these mines. Early in the year Mr. Wm. Thompson took charge and directed concentration experiments, which were successful. A small plant, including three Tremayne mills, each of two stamps, and two concentrating tables, was first put in. The complete plant, either already installed or being put in, will consist of, in addition to that above-mentioned, six stamps in two batteries of three each (these arranged on a plan that admits of any single stamp being hung up when necessary without stopping the others in the battery); three more Overstrom tables, two sets of Brown's hydrometric classifiers, a 7 by 10 Jenckes crusher, and a 10 by 12 slide-valve engine. The new plant will probably be in operation in January, buildings being all ready and awaiting the arrival of the remainder of the machinery. Capacity of mill will be 80 tons per day, which will be an increase of 50 tons over that of the machinery at first installed. Gold predominates in the ore and the average extraction is about 80 per cent. There are also copper values. Up to December 1 the tonnage of ore milled was 2,508 tons and the concentrates made 501 tons. The concentrates are sent to the Northport smelter for treat-

ment. There is a considerable quantity of ore on hand, so mining has not yet been commenced under the new auspices, but it will be shortly. The mine is well equipped, having all necessary plant and machinery.

*Jumbo.*—When, in May, 1903, Mr. Galusha, resumed work at the Jumbo, which had lain idle since 1900, the cash in the company's treasury was only about \$1,000. With two or three men he got things in shape and within two months commenced shipping ore to Northport. Returns from the smelter were more than sufficient to keep things going, and by the end of the year, 4,395 tons had been shipped. Production in 1904 was about 12,000 tons, which ore was shipped to the Granby Company's smelter, at Grand Forks. Recently the striking of a shoot of ore of higher grade has been reported. Besides stoping ore, some 750 ft. of development work has been done, and a compressor building and boarding house have been erected. A belt-driven air compressor was installed also a 100-h.p. General Electric motor to operate it. Four Rand Little Giant machine drills are used in the mine. Of the four tunnels driven prior to 1900, No. 1 and an intermediate were extended last year. A "glory hole" was opened in a body of ore 30 to 40 ft. in width. The ore mined last year ranged in value from \$7.50 to \$20 per ton. It is proposed to shortly construct an aerial tramway, about 6,000 ft. in length, from the mine to the Columbia & Red Mountain railway.

*White Bear.*—No information was obtainable at this mine relative to either production or development. From the published shipments from Rossland mines it is learned that the White Bear output for the year was more than 2,000 tons. It is stated that development is being done at about 1,000 ft. depth. A power plant installed during the year includes a 150-h.p. Jenckes electrical hoist, with about 1,400 ft. of wire rope, and a 30-drill Rand compound air compressor, driven by a 300-h.p. electric motor. The machinery installed in the 30-stamp mill consists of 6 batteries each of 5 stamps with double-discharge mortars, 6 Willfley tables, a Jenckes crusher 40 by 6 and another 20 by 10, grizzlies, screens, etc. The Elmore oil concentration plant is what is known as a 4-unit plant, its capacity being about 100 tons per diem, or sufficient to treat the tailings from the 6 Willfleys in use. The White Bear ore is of the typical Rossland camp class. It is a friable chalcopyrite, the gangue here being very hard, so that in crushing it slimes considerably. It is, therefore, difficult to save the very fine metals on the tables. Although the water concentration plant was in operation earlier, it was not until late in November that the oil part was started, owing to unavoidable delays, but when visited three weeks later it had been running continuously without a hitch. While then too soon for definite results to be obtained, it was stated that the ratio of concentration and extraction of values thus far appeared to be satisfactory.

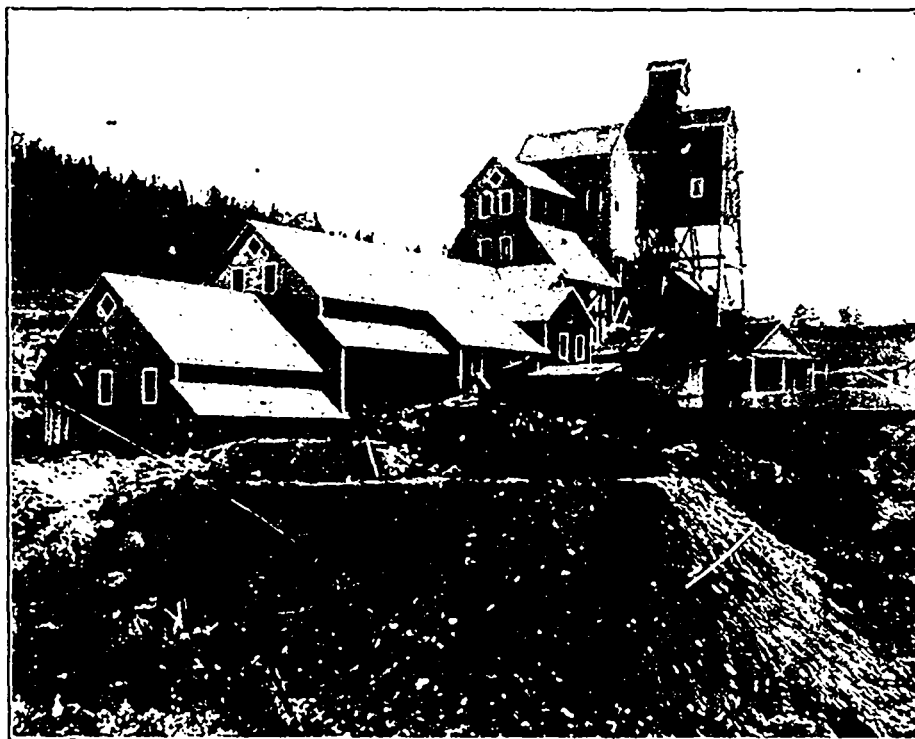
*Spitzee.*—The Spitzee Gold Mines, Ltd., owning a group of four claims, did some 950 ft. of development and shipped 990 tons of ore during the year. The mine has so far been opened up by two levels, with drifts of about 400 ft. on each. The power

plant consists of a 5-drill Rand air compressor, and a hoist, both operated by electric motors, while an electric pump disposes of the water. The drifts on the 100 and 200-ft. levels have together exposed about 30,000 tons of ore. Shipments to date have totalled about 2,000 tons, taken from various parts of the mine, to determine the average value in bulk. Values have ranged from \$8 to \$25 per ton, the average being placed at about \$12, which grade of ore will leave a good profit. The ore carries 1.5 per cent copper, a little silver and the balance gold. It is intended to do 1,000 ft. more development and instal a larger hoist before entering upon a regular monthly output of ore. Transportation facilities are

#### MILLING AND CONCENTRATION IN ROSSLAND CAMP.

THE problem of milling and concentrating the difficult ores of the Rossland district was last year taken in hand in a decisive manner by four companies, viz., the Le Roi No. 2, the Velvet-Portland, the White Bear and the Rossland Power Company, the last-mentioned to deal with the ores of the War Eagle and Centre Star mines and the others with those of their own mines, respectively. In addition, some experiments were carried out by the Le Roi Mining Company.

In the Le Roi No. 2 mill the ore is crushed in two Trent mills to 40 mesh size and subjected to water



The Elmore Plant at the White Bear Mine, Rossland.

excellent, a spur from the railway running to the mouth of the shaft. In addition to paying for the work done during the year, the final payment was made on two of the claims, which were recently purchased.

*General.*—No information was supplied by the Kootenay mine, which appears on the list as having shipped 5,084 tons of ore before it was closed down. The Cliff shipped 1,517 tons, but under such disadvantages that work was suspended. The Iron Mask and View were small shippers and nearly 1,000 tons of I.X.L. ore were milled during the year. Other mining operations in the camp were, as a rule, unimportant.

concentration on Wilfley tables, the tailing from these tables going to a two-unit Elmore Oil Process plant, having a capacity of 50 tons. During the greater part of the year 1904 the operations of this mill were restricted to the production of concentrates from the Wilfley tables, for after a few months earlier experience it was found that the grade of ore being milled did not leave tailings from the Wilfleys sufficiently high in value to make their treatment by oil profitable. The Elmore plant, therefore, has since been allowed to remain idle. There does not appear to be room for doubt that technically the Elmore Oil Process was a success here, but conditions were not favorable to its being a commercial



success as well. Beside the drawback of the lowness of grade of ore sent to the mill there were other things that combined to prevent its being operated profitably. First, conditions at the Le Roi No. 2 mill were against economic handling; then there were interruptions to a practically continuous run, much time having been lost through stoppages of the mill, costs of labour, etc., in connection with the oil process meanwhile continuing; next, the price of oil was higher than later, and finally, the scale on which the plant was operated was altogether too small to admit of a profit being made with other adverse conditions to contend against as well.

At the Velvet-Portland mill stamps and water concentration are being profitably employed. Tremayne stamps crush the ore and Overstrom tables save the concentrates, an extraction of 80 per cent of the values contained in the ore being claimed for this plant. The doubling of the capacity of this mill, after a sufficiently long run to prove its effectiveness in saving values, is the best evidence that the management is satisfied with the results achieved.

The White Bear mill was designed to crush the ore by 30 stamps to a 40 mesh size, and, after passing the product over Wilfley tables, to subject the tailings to the Elmore Oil Process. The stamps have been running for several months, but there was unavoidable delay in starting the oil plant, so that it was not until late in the year it commenced operating. As the difficulties the process had to contend against at the Le Roi No. 2 mill are believed to have been provided against in connection with the White Bear mill, it is believed a commercial as well as a technical success will be here achieved. The oil plant is twice as large, it is more conveniently arranged and can so make economies in working, oil is obtainable at lower cost, and interruptions to the running of the plant have so far not been experienced. Further, it is thought the tailings will in this case contain enough value to give the oil plant a fair chance of proving profitable.

The Rossland Power Company's mill was subjected to a series of delays in its construction, so that it was not completed until the end of last July. An unusual water drouth had by then so reduced the supply that had been depended upon that it became necessary for the company to build its own permanent water system before the mill could be operated. This further delayed starting the mill until the close of October. The process used here is ordinary coarse concentration on jigs, the tailings from which are pulverized in Trent mills and treated by cyanide. The capacity of this mill is about 200 tons per diem. It was found after the mill had been running for a short time that the coarse concentrates did not extract so large a proportion of the value as had been expected they would, and that it was necessary to provide additional concentrating tables to complete the separation after fine grinding. The mill was therefore closed early in December, in order to have the additional appliances installed. It is in-

tended to resume operations as soon as the mill shall have been provided with this further equipment.

#### EAST KOOTENAY.

THE resumption of work at the St. Eugene mine, the important construction work on the aerial tramway and lead smelter for the Sullivan mine, the continued but unexpected ore production at the North Star, in the Fort Steele division; the renewed interest in several mining properties in the Windermere division, consequent upon the carrying out of surveys for the proposed Kootenay Central railway; the increased tonnage and general improvement of conditions at the Crow's Nest Pass Coal Company's collieries, and the attention that has been given to the oil prospects of the Flathead country, in South-east Kootenay, are among the leading features of the year in East Kootenay. Probably the extension of the Crow's Nest Southern railway, now operated by the Great Northern Railway Company, from Clinton (Morrissey Junction) to Fernie, and its connection at that town with the branch line to the Coal Creek collieries, should be given much prominence, since it provides additional transportation facilities and enables the Crow's Nest Pass Coal Company to enlarge its export trade, now attaining such considerable proportions that a steady output can be maintained at the several collieries without the loss sometimes unavoidable with a fluctuating and uncertain market.

Progress at the metalliferous mines of the district and in connection with placer and hydraulic mining on several streams in the Fort Steele division is indicated in the following summary.

#### FORT STEELE DIVISION.

*St. Eugene.*—The St. Eugene Consolidated Mining Company, of Toronto, Ontario, is the largest producer of lead ore in British Columbia. It owns three adjoining groups of mineral claims, known respectively as the St. Eugene, Moyie and Lake Shore groups, situate on the east side of and contiguous to Moyie Lake, along the eastern shore of which runs the C.P.R. Company's Crow's Nest railway. There are altogether about 6 miles of underground workings in the St. Eugene mine, which is opened by 12 tunnel levels, an 125-ft. shaft from the lowest tunnel level down to 50 ft. below the surface of the lake, and numerous drifts, crosscuts, winzes, raises, etc. The vertical depth from the top of the St. Eugene Mountain to the level of the bottom of the lowest working in the mine is 1,925 ft. There are two known parallel veins running the whole length of the property. Six cross veins have also been opened up by the workings. During 1900, which was the first year the mine shipped its products, 66,507 tons of ore were milled on the property, producing 17,201 tons of concentrates, having a gross value, (with lead at £18 per ton and silver at 58 to 60 cents per oz.) of \$1,100,994.45. During the first 5 months of 1901 there were milled 49,159 tons of ore, which produced 12,025 tons of concentrates, having a gross value

(with lead down to £13 to £16 per ton and silver at 58 cents per oz.) of \$610,561. Low prices for lead and a difficulty in finding a market for that metal necessitated a suspension of production until May, 1904, when operations were resumed and the mine has since been producing freely from its large reserves of ore. Production during the year just closed was (with output for December estimated) 73,043 tons of milling ore yielding 15,139 tons of concentrates, and 733 tons of crude ore. The latter was shipped direct to home smelters (about half each to Trail and Nelson), which also received 8,621 tons of concentrates, while the remaining 6,518 tons went in European smelters. The mine's total production of lead in 1904 was 21,048,708 lb. and of silver 541,587 oz.

Since resuming work last May about 3,000 lin. ft. of development work has been done, more than one fourth of it on the 1900-ft. level. Some of the development has exposed a large quantity of ore in parts of the mine where it was not expected to be found. One such find was made last June on the 1,800-ft. level. Cross-cutting at the point where the ore was discovered disclosed a vein 14 ft. wide. This ore averaged about 40 per cent lead and 30 oz. silver, with numerous streaks of clean ore which ran as high as 84 per cent lead. This shoot has since been under development at the level immediately above (the 1,700-ft. level) the tunnel having already been driven about 250 ft. on the ore, which in this working has varied in width from 4 to 15 ft. The face of this drift is at present all in ore.

The development, though, that has added most to the known value of the property is that done on the 1,900-ft. level, on which the drift following the vein east from the shaft has been extended about 500 ft. For a distance of 250 ft. west of the point of resuming, the drift had shown a continuous vein of ore, but, owing to the fact that the 1,800-ft. level did not carry ore farther back, it was not expected that it would be encountered in the 500 ft. driven on the 1,900-ft. level, which was extended to cut ore known to be farther in at higher levels. To the surprise of the management, however, the ore did not give out, but continued with a width varying from 2 to 5 ft. until finally it opened out, in the last 100 ft. driven, to an extensive body of ore at least 10 ft. wide, and it may be twice that width for it has not yet been explored to the hanging wall side. The ore in this strike is clean, with 6 ft. of it nearest the footwall averaging 60 per cent lead and 30 to 35 oz. silver. From early in November this ore has been shipped to the smelters as broken, hand-sorting not having been required. The output is about 40 tons a day of this class of ore. The two finds above referred to are well in the middle of the Moyie claim. Finding clean ore at such a depth is, it is stated, very unusual in lead mining.

At other levels in the Moyie and in the St. Eugene claim several hundred feet of development work were done, this opening up ore shoots varying in width from 5 to 15 ft. The finding of ore in these places

was not regarded as important, though, since its occurrence was expected.

The production of the mine was reduced by one-half during the 4 months August-November, owing to an unusual scarcity of water, of which there was during that period an altogether insufficient quantity to concentrate the ore in the mill, the full capacity of which is the treating of 400 to 500 tons of crude ore per day. To overcome this difficulty it was decided to pump water from Moyie lake, and for this purpose a pump having a 16-in. suction and 14-in. discharge pipe, and a pumping capacity of 2,500 gal. per minute, was ordered from the East, but it did not arrive at the mine until the water shortage had been relieved by a heavy fall of rain. Another result of the shortage of water was that it was found necessary to install a 240-h.p. steam engine to supply power for operating the mill, the water power having failed. After this engine was put in, the mill was run by steam. No other important additions were made to plant and machinery, but the installation of a 20-drill compressor, to supplement the two compressors already in use is under consideration, it being proposed to install this machine next spring.

*Society Girl.*—The Society Girl group of 7 crown-granted mineral claims owned by C. C. and M. Farrell, adjoins the St. Eugene group on the east. The property is situated at an elevation of 2,100 ft. above Moyie Lake, and is distant from the town of Moyie by wagon road about 4½ miles. No development nor production took place in 1904 but in previous years about 900 ft. of underground work was done and some 400 tons of ore shipped to the Nelson smelter.

*Sullivan Group.*—The Sullivan group of 3 mineral claims is situated on Mark Creek, near the town of Kimberley. Considerable work has been done in the way of development, consisting chiefly in small tunnels and drifts run in what appeared to be a great basin of ore, seemingly for exploration purposes. These workings have developed a very large quantity of ore, there being in sight, on a rough calculation, from 300,000 to 400,000 tons, assaying, approximately, 30 to 35 per cent lead and 15 to 18 oz. silver. The ore is of such a character, being chiefly metallic sulphides, as to preclude any method of water concentration, so smelting is the only reduction process that appears to be suitable. No mining work was done on the property last year, but important improvements were undertaken, among them the remodelling of the unfinished smelter and the construction of an aerial tramway a distance of about three-quarters of a mile from the mine to a spur from the railway, whence the ore is to be conveyed to the smelter at Marysville. It is claimed the expenditure of more than \$250,000 on these works and the intended operation of the Sullivan mine, are among the most important results of the granting of a bounty on lead, and that the mine would have remained unworked, owing to the impossibility of turning its low-grade ores to account without the aid of the bounty. It is calculated that the production of this

mine will increase the total output of lead in the province by at least one third. The completion of the smelter, which will probably also treat custom ores, is looked for shortly, construction work on it having been in progress for several months. The Sullivan shipped some 3,000 tons of ore in 1901 and a small quantity in 1903, but none since. The money now being expended on the works looking to a resumption of production is being provided by Spokane capitalists.

*North Star.*—This mine is the oldest lode-ore producer in East Kootenay, its initial shipments of silver-lead ore having been made in 1895, followed in 1896-7 by an output of some 8,000 tons, which tonnage has since been increased to between 40,000 and 50,000 tons. The production in 1904 was 5,768 tons, and the development work done, 1,227 ft., bringing the aggregate of development up about 21,785 lin. ft. During the period of one manager's term of office development was carried on in accordance with his theory that the ore lay in basins or channels not far from the surface, while another manager afterwards tried development at depth. The greater part of the ore in sight having been extracted and no new bodies of considerable size having been found, the directors informed the shareholders in the North Star Mining Company that, independent expert opinion having first been obtained, the closing of the mine appeared inevitable. In May last Mr. N. McL. Curran, who had been connected with the mine for years as accountant and business agent, was put in charge, and since then he has been working a force of 12 men, and has been successful in opening up several small deposits of high grade ore. In view of the adverse opinions expressed as to the future of the property, a very conservative policy has been followed; still it is earnestly hoped that more ore will yet be discovered, and that this mine, which in earlier years was chiefly instrumental in attracting attention to the mining possibilities of the Fort Steele mining division, will again become an important producer.

#### WINDERMERE DIVISION.

*Paradise.*—At this mine, which is situate in North-east Kootenay, the owners, Messrs. Hammond, Bruce and Fowler, did last year 1,147 ft. of development work, and produced 360 tons of first class ore, of which quantity 300 tons were shipped. The property, which consists of a group of 9 claims, situate at the head of Springer Creek, a tributary of Toby Creek, is considered to be a valuable one. During the last 3 years more than 2,000 tons of first-class ore have been extracted, beside which some 4,000 tons of second-class ore have been piled on the dump, awaiting some form of concentration. The opinion has been expressed by a fully competent authority that there are probably 50,000 tons of ore available

for mining here, with good reason to believe that further development would add largely to this quantity. The owners, therefore, feel warranted in endeavouring to make arrangements to put in during 1905 some form of concentrator, and in constructing an aerial tramway, surveys for which have been made.

*Delphine.*—This mine is under lease to Mr. Wm. Beattie, who is working a small force extracting ore, of which some 75 tons have been taken out. The shipping ore averages 125 oz. silver, 30 per cent lead and 4.5 per cent copper. About 200 ft. of drifting was done last year. The present lease extends to July 1, 1906.

*Lead Queen.*—The Lead Queen group consists of 7 mineral claims situate on B. D. S. Creek, a small tributary of No. 3 Creek flowing into the Columbia River above Wilmer, from which town the group is about 28 miles distant. Not much work has been done on this group of late, but as it is regarded as one of the most promising low-grade properties in North-east Kootenay it is worthy of notice. On one of the claims the lode, which has been traced through all seven, has been cut in an adit at a depth of 40 ft. It is described as being here 14 ft. in width, with 16 in. of solid steel galena on the footwall and about 3 ft. of same on the hanging, the intervening vein filling being concentrating ore. On another claim the lead has been tapped by an adit and drifted on about 160 ft., the showing in this drift being a 3-ft. vein, of which 30 in. is clean ore. The surface showing along about 2,000 ft. is anywhere from an inch or so to 2 ft. of galena in a lead that in places is up to 10 ft. wide. The lowest assay returns received gave 61 per cent lead and 41 oz. silver, while the latter mineral sometimes runs much higher. A large quantity of ore is obtainable from the grass roots. There are excellent facilities for tunnelling to cut the ore at considerable depth, so that hoisting would not be necessary. A good site for a concentrator is available, and timber and water are in abundance close at hand, the latter for power purposes as well as for other uses in the concentrator.

*Ptarmigan.*—The Ptarmigan group is situated at the head of McDonald Creek, a branch of Horse Thief Creek. Between 3,000 and 4,000 ft. of development work have been done, chiefly drifting. This is another property awaiting transportation and concentration facilities. Its ore carries good values in silver and copper, with some gold. Experiments have been made with magnetic separation at outside works, but at date nothing definite is publicly known as to what the owners of this mine will do in the direction of providing for concentration. An aerial tramway, 7,550 ft. long and dropping about 2,000 in that distance, has been constructed on the property.

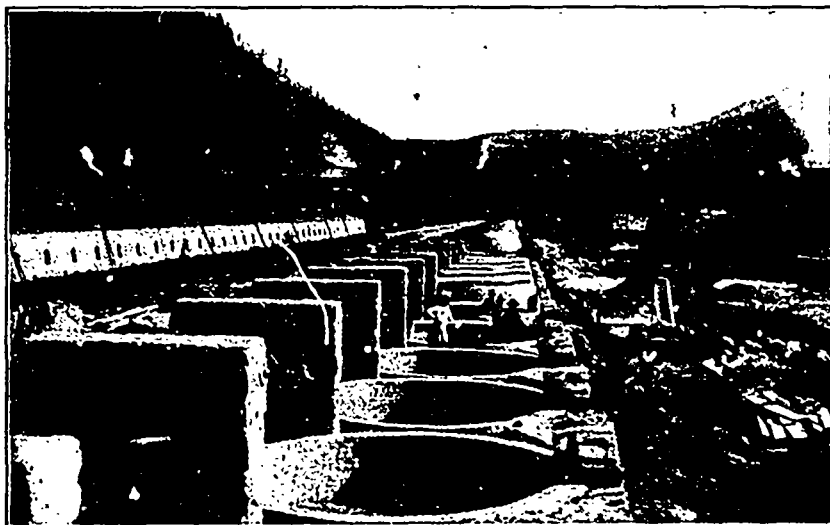
No information has been received from the Golden division of North-east Kootenay, nor is it known whether any mining development of importance has taken place in that section during the year.

## NORTHEAST KOOTENAY.

**M**R. JAMES BRADY, M.E., writing in reference to mining operations in this section of the province during the year states that progress has been relatively small. The Paradise mine has been steadily developed, and in company with several smaller properties has made occasional shipment of ore to the smelters. The Ptarmigan mines upon which operations have been suspended are not likely to resume work until the C.P.R. branch line through the valley shall have been built, or is, at least, definitely assured. The location surveys for this line will be completed about March next, and is a reasonable likelihood that construction work will be commenced in the spring, in which event much mining activity is anticipated.

of the numerous coal seams, with the object of discontinuing work on all that should be found, after analyses of their coals, of inferior quality. This thorough testing of the coal and rejection of all not found of good quality has already resulted in a considerable reduction having been made in the ash contents of the products of these collieries.

At Coal Creek Nos. 2, 3 and 9 mines have been largely developed. These are all on the same seam, which gives from 6 to 9 ft. of one of the best coals, both steam and coking, being produced in the Crow's Nest Pass field. No. 9 mine gives promise of being one of the most productive at this colliery. It is now yielding about 5,000 tons per month. The long-wall system is now fully installed here, which should result in a larger production of lump coal than in the past.



Coke Ovens at Michel, showing ovens in operation and others in course of building.

CROW'S NEST PASS COAL COMPANY'S  
COLLIERIES.

**A**T this company's several collieries, situated in the Crow's Nest Pass, East Kootenay, the year was one of steady and substantial progress rather than of large expenditure on capital account, such as marked earlier years in the company's history. Yet the outlay in actual improvement work, while small in comparison with that of former years, was by no means insignificant, since it amounted to more than \$250,000, a sum that by most companies would be considered a large one.

While all necessary additions to plant and equipment have been made the main features of the year's progress are, perhaps, the important improvements effected in quality of product and the reduction of operating costs, the latter chiefly by concentration of work. To secure the former there has been during the whole year a careful and systematic examination

At Michel No. 6 mine was opened during the year and is now giving satisfactory results. The chief development was in No. 8 mine, which, though a considerable producer in earlier years, is now steadily maintaining an enlarged output, and is the main source of supply at this colliery. Its seam is 10 by 12 ft. in thickness of coal of excellent quality both for steam and coking purposes.

No additional openings were made at Carbonado (formerly known as Morrissey), but coal from Nos. 3 and 0 seams has been submitted to careful tests in locomotives working under ordinary conditions with results that compare favourably with those from the best Pocahontas, Pa., coal. The greater part of the output of this colliery is now being sold for steam and domestic uses, very little coke being made in the ovens here.

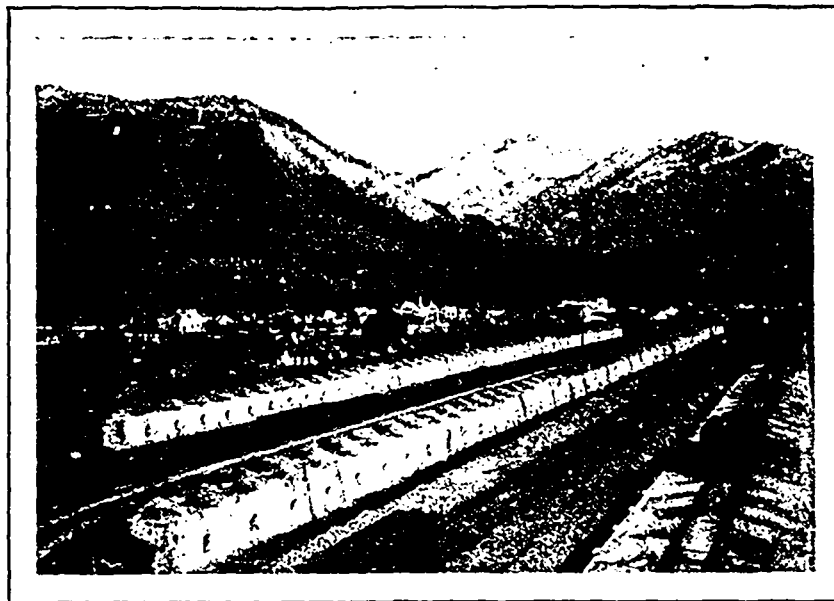
Production in 1904 was higher than in any previous year, having been about 1,086,000 tons. Of this quantity 718,111 tons were disposed of as coal and the remainder made into 245,411 tons of coke. For comparison the following tables, showing production for 5 years and disposition of products, will probably be of interest:

PRODUCTION OF COAL.			
Year.	Consumed	Exported.	Total.
	in Canada.		
	Tons.	Tons.	Tons.
1900 . . . . .	211,533	8,925	220,458
1901 . . . . .	343,860	81,597	425,457
1902 . . . . .	324,908	116,328	441,236
1903 . . . . .	498,166	162,952	661,118
1904 . . . . .	581,634	136,477	718,111
PRODUCTION OF COKE.			
1900 . . . . .	45,445	28,051	73,496
1901 . . . . .	89,678	35,407	125,085
1902 . . . . .	87,643	33,134	120,777
1903 . . . . .	136,650	31,089	167,739
1904 . . . . .	138,076	107,335	245,411

having cost about \$20,000. It is well appointed, and is lighted by electricity, the Michel electric lighting plant having been put in operation during the year. At Carbonado new fans were installed at Nos. 2 and 3 mines, slack bins having a holding capacity of about 4,000 tons were completed, the coke ovens were finished, making the number here 240, and 25 cottages were erected.

The Crow's Nest Pass Electric Light & Power Company has electric light and water plants at Fernie, Michel and Carbonado. The power plant at Coal Creek furnishes light to both the colliery and the town of Fernie.

In conclusion, it may be stated that the mines of the Crow's Nest Pass Coal Company have now



Coke Ovens at Fernie. Box cars between coke wharves. Loading larry on top of ovens.

Permanent improvements made and additions to plant and equipment in 1904 were as follows: At Coal Creek a stone lamp house and an addition to the wash house were erected. Five new Mumford steam boilers made at Amherst, Nova Scotia, were installed, and the new haulage plant for No. 2 mine was completed, this enabling the reaching of districts in that mine the coal from which was not previously available. At Michel the unfinished coke ovens were completed, bringing the total up to 464, which was the number originally intended to be built here. The total capacity of the coking plants of all three collieries is now about 45,000 tons per month. A new fan was put in at No. 8 mine, this increasing the air current there to 250,000 cubic feet per minute. Another screening plant and picking table were added, increasing the shipping facilities at Michel at least 50 per cent. Twenty-five new cottages were built and a new wash house is under construction. The new hotel built by the company, to replace that destroyed by fire about a year ago, is an up-to-date structure with all modern conveniences.

reached a stage at which they are in a position to meet all the requirements of the British Columbia market looking to the Crows' Nest coal fields for its supply, and, too, any demands made from outside sources, their facilities now being more than adequate, both as regards the production of coal and the manufacture of coke.

SOME NOTES FROM CARIBOO.

MR JAMES MOORE, of Black Bear Creek, writes: The season of 1904 was a very backward one for mining, caused by the long, dry summer, there having been insufficient rain to lay the dust. In the Quesnel mining division the Consolidated Cariboo hydraulic mine closed down early in the season, on account of water shortage, but the mine work was carried on and a gold recovery of about a thousand dollars per day was made. On the high benches at the foot of Quesnel Lake both the Lakeview Mining Company (Robt. Winkley, manager) and the Rising Sun Company (Patrick Gaffney, superintendent) earned expenses, but the

mines will also be closed down early in the season. On Spanish Creek the Moore Company working a drifting mine had a fairly successful season. On Keithley Creek, the Onward Company paid substantial profits, while John Malcolm, a pioneer miner working on this creek, struck a very good prospect in the hill. Other claims on this creek have done fairly well. On Snowshoe Creek the hydraulic claims suffered also by reason of the season's inadequate water supply. However, the Hayward Company did well, and other claims on this creek worked by Chinamen yielded good wages. On Morehead Creek, Jay Pratt, with a small force of men constructed a ditch to bring in a small water supply to prospect a high bench of gravel, the prospects so far being very encouraging. On Horsefly Creek new prospects were discovered this autumn, but not enough work was done to prove the extent of these

power plant at the falls, which in their natural state are estimated to develop 15,000 h.p. There are seven placer leases in force or applied for on this river, of which this company controls five. They are said to have expended about \$25,000 already on the flume-grade, mill and dam. Work is still progressing and will be continued during the winter.

*Perry Creek.*—In this district the work of the season has been chiefly that of development—installation of hydraulic plants, and the commencement of active mining operations by the Perry Creek Hydraulic Company, whose operations have greatly stimulated placer mining in this vicinity. There are 19 leases in force on this river and 7 more applied for. The East Kootenay Placer Mining Company are said to have disposed of their leases and steam shovel and other machinery to a strong American company, who are applying for additional leases further up stream.



C. P. N. Co's Morrissey Mines, Surface Works.

new finds. A reasonably large gold production has been made from the district considering the unfavourable conditions.

#### NOTES ON PLACER AND HYDRAULIC MINING IN FORT STEELE MINING DIVISION.

**WILD HORSE CREEK.**—The placers and dry diggings of this creek are being worked mainly by Chinamen under lease from the crown grantees. The yearly production is estimated by the Fort Steele Prospector is \$30,000. The Nip and Tuck hydraulic claim produced last year about \$10,000, and this season's clean-up is expected to show an increase. Leases have been applied for for dredging purposes near Fort Steele.

*Bull River.*—The Bull River Mining & Power Company has been busy all summer continuing the work of damming the river about two miles above the falls to divert the most of the water into a flume or stave-pipe, the expectation being to recover enough gold from the dry river bed to defray the cost of a huge

Other leases have been applied for on tributaries of Perry, such as Manchester and Valley Creeks.

*Moyie River and Tributaries.*—Four hydraulic leases have been granted during the year on the Moyie and its tributaries, Nigger and Salisbury Creeks. Little has been done except initiatory development work.

*Trent Creek.*—Three placer claims were staked on this tributary of Joseph's Prairie Creek this summer, and a company under the guidance of an expert old-timer has hopes of bright things after the winter lay-off.

#### BRITISH COLUMBIA MINES AND THE BRITISH INVESTOR.

(From our London Correspondent.)

LOOKING backward over the past year one has to admit that there has been little to accelerate that revival of public interest in British Columbia mining matters, which was so much in evidence in the latter years of the old century. The flattering tale told by hope in the Machiavellian

form of the London promoter in the brief period during which British Columbia loomed large in the public eye, has never been fulfilled, and investors in this country have lost millions sterling as a result of the seductive arts of the financiers who exploited their pockets so adroitly. No satisfaction would follow a recital of the facts: they are patent to everyone interested. All that the investor on this side cares to know is that almost without exception the companies so recklessly promoted seven or eight years ago, have proved complete failures. Here and there an exception is to be found, but for the most part the public has lost its money, only gaining in exchange experience, which although invaluable in itself, is hardly a good advertisement for British Columbia and its mines. At the end of a year which has been exceptionally dismal from a financial point of view, there are indications of a revival of interest in mining matters generally, but I am afraid that this will not extend to British Columbians. There is still supposed to be a British Columbia market, it is true, but apparently the few shares dealt in are chiefly limited to such companies as Stratton's Independence, Camp Bird, etc., which of course are purely American, and only dealt in in the section in question for purposes of convenience. I doubt whether out of the shoal of British Columbia concerns floated a few years ago the shares of six companies command a free market. One of the strongest is the Tye Copper Company, which after its recent fall has recovered sharply owing to public appreciation of the prospects you have so often referred to in your columns. The two Le Rois jog along. It is, however, difficult to get information, and to facilitate matters in this respect I have recently adopted a course by means of which I shall have a chance of securing fairly early news for the benefit of your readers. Reconstruction rumors are still in the air, and it is now said that a scheme is on foot to amalgamate the Le Rois, War Eagle, Centre Star and Snowshoe companies. But the public remain unperturbed, and share values have hardly altered for weeks. The Le Roi group is in fact under a cloud, and many changes must take place in the expensive London management before the public takes it seriously again. The New Goldfields of British Columbia is still in the doldrums, and many other concerns are moribund. The London & B. C. Goldfields and its subsidiaries have long ceased to receive serious attention, as you will have gathered from the very reduced quotations for their shares—nominal as they are. I learn that there is some prospect of success attending the efforts to carry through the Lenora-Crofton Smelter-Britannia scheme, and the contract recently entered into between the last mentioned and the smelter will doubtless materially assist matters.

Lenoras a nos motons, or rather mines. What the future has in store for us is of course uncertain. The one thing that is absolutely definite is that until some of the existing British Columbia mines can prove their capacity to earn dividends for their unfortunate shareholders, the London money market

is shut to new British Columbia mining propositions. Hitherto it has been all promise: the British investor has now decided that before he puts up any more money to assist in the exploitation of your mines he must have tangible evidence in justification of the golden inducements held out by the promoting fraternity in the boom times. At the moment South Africa is much more attractive from every point of view than British Columbia.

#### COMPANY MEETINGS AND REPORTS.

ST. EUGENE CONSOLIDATED.

**T**HE Directors in their report state that operations at the mine commenced about the end of April last, since which time about 10,740 tons of concentrates, the product of 50,456 tons of ore have been produced. This quantity would have been greatly exceeded had it not been for the unprecedented drouth. The company had \$10,378.87 in hand at the end of our fiscal year and by the end of April an indebtedness of \$25,476.77. Since that time there has been received in cash profits over and above operating expenses and the cost of freight and treatment the sum of \$115,936.09, leaving a net profit after paying off the indebtedness of \$90,459.32. In addition to this there is owing to the company for bonuses from the Government the sum of \$41,505.74.

We extract the following from the general manager's report:

**Equipment.**—It being decided over a year ago that further equipment was necessary to facilitate economical mining and milling, the following were added:

A large slime-saving plant and building 20 ft. wide by 150 ft. long. In this building are six Frue Vanners, two Wilfley tables and two double deck King Classifiers. These tables are fed from large settling tanks running the full length and width of the building. The tanks are supplied by elevating the tailings from all the vanners and Wilfley tables of the mill, a 40-h.p. engine erected in the slime building supplying the power to run all the machinery in the slime plant.

**Mill Equipment.**—It was found during the low water months, viz., August, September and October, that the water power obtainable could not be depended on to give the required pressure, therefore an 80 h.p. engine was added to the mill, but a more powerful one has since been ordered.

Some changes were made in the mill to facilitate the saving of zinc. The zinc concentrates saved were carefully tested and proved to be of no commercial value as far as known to established methods of purifying zinc, owing to the zinc, iron, lead and silicious matter being too closely alloyed to be separated by known mechanical appliances. This obliged us to discontinue the saving of zinc.

**Mine.**—At the shaft a hoisting plant was installed, capable of handling operations to a depth of 500 ft. to good advantage.

**Development Work.**—Since resuming work in the mine on the 1st of May, 1904, the development work performed consists of 2,459 ft. of drifting at an average cost of \$11.74 per foot, and 147 ft. of raising at an average cost of \$13 per foot. There was also an expense incurred of \$1,000 in the grading and straightening of drifts and tunnels.

**Ore Found With Development Work.**—On the Moyie a large block of ground has been opened by the intermediate level which has been run between the 1,100 and 1,000 ft. levels, a distance of 375 ft, showing ore to a width of from three to eight feet.

The strike, as reported, made in June in a raise from the 1,800 ft. level, and at a depth of about 1,000 ft. from



the surface, is proving of substantial value. About the 1st of September the tunnel of the 1,700 ft. level reached the ore shoot of this strike and has continued in ore a distance of 150 feet, the ore varying in width from 4 to 10 ft. The ore at present in face of tunnel shows a width of five feet and is of a quality that will yield one ton of concentrates to every two tons of ore. So far there are no signs of weakening of the ore as the drift progresses easterly.

In running the east drift on the 1,900, or shaft level, the development work there has been going on very satisfactory. Since the 1st of May this drift has been extended 380 ft., and in all this distance only about 20 ft. of the drift showed the vein that was of an unprofitable quality. At present the vein in the face of the drift shows seven feet of good concentrating ore.

Before the development of the new ore strike could be economically continued it was necessary to advance the tunnel of the 1,700 ft. level 400 feet, for the purpose of securing ventilation, by connecting it with the raise which was made following the ore in the new strike. The last 100 feet of the above work was in the ore shoot; therefore, only the development of September can be credited to adding to the ore in sight in this portion of the mine. However, the ore now opened in this region and in the East drift of the 1,900 ft. level, and also in the intermediate level of the Moyie, very nearly makes up for the ore that has been extracted since May 1st.

Ore in Sight.—My last annual report, made when the mine was operating, stated that 46,000 tons of concentrates were practically in sight; without giving the details here, I find that there are now about 43,000 tons in sight.

Future Prospects.—When the mine was shut down two years ago the continuity of the ore in depth was not proven to any great satisfaction. However, it seemed of sufficient promise to justify the buying and erecting of the present fine hoisting plant. It is now fairly well proved that the indications were not misleading, as all our work, since resuming operations in May, following the vein easterly in the 1,900 ft. level, has shown up good ore where it was not expected, as the vein in the level above for the same distance, although well defined, was practically barren.

It was also feared that other ore shoots did not exist in the vein east of those which followed on the slope of the hill and cropped out on the surface. This fear is also removed by the June strike of the ore body referred to, which has now been under development work on the 1,700 ft level. This ore body occurs about 700 feet east of the surface ore bodies which are being mined along the slope of the hill.

The aim of our development work since resuming has been to prove the doubtful points relative to the continuity of the ore. I am pleased to state that the present outlook in this direction promises better than at any time since the vein was explored to a depth of 300 feet.

Ore Production and Cost.—From stopes and development work during the five months of milling operations the ore broken amounted to 58,456 tons, at a cost for breaking of \$1.69 per ton. 8,000 tons of this ore is in the stopes, the balance, 50,456 tons, has been milled, and produced 10,739 tons, 865 lbs. of concentrates, thus concentrating about 4.7 tons of crude ore into one of concentrates.

The total amount of money received and estimated due for the ore sold is as follows:

Sold to Trail and Nelson—  
12,786,860 lbs. concentrates, net value from smelter, \$130,053.24  
Government bounty on 8,269,357 lbs. lead..... 62,127.94

Total net value .....\$192,181.18  
Or, about \$30.00 per ton.

Sold in Europe—  
To L. Vogelstein ..... 8,032,601 lbs.  
" Beer, Sonderheimer & Co. .... 659,404 "

8,692,005 lbs.

Net value from purchasers .....\$127,410.71  
Government bounty ..... 29,533.20

Total net value .....\$156,943.91

Or, about \$36.00 per ton.

From this \$36.00 there is to be deducted \$1.25 per ton, costs of sacks and sacking, also the difference in the amount of lead contained in the tons of ores sold at home and in Europe, the home tonnage averaging 1,293 lbs. lead to the ton, while the ore exported averaged 1,408 lbs. of lead to the ton. When this excess is figured out it shows that the advantage in selling in Europe has averaged a little less than \$2.00 a ton in our favor.

The milling capacity being reduced one-half during the months of August and September and to less than one-half during October, caused by the want of water and the breaking down of the mill engine, and not being sure of the pump being installed before the end of November, which will hold the November output at a low figure unless relieved in the meantime by rain, places us in a very serious condition about filling our contracts in due time. The total of the contracts calls for 33,000 tons, and we have until July 1st, 1905, to complete the total. The October production of 872 tons brings the total to date up to 11,611 tons. Adding 1,500 tons for November make 13,111 tons, leaving 18,889 tons to be made in the following seven months, or an average of about 2,700 tons per month. I am of the opinion that we will be able to produce the required amount unless some other unforeseen trouble occurs.

#### THE CENTRE STAR MINE.

Mr. E. B. Kirby, the manager, reports as follows on the year's operations:

Explanatory Note.—The values given are based upon the price of 12 cents for copper instead of 16.25 cents, as in previous reports.

It is the usual practice of mines in pricing and recording ore to use the "Full Assay Value" instead of the "Smelters' Gross Assay Value," which is less. While this plan is often preferable, it has so far been more convenient for the Centre Star Mine to use the latter value, which, as shown by the table opposite, has on shipping grades ranged from \$1.72 to \$3.93 less than the Full Assay Value.

In the last annual report attention was called to the fact that the Centre Star Mine had experienced the same general change in the character of its ore deposits which had occurred in all other productive mines of the Rossland district, and which is the general rule throughout the mining districts of the world. This is the transition from the occurrence of high-grade bonanza ore bodies, capable of profit under the process of smelting, to masses of low grade requiring a cheaper treatment by milling.

The reserves of smelting ore at this date were not large and were of such shape that their dimensions could not be accurately estimated. The future, therefore, depended upon the establishment of milling operations, together with what fortune might bring in the way of new bodies of smelting grade.

During the year the Canadian Smelting Works have assisted by further voluntary reduction in the smelting rate, while development work has exposed considerable quantities of smelting ore, although of lower grade. Sale of this ore amounted to 77,892 tons, averaging \$7.75 smelter gross assay value. The average assay contents were: Gold, 0.36 oz.; silver, 0.35 oz.; copper, 0.72 per cent. The reserves of smelting ore exposed are estimated at 50,000 tons, averaging about \$8.50 smelter gross assay value.

The main feature of the development work has been the encouragement afforded by the East ore shoot, which is now well defined and proves to be more productive than was expected. This shoot has a dimension of 150 to 200 feet along the vein, and has so far yielded pay bodies on the second, fourth, sixth and seventh levels. Where it is

cut by the seventh level, the pay ore exposed is 215 feet long and 4 feet wide, averaging \$17.50 smelter gross assay value. Other levels are being extended to explore the east shoot, which is so far only partially exposed.

**General Remarks.**—The mill under construction by the Rossland Power Company, and intended to provide an outlet for these ores, has been delayed by an unfortunate series of circumstances. The arrangements for site, railway facilities, etc., were not settled until late in the season of 1903. The pressing need for milling facilities compelled a forced start and construction during a winter which proved to be of unusual severity and length. This, with numerous attendant difficulties in the delivery of materials and machinery, delayed the completion of the plant until the end of July. Owing to the universal expectation of at least a normal water supply this season, it was intended to use temporarily the water system of the Canadian Smelting Works, and to postpone until the following year the construction of its own water line extension to Murphy Creek. The season, however, has been marked by a drouth beyond all precedent, and this fact, together with unexpected difficulties with the city of Rossland, made it impossible for the smelting works to supply the water required to operate the mill. It thus became necessary to immediately construct a four-mile line to Murphy Creek. This is now finished and the mill has just begun operations.

We have been fortunate in retaining an unusually able staff, and I take pleasure in expressing my appreciation of their earnest co-operation. The chiefs of departments are: Mr. Carl R. Davis, E.M., superintendent, and Mr. Charles V. Jenkins in charge of the purchasing and accounting.

(Mr. Kirby's interesting tables of production and costs will be published in the February issue of the *MINING RECORD*.)

#### THE HASTINGS (B. C.) EXPLORATION SYNDICATE.

The Directors, in their report for the year ended May 31st last, state that the slight improvement recorded in the financial position of the company for the previous twelve months has been further maintained. The cash on hand at bankers has increased to £4,382; the general expenses exhibit a reduction of £193, and the expenditure on mine development has decreased by £851 in comparison with the figures in the balance-sheet on May 31st, 1903. The ore shipped to the smelters realized \$9,163 sterling, after deducting the cost of freight and treatment. From the report of Mr. Leslie Hill (the local manager and engineer) it will be seen that all Mr. Hill predicted in his previous report in respect of the Arlington mine has been fully borne out, and although, with his usual caution, he does not commit himself, it is satisfactory to note that he believes shipments of ore to the extent of 100 tons monthly can be maintained for the present. On the company's other mining claims in the East Kootenay district no work has been done during the past year, the directors preferring to wait the result of developments on adjacent properties. Under the manager's advice, two additional sections to the Blairmore coal lands have been secured, which Mr. Hill considered were necessary, and will be valuable when the proper time arrives for negotiating for the sale of the properties, as to which the directors advise a waiting policy. The coal lands being situate in the Northwest Provinces of Canada, it became necessary, in order to comply with the laws of the district, to establish a registered office of the company at Coleman, in the neighborhood of the coalfields, and this has been effected at a very nominal cost. During the spring Mr. Leslie Hill, at the invitation of the board, paid a visit to this country, and the directors were thus afforded an opportunity of personal conference with him, the advantages of which are sufficiently obvious.

#### B. C. INSTITUTE OF ASSAYERS.

At the annual meeting of the B. C. Institute of Assayers held in Rossland during the month the following gentlemen were elected to executive offices: President, William F. Rob-

ertson, Provincial Mineralogist, Victoria; vice-president, A. I. McNab, Canadian Smelting Works, Trail; secretary-treasurer, Arthur A. Cole, Centre Star mine, Rossland. The following named, in addition to the officers elected, constitute the members of the council: J. Cuthbert Welch, smelter manager, Montreal and Boston Copper Company, Boundary Falls; Alex. McKillop, Nelson; Thomas Kiddie, smelter manager, Tyece Copper Company, Ladysmith; Herbert Carmichael, provincial assayer, Victoria. The treasurer having submitted a satisfactory financial statement, the committee appointed to prepare a minimum schedule of assay charges for adoption in British Columbia offered the following recommendations:

#### FIRE ASSAYS.

Gold .....	\$ 1.50
Silver .....	1.00
Lead .....	1.50
Gold, silver and copper in one sample....	3.00
Gold, silver and lead in one sample.....	3.00

#### WET ASSAYS.

Alumina .....	2.50
Antimony .....	5.00
Arsenic .....	5.00
Chromium .....	8.00
Cobalt and nickel not separated .....	5.00
Cobalt separated from nickel .....	10.00
Copper .....	2.00
Iron .....	2.00
Lead .....	2.00
Lime .....	2.50
Magnesia .....	3.00
Manganese .....	5.00
Nickle separated from cobalt .....	10.00
Phosphorus, rough determination in an ore	5.00
Silica .....	3.00
Silica, insoluble matter, no fusion .....	1.00
Sulphur .....	3.00
Zinc .....	2.50

For control work, i.e., assayed in duplicate, add 50 per cent to above figures. For umpire work, i.e., assayed in triplicate, or more, double above figures.

Discounts when five samples are submitted at one time, 10 per cent, when ten or more samples are submitted at one time 20 per cent. The report was adopted.

Papers were read by Mr. L. C. Wynne on "The Extraction of Oil in Oil Concentration Products," and by Mr. Douglas Lay on the "Determination of Silver in the Sulphide Ores of the Slovan," followed by an interesting discussion.

#### BRITISH COLUMBIAN SMELTERS AND THEIR PRODUCTION OF METALS.

The following brief review shows the tonnage treated at the several smelters that reduce British Columbian ores, together with their production of metals and the additions to plant, machinery, etc., made during the year. In all instances both tonnage of ore and production of metals for the month of December are estimated, so that the figures, though approximately correct, are subject to such revision as shall be necessary when the actual results of December's operations shall be ascertained.

*Trail.*—The ore receipts at the Canadian Smelting Works, Trail, in 1904 totalled 163,865 tons. The sources of this ore were as follows: East Kootenay, 7,725 tons; Nelson and Kootenay lake, 2,450 tons; Ymir, 1,090 tons; Rossland, 131,130 tons; Slovan, 7,040 tons; Lardeau, 590 tons; Boundary, 7,590 tons; miscellaneous B. C. ores, 1,450 tons; foreign ores (chiefly from Republic and neighbouring camps), 4,800 tons. Of these ores, 5,525 tons were gold quartz; 17,080 tons silver-lead and silver-bearing lime, and 141,260 tons gold-copper. Included in the foregoing were 5,100 tons of concentrates. The production of matte was 2,675 tons, and of silver-lead bullion,

6,382 tons. The matte was converted at the Tacoma Smelting Works, Washington, and the B. C. Copper Company's Works, Greenwood. Part of the silver-lead bullion was shipped to San Francisco and the remainder was refined at the lead refinery of the Canadian Smelting Works. The total production of metals during the year was as follows: Gold, 60,855 oz.; silver, 1,389,757 oz.; copper, 2,227,617 lb., and lead, 12,678,109 lb. The lead refinery at these works was continuously operated throughout the year. The electrolytic process, upon further use of it, proved itself especially suitable for the refining of lead, and, it is believed, admits of the production of pig lead at less cost than that of the old or fire process. The lead pipe plant installed in 1904 turned out quite a lot of manufactured lead product and proved equal to all expected of it. The company's display of manufactured lead at provincial exhibitions last autumn attracted much favorable notice, and its enterprise in this connection was generally commended.

*Nelson.*—The ore receipts at the Hall Mining & Smelting Company's works, Nelson, during the year 1904 totalled 34,376 tons. The sources of this ore were as follows: East Kootenay, 4,602 tons; Nelson and Kootenay lake, 2,348 tons; Ymir, 11,027 tons; Slocan, 5,896 tons; Lardeau, 354 tons; Boundary, 7,727 tons; miscellaneous B. C. ores, 7 tons; foreign ores (chiefly from Republic and neighbouring camps), 215 tons. Of these 11,444 tons were dry ores, 12,798 tons silver-lead and silver-bearing lime, 2,509 tons silver-copper, and 7,625 tons low-grade iron-copper. Included in the foregoing were 10,730 tons of concentrates. The production of copper-lead matte was 537 tons, and of silver-lead bullion 7,287 tons. The matte was converted part at the Tacoma Smelting Works, and part at the B. C. Copper Company's works, Greenwood; and of the silver-lead bullion part was shipped to San Francisco, and the remainder refined at the Canadian Smelting Works, Trail. The total production of metals at these works during the year was as follows: Gold, 8,443 oz.; silver, 1,303,663 oz.; copper, 105,363 lb., and lead, 14,197,468 lb.

*Grand Forks.*—The ore receipts at the works of the Granby Consolidated Mining, Smelting & Power Company, Grand Forks, during 1904 totalled 597,119 tons. Of this ore practically all came from Boundary mines, a few thousand tons each from Rosland and Republic camps constituting the small quantity received from other sources. The copper matte made was converted at the company's own works. The total production of metals during the year was: Gold, 50,694 oz.; silver, 217,472 oz., and copper, 17,843,399 lb. The connection of the Great Northern railway with these works was one of the important advances made in the period under notice. This railway is about completing a branch line to Phoenix, where are situated the Granby company's big mines. The C. P. R. has heretofore hauled all the ore from these mines to the smelter, but now, with a second railway to depend upon, there should be little chance of any serious interruption to the supply of ore for the smelter. New ore bins having a capacity of about 6,000 tons were lately constructed to provide storage for the ore arriving by the new branch railway. The substitution of electric charging appliances for those hitherto in use for feeding the furnaces, is about to be made, the system having been found effective at the single furnace at which it has been tried for some time. The intention to add two more furnaces, thereby bringing the total up to eight, has been announced, and this will probably be done early in the new year.

The transfer of the control of the company from Montreal to New York, made a few months ago, brings this large and important industry into close touch with prominent men also holding large copper interests in the United States.

*Greenwood.*—The ore receipts at the British Columbia Copper Company's smelting works, Greenwood, during the year 1904 totalled 211,864 tons. The sources of this ore were as follows: Ymir, 148 tons; Rosland, 22,360 tons; Boundary, 188,249 tons; foreign ores (chiefly from Republic and neighbouring camps), 1,107 tons. Of these ores 1,197 tons were gold-quartz; 148 tons silver-bearing lime, and 210,519 tons gold-

copper. Included in the foregoing were 70 tons of concentrates. The production of matte was 2,439 tons, and of blister copper, 1,526 tons. The matte was Bessemerized at Tacoma until June 27, and thereafter at the company's own works. The total production of metals was as follows: Gold, 35,911 oz.; silver, 116,685 oz.; copper, 5,201,073 lb.

The completion and successful operation of the copper converting plant that a year ago was in course of construction constitutes the leading feature of progress in 1904 at this company's smelter, where the matte made, as well as custom matte, is converted into blister copper. A briquetting plant is now being put in, there being a large accumulation of flue dust at the works awaiting utilization. Electricity has superseded steam as motive power here, with results that are satisfactory, in regard to both efficiency and cost. The intended installation of two more blast furnaces has been announced, which will bring the number here up to four. The year's results, as recently intimated to the stockholders by the president of the company, are decidedly satisfactory, and the company's pluck and persistence appears to be at last in a fair way towards being adequately rewarded.

*Boundary Falls.*—The ore receipts at the Montreal & Boston Consolidated Company's smelting works, Boundary Falls, during the year 1904 totalled about 40,000 tons, all Boundary district ores. The production of matte was 1,125 tons; this was converted into blister copper at the B. C. Copper Company's smelting works, Greenwood. The approximate production of metals was as follows: Gold, 3,435 oz.; silver, 13,494 oz.; copper, 920,000 lb.

These works were started up about three months ago, after having been idle since December, 1903. Only one furnace was blown in and this has been operated without interruption. A few days ago a second furnace was started. A third is being erected, an ample supply of ore for all three now being practically assured. The company will very shortly be in a position to mine and ship from its own properties all the ore, in both quantity and variety, required to keep its works going at full capacity, so the maintenance of a comparatively large production of copper, with the precious metals associated with it in district ores, is looked forward to with every confidence. The installation of a converter plant is proposed, and this will no doubt be provided as soon as shall be practicable—probably next summer.

*Ladysmith, V. I.*—The ore receipts at the Tye Copper Co.'s smelter, Ladysmith, Vancouver Island, during the year 1904 totalled 65,403 tons. The sources of this ore were as follows: Vancouver Island and Coast, 64,129 tons, and foreign ores, chiefly from northern points, 1,274 tons, all gold-copper. Included in the foregoing were 36 tons of concentrates. The production of matte was 6,026 tons; this was converted at the Tacoma Smelting Works, Puget Sound, Washington. The total production of metals at the Ladysmith works during the year was as follows: Gold, 11,089 oz.; silver, 179,769 oz., and copper 5,129,870 lb.

During the year much grading, for the new sampling plant, just completed, and for coke storage purposes, was done. The sampling mill is equipped with a No. 4 Gates crusher, Blake crusher, rolls, grinders, and a complete set of Snyder automatic samplers. An additional steam boiler, of 80-h.p., was installed. More trackage was put down to facilitate delivery of ore. The furnace was in blast 265 days of 24 hours each. An insufficient supply of ore prevented continuous running. The total value of the metal product, less refining charges only, was \$831,902.

*Crofton, V. I.*—No information was received relative to operations at the Northwestern Smelting & Refining Company's works, at Crofton, Vancouver Island, during the two or three months they were running in the early part of the year, since which time they have been idle.

*Northport, Wash.*—The Northport Smelting & Refining Company's works, also known as the Le Roi Mining Company's smelter, treated 176,903 tons of ore, of which about 4,036 tons were from Ymir and the remainder from Rosland. No information is available for publication concerning

the production of metals at these works. A Vezin sampler was installed during the year and many improvements to plant were made, so that the smelter is now in excellent running order. Although this smelter is outside the province, being situated a few miles south of the International Boundary line, it is to all intents and purposes a British Columbian establishment, since it is owned by the Le Roi Mining Company and obtains its supplies of ore from British Columbian mines.

BOUNDARY DISTRICT.

The Boundary shows a large advance in tonnage for the year 1904 as compared with the production of earlier years, and this notwithstanding that the Snowshoe mine, which in 1903 produced nearly 100,000 tons, was not working. The

Senator .....	3,500
Sunset .....	2,800
Mountain Rose .....	1,800
Sundry small shippers .....	2,500

Total ..... 811,000

*Granby.*—The report of development for the year is that 2,130 feet of sinking and raising and 3,046 feet of cross-cutting were done; total 5,176 feet. The total footage to date is 26,237 lin. feet, about five miles of underground workings, to say nothing of stopes of immense size and enormous excavations in the quarries of these mines. With a record output of about 1,500,000 tons to date, extensive workings at these mines may well be looked for. The information supplied from the mine does not give particulars of new plant and ma-



Second Big Crusher Supplied by the Jenckes Machine Company to the Granby Company's Mines, Phoenix.

Brooklyn, Stenwinder and Rawhide mines, in Phoenix camp, and the Senator, Mountain Rose and two or three others that were not producers in 1903 added 30,000 to 40,000 tons to the total output of 1904. As in former years, though, the larger part of the ore produced came from the Granby mines, with the Mother Lode next, these two being together credited with about 719,000 tons. The details of production have not been supplied by some of the mines, notwithstanding the efforts made to secure the tonnage direct from the companies shipping. Some of the figures that follow, have therefore been approximated or taken from published tables. Where there are discrepancies they are caused by different tonnage having been supplied by the mines concerned, but in the main they are substantially correct. The following is the tonnage of the various shipping mines:

	Tons.
Granby .....	543,000
Mother Lode .....	175,800
Emma .....	38,000
Brooklyn and Stenwinder .....	24,000
Oro Denoro .....	15,000
Athelstan-Jackpot .....	4,600

chinery installed, but it is known that new ore bins were built, to meet requirements of the Great Northern Railway company's connection of its system with No. 3 tunnel, and that this tunnel is being equipped in readiness to send out a large tonnage of ore to the smelter over the new railway. Hauling from the tunnel will be by an electric locomotive, which should by now be at the mine. No. 4 tunnel will be similarly prepared for delivering ore to the same railway. A second big crusher has been obtained for use here. Like the other installed some time ago, it was supplied by the Jenckes Machine Co., of Sherbrooke, Quebec. Its nominal capacity is 150 tons per hour, the size of its jaw-opening, 42 by 30 in., and its total weight 113,000 lb. Its frame is of semi-steel, having a tensile strength of 32,000 lb. to the square inch. The accompanying illustration shows the chief parts of one of these big machines as they reached the Granby mines on one of the largest and strongest flat cars the C. P. R. company possesses. About 350 men are employed at these mines, which are steadily enlarging their producing capacity, already considerably beyond the present requirements of the company's smelting works.

*Mother Lode.*—At the B. C. Copper Co.'s Mother Lode

mine, substantial progress was made last year. The open workings were considerably enlarged—in fact they are now one big quarry, the dividing masses of ore having been broken down and sent to the smelter. There is here a long, double-tracked adit, known as the mule tunnel, from which half a dozen raises have been made to the quarries above. Near the end of this tunnel, a big stope was opened a few months ago in a large body of ore of good grade. This ore may prove to be the same body as that in No. 5 quarry, but this cannot be determined until the raise, now being made, shall break through. When the mine was visited about the middle of November this raise was up about 150 feet, in ore most of the way, but there remained about 50 feet more to be passed through before the connection would be made. The consolidation of the crushing plants having been decided upon, a new tunnel was driven, to intersect the main shaft (from which the 200-ft. and 300-ft. levels were opened) on the same level as the quarry tunnel. At the shaft a large pocket has been excavated, and this will discharge into the 4 to 5-ton skips, obtained to replace the cages previously used. The skips will empty into a bin at the head of the shaft, the ore passing thence to either one of a pair of Jenckes-Farrel crushers, each having a jaw-opening of 24 by 36 in. These crushers will be worked by two engines, driven by compressed air, so arranged that either engine can drive either crusher, thus reducing chances of stoppages by breakdowns in either engines or crushers. A belt conveyor will take the crushed ore to the main ore bins for shipment by rail thence to the company's smelter at Greenwood. All the plant for this improved arrangement for crushing the ore has been purchased and some of it has already been installed. Where the excavation was made for the crushers a body of good ore was opened up and from this 6,000 to 7,000 tons were taken out. This body of ore has since been proved to be of considerable size, recent reports placing its dimensions, so far as yet explored, at 200 ft. by 130 ft. The diamond drill has been used underground during recent months with satisfactory results, one hole proving the occurrence of very good magnetic oxide ore down to 345 feet below the collar of the shaft, at which depth the drill was withdrawn.

*Montreal & Boston Co.'s Mines.*—This company last summer arranged to consolidate the Dominion Copper Co.'s Brooklyn-Stemwinder and Rawhide mines, Athelstan-Jackpot mine, Sunset group and Morrison mine. With the exception of the last mentioned all these several properties are now on the list of shippers, sending their ores to the company's smelter at Boundary Falls. The Brooklyn and Stemwinder have been equipped with new machinery and plant equal to handling 600 tons of ore a day, and they are now producing about 400 tons. Ore bins, tramways, and other surface works have been constructed. Altogether these properties are now in condition to regularly maintain the output required from them to keep the smelter supplied. The Rawhide lately commenced shipping and will soon be producing about 300 tons daily. The company has expended many thousands of dollars on this property during the last six months, providing it with machinery, building gravity trams capable of handling up to 600 tons a day, and generally putting the mine into shape for dealing with the large tonnage of ore it has in sight.

*Emma.*—During the year important development work was carried on at the Emma mine, and the existence of large ore reserves of similar high character of fluxing material, but having higher values in gold and copper, was fairly demonstrated. A second incline was sunk, started from the level of the lower railway track, and from the bottom of this diamond drilling in various directions was carried on. At the same time a considerable tonnage was shipped, the shipments for the calendar year amounting to about 38,000 tons. In June of last year a three-fourths interest in the property was acquired from Messrs Mackenzie, Mann & Cox, by Mr. J. J. Campbell, who afterwards sold out to the B. C. Copper Company, between whom and the Hall Mining & Smelting Company (by virtue of the latter's rights as owners of

the other one-fourth interest) an arrangement was entered into under which the B. C. Copper company operates the property for the benefit of both companies. As the mine is only about ten miles distant from the head office of this company, this arrangement should prove a convenient one.

*Oro Denoro.*—The ore quarries opened on this property in 1903 were worked last year and some 15,000 tons (dry weight) were shipped. The value of the mine has been greatly added to by recent developments. In grading for the new railway line, from Grand Forks to Phoenix, which crosses this claim, another big body of ore was cut. This appears on the surface to be about 100 ft. in width. Higher up the hill its width at one point seems to be about 200 ft. Ore has also been uncovered in many new places. Shipments are being made from No. 1 quarry, which is alongside the C. P. R. company's Phoenix branch line, and from the magnetic or No. 2 vein.



Copper Converter Plant at Granby Company's Smelter, Grand Forks.

*Senator.*—The Granby company is working this claim for the useful fluxing ore obtainable from it. Some 3,500 tons have been shipped to the smelter at Grand Forks. In November a 39-h.p. steam boiler and 25-h.p. double drum hoist were installed, for the purpose of operating a derrick, the mine being worked by the "glory hole" method. The ore carries low values in gold, silver and copper. It is hauled about three-quarters of a mile to the railway, on a downhill grade.

*Mountain Rose.*—This claim lies next to the Emma, and its ore is of a similar nature to that shipped for some time past from that mine. Its output is not yet large. There are two or three other claims in the same vicinity upon which work was done last year and from which small shipments were made.

#### THE HIGH-GRADE MINES.

The silver-gold mines about Greenwood attracted attention throughout the year. Beyond mentioning that the Provi-

dence, Elkhorn and E. P. U. continued to ship ore, and by development work, made it evident that their rich quartz veins go down, there is not much to state. The output of these three mines was about 1,400 tons. The ore carried values from \$50 to \$100 per ton in carload lots. A discovery was made a few weeks ago on the Providence of ore close to the surface, and this lead was stripped along a distance of about 215 feet. It is thought by some to be an extension of the vein that has been during two years past followed down on its incline for 300 f. It is probable that a drift 270 ft. into the hill will connect the new find with the present 300-ft. level.

Among the claims near Greenwood that have been purchased, leased or taken on working bonds during the year are the Strathmore, Barbara, Helen, Last Chance, Skylark, Goldfinch, Day, Silver Cloud, Silver King, Hope No. 2, and others. Only passing mention can be made of these, there being too many of them to admit of details being given. The Strathmore is near the Providence; several years ago ore was shipped from it that gave high assay returns; now it is being opened up by a company composed of Rosland and Boundary men, who expect to start stopping early in the new year. The Barbara, which is within a few hundred yards of the business portion of Greenwood, was bought outright by a Chicago syndicate. A shaft has been sunk 125 ft. on the incline and drifts have been run about 100 ft. The vein varies from 8 to 30 in. in width, the average being about 14 in. Some 20 tons of ore, taken out in development, gave assay returns between \$35 and \$50. The ore carries galena, silver and a little free gold. The Helen, at Anaconda, is held by a local syndicate. About 175 ft. of sinking and 80 ft. of drifting have been done. The ore is rich in places, but not much has been shipped lately, only about 20 tons, which went \$58 per ton. The Last Chance, in Skylark camp, has commenced to make small shipments of high-grade ore, as too, has the Skylark.

#### WEST FORK OF KETTLE RIVER.

Development of this district has been slow owing to the absence of transportation. In 1904, however, there was more work done than for several previous years.

On Wallace mountain, the Sally claim last winter and spring shipped three carloads of ore to Midway by sleighs. The ore was galena and grey copper and contained much native silver. The values averaged more than \$100 a ton, one car running over \$125. A lot of second-class ore was also got out, but this cannot be shipped under the existing conditions, freight and treatment costs amounting to nearly \$30 per ton. Five men are at present engaged in development, and more will be put on as soon as sufficient snow falls to admit of shipment of ore.

The Wellington, also on Wallace mountain, has lately been leased and three men are now at work on it. The ledge is an extension of that on which the work has been done on the Sully. There is a good showing of ore in the face of a drift at the 40-ft. level. On an adjoining fraction about 100 ft. of tunneling has been run to cross-cut a strong ledge of high-grade ore showing on the surface.

On the Bounty, a tunnel driven 100 ft. taps the ledge. This property will also ship this winter, the ore being high-grade.

On the Gold Drop fraction a tunnel is in about 20 ft. The ore on this claim carries good values in gold. A lot of work has also been done on the Gold Drop, on which there is a high-grade silver ledge.

On the Napancee group, situated about two miles from Wallace mountain, several men were at work all last summer. Two ledges have been opened up, and the ore assays up to \$40 per ton in gold, which is associated with arsenical iron.

On the Curry group, on Curry creek, more than 100 ft. of work was done in 1904 and several ledges were worked on. On Beaver creek some claims in St. John camp also had considerable development work done on them. This is a copper-gold camp, with large bodies of low-grade ore. The results of the work have been very promising.

There has also been a great deal of assessment work done throughout the district.

*Carmi.*—A small test mill with two Fremayne stamps and an Overstrom table were installed at this mine last year. Lately five more stamps were installed. The mine had not been worked for some time, but it was known to have a good grade of ore, for between 800 and 900 tons were shipped to a Boundary smelter, and its value in bulk ascertained. The experiments now being made to concentrate the ore are for the purpose of lessening the heavy cost of the 50-mile haul to the railway at Midway. The extraction obtained is 87 per cent, of which 30 per cent is by amalgamation. The concentration is 6 to 1. Water will be brought in next spring for power purposes and additional plant installed.

*Butcher Boy.*—This claim is the extension of the Carmi on the west. A shaft has been sunk 75 feet with drifts at 45 and 70-ft. levels. The ore is free-milling and concentrating. About 50 tons were taken out lately and of this quantity some 20 tons will be shipped. Values range from \$50 to \$100. A small mill may be put in next spring.

*Observatory Group.*—There is a small high-grade silver ledge on this property, from which two or three cars will probably be shipped this winter. Numbers of other claims in the Carmi camp have promising showings and some of these are being prospected.

#### ABOUT GRAND FORKS.

The Betts and Hesperus group, owned by the Hesperus Gold and Copper Mines, of Chicago, was worked throughout 1904. The company purchased the Lancaster and Chicago fraction claims, which adjoin the Hesperus. No. 2 tunnel was extended, the intention being to continue driving this until a total length of about 600-ft. shall have been reached. A wagon road was constructed a mile and a quarter, from the mine down to the branch railway the Great Northern Railway company built during the year to Phoenix.

The Marquette, Michigan, syndicate that in the latter part of 1903 and beginning of 1904 was prospecting the Volcanic with a diamond drill ceased work and did not take up its bond, the reported reason being that the property was found to be more encumbered financially than had been represented, and there did not appear to be any certainty as to the actual extent of the obligations that would have to be assumed if it were taken over.

Negotiations were in progress late in the year for resuming work on the Golden Eagle, a high-grade gold-copper property situated near Volcanic mountain. Shipments made two or three years ago showed this property to be a valuable one, but capital for its further development has not hitherto been available.

#### FRANKLIN CAMP.

This camp is situated up the North Fork of Kettle river, between 40 and 50 miles above Grand Forks. There are a number of promising mineral claims in the camp—among them the McKinley and Gloster groups and the Banner. The McKinley is owned by the McKinley Mines, Ltd., a local company to be shortly incorporated. On its four claims there are five known ledges. The main work done is on the McKinley claim, near the centre of which an open cut has been run 80 feet across a big body of ore, the values in which are in copper, gold and silver, these being contained in an iron gangue. Assays as high as \$15 have been obtained, but the average is \$8. The open cut mentioned is 40 ft. wide and 30 ft. deep, all in ore. Another cut, 150 ft. higher up the hill, has exposed ore of higher grade. This cut shows a breast of about 30 ft. of ore. Much other prospecting work has been done, exposing considerable ore in several other places. Buildings have been erected on the property and good trails made.

A shaft on the Gloster is 55 ft. deep, in ore giving good values in copper, gold and silver. A tunnel is being driven to come under the shaft at a depth of about 150 ft. On the Banner there is an excellent showing of galena, which gives average assay values of \$67. A tunnel has been driven 180 ft on this claim. There are other claims with big surface



showings, but little development. The camp needs transportation facilities and more work to bring it into prominent notice.

### CARIBOO.

The Cariboo district embraces the Cariboo and Quesnel mining divisions. The following is a brief review of these divisions:

*Cariboo.*—Among the most important enterprises in this part of the district are those of the Consolidated Cariboo, Ltd., on Lightning creek, and the Slough Creek, Ltd., on Slough creek. For years these have been endeavoring to prove the value of the deep channels of the respective streams upon which they are operating.

The Cariboo Consolidated, after putting down a series of boreholes on one of its Lightning creek claims, to ascertain the cross section of the valley, and obtaining most encouraging prospects of gold from bedrock, sank a working shaft to a depth of 175 ft. At 165 ft. the main tunnel, 8 by 5 ft., was opened and was driven 306 ft. to the gravel in the deep channel. From this tunnel drives have been run, both up and down stream, with the object of draining and blocking out these gravels. Cross-cuts have been made from these drives, and there are now practically 400 ft. in length of the deep channel blocked out and in condition to mine when once the gravels shall have been drained. The water has been steadily lowered, at last accounts by some 80 ft., with about 40 ft. more to lower before the gravels may be worked on the large scale contemplated. The quantity of water pumped is approximately 1,300,000 gallons every 24 hours, but this is less than one-half the capacity of the pumps installed. Forty men, on the average, were employed last year daily. The values obtained from the bedrock gravels are stated to be of a most encouraging nature, and are believed to prove without doubt that it will be practicable to mine these gravels at a large profit after the deep channel shall have been drained. The company's Lightning creek property extends from Beaver Pass to a mile and a half above the town of Stanley, a distance of seven miles, five of which have not been worked. The power plant installed here includes steam boilers of 190 h. p. capacity, Corliss engine, hoisting engine, air compressor and machine drills, exhaust fan, two Cornish pumps, each 18 in. in diameter and 8-ft. stroke, etc. An electric lighting plant, was also installed and a ditch 300 ft. long constructed, to bring in water for washing the gravels when mined.

The Slough Creek Company's experiences on Slough creek have been similar in general character to those of the Cariboo Consolidated at La Fontaine, as stated above. The main tunnel from the shaft here is more than 1,000 ft. long. It is 8 by 7 ft. and at 889 ft. from the shaft water locks were placed. Much driving and boring has been done beyond these locks. Last year the work of driving cross-cut tunnels was continued until August, by which time a remarkable improvement in the reduction of the heavy pressure and flow of water had taken place. Yet headway was unsatisfactory, so it was decided to use the diamond drill to make a cross-section of the channel from the main tunnel. This work was proceeded with, using compressed air, and it was expected that it would be completed by January 1. The decrease of water underground during the entire run of the spring freshets, and the continuous simultaneous working in the tunnel, proved that there is no connection between the surface water and that being drained from the deep channel gravel, which is covered by a capping of 100 ft. of blue clay. The considerable decrease in the flow of water is shown by comparisons made in total quantity at different dates in the year. Wherever openings were made in the gravel most satisfactory prospects of coarse gold were secured, notwithstanding that the gravel had to be shovelled out of a torrent of water, so that only a percentage of the gold could be saved. The big pumps and other machinery are in excellent order, and the mine generally in good shape.

With continued drainage and decrease of water there are most encouraging prospects of success in the near future and of large profits being earned from the mine.

*General.*—The hydraulic season of 1904 was only an average one. The heavy rains that fell in the autumn of 1903 made that season longer than usual, admitting of work being carried on quite late in the year. The miners have been a little dissatisfied that a similarly long run could not be made during the season lately closed.

The Flynn claims on Mosquito creek, and their Alabama claim on Willow river, are now on a good paying basis. Formerly these two were drifting diggings, but they are now open hydraulic. The Thistle company of St. Paul, Minneapolis, on 8-Mile lake, is reported to have taken out more gold this year, as well as last, than has been recovered the same season from any other claim around Barkerville. The value of the season's clean-up is placed at something like \$30,000. Two creeks down Big Valley, viz.: Stuart and Coffee creeks, below the Thistle company's ground, are being worked. Drifting is being carried out on Stuart creek, and a 12-ft. waterwheel has been installed for pumping and hoisting. On Coffee creek the diggings are open hydraulic and are owned by the Thistle company. On Jack of Clubs creek a bedrock tunnel, now in about 1,200 ft., is being run to strike a hill channel on the right bank of the creek. At about 1,000 ft. in, connection was made with the surface by a raise, to facilitate further work in the tunnel.

Since water went down in October, and for about two months, the Point claim, on Lightning creek, was reported to have taken out about 100 oz. of gold per week. Prospecting is going on, above the La Fontaine, on this creek, on several other claims.

A shaft is being sunk to strike the channel of Canadian creek; this is now down 350 ft.

The Pleasant Valley, Ltd., is sinking a shaft on a side hill in Libe valley, and a drainage tunnel is being driven to connect with the same. A large shaft house has been built, and a plant, consisting of two steam boilers, engines for pumping and hoisting, and a Cornish pump, has been installed. The pump easily disposes of all the water that comes into the shaft.

In the Antler creek section, Mr. B. A. Lascelles' company has had much success with an open hydraulic on Wolf creek (also called China creek). The same company has had similar results from their hydraulic on Cunningham creek. The Union company has resumed work and is running a drift to strike the channel of Grouse creek. This claim is situated about a mile above Waverley, which latter has at last, after 20 years' work, proved a payer and a good one at that.

On Willow river, Laird & Co. have, on their deep diggings, a 24-ft. water wheel and two 18-in. pumps working day and night. This claim lies immediately below Mosquito creek and it is believed to be very rich. With the present pumping plant there should be no risk in entering the deep channel this season.

There are about the districts many claims that afford a living to a single miner, or to a man and his "pard." The Chinese do a lot of mining here and there, but little is heard about their work or its results. The best claim owned by Chinese is, perhaps, Stevens creek, on which nuggets worth \$50 to \$60 are sometimes found.

*Quesnel.*—The hydraulic mining operations of the Consolidated Cariboo Hydraulic Company, on the south fork of Quesnel river, are the most extensive of their class in the Province. With an ample supply of water, results obtained some years have been very profitable, but during the three seasons, 1902-04, the working periods were very short, the water supply having been entirely insufficient. It is proposed to greatly extend the company's water drainage area, so as to provide against similar unprofitable experiences in the future. The effect of dry seasons may be gathered from the following comparative figures: In 1900 there was an ample supply of water so that a run of 172 days was made, with a recovery of \$350,086; in 1903 water was very short,



so that the run was only 53 days and the gold recovery \$44,944. The 1904 season is reported to have resulted in a recovery of about \$90,000. The run was 83 days, so that an average of more than \$1,000 per day was obtained. One of the directors of the company visited the mine last season, and before his return to Toronto he was reported to have told an interviewer that in his opinion the company will have to spend \$200,000 or \$250,000 more to secure an additional water supply needed, and thought it probable this outlay would be provided for.

There are other hydraulic enterprises in the Quesnel section, but no information has been received concerning them. It is reported that dredging is to be tried on Horsefly river. Reports were published last autumn of new placer diggings having been found on one of the upper branches of the Horsefly, but there could not have been much gold obtained there or by this time more would have been heard about it.

MINERAL PRODUCTION IN 1904.

(By E. Jacobs.)

THERE does not seem to be any room for doubt that the mineral production of British Columbia in the year 1904 reached the highest total value of any year in the history of mining in the province. In 1901 the total was \$20,086,780, but in both 1902 and 1903 it was a little short of \$17,500,000. A carefully prepared estimate of the year just closed gives a total of about \$21,000,000.

The value of the several minerals produced, calculated at New York average prices for the year less the usual deductions, is, approximately, as under. The corresponding figures for 1903 are shown for purposes of comparison:

	1903.	1904.
Gold—Placer.....	\$1,060,420	\$1,141,000
Gold—Lode.....	4,812,616	5,123,000
<b>Total Gold .....</b>	<b>\$5,873,036</b>	<b>\$6,264,000</b>
Silver.....	1,521,472	1,898,000
Copper.....	4,47,535	4,540,000
Lead.....	689,744	1,415,000
Zinc and Iron.....		100,000
<b>Total Metallic .....</b>	<b>\$12,631,787</b>	<b>\$14,217,000</b>
Coal.....	3,504,582	5,004,000
Coke.....	827,715	1,362,000
Building materials.....	531,870	550,000
<b>Totals.....</b>	<b>\$17,495,954</b>	<b>\$21,133,000</b>

(Note.—Zinc and iron, if any, in 1903 were included in total of building materials, etc.)

Production by districts was as follows:—

	1903.	1904.
Cariboo.....	\$ 475,200	\$ 500,000
Cassiar.....	480,368	520,000
East Kootenay.....	1,951,128	4,813,800
West Kootenay.....	6,489,981	6,266,600
Lillooet.....	31,283	25,000
Yale.....	3,707,552	4,025,900
Coast (Mainland, Vancouver Isl- and, etc.).....	3,819,572	4,431,700
Miscellaneous.....	531,870	550,000
<b>Totals.....</b>	<b>\$17,495,954</b>	<b>\$21,133,000</b>

Quantities of minerals produced are shown in the following table:—

	1903.	1904.
	ozs.	ozs.
Gold—Placer .....	53,021	57,050
Gold—Lode.....	232,831	254,135
<b>Total Gold.....</b>	<b>285,852</b>	<b>311,185</b>

Silver.....	2,996,204	3,505,805
	lbs.	lbs.
Copper.....	34,359,921	36,088,580
Lead.....	18,089,283	37,000,000
	Tons.	Tons.
Coal.....	1,168,194	1,668,000
Coke.....	165,543	272,400

An examination of the figures in the first of the foregoing tables shows that gold increased \$390,000 (placer \$80,000 and lode \$310,000), silver \$377,000, lead \$725,000, coal \$1,500,000, coke \$534,000 and miscellaneous minerals \$118,000, while copper lost \$7,000. In view of the fact that more than \$2,000,000 of this gain of \$3,600,000 was made by coal and coke, it is plain that much of the improvement is largely attributable to increased production of coal, and not solely to the adventitious aid given by the granting of the lead bounty, though that certainly has contributed to an important extent by increasing the output of silver-lead ores to the advanced position now occupied by mineral production.

In lode gold, copper, coal and coke, the quantity produced in 1904 was not reached in the province any previous year, but in placer gold and silver some years have seen a much larger quantity, while in 1900 and 1901 lead largely exceeded the output of last year.

**Gold.**—The increase in placer gold came from the Cariboo and Quesnel divisions of Cariboo district, and from the Atlin division of Cassiar. At Quesnel, the Consolidated Hydraulic Company recovered about \$90,000 as against less than \$45,000 in 1903, while the estimate for Atlin shows an increase of \$60,000, which is much below some estimates made by mining men down from that field for the winter. Much of the increase in lode gold is credited to the Similkameen, where the owners of the Nickel Plate mine and mill joined the producers last year.

**Silver.**—The increase in silver came from East Kootenay, the St. Eugene mine, after three years' idleness, having resumed operations, consequent on the granting of the lead bounty. Its silver output was about 540,000 ounces. A larger production of this metal by the Slocan mines was looked for, but various reasons prevented this expectation being realized. The Silver Cup Mines, Ltd., started its silver mill late in the spring, and produced an appreciably large quantity of silver from dump ores, which took the place of production from ores of higher grade shipped the previous year to the smelters.

**Copper.**—There was an enlarged output of copper both in the Boundary and on Vancouver Island. The increase in the former district was not proportionate to the larger tonnage of ore smelted, showing that the low costs of mining and smelting there are admitting of ores of even lower grade than heretofore being mined and smelted. On Vancouver Island the Tye Copper Company's works at Ladysmith were kept going nearly all the year, but those at Crofton were shut down early in the spring for lack of ore to treat. The Island smelters feel keenly the effect of the competition of the smelter at Tacoma, Washington, which has for some time past had contracts with British Columbia coast mines that take away from the local works a tonnage of ore that, had they it, would do much to keep them running the year through. The average price of electrolytic copper in 1904 was about 12¾ cents, as against nearly 13¼ in 1903.

**Lead.**—The tonnage of metallic lead—about 18,500 tons—falls far short of that anticipated as a result of the granting of the bounty of \$15 per ton on lead mined and smelted in Canada, up to an annual output of 33,000 tons. This, however, is chiefly attributable to the unusually dry season and the consequent shortage of water, which prevented the concentrating mills from being operated more than about half time. The output of the St. Eugene mine alone would, under ordinary conditions in this respect, have made up more than half this deficiency, which is not expected to occur in 1905.

**Zinc.**—The mining of zinc is at last becoming practicable at a profit. It occurs in the Slocan mines in large quantities, freely intermixed with lead, so that the mining of these two

metals must, to a considerable extent, be carried on together. There are, however, exceptions, some mines having big deposits of ore almost pure zinc blende. The Lucky Jim, situated about on the dividing line between the Ainsworth and Slocan mining divisions, is one of these, having a large body of ore averaging about 54 per cent zinc. Late in December a sale of 2,000 tons from this mine was made, and it is understood that the Slocan Star has practically concluded negotiations for the sale of 2,000 tons. While marketable zinc was obtained here in only small quantities (having been hitherto run to waste with the tailings from the silver-lead concentrating mills) buyers of this metal, with a single exception, did not give this district any attention, but now there is a change for the better in this connection. Several of the concentrating mills have had their plants remodelled, so as to save the zinc as a by-product when treating ores for their silver lead contents, and two or three of these have added magnetic separating plants to raise the grade of the zinc concentrate still higher.

*Iron.*—Nothing of importance was accomplished last year in the direction of turning to account the iron ores known to occur in quantity in widely separated parts of the province. On Vancouver and Texada Islands some development work has been done and the attention of capitalists has been drawn to the former, particularly to the properties of the Bentley Iron Mining Company, at Bugaboo creek. The iron smelter at Irondale, Washington, having been closed down, shipments of iron ore from Texada Island have been discontinued. Little change took place at the Kamloops iron property. In the Nelson mineral division, the Crawford Bay Iron deposits are being prospected. In East Kootenay there are also iron properties, but they are awaiting capital for their development.

*Coal and Coke.*—On Vancouver Island the Wellington collieries made an excellent showing last year, both at Extension and Cumberland (Comox), their output of about 750,000 tons having been larger than that of 1903. Developments and permanent improvements recently made at these collieries and at their seaboard shipping wharves, indicate that the alleged "impending exhaustion" of the workable coal seams of Vancouver Island is not anticipated by the Wellington Colliery Company, which claims to have ample coal yet undeveloped to last at least until the close of the present century. The year's supply of coke at Comox was in excess of the local demand. The Western Fuel Company, of San Francisco, successor to the New Vancouver Coal Company, is operating the Nanaimo collieries, the output of which was curtailed last year by the destruction by fire of the head-works at No. 1 mine. The Crow's Nest Pass Coal Company produced more than a million tons of coal in 1904. Of this quantity, 744,000 tons were disposed of as coal, and the remainder made into 244,000 tons of coke. This company is successfully seeking an enlarged market in the north-western United States—Washington, Idaho and Montana—for coal and, in the last-mentioned state, for coke as well.

*Other Minerals.*—No developments of note took place in regard to other minerals commercially valuable excepting, in small measure, the shipment of some of the excellent building stone occurring in variety on Vancouver Island and neighbouring smaller islands, and on the coast of the mainland. This valuable natural resource is, to a large extent, neglected, little persistent effort being made to turn it to profitable account. The lime quarries at Marble Bay, Texada Island, exported a lot of lime. Cement works are being established near Saanich, on Vancouver Island, and will probably be in operation early in the new year.

#### CROW'S NEST PASS COAL COMPANY'S OUTPUT IN 1904.

Since the statistics of production at the Crow's Nest Pass Coal Company's collieries, appearing on page 31 of this issue, were printed, advice has been received that the figures for 1904, previously sent out by the company and which included an estimate for the latter part of December, were inaccurate.

The corrected figures are as follows: Production of coal in 1904 (exclusive of that made into coke) was 744,000 tons, of which 581,634 tons were disposed of in Canada and 162,366 tons were exported. The production of coke was 244,000 tons, of which 138,076 tons were sold in Canada and 105,924 tons exported to the United States. The gross production of coal was about 1,110,000 tons, of which 366,000 tons were made into coke and the balance disposed of as above stated.

#### AN IMPROVED ORE-CARRYING BARGE.

MR. ROWLAND BRITAIN, patent attorney of Vancouver, sends us the following report:

Mr. T. Kiddie, manager of the Tye Smelter at Ladysmith is the inventor of an improved barge or scow which should be of considerable importance to coast mines shipping ore to a smelter, as it is particularly designed to effect the rapid discharge of a load of ore, coal or similar material carried in bulk.

According to Mr. Kiddie's patent specification the deck of the barge or scow is divided into a series of pyramidal hoppers, the lower ends of which communicate through doors into sub-deck galleries running fore and aft of the boat. In these galleries or tubs or cars may be run on tracks provided and communicate with hatchways at the ends of the boat through which the cars may be hoisted.

The discharge apertures of the hoppers are closable with a particular form of door in which a segment of a hollow cylinder is pivotally mounted at the axis of its curve, and rotatable on that axis to open or close the door by levers beneath. This form of door and the position of the axis on which it is movable permits the door to move very freely even with the weight of a full load against it, so that they may be readily manipulated to regulate the discharge into the ore cars.

Mr. Kiddie has designed further improvements on this door to obviate the possibility of the choking of the aperture, particulars of which improvement will be announced at a later date when the patents on it are issued.

#### PERSONALS.

Mr. Paul S. Couldrey, who a few weeks ago retired from the managership of the Le Roi No. 2 Company's mines, at Rossland, left British Columbia early last month for Australia, where he will have charge of important mining interests.

Mr. Wm. Thompson, until recently manager of the Rossland-Kootenay and Velvet Portland mines, and previously for several years associated with the management of the Le Roi and other important mines at Rossland, left that camp last month for Ocampo, Chihuahua, Mexico, where he is now general manager for the Waterson Gold Mines, Ltd.

Mr. J. E. McAllister, manager of the B. C. Copper Company's smelter, at Greenwood, in the Boundary district, has returned from a trip to the Southern States and Mexico.

It is announced that Mr. Jas. McEvoy, for some time past chief geologist for the Crow's Nest Pass Coal Company, has been appointed the company's land commissioner, having supervision of the company's land department.

Mr. Ernest Levy is now manager of the mines of the Le Roi No. 2 Company, Rossland, in succession to Mr. Paul S. Couldrey.

Mr. A. G. Larsen has been appointed manager of the Velvet-Portland mines, near Rossland. Mr. Wm. Thompson, the late manager, continues his official connection with these mines, but now in the capacity of consulting engineer.

#### HELD OVER.

A review of Nelson and Lardeau districts, by our special representative, was received too late for publication in this issue of the *MINING RECORD*. This and other matter relating to the progress of mining in 1904, also unavoidably held over, will appear in our February number.