THE BRITISH COLUMBIA MINING RECORD

SUPPLEMENT

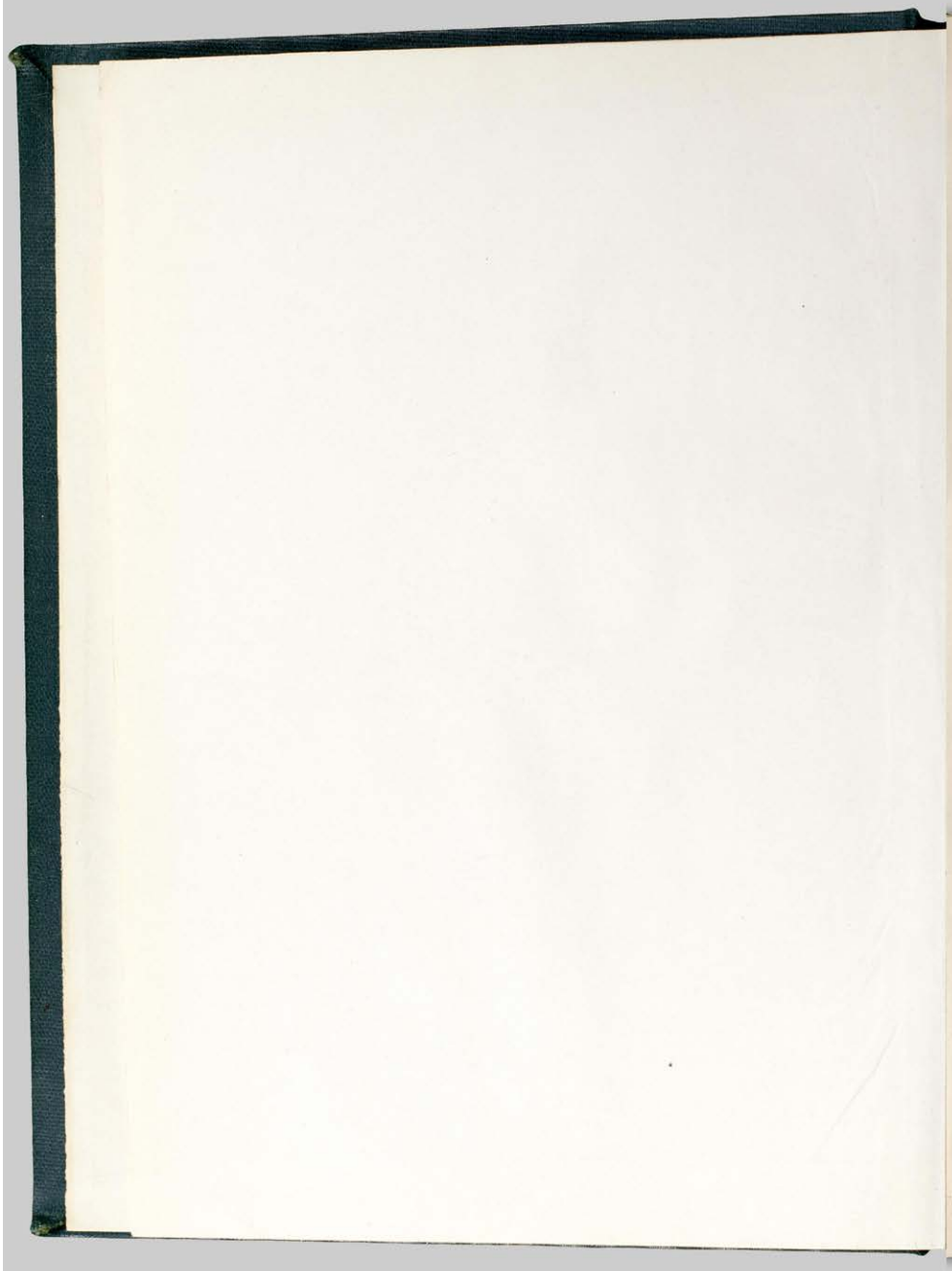


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CHRISTMAS 1900

PUBLISHED BY
THE MINING RECORD, LIMITED LIABILITY
VICTORIA AND VANCOUVER, B.C.

The British Columbia Mining Record December 1900



BRITISH COLUMBIA

MINING RECORD.

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From January to December, 1900.

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THE MINING RECORD, LIMITED LIABILITY,

VICTORIA AND VANCOUVER.

THE BRITISH COLUMBIA PRINTING AND ENGRAVING CORPORATION, LIMITED, VICTORIA, B.C.

The British Columbia Mining Record December 1900

thickness of intervening strata and nature of deposits on the bottom of the harbour warrant the removal of the coal by this method. The collieries are equipped with the following machinery: warrant the removal of the coal by this method. The collieries are equipped with the following machinery:

No. 1 Shaft.—1 double direct acting hoisting engine, 30" cylinder, 60" stroke, 14'diameter of drum and one 16" cylinder, 36" stroke, drum 5' in diameter at head of slope, 2 Cameron pumps 16"x6" x36"; 12 double flue boilers (Lancaster) stroke, drum 12' diameter. One single direct acting engine for operating underground rope haulage; one Cameron pump, 30"x6"x36"; 10 double flue boilers 4½"x25' long; 1 double air compressing engine.

Newcastle Island Shaft.—1 Guibal fan 14' diameter; 4 double flue (Lancaster) boilers 5'x25' in length.

No. 5 Shaft.—1 double direct acting hoisting engine 16" cylinder, 36" stroke, drum 12' in diameter; 1 double direct acting haulage engine, 7" cylinder, 10" stroke, drum 3' in diameter; 2 Cameron



New Vancouver Coal Co's Headw rks and Shipping Wharves, Nanaimo.

5'x30'; four plain cylindrical boilers 5' in diameter by 30' long.

Electric Haulage.—4 thirty ton electric motors; 2 Ball engines, 150 H. P. each; 2 100 K. W.-250 volt dynamos with necessary equipment; 2 double flue boilers 4½' diameter by 25' long. Air compressing plant.—2 double and 2 single air compressing engines.

No. 2 Shaft.—One Guibal fan, 36' diameter by 12' wide; one double Murphy fan.

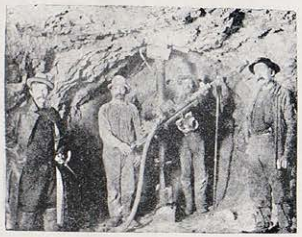
Protection Shaft.—One double direct acting hoisting engine, 26" cylinder, 42" pumps; 2 double Murphy fans, 8' diameter; 6 double flue (Lancaster) boilers 4½" diameter by 25' long; 1 double air compressing engine.

While the geological formations on the northern end of Texada Island are very similar in some respects to those on the western coast of Vancouver Island, yet there is one very marked difference with regard to the values carried by the ores on Texada as compared with those on Vancouver Island. The difference is in the gold values carried

by the Texada gold-copper ores.

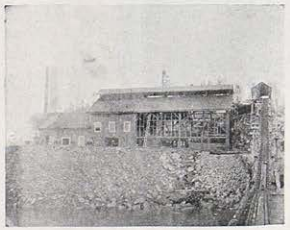
So far as work has demonstrated to the present time, the copper gold ores of Vancouver Island rarely carry more than $2.00 per ton in gold, but these ores on Texada Island usually average $8.00 or $9.00 per ton in gold, and very often carry more than one ounce per ton in gold. Northerly from an imaginary line drawn across Texada Island from Van Anda to Davies Bay, the

Van Anda Mines, by W. M. Brewer.



Crosscut on the 160-ft. Level, Cornell Mine.

principal ore deposits are copper carbonates and bornite, the latter even to a depth of 450 feet; actual work having demonstrated this fact in the Copper Queen mine. The ores from this northern portion are very much more silici-



Smelter at the Van Anda Mine.

ous than those which have been so far discovered south from the Copper Queen.

The ore from the Copper Queen 400-foot level carries besides its high copper values $9.00 per ton in gold, making the total smelting value of the ore not less than $25.00 per ton. In fact this has been the average value for 6,000 tons of ore smelted from the Copper Queen and Cornell mines during the past nine months.

On the Van Anda Copper & Gold Co's properties work has been concentrated on the Cornell and Copper Queen mines. The former has been opened up to the 160 foot level, and another 100 feet is being sunk below that level; on the latter sinking has been continued down to the 500 foot level. On both of these properties the development work has been kept well ahead of stoping, consequently there has been but very little trouble during the year to keep the smelter running continuously.

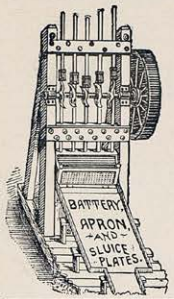
On the 160 foot level in the Cornell the ore body in the west stope was



Enormous Bluff of Ore on the Britannia Mine (Howe Sound).

found to have maintained continuity from the 80-foot level. Besides this an ore body was exposed on the 160 foot level, underlying the lime stone on the 80 foot level. This newly discovered body of ore occurs at a contact between lime stone and black felsyte, and about 35 feet northerly from the ore body known as the west stope. The line of strike is apparently identical with the line of strike of the ore body known as

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DIRECTORY OF ADVERTISERS—Continued.

CRUSHERS AND ORE BREAKERS—(Con.)— Page.
Fraser & Chalmers, Chicago, Ill. III.
Hendy, Joshua, San Francisco, Cal. VI.
Hamilton, The Wm. Mfg Co., Peterboro, Ont., and Vancouver, B.C. Back Cover.

CARS, CAGES, CHAIRS—
Fraser & Chalmers, Chicago, Ill. III.
Bacon, Earle C., New York I.

CARBONS—
Lexow, Theo., New York I.

DREDGES, DITCHERS AND STEAM SHOVELS—
Sons, Welland, Ont. V.

ELECTRICAL SUPPLIES AND MACHINERY—
Hinton, Geo. C., & Co, Victoria and Vancouver Cover.
Royal Electric Co., Montreal, Vancouver and Victoria Cover.
Link Belt Machinery Co., Chicago, Ill. I.
Canadian General Electric Co, Toronto and Vancouver, B.C VII.
Hendrie & Bolthoff Mfg. Co., Denver, Col XII.

ELEVATORS AND CONVEYORS—
Link Belt Machinery Co., Chicago, Ill. I.

ENGINES AND BOILERS—
Bacon, Earle C., New York I.

FILTER PRESSES—
Perrin, Wm. R., & Co., Chicago, Ill. I.

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Denver Fire Clay Co., Denver, Col II.
B.C. Pottery Co., Victoria, B.C. XII.

GENERAL MACHINERY & POWER PLANTS—
Jenckes Machine Co., Sherbrooke, Que., and Rossland. VI.

HOISTING MACHINERY—
Fraser & Chalmers, Chicago, Ill. III.
Bacon, Earle C., New York I.
Beatty, M., & Sons, Welland, Ont. V.
Hendrie & Bolthoff, Denver, Col. XII.

HYDRAULIC PIPE & MACHINERY—
Armstrong & Morrison, Vancouver V.
Hendy, Joshua, San Francisco VI.
Albion Iron Works, Victoria XIII.

MINING, ENGINEERING AND SURVEYING INSTRUMENTS—
Hearn & Harrison, Montreal II.
Wittstock, P. & R., Berlin, Germany X.

MACHINERY AGENTS—
Heaps, E. H., & Co., Vancouver, B.C. VI.

MINING BROKERS—
Grigor, R. W., Rossland, B.C. XIII
Pemberton & Son, Victoria, B.C. XVII
Thornton, Langley S., & Co., Rossland, B.C. XVII
Nicholson, Henry, Camp McKinney XVII
Mackinnon, J. M., Vancouver, B.C. XVII
Hawley, John, Vancouver, B.C. X.
More, A. W., & Co., Victoria, B.C. XV.
Purgold, George, Rossland, B.C. XV.

MINING ENGINEERS—
West, Howard, New Denver, B.C. XVI.
Bromly, A. H., Vancouver, B.C. XVI.
Trethewey & Bucke, Vancouver, B.C. XVI.
Harvey, W. Pellew, Vancouver, B.C. XVI.
Archibald & Pearson, Nelson, B.C. XVI.
Groves, F. W., Greenwood, B.C. XVI.
Tytler, F. J. L., Vancouver, B.C. XVI.
Redmond & Outhett, Kamloops, B.C. XVI.
Selby Bros., Portland, Ore. X.
Brewer, W M., Victoria, B.C. XVII.
Tyrell, J. B., Dawson City, Yukon XVII.
Mackinnon, W. M., M.A.C., Vancouver, B.C. XVII.
Fergusson & Crofts, Vancouver XVII.

METAL JOBBERS—
Robertson, James, & Co., Montreal, Vancouver. Back Cover.

ORE PURCHASERS—
Van Anda Copper and Gold Co., Van Anda. X.

PUMPS AND AIR COMPRESSORS— Page
Fraser & Chalmers, Chicago, Ill. III.
Taylor Air Compressing Co., Spokane, Wash. IV.
Hendy, Joshua, San Francisco, Cal. VI.
James Cooper Mfg. Co., Montreal and Rossland VIII.
Hendrie & Bolthoff, Denver, Col. XII.
Albion Iron Works, Victoria XIII.
Canadian Rand Drill Co., Montreal. Back Cover

PLATINUM REFINERS—
Baker & Co., Newark, N.J. VI.

POWDER—
Hamilton Powder Co., Nanaimo VI.

PAINTS—
British American Paint Co. VIII.
Robertson, James, & Co., Ltd., Montreal and Vancouver Back Cover.

PUBLICATIONS—
Mining Journal, London, Eng. XVIII.
Scientific Pub. Co., New York. XVIII.

PHOTOGRAPHIC SUPPLIES—
Edwards Bros., Vancouver. XVIII.

ROCK DRILLS—
James Cooper Mfg. Co., Montreal and Rossland. XVIII
Canadian Rand Drill Co., Montreal. Back Cover

STAMP AND CONCENTRATING MILLS—
Hendy, Joshua, San Francisco, Cal. VI.
Fried Krupp Grusonwerk, Germany and Montreal. Cover.
Wilfley Ore Concentrator Syndicate, London, Eng. X.

SURVEYORS AND CIVIL ENGINEERS—
Gore, Burnett & Co., Victoria and Nelson X.
Cleveland, E. A., Vancouver XVII.
Fergusson & Crofts, Vancouver XVII.
Mackinnon, W. M., Vancouver XVII.
Silver-Lead Mines Association XVII.
Tytler, T. J. L. XVII.
Groves, F. W., Greenwood XVI.

SHAFTING, PULLEYS AND GEARING—
Link Belt Machinery Co., Chicago, Ill. I.

SCREENS AND PERFORATED METALS—
Fraser & Chalmers, Chicago, Ill. III.

SMELTING AND ROASTING FURNACES—
Fraser & Chalmers, Chicago, Ill. III.

STOCK COMPANIES—
Referendum Gold Mining and Milling Co., Rossland. XIII.

SHIPPING AND INSURANCE AGENTS—
Ward, Robert, & Co., Victoria XIV.
Rithet, R. P., & Co., Victoria XX.

TRADING CORPORATIONS—
V. Y. T. Co., Lake Bennett XI.

TECHNICAL SCHOOLS—
Van Der Naillens', San Francisco XIII.
Michigan College of mines, Houghton, Mich. XVIII.
International Correspondence Schools, Scranton, Pa. XVIII.

TRANSPORTATION COMPANIES—
Canadian Pacific Railway Co. XX.
Canadian Pacific Nav. Co., Victoria XX.

WATER WHEELS—
Pelton Water Wheel Co., San Francisco IV.
Leffel, James, & Co., Springfield, Ohio IV.
Stilwell-Bierce & Smith-Vaile Co., Dayton, Ohio IV.
Hendy, Joshua, San Francisco VI.

WHOLESALE MERCHANTS—
Stemler & Earle, Spices, Etc., Victoria XII.
Smith, M. R., & Co., Biscuits, Victoria XII.
Fraser, Walter S., & Co., Hardware XIV.
Ward, Robert, & Co., Ltd., Commission Merchants and Importers XIV.
Leiser, Simon, & Co., Groceries XIV.
Weiler Bros., Furniture XIV.
Lenz & Leiser, Dry Goods XV.
Turner, Beeton & Co., Dry Goods and Liquors, XV.
Hudson's Bay Co., General Merchants. Back Cover.

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The Referendum Free Gold Mining and Milling Co'y, Ltd.

NON-PERSONAL LIABILITY.

CAPITAL STOCK $500,000, in 2,000,000 shares of 25c. each.

ROSSLAND, B.C., May 19, 1899.

We submit to the public as a safe and profitable investment the second issue of 100,000 shares in the Referendum Free Gold Mining and Milling Company, Limited, non-personal liability, just organized and registered during the first week of July. The capital stock of the Company will be $500,000 in shares of 25 cents per value. Of these 800,000 shares are set aside to be sold to develop further the property and operate the mine.

The Company's property is situated on Forty-Nine Creek, about 8 miles from the City of Nelson, B.C., and in the well-known free-gold belt, in which are also the Athabasca and Poorman mines, which have yielded excellent profits to their owners. Two shafts 35 feet deep have been sunk on one vein, and numerous cuttings have been made, showing the continuity of the ore body for one thousand feet. Assays from ore from these works are as follows: $80, $87, $246, $360, $412. Dr. P. Langhammer, mining engineer, estimates this vein to average $43 in value and 20 inches in width. This showing has enabled the Company to conclude arrangements for a plant to treat the ore, to be installed before snowfall. The gold being free and capable of extraction on the ground the expensive charges of transportation and smelting are obviated, and the profits will be correspondingly larger than from a base ore of equal assay value. The Company has thus its property proven and arrangements made to mine profitably from its inception and to pay dividends at an early date.

The Company recently purchased a 5-stamp mill, boiler and engine with cyanide and chlorination plant. This plant will be operated within 90 days from August 10. A stage of progress has been reached when the mine can be worked throughout the winter. The plan of operation includes the addition of five more stamps in the spring and running a tunnel to the boundary of the Referendum claim which is expected to cross-cut five more leads which now show on the surface.

All that was outlined in our circular of May 15 has been carried out.

Applications for stock and remittance for first payment of two cents per share may be made through any chartered bank or direct to the undersigned.

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Montreal (Westmount).
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Nelson, B.C.
Newcastle, N.B.
Ottawa, Ont.
Pictou, N. S.
Port Hawkesbury, N. S.
Rossland, B.C.
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Shubenacadie, N. S.
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countered which is said on good authority to assay 1½ unces of gold to the ton and about 7 per cent. copper. Some large pieces of this ore have been brought up from the mine, and altogether about ten tons have been placed on the dump. The ore is evidently from one of the main veins of the camp, a vein which runs southeast and northwest. This is evident enough judging from the size and quantity of the pieces abstracted from the ledge. So far there have been cut two and a-half feet of this solid ore and I am credibly informed that the point where this was cut is the lowest in the camp measured from the surface. Mr. William S. Harkens is the superintendent, and there is much satisfaction in the division on this account. Mr. Harkens is one of the best liked, and most efficient superintendents in the country. The strike itself is the best ever made in the Nickel Plate, which is the property of the British America Corporation.

The Le Roi so far has shipped about 12,400 tons, the War Eagle 10,600, Centre Star 7,000, Iron Mask 1,434, Evening Star 189, I. X. L. 273 and Monte Cristo 40.

The announcement of a further dividend of $750,000 by the Le Roi management in England has come opportunely. Spring is now here and the present mining situation has begun to show material improvement, so that when my next report is made I hope to be able to show the facts and figures of a general and substantial advance.

SLOCAN.

(From Our Own Correspondent.)

The one item of the month which naturally overshadows all else is the joyous and far-reaching statement that the labour difficulty is at an end—permanently we venture to hope—and that a general resumption of work underground has taken place. Little remains to be said on this score that cannot readily be conjectured by the intelligent reader, for unfailing signs of coming prosperity are everywhere commencing to put in an appearance. Mines long deserted and idle are resuming their wonted attitude of energy and bustle, and buildings which have lain silent and unoccupied for many moons resound once more to the unharmonious clanging of the blacksmith's hammer and the welcome noise of ore-sorters at their work. Altogether the old French proverb "après la pluie, le beau temps" bids fair to be exemplified once more. True, the minds of the populace have been occupied to some extent with the news of the "relief of Ladysmith," the gallant doings of Canadian contingents and other items from the seat of war, and incidentally we have indulged in a mild excitement of our own derived from a more or less exaggerated small-pox scare, but to the professional, business and working man alike these—notwithstanding their evident importance—appear as mere side issues, absolutely nothing sufficing to ruffle the complacence with which he has learned in the last few weeks to view the world, save perhaps the ominous clouds on the political horizon. In the lightness of his heart even these are not taken seriously, and the fact that minor (no joke intended) troubles of a like nature are being experienced in the district around Nelson, Rossland and Boundary serves only to increase his thankfulness for the period of activity attained at last. I voice the unanimous sentiment of the miners, mine operators and business men generally in expressing the hope that a lasting and final settlement has been reached which will allow the district to progress at its worth, and that it will be long are a disaster of this character again threatens. The effect of mutual forbearance and concession is seen in the fact that no ill-feeling has been engendered, each of the contestants recognizing that the other necessarily had rights as well as wrongs in the matter of a struggle thus thrust upon them. Like two nations who have expended their resources in the futile art of war, we in the Slocan long now, one and all, for peace accompanied by its glorious economic and industrial conquests. That the strike is at an end would be self-evident to the most casual visitor, but it is perhaps more markedly displayed in a statistical way as shown in the columns of the newspapers. While the ore shipments in the latter half of 1899 totalled only 4,300 tons, over half of that amount has left the district in the first month of the resumption of operations. This might in some quarters be regarded as the result of accumulation, but there is evidence to show that shipments in the ensuing months will likely exceed this figure to a considerable extent. The majority of the mines were not in condition to employ forces on the start, and in addition, the season when the roads are breaking up is obviously very unfavourable for getting down ore. The list of shippers so far includes only fifteen names and several of these figure almost for the first time, so that many of the best known mines are yet to be heard from. The Payne, apparently unwilling to relinquish its hold to the title of the richest mine in the district has started off well, being credited with over half the production to date, consequently we are not surprised to see the stock of this company in the ascendant. None of the other mines have made any conspicuous move as yet, and are hardly expected to, of course, until the roads are in better condition. On account of the early spring we are anticipating a good season for prospectors, the annual exodus this year being billed in advance for the Kettle River district situate between Arrow Lake and Vernon. Reports of rich finds, though conflicting and subject to a liberal discount, are still good enough to warrant investigation at least, and many are waiting only for the snow to vanish before venturing there on business.

A RESUMPTION OF WORK.

Lists of casualties are not confined to South Africa by any means, the yearly recurrence of snow and mud slides attended with fatal consequences reminding us of the precarious nature of the miners' calling. It would appear also from the accident which occurred at Sandon through part of the bank above the town giving way, that the danger is shared to some extent by all who live in the mountains.. Two men killed by the Noble Five slide, and one killed and several injured as a result of the Sandon catastrophe is the record for the past week, added to which a solitary worker at the Silver Bell, Kaslo Creek, lost his life through a fall of rock doubtless occasioned by the thaw, and a miner from the Enterprise lies dead from the effects of an unexpected explosion.

It is gratifying to record that most of the ore leaving the Slocan is now consigned to Trail in place of the American smelters. So long as the management continues to give satisfaction it is matter for mutual congratulation, for at present they certainly appear to have the advantage over their competitors in being able to pay on the London price with certain deductions, thereby netting more for the shippers on the lead contents of the ore than could be done on the hitherto existing arrangement.

Zinc ore comparatively free from lead, mined at the Bosun, continues to find a profitable market in Belgium, and so well known has this become that other mine owners are contemplating following suit. The new concentrator at the Wakefield which was run successfully for a few days not long since and will soon be in continuous operation is especially adapted for saving this product which will no doubt prove a source of considerable revenue.

The signs of an all-round revival in interest in this section are numerous and varied. But few vacant houses are now to be seen, and judging from the number of applications for naturalization papers which are being received, many evidently find it to their advantage to settle here permanently. Bonds and options are again spoken of, in whispers, of course, the Mollie Hughes, Lost Tiger, Monitor and Mountain Chief being each in receipt of attention from prospective purchasers. That old familiar cry of waggon roads, as indicating the necessity for their construction is again being heard with respect to the properties on Silver Mountain, and there is every likelihood of its being constructed during the coming summer.

PRODUCING MINES.

TEXADA ISLAND.

THE following returns of smelter operations are published in the annual report of the Van Anda Copper and Gold Company:—

JANUARY.

Receipts—		
Matte sales	$18,637 61	
Store	5,904 17	
Lot	230 00	
Wharf	55 00	
Rentals	102 75	
Total		$24,929 53
Disbursements—		
Labour	$12,874 75	
Material and Repairs	4,980 99	
Freights	2,500 00	
Interest and discount	550 00	
Total		$20,905 74
Profit for month		4,023 79
January ore hauled to smelter		619 tons

FEBRUARY (ROUGHLY.)

Receipts—		
Matte sales	$17,285 64	
Store	5,241 93	
Lots	200 00	
Wharf	50 00	
Rentals	102 75	
Total		$22,880 32
Disbursements—		
Labour	$12,375 36	
Materials and repairs	4,841 85	
Freights	2,100 00	
Interest and discount	700 00	
Total		$20,017 21
Profit for month		2,863 11
February ore hauled to the smelter		749 tons

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I. X. L.	48	105.5	153.5
Evening Star	30	69.5	99.5
Monte Christo	273	.....	273
Giant	42	.....	42
Total tons	24,427.5	7,544.5	31,972

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14th	SS. Titania	Port Los Angeles	5,781
18th	SS. New England	Alaska	62
Total			19,343

The British Columbia Mining Record December 1900

countered which is said on good authority to assay 1½ unces of gold to the ton and about 7 per cent. copper. Some large pieces of this ore have been brought up from the mine, and altogether about ten tons have been placed on the dump. The ore is evidently from one of the main veins of the camp, a vein which runs southeast and northwest. This is evident enough judging from the size and quantity of the pieces abstracted from the ledge. So far there have been cut two and a-half feet of this solid ore and I am credibly informed that the point where this was cut is the lowest in the camp measured from the surface. Mr. William S. Harkens is the superintendent, and there is much satisfaction in the division on this account. Mr. Harkens is one of the best liked, and most efficient superintendents in the country. The strike itself is the best ever made in the Nickel Plate, which is the property of the British America Corporation.

The Le Roi so far has shipped about 12,400 tons, the War Eagle 10,600, Centre Star 7,000, Iron Mask 1,434, Evening Star 189, I. X. L. 273 and Monte Cristo 40.

The announcement of a further dividend of $750,000 by the Le Roi management in England has come opportunely. Spring is now here and the present mining situation has begun to show material improvement, so that when my next report is made I hope to be able to show the facts and figures of a general and substantial advance.

SLOCAN.

(From Our Own Correspondent.)

The one item of the month which naturally overshadows all else is the joyous and far-reaching statement that the labour difficulty is at an end—permanently we venture to hope—and that a general resumption of work underground has taken place. Little remains to be said on this score that cannot readily be conjectured by the intelligent reader, for unfailing signs of coming prosperity are everywhere commencing to put in an appearance. Mines long deserted and idle are resuming their wonted attitude of energy and bustle, and buildings which have lain silent and unoccupied for many moons resound once more to the unharmonious clanging of the blacksmith's hammer and the welcome noise of ore-sorters at their work. Altogether the old French proverb "après la pluie, le beau temps" bids fair to be exemplified once more. True, the minds of the populace have been occupied to some extent with the news of the "relief of Ladysmith," the gallant doings of Canadian contingents and other items from the seat of war, and incidentally we have indulged in a mild excitement of our own derived from a more or less exaggerated small-pox scare, but to the professional, business and working man alike these—notwithstanding their evident importance—appear as mere side issues, absolutely nothing sufficing to ruffle the complacence with which he has learned in the last few weeks to view the world, save perhaps the ominous clouds on the political horizon. In the lightness of his heart even these are not taken seriously, and the fact that minor (no joke intended) troubles of a like nature are being experienced in the district around Nelson, Rossland and Boundary serves only to increase his thankfulness for the period of activity attained at last. I voice the unanimous sentiment of the miners, mine operators and business men generally in expressing the hope that a lasting and final settlement has been reached which will allow the district to progress at its worth, and that it will be long are a disaster of this character again threatens. The effect of mutual forbearance and concession is seen in the fact that no ill-feeling has been engendered, each of the contestants recognizing that the other necessarily had rights as well as wrongs in the matter of a struggle thus thrust upon them. Like two nations who have expended their resources in the futile art of war, we in the Slocan long now, one and all, for peace accompanied by its glorious economic and industrial conquests. That the strike is at an end would be self-evident to the most casual visitor, but it is perhaps more markedly displayed in a statistical way as shown in the columns of the newspapers. While the ore shipments in the latter half of 1899 totalled only 4,300 tons, over half of that amount has left the district in the first month of the resumption of operations. This might in some quarters be regarded as the result of accumulation, but there is evidence to show that shipments in the ensuing months will likely exceed this figure to a considerable extent. The majority of the mines were not in condition to employ forces on the start, and in addition, the season when the roads are breaking up is obviously very unfavourable for getting down ore. The list of shippers so far includes only fifteen names and several of these figure almost for the first time, so that many of the best known mines are yet to be heard from. The Payne, apparently unwilling to relinquish its hold to the title of the richest mine in the district has started off well, being credited with over half the production to date, consequently we are not surprised to see the stock of this company in the ascendant. None of the other mines have made any conspicuous move as yet, and are hardly expected to, of course, until the roads are in better condition. On account of the early spring we are anticipating a good season for prospectors, the annual exodus this year being billed in advance for the Kettle River district situate between Arrow Lake and Vernon. Reports of rich finds, though conflicting and subject to a liberal discount, are still good enough to warrant investigation at least, and many are waiting only for the snow to vanish before venturing there on business.

A RESUMPTION OF WORK.

Lists of casualties are not confined to South Africa by any means, the yearly recurrence of snow and mud slides attended with fatal consequences reminding us of the precarious nature of the miners' calling. It would appear also from the accident which occurred at Sandon through part of the bank above the town giving way, that the danger is shared to some extent by all who live in the mountains.. Two men killed by the Noble Five slide, and one killed and several injured as a result of the Sandon catastrophe is the record for the past week, added to which a solitary worker at the Silver Bell, Kaslo Creek, lost his life through a fall of rock doubtless occasioned by the thaw, and a miner from the Enterprise lies dead from the effects of an unexpected explosion.

It is gratifying to record that most of the ore leaving the Slocan is now consigned to Trail in place of the American smelters. So long as the management continues to give satisfaction it is matter for mutual congratulation, for at present they certainly appear to have the advantage over their competitors in being able to pay on the London price with certain deductions, thereby netting more for the shippers on the lead contents of the ore than could be done on the hitherto existing arrangement.

Zinc ore comparatively free from lead, mined at the Bosun, continues to find a profitable market in Belgium, and so well known has this become that other mine owners are contemplating following suit. The new concentrator at the Wakefield which was run successfully for a few days not long since and will soon be in continuous operation is especially adapted for saving this product which will no doubt prove a source of considerable revenue.

The signs of an all-round revival in interest in this section are numerous and varied. But few vacant houses are now to be seen, and judging from the number of applications for naturalization papers which are being received, many evidently find it to their advantage to settle here permanently. Bonds and options are again spoken of, in whispers, of course, the Mollie Hughes, Lost Tiger, Monitor and Mountain Chief being each in receipt of attention from prospective purchasers. That old familiar cry of waggon roads, as indicating the necessity for their construction is again being heard with respect to the properties on Silver Mountain, and there is every likelihood of its being constructed during the coming summer.

PRODUCING MINES.

TEXADA ISLAND.

THE following returns of smelter operations are published in the annual report of the Van Anda Copper and Gold Company:—

JANUARY.

Receipts—		
Matte sales	$18,637 61	
Store	5,904 17	
Lot	230 00	
Wharf	55 00	
Rentals	102 75	
Total		$24,929 53
Disbursements—		
Labour	$12,874 75	
Material and Repairs	4,980 99	
Freights	2,500 00	
Interest and discount	550 00	
Total		$20,905 74
Profit for month		4,023 79
January ore hauled to smelter		619 tons

FEBRUARY (ROUGHLY.)

Receipts—		
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talls of Rock Creek on the property and should considerably lessen the cost of crushing.

The vein has a north and south strike and dips about 45 degrees near the surface, but has now straightened to about 80 degrees east. The ore is a chalky looking quartz well mineralized with pyrites. It occurs in a talc ledge matter which also contains cubes of pyrites, and is found mostly near the hanging wall. Assays of from $12 to $72 have been obtained from the pay streak.

Across the creek and a little lower down are the workings of the Victoria mine, owned by the Rock Creek Gold Mines Company, Ltd. The Victoria and the Old England, as I have mentioned before, are the oldest locations in Camp McKinney.

In 1896 and 1897 about 1,000 feet of development work was done. An incline shaft 110 feet down ran into base ore. No. 1 tunnel, run in 198 feet from the side of the Rock Creek gulch, struck the vein which was drifted on for 200 feet. In No. 2 tunnel the vein was found 205 feet in and a winze sunk for 106 feet Thirty tons were stoped out and shipped, giving returns of $50 g ld, $2.00 silver and two per cent. lead.

There are two undeveloped veins of which little is known, but the main one has been opened up sufficiently to demonstrate that if the ore is found in place it will pay well to mine. The ledge is from five to six feet between walls and contains a bluish quartz with pyrites, blende and a little galena. This quartz is from a few inches up to 20 inches wide, and is badly broken. Work has been suspended a number of years, but it is nevertheless unfortunate that in view of the circumstances development was discontinued at so early a stage.

Last November some excitement was created by the report that free gold had been struck on the Dayton, a claim lying on the "hog's back," which runs southward about two miles due east of the camp. The gold occurred in "gossen" and was found in large quantities where the vein was opened up. "Colours" could be obtained by "panning" any of the rock. The claim was located a year ago and shortly after the "strike" of free gold,was bonded and sinking was commenced. The ore proving refractory the bond was allowed to lapse, but the owners of the claim continued the shaft down to a depth of 50 feet and crosscut twelve feet east to the vein. Surface cross-cuts were also made, in all of which rock was found that would "pan." The strike of the vein is north 40 degrees west and it dips about 70 degrees east. Assays of $72, $96 and $812 have been secured from the surface, but, of course "specimen" assays are hardly satisfactory evidence as testifying to the value of a prospect or mine.

On this "hog's back" there are many other properties with good showings of base ore, but on these so far very little development work has been done, and but little can be accomplished without the aid of outside capital. The Dayton, Le Roi, War Eagle and many other claims offer good inducements to the capitalist prepared to expend an adequate sum for their proper exploitation and development.

Camp McKinney in the past has not received that attention which in view of the many excellent surface showings to be found in the neighbourhood it merits. The only mine, the Cariboo, which has been extensively developed, has rendered an excellent account of itself, as all who have been fortunate enough to be shareholders have every reason to know. The Waterloo, Fontenoy and other mines, on the development of which the expenditure has been very much less considerable, will ere long prove profitably productive, while there are unquestionably many good claims elsewhere in the camp which would well repay investigation. It, however, can only be a question of a short time ere these facts are more widely recognized.

DEVELOPMENT ON TEXADA ISLAND.

(By Wm. M. Brewer, M.A.I.M.E.)

WHILE the geological formations on the northern end of Texada Island are very similar in some respects to those on the western coast of Vancouver Island, yet there is one very marked difference with regard to the values carried by the ores on Texada as compared with those on Vancouver Island. The difference is in the gold values carried by the Texada gold-copper ores.

So far as work has demonstrated to the present time, the copper gold ores of Vancouver Island rarely carry more than $2.00 per ton in gold, but these ores on Texada Island usually average $8.00 or $9.00 per ton in gold, and very often carry more than one ounce per ton in gold. Of the southern portion of Texada Island hardly anything is known with regard to its mineral resources or geological formation. So far as one can judge while travelling up the Straits, the mountains on this portion of the Island are not only very much higher than on the northern portion, but the timber and underbrush are very much more dense. These conditions account for the fact that this portion of the Island has not been prospected.

It would appear as though the geology in the Southern portion differs considerably from that in the northern portion. The writer's reason for stating this theory is that the ore deposits which have already been discovered southerly from an imaginary line drawn across the Island from Van Anda to Davies Bay, carry very much heavier iron contents than those north of this line. In fact the ore in the Raven prospect near North East Point is principally iron, while on the west coast are located the very extensive deposits of magnetite which carry practically no copper values and which have been prospected to a depth exceeding 200 feet at which depth the writer is reliably informed, the ore is to all intents and purposes a Bessemer iron ore. Northerly from this imaginary line the principal ore deposits are copper carbonates and bornite, the latter even to a depth of 450 feet; actual work having demonstrated this fact in the Copper Queen mine. The ores from this northern portion are very much more silicious than those which have been so far discovered south from the Copper Queen.

A change in the geology occurs about 2,500 feet southerly from the Copper Queen shaft, and on the mineral claim known as the Little Billy. At that point a quartz syenite flanks the metamorphosed lime stone, which is apparently the oldest rock, at least on the northern portion of Texada Island. As one proceeds towards the extreme north end of the Island at Blubber Bay, he finds this lime stone is the predominating rock with intrusions of felsite and diorite dikes. The latter appear to belong to a more recent period than the former, as it is found in the underground workings that the diorite dikes usually cut through the ore bodies which occur on the contact between the lime stone and felsite.

There has apparently been a still later movement,

because in the Marble Bay underground workings one finds fissures crossing the general trend of the formation which are to-day only filled with mud and breccia. In these, so far as they have been prospected, which in the Marble Bay is for some considerable distance, no ore bodies occur, and as the fissures intersect ore bodies in that mine cutting through them with the ore found on both sides of the fissure, the theory that these mud seams were formed more recently than the period when the deposition of ore occurred would appear to be warranted.

The ore from the Copper Queen 400-foot level carries besides its high copper values $9.00 per ton in gold, making the total smelting value of the ore not less than $25.00 per ton. In fact this has been the average value for 6,000 tons of ore smelted from the Copper Queen and Cornell mines during the past nine months.

While on a recent visit to the Island, the writer had the opportunity of examining the development work in the various properties, and found that the main shaft on the Copper Queen had reached a depth of 518 feet. At the 500-foot level a station has been cut, and drifting started and the ore body found, but apparently this is not the same as on the 400-foot level, reached a depth of fifty feet, showing the ore to be continuous to that depth. It is probable that driving on the 500-foot level will have to be continued for about 50 feet before the same ore body as occurred on the 400-foot level is reached, because all the ore in the Copper Queen mine has dipped towards the west as well as dipping vertically and comformably with the foot wall. It would appear as though the ore which has been exposed on the 500-foot level and which is being stoped is another lense having its apex between the 400 and 500-foot levels. On the 14th of July there was the following described virgin ground opened ready for stoping: On the Copper Queen—A newly discovered ore body from the 174-foot level upwards, also between the 224 and 174-foot levels, also between the 500 and 400 foot levels, also an ore body having its line of strike nearly at right angles to the main ore body and extending northwesterly from the old 100-foot incline shaft. This last has been proven from the 100-foot level to the surface and in an open cut on the surface run when the discovery of the body was first made has been proven in length 40 feet with ore still in the face of the cut, and with every indication that this body extends under the waggon road and houses opposite to the shaft-house. On the Cornell the main shaft has been sunk 80 feet and the 160-foot



From Minister of Mines Report, 1899.
The Van Anda Smelter, Texada Island.



From Minister of Mines Report, 1899.
Marble Bay Lime Kiln, Texada Island.

The British Columbia Mining Record December 1900

level opened, station cut and drifting on the ore body which is proven to be a continuity of the ore body which was stoped from the 80-foot level up. The two levels have been connected by an upraise on ore and stoping has commenced. This ore body on the 80-foot level had a length of 112 feet, and an average thickness of 12 feet with a maximum thickness of 23 feet. On the 160-foot level the maximum thickness of ore in felsite gangue exceeds 30 feet. The virgin ground ready for stoping is between the 160 and 80-foot levels on what is known as the east ore chute.

About 300 tons of ore have recently been shipped from the Lenora mine at Mount Sicker to the Van Anda smelter. There is also being shipped a quantity of ore from the Marble Bay, the property of which company adjoins the Van Anda company's properties. The management at the Marble Bay mine have commenced to stope the ore between the 50 and 140-levels. Heretofore the only ore mined below the 50-level has been such as was taken out while driving.

The lime kiln at Marble Bay is also being run up to its capacity, lime from these kilns having been placed on the Vancouver and Victoria markets.

The difference in the appearance of this portion of the Island to-day and a year ago is very marked as can readily be understood when it is considered that in place of a small population a year ago, and a few shacks together with the Marble Bay hotel, to-day there is a population of between five and six hundred on the two townsites. Of course the bulk of this population is located on the Van Anda townsite, because the company employs a very much greater force of men than the Marble Bay. The growth of the town of Van Anda during the past year has been somewhat phenomenal, the houses are substantial structures built from the lumber sawed in the Van Anda company's mill which has a capacity of turning out about 12,000 feet daily, and is furnished with planing and shingle mills, as well as ordinary saw carriage.

Travelling up the east coast of Texada three miles above the town of Van Anda there is a new prospect being opened known as Loyal group. The discoveries of ore were first made on the Crown grant land owned by Carter-Cotton, and in many respects these prospects are ideal ones. The fact that to a depth of some 40 or 50 feet the ore can be mined from an open cut, and also that this open cut is only about 500 feet from deep water where a cribbing has been built for a dock, and connected with the open cut by a surface tramway, demonstrates some of the advantages found at these new prospects.

Surface work has been done on this prospect which demonstrates that bodies of ore (carbonates) occur for a distance of some three or four hundred feet along the line of strike, and apparently the mineralized zone has an average thickness of some 50 or 60 feet. The actual conditons though will be thoroughly demonstrated after the open cut already referred to has been driven across this zone.

At the time of the writer's visit only two weeks had elapsed since work of development had been commenced. This had been prosecuted so diligently though, that it is almost a certainty ore will be shipped to the smelter within fifteen days from the time of the writers' visit. The most encouraging feature with regard to this northern portion of Texada Island is that the Cornell mine for instance, and almost certainly the Loyal group can be considered as having paid from the grass roots, which is certainly phenomenal.

At Blubber Bay, the extreme end of Texada Island, Messrs. MacKenzie, Mann and Holt are opening some copper prospects, and employing a large force of men. Considerable ore has already been accumulated on the dumps, and good waggon roads built connecting the mine workings with the shore.

A peculiar feature with regard to ore found on these Blubber Bay properties, is that galena carrying 25 to 30 per cent. lead has been found associated with the copper ore.

At Blubber Bay are located some old lime kilns in which lime was burnt some years back. At the present time, although the kilns are not in operation, yet a certain quantity of the lime stone is quarried, and used in the manufacture of cement.

There are at present upwards of 300 men employed in the various mines on the northern end of Texada Island, a large proportion of whom are married, and have their families residing on the Island with them. The majority of these live either on the Van Anda or Marble Bay townistes.

THE REVERBERATORY SMELTING OF LEAD ORES.*

(By Capt. C. C. Longridge, M.I.M.E.,M.I. Mech. E., Etc.)

I.—REVERBERATORY SMELTING.

THE process of roasting to which most lead sulphide ores are subjected preparatory to smelting is not always effected outside of the smelting furnace. In the method of smelting here considered, the roast is accomplished in the smelter itself, and the treatment is, therefore, graphically described as the roasting and reaction, or sometimes the air reduction or the reverberatory process, inasmuch as it is conducted in a reverberatory furnace. The crushed ore charge, spread out in a 3 to 5 inch layer on the reverberatory hearth, is first roasted at a comparatively low temperature, until the requisite quantity of lead sulphide is converted into oxide and sulphate. For the English method of reverberatory smelting, the proper proportion is one molecule of lead sulphate to two molecules of lead sulphide; for the Carinthian method, one molecule of sulphate and two of oxide to one molecule of sulphide. When the roast is sufficiently advanced, the furnace temperature is raised and the interaction of the sulphate and oxide is started and the metals are reduced. The reduction, however, is not at once complete. For, in the first place however assiduously fresh surfaces of the ore may have been exposed to the air by rabbling, during the roast, the whole charge will not at once have been brought into the necessary condition for the reduction reactions. On the other hand, as the reactions are satisfactorily effected only when the sulphides and oxides are in, not a fluid, but a pasty condition, complete contact of the interacting particles and reduction of the enclosed metal is not at once effected. The reverberatory lead smelter, therefore, employs a cycle of operations in which the ore is first roasted at a temperature of 500-600 degrees C., then partially reduced at a higher temperature; when the furnace heat is again lowered, the charge re-rabbled and re-roasted, and the temperature once more raised for a further reduction, and so on. Every time the operations of roasting and reducing are repeated, and the ore becomes poorer in lead, a higher reduction temperature must be used. To avoid fusion under the greater heat, and to keep the charge in the desired pasty condition, slacked lime is added; while, to accelerate the chemical reactions, powdered coal or charcoal may be mingled with the charge.

*From the London Mining Journal.

II.—EFFECT OF ORE IMPURITIES.

This process of reverberatory smelting, of which the details appear sufficiently simple, may in practice be much complicated by the ore impurities. The influence of some of these impurities is described: A small quantity of iron oxide is advantageous, in so far as it helps to stiffen the charge. A slight proportion of iron pyrites also is favourable, as it promotes oxidation, and when itself reduced to ferric oxide, renders the charge less fusible. If, however, the proportion of pyrites rises to 10 per cent. or 12 per cent. it is injurious, since it is likely to combine the lead sulphide, and thus prevent reduction of the latter. The presence of 35 per cent. to 40 per cent. of iron pyrites renders the ore unfit for treatment in a reverberatory furnace. Spathic iron ore, in the presence of silica, forms a fluid slag, and is to be avoided in reverberatory lead smelting. In the case of copper pyrites most of the copper combines with sulphur to form subsulphide, but some is likely to enter the lead and may be sufficient to need subsequent separation. Blende, in quantities of 4 per cent. to 5 per cent., assists the roasting of the charge, but 10 per cent. to 12 per cent. both prolongs the roast and diminishes the lead extraction. With 20 per cent. to 24 per cent. of zinc very little lead is extracted, and with 35 per cent. to 40 per cent. the reverberatory method cannot be employed. Antimony, even to the amount of 2 per cent. to 3 per cent. is very prejudicial, as it not only promotes caking and fusing of the charge, but carries lead into the slag, and itself mixing with the lead, injures the quality. It also increases the volatilization losses. Next to antimony, arsenic is the most deleterious impurity, producing results similar to those of antimony. The gangue constituents also have considerable influence on the process of smelting. Limestone, more especially dolemite, stiffens and hinders fusion of the charge; but a large quantity will prevent the various lead compounds coming into contact, and thus, by impeding reduction, will reduce the yield of lead. The highest permissible percentage of limestone for a reverberatory charge is 12 per cent. Silica combines to form lead silicates. These not only react with the oxide, sulphate, and sulphide of lead; but, in consequence of their low fusion point, easily melt, and, coating the particles of the charge, check all reaction. For successful reverberatory work, therefore, the lead ore charge must not contain more than 4 per cent. to 5 per cent. of silica. Barytes and fluorspar, if seperate, have no effect; but if both are present, they may increase the fusibility of the charge by combining with lead sulphade.

III.—ADVANTAGES AND DISADVANTAGES OF REVERBERATORY SMELTING.

These may be deduced from the observations made in the foregoing paragraphs. Briefly enumerated, the advantages of reverberatory smelting are: First, raw ore can be smelted. That is to say, no preliminary or independent calcination of the ore is required, because the ore roasting is done in the furnace itself. Secondly, raw fuel can be used. The use of cheaper combustibles, such as coal, wood, etc., is possible, because very high temperature is not needed. The operation, as we have seen, does not aim at gangue fusion, except in the last stage; and, even then, as much refractory material, such as lime, silica, etc., cannot be present in the charge, no great heat is necessary. Thirdly, the volatilization losses of silver and lead are small; an advantage due to the low furnace temperature. Fourthly, the slag losses are strictly moderate. For, though the slags themselves are rich, their quantity, owing to the purity of the ore employed, is small; and thus the net loss in the operation is reduced. Fifthly, unbricked fines can be smelted without excessive loss in flue dust, since the necessary temperature can be attained without the use of a blast. Sixthly, extraction is easy, and the yield is pure; this results from the high grade and purity of the ores used. Lastly, the plant is cheaply erected. As offset to these advantages, there are the following defects: As intimate contact of the metallic particles is necessary, only rich sulphides, or mixtures of sulphide and carbonates, containing, say, 58 per cent. to 70 per cent. of lead are suitable for reverberatory smelting. For the same reason, the ores must be fairly pure. Blende, iron pyrites, chalcopyrite, calcspar, barytes, silica, lime, magnesia, etc., must not, therefore, be present in larger quantities than already indicated. Other defects are the comparative slowness of the operation, the heavy fuel consumption, usually about 45 per cent. of the charge, the necessity for a good deal of skilled labour, and lastly the richness of slags, which necessitates their re-treatment.

IV.—VARIOUS FORMS OF REVERBERATORY SMELTING.

Those that merit attention are the Carinthian, the English and the Silesian.

The Carinthian method, now almost obsolete, is adapted to treat small charges of pure rich ores, containing 60 per cent. to 75 per cent. of lead, at a low temperature. On account of this low temperature, the Carinthian are more durable than the English furnaces. Instances of such furnaces are the Raibl at Carinthia, the modified Raibl at Egnis, Belgium, and the American air furnaces in the Mississippi valley. The Carinthian method gives a high extraction, but is attended with the disadvantages of a small output and heavy cost of fuel and labour.

The English method aims at dealing with large charges at a high temperature. The extraction is quicker but lower, and, in consequence, the charge residues have to be re-smelted in the blast furnace. The volatilization losses naturally are higher.

The Silesian is a modified English method, the furnace, etc., being correspondingly arranged. This method follows the English in dealing with large charges, but the Carinthian in employing a low temperature. The result is a larger output of purer lead than the English furnace product. The volatilization losses also are lower. The charge residues are sent to the blast furnace.

The reasons for the above difference in practice are sufficiently obvious. A slow roast at a low temperature, without charge fusion, favours the extraction of a comparatively large percentage of pure lead, with low volatilization losses. Hence the suitability of the Carinthian method for treating small quantities of pure and richly argentiferous, high grade lead ores. But the majority of lead ores are not pure, and their complete reduction, therefore, requires a higher temperature. The Silesian method is designed to deal with these by extracting, with the least lead and silver volatilization losses, as much lead as possible at