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Vol. XVII—No. 12.

OTTAWA, DECEMBER 31st, 1898.

Vol. XVII—No. 12.

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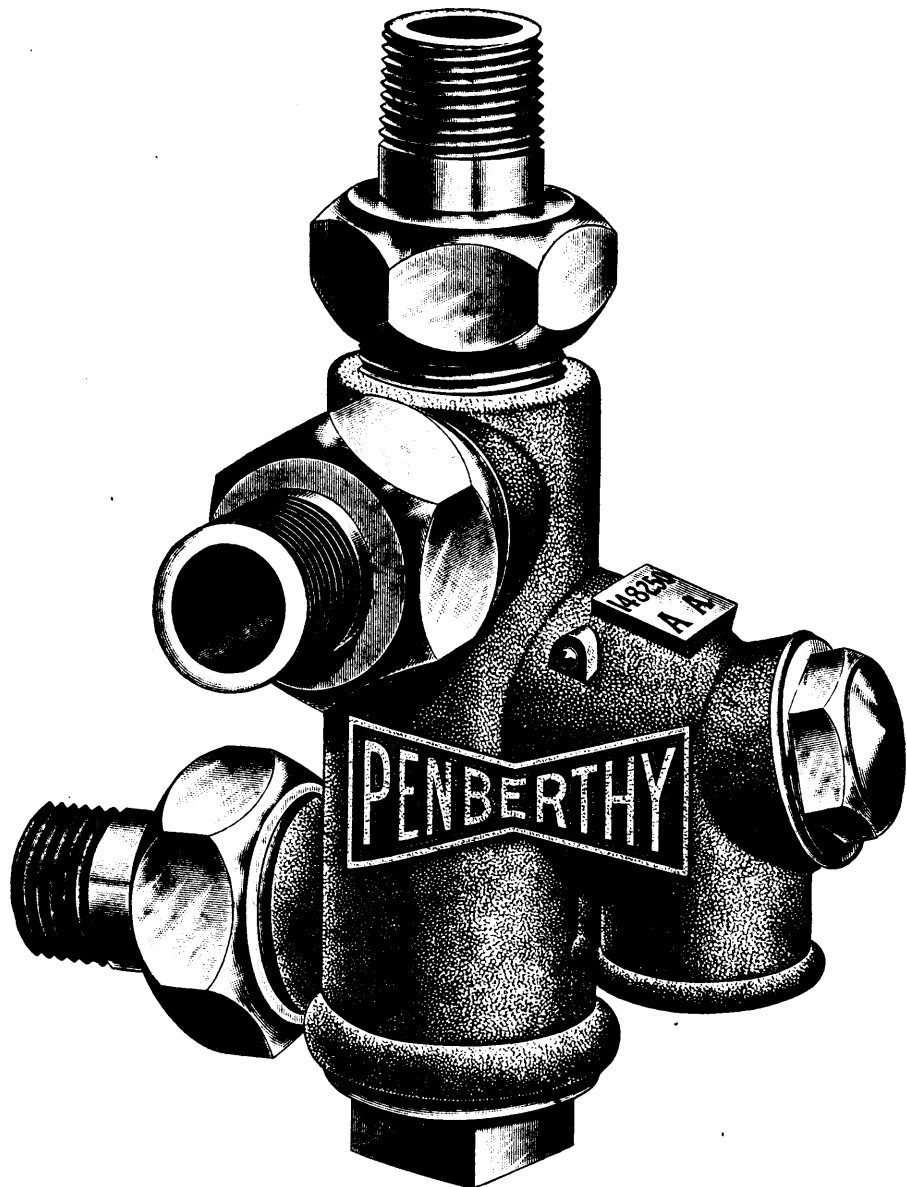
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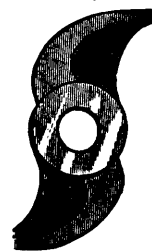
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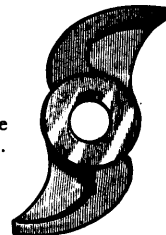
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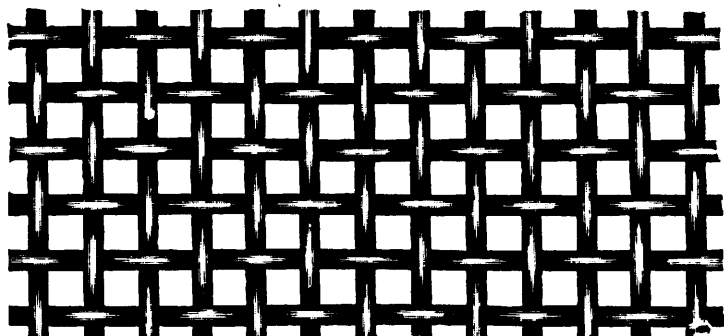
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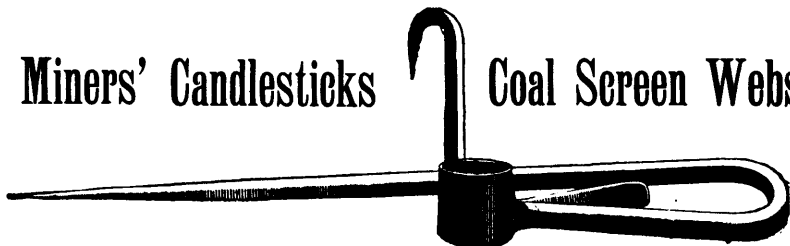
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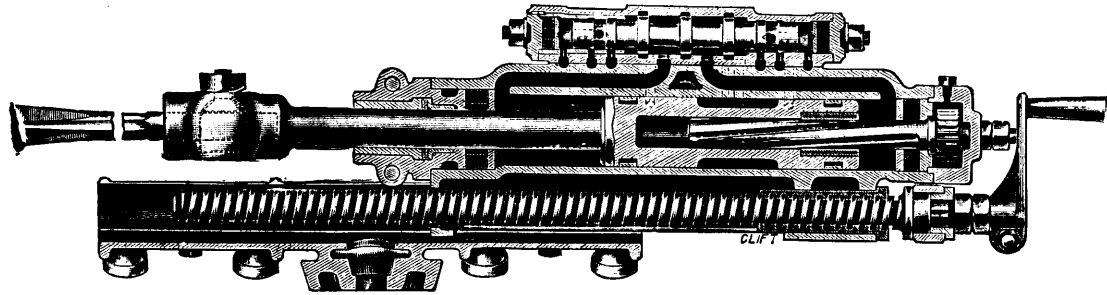
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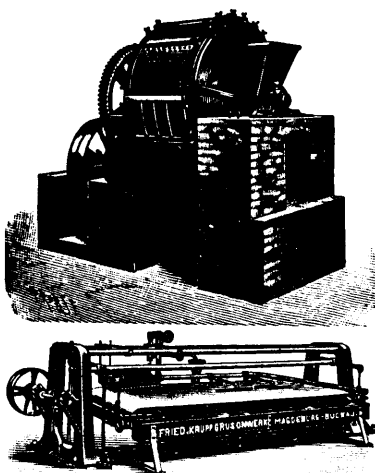
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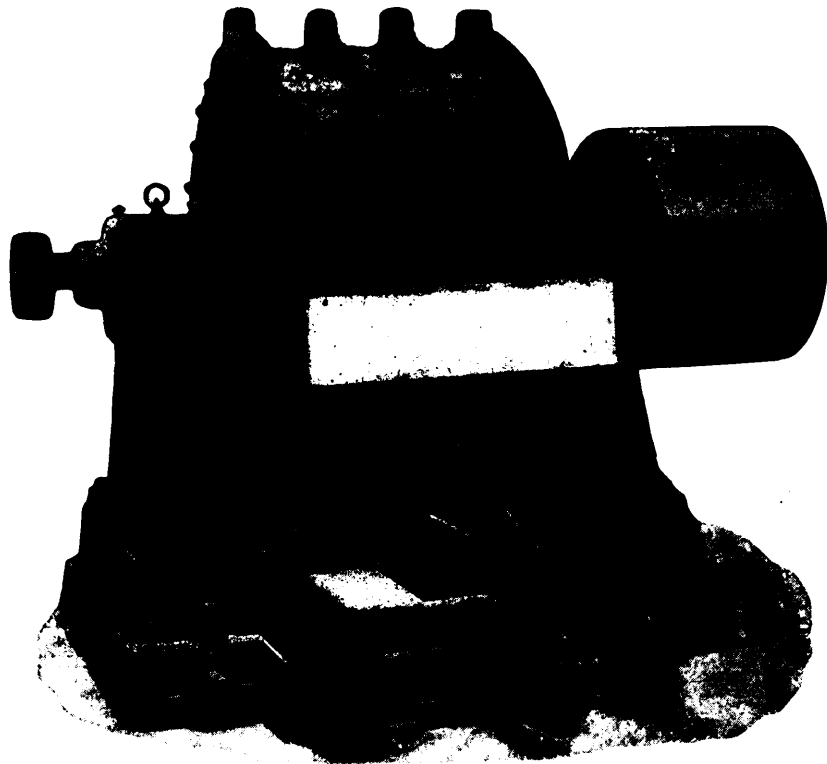
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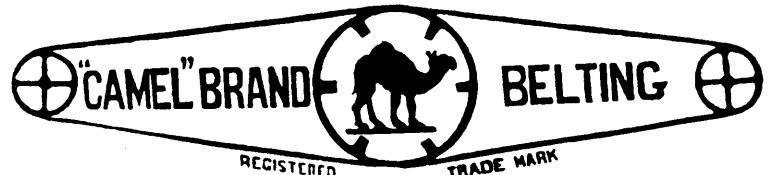
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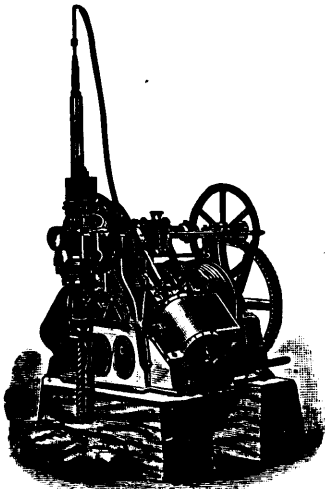
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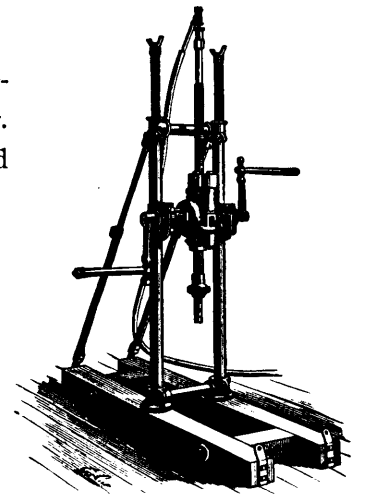
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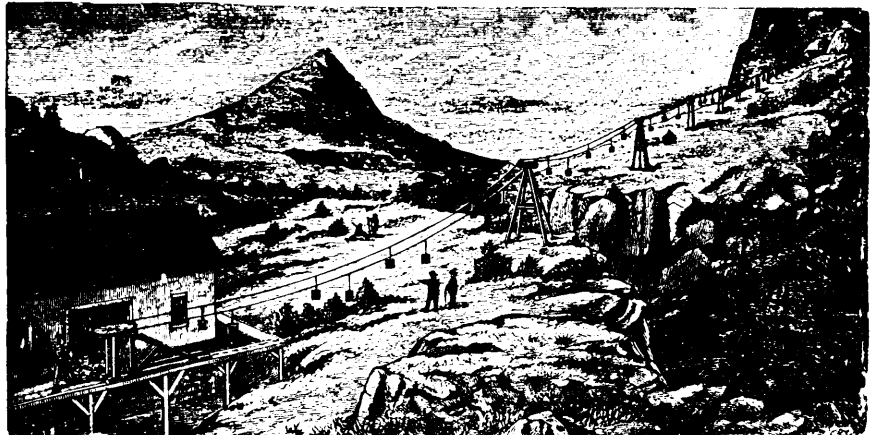
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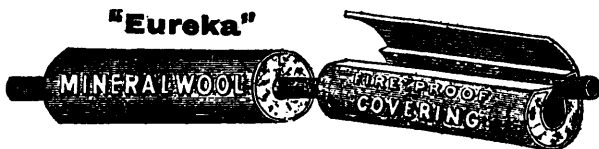
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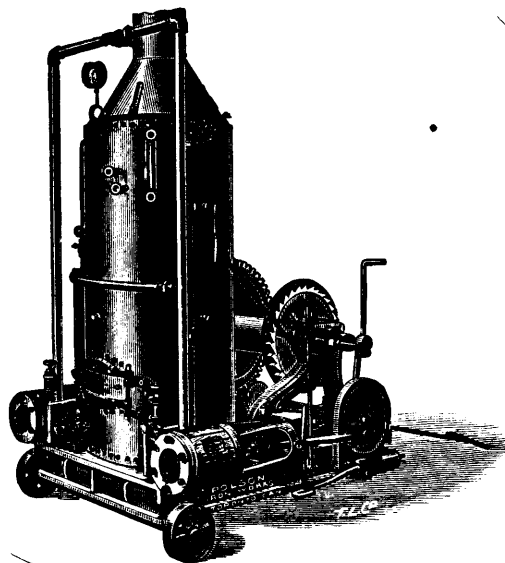
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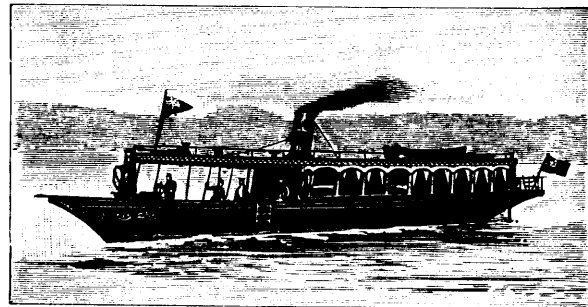
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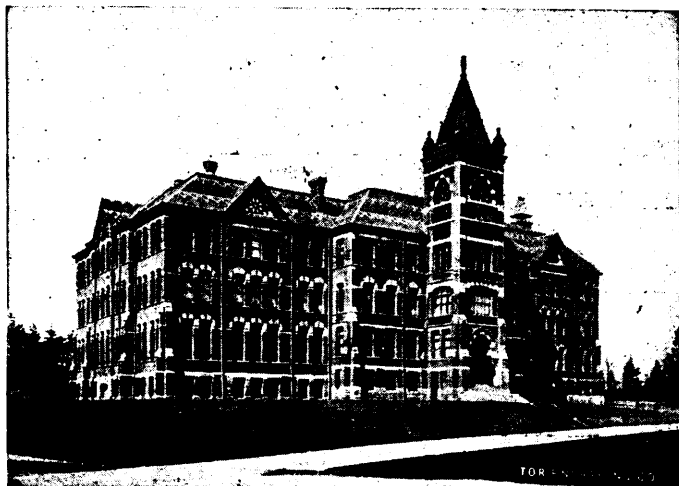
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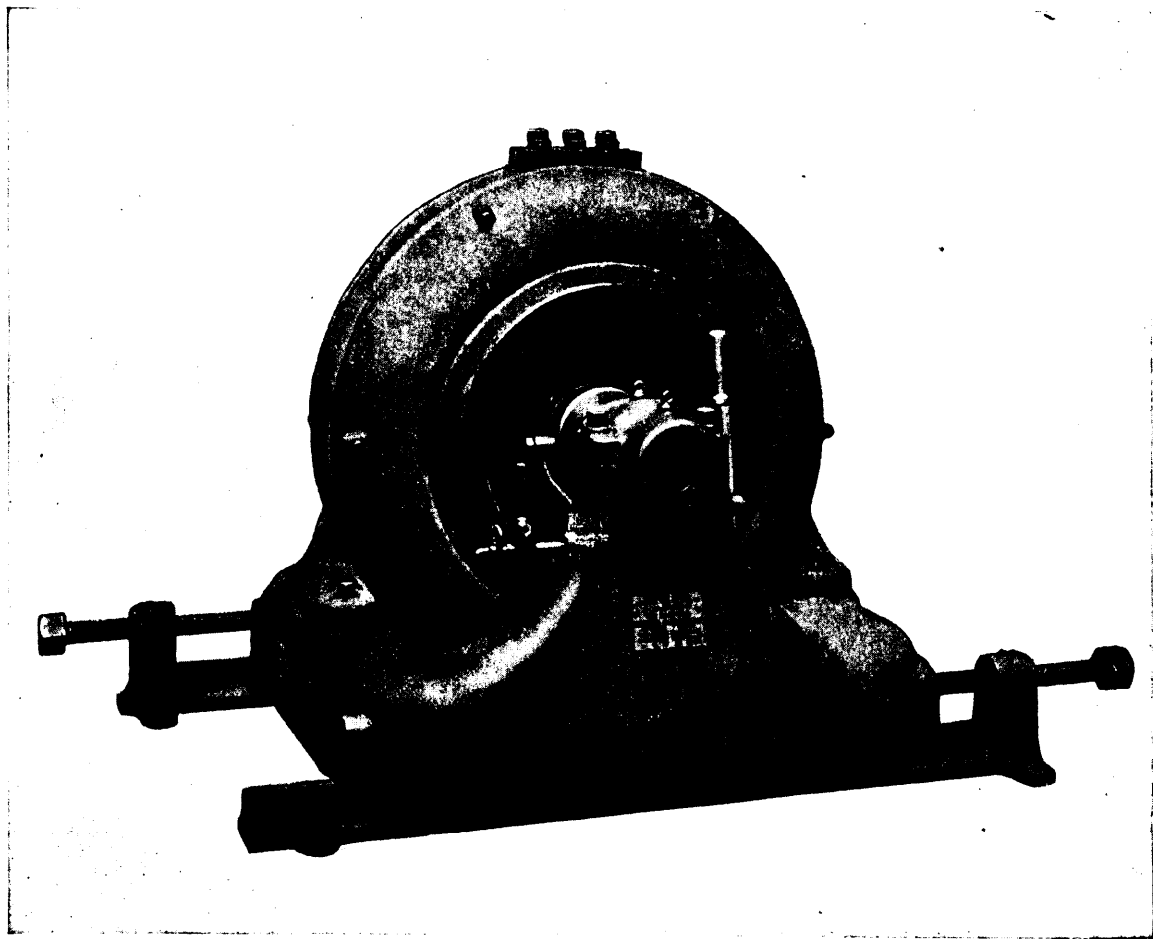
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AMOUNT AND VALUE OF MATERIALS PRODUCED 1896 AND 1897.

	Customary Measures.	1896.		1897.	
		Quantity.	Value.	Quantity.	Value.
Gold, Placer	Oz.	27,201	\$ 544,026	25,676	\$ 513,520
" Quartz	Oz.	62,259	1,244,180	106,141	2,122,820
Silver	Oz.	3,135,343	2,100,689	5,472,971	3,272,836
Copper	Lbs.	3,818,556	190,926	5,325,180	266,258
Lead	Lbs.	24,199,977	721,384	38,841,135	1,390,517
Coal	Tons	894,882	2,688,666	882,854	2,648,562
Coke	Tons	615	3,075	17,832	89,155
Other materials			15,000		151,600
			\$7,507,946		\$10,455,268

Production for 1890, \$2,608,608; for 1896, \$7,146,425; for 1897, \$10,452,268.

GOLD.

Gold-bearing lodes are now being prospected in many parts of the province, and at Rossland magnificent ore-chutes of very profitable gold-copper ore are being mined and smelted, the Le Roi having paid to date, \$725,000 in dividends, with a large and increasing amount of ore in sight as the workings attain greater depth, while systematic development on other properties is meeting with excellent results, mining having just fairly begun in this camp. Little doubt can now be entertained that Rossland will become a heavy producer of gold, and that excellent properties now only await sufficient and abundant capital to become paying mines, to further aid in which the facilities for cheaper transportation and smelting are being now supplied. At NELSON and at FAIRVIEW, CAMP MCKINLEY, GREENWOOD, CENTRAL and other camps in the southern part of Yale, important work is being done on the quartz ledges there, several new mills being under erection.

Exploratory work is also in progress in EAST KOOTENAY and in LILL-OOET, ALBERNI, and on the Gulf islands and along the coast line of the mainland, as well as in other parts of the province.

In CARIBOO, several large undertakings, involving a large amount of capital, are at work exploring both modern and ancient river channels, the Cariboo Hydraulic Mining Co., on the Quesnelle river, proving, on development, to have in a channel of the latter kind, a great gravel deposit of exceptional richness, while other parts of this district now offer every inducement to capital.

Into CASSIAR, OMENICA, and the great area to the north, as well as Cariboo, there now promises to be a great exodus of explorers, incited by rich diggings now being mined in the YUKON, as on the KLONDYKE, to the north, and river and creeks long reported to be gold-bearing will now be made accessible, and well tested.

SILVER-LEAD.

Despite the drop in the price of silver, the SLOCAN mines are being much more extensively worked, while the shipments of high grade ore are constantly increasing, the higher price of lead more than compensating for the lower silver values. The production for 1897 has much exceeded that of 1896, as such mines as the "Payne," "Ruth," "Whitewater" and other mines increased their output.

At NELSON, the "Silver King" or Hall mines is shipping constantly a large amount of silver-copper ore, and the LARDEAU, TROUT TAKE, ILLECILLEWAET districts, on further exploration, promise to become rich districts. In EAST KOOTENAY large bodies of silver-lead ore will be mined on completion of the railroads now under construction.

COPPER.

Copper is being produced to a limited extent at ROSSLAND and NELSON, but the large deposits of at present low-grade ore in the BOUNDARY CREEK district will be fully tested when the railroad, now almost assured, is constructed. Prospecting is being done at KAMLOOPS, along the west coast of

the mainland and of Vancouver island, as well as at many other points, and TRXADA is producing high grade bornite ore.

COAL AND COKE.

The large collieries on VANCOUVER ISLAND are producing about a million tons of coal annually, and at COMOX an excellent coke is now being produced, much of which is shipped to the inland smelters. The great deposits of coking coal in East Kootenay, at the CROW'S NEST PASS, are now being opened, as the C.P.R. is now being built to the Columbia river to supply the great mining regions with cheap coal and coke.

SMELTERS AND RAILROADS.

The smelting industry is now beginning to assume large proportions, as preparations are being made to treat the ores of this province within her own borders, a most important factor in the increasing prosperity of this country, entailing as it does, and will, the employment of much capital and many men. The extension of the railroad systems to different parts is now in progress, and the next few years will see many parts in which the prospects for good mining are excellent, made easy of access, while ores can be shipped with facility to the smelting centres, where the assembling of the various interfluxing ores will make possible the treatment of all British Columbia ores at home.

CAPITAL.

Capital can now find here excellent and many opportunities for investment, if proper business care and the experience of qualified men are utilized, as the values placed on mines and undeveloped properties have reached a reasonable basis.

MINERAL LANDS.

Mineral lands are open to location to any person over eighteen years of age, who has obtained a free miner's certificate, and perfect titles to lode claims can be easily secured after \$500 worth of work has been done per claim. A great extent of territory has yet to be prospected.

YUKON GOLD FIELDS.

As the KLONDYKE and other gold fields in the Yukon in British territory is reached mostly via British Columbia, all SUPPLIES and OUT-FITS obtained at VICTORIA, VANCOUVER, ASHCROFT, KAMLOOPS, etc., can be taken in FREE OF DUTY, which otherwise WILL HAVE TO BE PAID if not purchased in CANADA.

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GOLD AND SILVER.

Under the provisions of chap. 1, Acts of 1892, of Mines and Minerals, Licenses are issued for prospecting Gold and Silver for a term of twelve months. Mines of Gold and Silver are laid off in areas of 150 by 250 feet, any number of which up to one hundred can be included in one License, provided that the length of the block does not exceed twice its width. The cost is 50 cents per area. Leases of any number of areas are granted for a term of 40 years at \$2.00 per area. These leases are forfeitable if not worked, but advantage can be taken of a recent Act by which on payment of 50 cents annually for each area contained in the lease it becomes non-forfeitable if the labor be not performed.

Licenses are issued to owners of quartz crushing mills who are required to pay

Royalty on all the Gold they extract at the rate of two per cent. on smelted Gold valued at \$19 an ounce, and on smelted gold valued at \$18 an ounce.

Applications for Licenses or Leases are receivable at the office of the Commissioner of Public Works and Mines each week day from 10 a.m. to 4 p.m., except Saturday, when the hours are from 10 to 1. Licenses are issued in the order of application according to priority. If a person discovers Gold in any part of the Province, he may stake out the boundaries of the areas he desires to obtain, and this gives him one week and twenty-four hours for every 15 miles from Halifax in which to make application at the Department for his ground.

MINES OTHER THAN GOLD AND SILVER.

Licenses to search for eighteen months are issued, at a cost of thirty dollars, for minerals other than Gold and Silver, out of which areas can be selected for mining under lease. These leases are for four renewable terms of twenty years each. The cost for the first year is fifty dollars, and an annual rental of thirty dollars secures each lease from liability to forfeiture for non-working.

All rentals are refunded if afterwards the areas are worked and pay royalties. All titles, transfers, etc., of minerals are registered by the Mines Department for a nominal fee, and provision is made for lessees and licensees whereby they can acquire promptly either by arrangement with the owner or by arbitration all land required for their mining works.

The Government as a security for the payment of royalties, makes the royalties first lien on the plant and fixtures of the mine.

The unusually generous conditions under which the Government of Nova Scotia grants its minerals have introduced many outside capitalists, who have always stated that the Mining laws of the Province were the best they had had experience of.

The royalties on the remaining minerals are: Copper, four cents on every unit; Lead, two cents upon every unit; Iron, five cents on every ton; Tin and Precious Stones; five per cent.; Coal, 10 cents on every ton sold.

The Gold district of the Province extends along its entire Atlantic coast, and varies in width from 10 to 40 miles, and embraces an area of over three thousand miles, and is traversed by good roads and accessible at all points by water. Coal is known in the Counties of Cumberland, Colchester, Pictou and Antigonish, and at numerous points in the Island of Cape Breton. The ores of Iron, Copper, etc., are met at numerous points, and are being rapidly secured by miners and investors.

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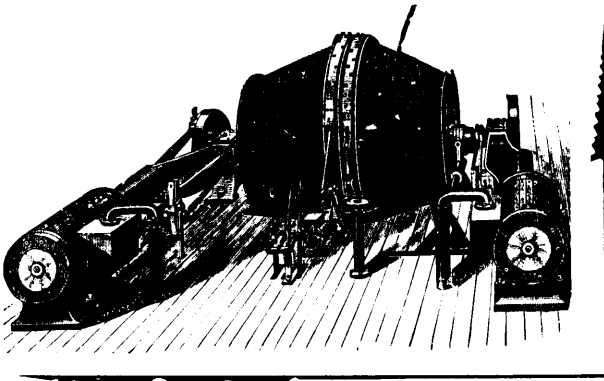
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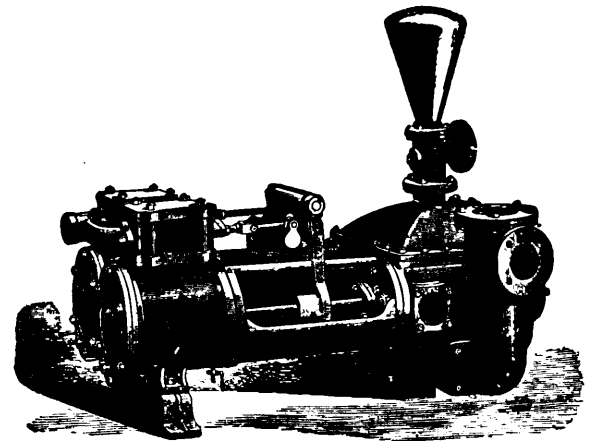
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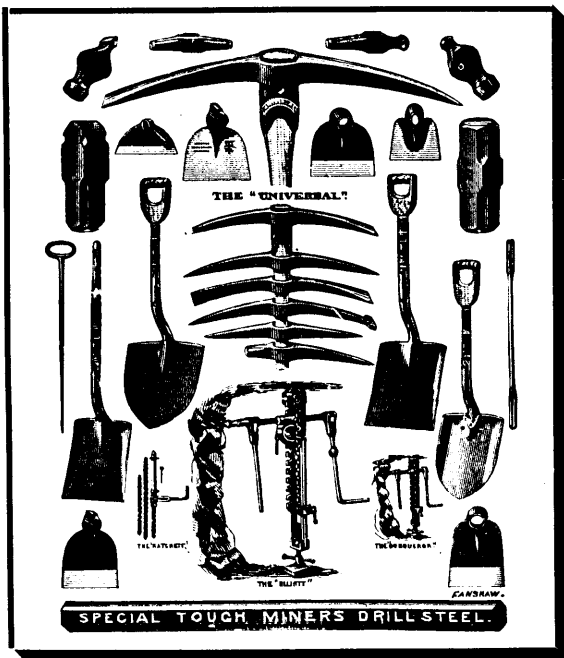
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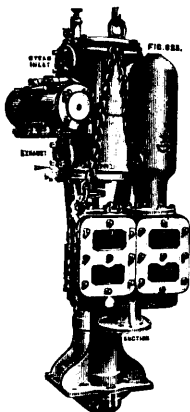


Fig. 620—"Griff"
Sinking Pump.

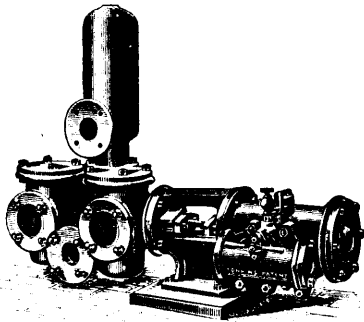


Fig. 598—"Cornish" Steam Pump
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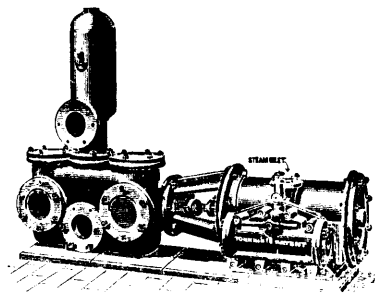


Fig. 600—"Cornish" Steam Pump
for General Purposes.

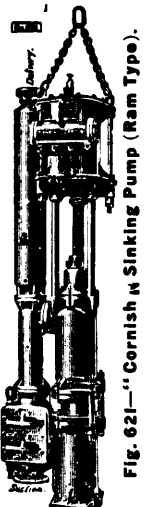


Fig. 621—"Cornish" Sinking Pump (Ram Type).

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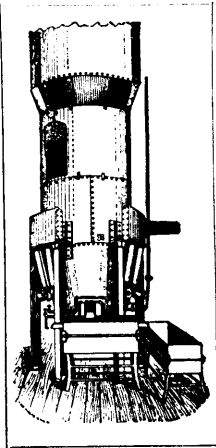
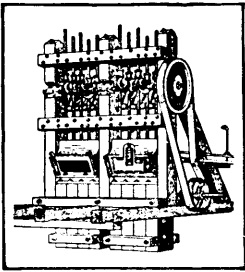
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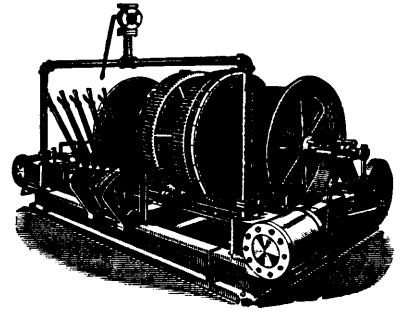
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THE MINING REVIEW

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DECEMBER, 1898.

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The Second War Eagle Report.

We must confess to a feeling of extreme surprise after reading the report of the War Eagle Consolidated Mining and Development Co., Limited, dated Nov. 15. Paragraphs which have appeared from time to time during the past season in the daily press, and the very high price to which the shares have been forced during the last five or six months, led to the belief that developments must have shown new and large bodies of high grade ore. Our surprise is to find no evidence whatever of such development, nor for such a belief, in the printed report now before us.

In the Manager's report we can find only six lines devoted to "Ore Reserves," the substance of which is that the aggregate tonnage in sight is 100,000 tons, of a total gross value of \$1,700,000, or a total *net value* of only \$625,000.00, since the total cost of extraction and treatment (according to Mr. Hasting's figures) is \$10.75 per ton.

That the present market value of a mine showing only \$625,000 net should be \$5,600,000 seemed to us so contradictory that we read and re-read, figured and re-figured, only to end as above said, with a feeling of great and unmixed surprise.

The report is a strong confirmation of the remarks we published in our July issue concerning the share values on the market.

Referring to details of the report, we note, in President Gooderham's address, that charges for transportation were reduced during the year some \$3.50 to \$4.00 per ton, but on examining the tabulated figures in the General Manager's report, we find the difference put at \$2.46 only. Moreover, we are surprised to find a difference of only 84 cents per ton between the *net values* per ton received for ore shipped during 1897, when the Directors announced that charges were so high it was expedient to stop ore shipments, and the values received in 1898, when the policy is one of pushing shipments. It is doubtful whether a smelting proposition, whose policy is dictated by a margin of only 84 cents a ton, can long remain "gratifying" to shareholders who have gone into it as an investment. Taking into consideration the reduction in charges (\$2.46 if we believe Mr. Hastings, \$3.50 if we believe Mr. Gooderham) it becomes evident that the grade of ore shipped during the period when the stock was ruling about \$2.90 was some \$3.30 to \$4.34 per ton *lower* than when the stock was ruling at 80 cents: again a matter of surprise!

President Gooderham's ingenuous statement that the C. P. R. smelter at Trail "continues to smelt at cost" will bring a smile to the faces of the management at the Hall Mines and Northport smelters; what margin there is between \$7.50 per ton and *cost* these gentlemen know well.

The financial statement calls for little comment; it is significant to note that but for the sale of 100,000 shares of treasury stock, which brought into the exchequer some \$270,000.00, there would have been no 1½% dividends and no profit balance of \$85,747.

The item of \$10,000 for remuneration of Directors, we should think, required some explanation to the shareholders; the work of the Board must have been very heavy to justify such remuneration; and the item of "Interest and Exchange" \$8,439.93, is also very heavy, but is accounted for, we suppose, by the interest on loan from Geo. Gooderham; why this loan was not paid off with the first receipts, and why a dividend was declared and paid with this loan account still standing, are questions an English company would have to answer satisfactorily.

In the General Manager's report there are many items of news which are significant. The most important of these is the cost of producing and marketing a ton of ore, which, on the supposition that the War Eagle Company is as well managed as any in Rossland, is of value as relating to the whole camp and the district in which it lies.

From Mr. Hasting's figures the "actual total smelting charges" per ton of ore was \$11.01, the cost of stoping per ton of ore was \$3.24; there is no direct statement of what the cost of development was per ton of ore, but we have endeavored to arrive at that as follows:—In the report of Nov., 1897, the ore reserves were placed at 38,000 tons; in the report for Nov., 1898, this figure becomes 100,000; there were stoped during the year 26,599 tons; there have been developed during the year, therefore, 88,599 tons, which (according to Mr. Hastings' figures in the "Table of Mine Costs") cost \$106,497.23; or \$1.20 per ton of ore for *development*. The sum of these three factors (\$11.01 + \$3.24 + \$1.20) is \$15.45, which is the deduction to be made from the assay value of the ore in order to determine its net value for profit account. In other words—ore assaying less than \$15.45 "gross market value" in the War Eagle mine shows no profit. But we think Mr. Hastings makes an error in tact in continuing in his columns the "Indirect smelting charge" and "Actual total smelting charge." He has had enough experience in the west to know that what he calls "Gross market values" are never realized, and he should have metallurgical knowledge enough to know that one ton of copper in his ore never reaches New York as 2,000 lbs. of casting copper any more than one oz. of silver or gold in the ore reaches the mint as 20 dwts. of metal. To do that, all smelting and refining operations would have to produce 100% of what they received, so that what he calls a "smelting and marketing charge" is, in many cases largely, a smelting and marketing *loss*. But if his assayer figures gold at \$20.66 per oz. and silver and copper at full New York quotations for refined metal, then he must recognize that assay values of less than \$15.45 show unworkable ore. We call the

error one of fact, because the vast majority of shareholders and ordinary people do not know these things, and the "smelter's gross value" column is the one upon which the profit and loss account depends, to add others is only confusing to people having no technical knowledge.

We are glad to note that work on the Crown Point prospect was discontinued, and we note also that only assessment work has been done upon the claims owned by the company in the Slocan. But, in view of the price at which the Crown Point was turned in to this company, and the disappointing results which have come therefrom, we think that a considerable sum should be written off the item of "Mines and Mineral Claims," which figures in the statement of assets at \$1,650,000.

The report is distinctly unfavorable to the maintenance of the stock at any price above par, and we cannot but conclude that the Board is not in sympathy with the coterie of speculators who have manipulated the shares to a price which is wholly unjustified by the facts.

Mining in Nova Scotia in 1898.

The mining industry of Nova Scotia has passed a fairly satisfactory year. The coal production may be approximated at 2,421,450 tons as compared with 2,340,031 tons in 1897. There were no new mines opened. In the Cumberland district the Springhill and Joggins mines worked steadily with an increased demand during the fall. At the former explorations have shown that the area of the worked seams extended much further south than expected, and have added much to the value of the district. In the Pictou district work which was light in the spring grew steadier as the season advanced. In the Cape Breton coal field the General Mining Association worked steadily, and having completed their new shaft to the No. 2 seam at a depth of 472 ft., they are engaged in deepening it to their No. 3 seam. The Dominion Coal Company put the Gowrie and Victoria collieries out of commission as they could raise the coal, represented by the working of these pits, more profitably from their other collieries. In fact, as their pits are equal to a daily output of nearly 80,000 tons, any demand could be readily met by them. A new pier was built beside the International pier. It is similar to the one at Louisburg and capable of shipping about 5,000 tons a day. It has been largely used for bunker business this year. In anticipation of the increased trade next year large quantities of coal will be banked during the winter; pockets to hold 10,000 tons of coal will be built on the Louisburg pier, as well as at the washery. The Burchell Bros have continued working at New Campbellton, and report the quality of the coal improved and that it is gaining in favor with their customers. A little work was done at the North Sydney mine. Prospecting on the Moseley areas has tended to show that the claims made of the great extent of country underlaid by the new seam are correct.

It is anticipated that the new gas works at Everett, near Boston, are now in such a state of forwardness as to be prepared to take coal before the end of February. In anticipation of the demand arising from this source, the Dominion Coal Company are preparing to raise and bank out a large quantity of coal this winter. If the alleged amount, 800,000 tons, is required by these ovens, the work of coal mining will receive quite an impetus in Cape Breton. It is to be hoped that the reductions in the cost of mining necessarily effected by such an increased output will enable more distant markets to be opened, and that thereby the great desideratum in coal mining, viz., all year shipping, be realized in Cape Breton.

The gold returns are estimated at 30,500 ounces, against 27,500 ounces in 1897. Stormont has been the largest contributor, the Richardson having worked steadily and profitably on its low-grade belt. Work was also carried on in the Modstock, Forrest Hill, and the reopened Hurricane Point mine. At Sherbrooke the returns are about as

usual. The output would have been larger if negotiations for the consolidation of the principal mines had not been pending. At Salmon River the Duferin mine has been extensively equipped and is now under way again. The Foster mine at Tangier passed into the hands of American capitalists, and is expected to yield largely next year. Work continued dull at Waverley, Oldham, Uniacke and Renfrew. At Montague work has been continued with fair success at the Golden Group mines. Mr. Anderson is opening a promising mine at Lake Catcha, but the district otherwise has done little. In the Caribou district the low grade ores of Moose River have received attention at the hands of the Pearson Syndicate and the Moose River Company. Development work and some mining has been done at the Jennings diggings. Fifteen Mile Stream has been worked by the New Egerton Company as usual. The Cashon areas at Leipsigate, in Lunenburg County, have made good returns. At a number of other points a little work has been done and developments made which promise a decided increase in the production next year.

The Cheticamp silver-lead mine has been put in working shape, and ore to the amount of several hundred tons dressed for a sample shipment to England. It is understood that this shipment will be followed by an investment of capital to provide for local smelting and reduction works.

The furnace of the Nova Scotia Steel Co. at Ferrona has been in operation during the summer. There were consumed 70,000 tons of coal for coke, etc. The Bridgeville mines supplied 19,000 tons of ore and 30,000 tons were imported from Newfoundland. There were 30,000 tons of coke made, and 22,000 tons of pig iron. The company's quarries also furnished 16,000 tons of limestone.

At Londonderry no pig was made, operations being confined to the foundry, which made 2,200 tons of pipe and several hundred tons of other castings. The mines were not worked. At Whycomagh, in Inverness County, explorations were continued in the magnetites and red hematites. The beds are of workable size, and the ores are reported as running high in iron and low in sulphur and phosphorous. These deposits are very favorably situated for mining and are immediately on tide water. No doubt the presence at this point of large, rich deposits of iron ore has been one of the factors leading up to the new smelting proposition at Glace Bay. Large deposits of magnetite are also reported from the Barasois, Little Bras d'Or. Should explorations show that the quality and quantity of the deposits are satisfactory, they will be utilized as an auxiliary to the other sources of ore for the new furnaces. It is satisfactory to be able to note in this connection that the coals from the deeps of the Dominion mines are very low in sulphur and make an excellent coke.

The plaster shipments amount to about 150,000 tons. The business would have been larger had not the rate of freights been affected by the Spanish-American war. The Messrs. McCurdy, of Baddeck, propose opening a new quarry at St. Ann's Harbor, Victoria County. There is a gradual increase in the consumption of this mineral in the manufacture of fertilizers. At present manganese mining is very dull. A trial shipment of good ore was made from deposits in Lunenburg County said to be of considerable extent.

At Wentworth in Cumberland County exploratory work has been carried on in copper ore of good quality and occurring in well defined veins. Bonds are reported as having been given on the Coxheath and other copper deposits in Cape Breton. It is to be regretted that so little attention has hitherto been paid to these copper deposits, which are widespread and in many cases promising. Some interest was excited during the summer by a discovery of Wolfram, at Margaree, in Cape Breton. There is a limited demand for this ore, and it is quoted at £80 a ton for 70 per cent. ore.

About 2,000 tons of infusorial earth have been shipped from St. Ann's, and Bass River. The usual quarry work has been performed in granite, freestone, etc. Work on the graphite properties near Grand Narrows, Cape Breton, has ceased. The mineral is said to be of good quality and local parties are arranging for a working test of the deposits. In this vicinity, at East Bay, a great deal of work has been done on ore shales which are stated to yield a large quantity of oil of a quality adapted for higher lubricating purposes, etc.

Another Yukon Blunder.

On account of the reported finding of outcrops of copper-bearing ledges in the Yukon territory, the regulations governing the disposition of lode claims in that country have been amended to provide that the Minister of the Interior may grant locations and licenses for mining copper, under the following conditions, viz.:—Locations are limited to one half a mile square, or 160 acres; boundary lines must run due north, south, east and west; and no one person can be granted more than one location within a radius of 10 miles. If the ground so located and granted, proves to contain iron, or coal, or gold, the locator has no rights in those minerals, and a subsequent location for any or all of them, can be granted over the ground he has been granted for copper. But the worst feature remains to be mentioned, and that is, the imposition of a royalty tax of 5 per cent. of the *gross value* of the copper produced.

The Department of the Interior is either very badly advised, or it is bent upon doing all that lies in its power to throttle legitimate development of the mineral resources of the lands over which it has administration.

To an impartial mind there is no earthly reason why copper in the Yukon should be of more value than copper in Eastern Canada; to the ordinary mind it would appear to be of less value, owing to greater cost of production, and heavier transportation charges to market. Yet in no other part of Canada is the royalty on copper greater than 2 per cent. on the gross value.

In Ontario the royalty is 2 per cent. on the *net* value at the pit's mouth; in Nova Scotia and New Brunswick, it is 4 cents per unit in a ton of 2,352 lbs., or slightly less than 2 per cent. with copper at present prices. In Quebec the statute of royalties is dead, but the provision contained does not ask for more than 3 per cent. of the *net value*, after deducting costs of extraction.

It would be interesting to know who advises the Department in these matters, for the advice up to date has been of such a quality (judged by results) as to seriously damage the prospects of mining upon Dominion lands.

Milling of Rossland Ores.

DESCRIPTION OF THE BRITISH COLUMBIA BULLION EXTRACTING COMPANY'S PELATAN-CLERICI CYANIDING PLANT.

One of the most important additions to Rossland's industries in the past year is the large ore reduction works erected by the British Columbia Bullion Extracting Company, Limited, at Silica, a siding on the Red Mountain Railway three miles southwest of the town on Little Sheep Creek. The site is one admirably suited to the purpose for which it is being utilized, since not only does the lay of the ground permit of the construction of the mill in such a way that the ore travels almost entirely by gravity during its course of treatment, but a water supply, water-power and a railway are all equally accessible.

The company is a private corporation having its head office in London, England, with a capital of £40,000. Its local manager is Mr.

Lionel H. Webber, who was also its promoter. Major-General Webber is chairman of the company, and its other directors are Lieut.-General Sir Bevan Edwards, Mr. Wilberforce Bryant, and Mr. Louis Pelatan, the latter being one of the inventors of the Pelatan-Clerici process, the system which constitutes the main feature of the company's works. The company owns the patent rights of the Pelatan-Clerici process in Ontario and British Columbia, and part of its business will be to erect plants wherever required in either of these provinces.

The ore is delivered to the works by a railway siding connected at both ends with the main line. Situated on this siding are bins with a capacity of 800 tons and a track scale, so that every carload of ore can be weighed before being dumped. The ore is first fed automatically to a 9 x 15 Blake rock crusher, and then by gravity through two sets of 16 inch Cornish rolls, one above the other, the first set being belted and the lower set geared. The pulp is thus elevated 40 ft. by a bucket elevator which delivers it into a Constant sampler, then into a Brunton sampler and finally into a three compartment ore bin.

From these the pulp is fed by James automatic ore feeders into two Chilian mills at a fineness from 10 to 30 mesh. Here water is added and it is reduced to a fineness of from 60 to 100 mesh and passed through 60-mesh screens. Thence by gravity it is fed into four agitator tanks which keep the pulp in continual agitation, and act as storage tanks ready at any time to feed any of the 12 Pelatan Clerici cyanide treatment tanks below. In these caustic soda is added to make the pulp alkaline.

In the treatment tanks it is again kept agitated for a period of from 10 to 12 hours, cyanide of potassium having been added. The cyanide attacks the gold, forming a gold solution, which is precipitated by the aid of an electric current on the mercury cathodes which cover the entire bottom of each tank. The pulp is then discharged and the tank is recharged for another operation. A clean-up of the precious metals recovered on the mercury cathodes is made at intervals ranging from 10 to 15 days.

At present when the pulp is discharged from the treatment tanks the tailings are impounded below the mill after passing over a short flume with riffles, where any mercury which may have escaped is recovered. It is the intention to shortly place concentrating tables in the basement of the mill below the treatment floor, when the pulp which has been impounded will all be worked over and all pulp from the treatment tanks will be run over the concentrating table before being discharged from the mill. In this way it is expected to recover a portion of the gold (a very small percentage of the assay value of the ore) which escapes from the treatment tanks, and also, the copper sulphides which experience has demonstrated are not affected by the cyanide solution at all.

The mill as at present equipped has a crushing capacity of 150 tons per day, while the treatment capacity is only about 80 tons. The upper half of the mill is therefore only run about 10 hours out of the 24. In erecting the building, however, everything was so planned that the lower half of the mill could be easily and quickly doubled, and this work will be proceeded with at an early date.

The results so far obtained (without the use of a concentrating table which it is now known will save most of the values contained in the tailings) are much better than the management ever anticipated, though Mr. Webber made exhaustive experiments, extending over a period of two years with low grade silicious Rossland ores in similar mills in Colorado. As the company is doing a custom business the writer is not permitted to make public the exact percentage of extraction. He can, however, state that the percentage of extraction is so high and the cost of smelting so low that the company feels able to undertake the treatment of silicious ores of any grade produced in this camp, which after a test have been proved amenable to the system in

competition with the smelters, and this without any reference to whether the ores contain a copper sulphide or not. The values in the solutions where the pulp is drawn off from the treatment tanks are merely nominal.

An interesting feature of this mill is the power supply which is obtained from the West Kootenay Power and Light Company. As already explained in the REVIEW the Power Company has its generating station at Bonnington Falls, on the Kootenay River, 30 miles from Rossland and 33 miles from the mill. The current is delivered at 2,080 volts to two motors. The one which drives the upper portion of the mill or crushing machinery is a 50 H.P. Induction motor, and the other is a 75 K. W. Synchronous motor furnishing power for the lower half. These motors were furnished by the Canadian General Electric Company and are most handsome machines.



B.C. Bullion Extracting Company's Pelatan-Clerici Cyaniding Plant at Rossland, B.C.

For treatment of the ore in the Pelatan-Clerici tanks the electric current is a direct current generated by two electrolytic dynamos, each with a capacity of 12 volts by 750 amperes. The plant and buildings are all lit by electricity with the aid of three lighting transformers which receive the current direct from the main power supply line. The current consumed is paid for on a meter basis, regulated by a meter situated on the nearest pole to the works.

The water supply is obtained from Little Sheep Creek by means of a flume 3,000 feet long, which taps it that distance above the works. The company also has another water right on Spokane Creek, which it expects ultimately to improve and utilize as a power supply.

Besides the mill the company owns a neat office, cosy residence for the manager, large boarding and bunk houses, blacksmith shop, stables, etc., all situated on its own land.

The manager of the works is Mr. Gerald Hopkins, who has had a long experience in the treatment of all classes of gold ore by means of cyanide.

H. W. C. JACKSON.

Mineral Lode Locations in British Columbia.*

By WILLIAM BRADEN, Helena, Montana.

In view of the current discussion of a proposed change in the United States mining law, abolishing the feature known as the extralateral right of a lode location, it is an interesting circumstance that in the neighboring Province of British Columbia this feature was tried for eight years and then abandoned. The results of that abandonment have been such as to disprove the proposition, so confidently advanced by many writers, that there is something in the nature of the mineral deposits of the Pacific Coast which requires the grant of the extralateral right to mining locators. In abolishing this peculiar privilege, British Columbia has followed the example of all civilized countries except our own.

From 1884 to 1892 the Mineral Act of this Province was modeled after that of the United States, and authorized lode locations 1500 ft. long by 600 ft. wide, carrying the extralateral right. But it was soon realized that, however equitable in intention, this principle was so liable to complications in application and such an endless source of litigation as to be a greater injury than aid to mining. The Act was consequently revised in 1891, and, since the end of that year, the Provincial lode-law (further amended in 1896 and 1897) has been liberal to the locator and miner, and clear and simple of execution.

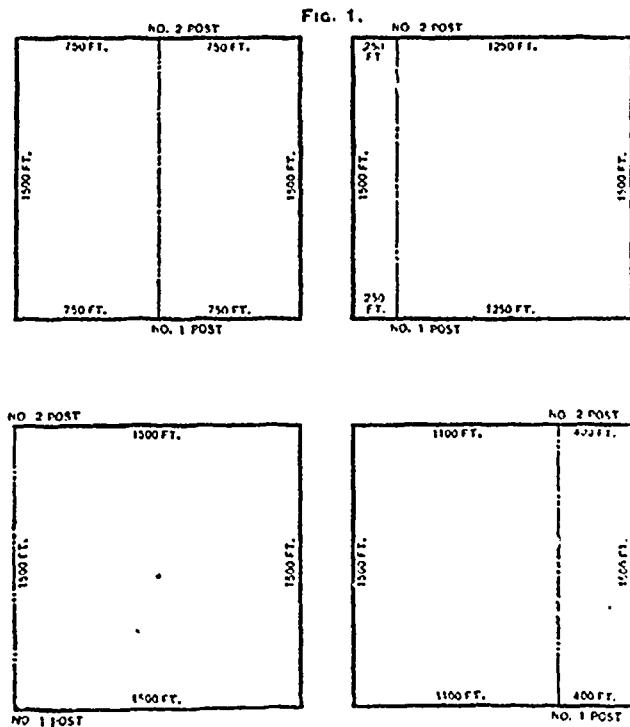
As it stands to-day,† it permits any person, whether a British subject or an alien, to locate a mining claim, or to engage in mining in any way, upon the single condition that he shall take out a "free miner's license," for which \$5 is paid to the Mining Recorder, and shall maintain the same in force by the subsequent annual payment of \$5. (There are other provisions, affecting companies, and providing for larger payments to cover larger terms, which we need not here recite.)

* Paper read before the Buffalo meeting, Am. Institute M.E.

† For the full text of the British Columbia Mineral Act, apply to the Minister of Mines, Victoria, B.C.

A free miner may locate upon land not already held under the Mineral Act a rectangular claim, not exceeding 1500 ft. in length or breadth (horizontal measurement).

The claim is marked by two posts, No. 1 and No. 2, placed on the



Diagrams Showing Optional Ways of Making a Lode Location Under the British Columbian Law.

(The Lode is supposed to run from Post No. 1 to Post No. 2.)

boundary, and as nearly as possible on the vein. The distance between these two posts, known as the "location line," must not exceed 1500 ft., and the course must be plainly marked by blazing trees or otherwise. Upon the two posts must be written the name of the claim, the name of the locator, and the date of the location. In addition to the foregoing, upon No. 1 post must be written "Initial Post," the approximate compass bearing to No. 2 post, and the number of feet of the claim lying to the right and left of the "location line." The locator must place a post marked "Discovery Post" where rock has been found in place. The four diagrams of Fig. 1 show the elasticity allowed in locating claims.

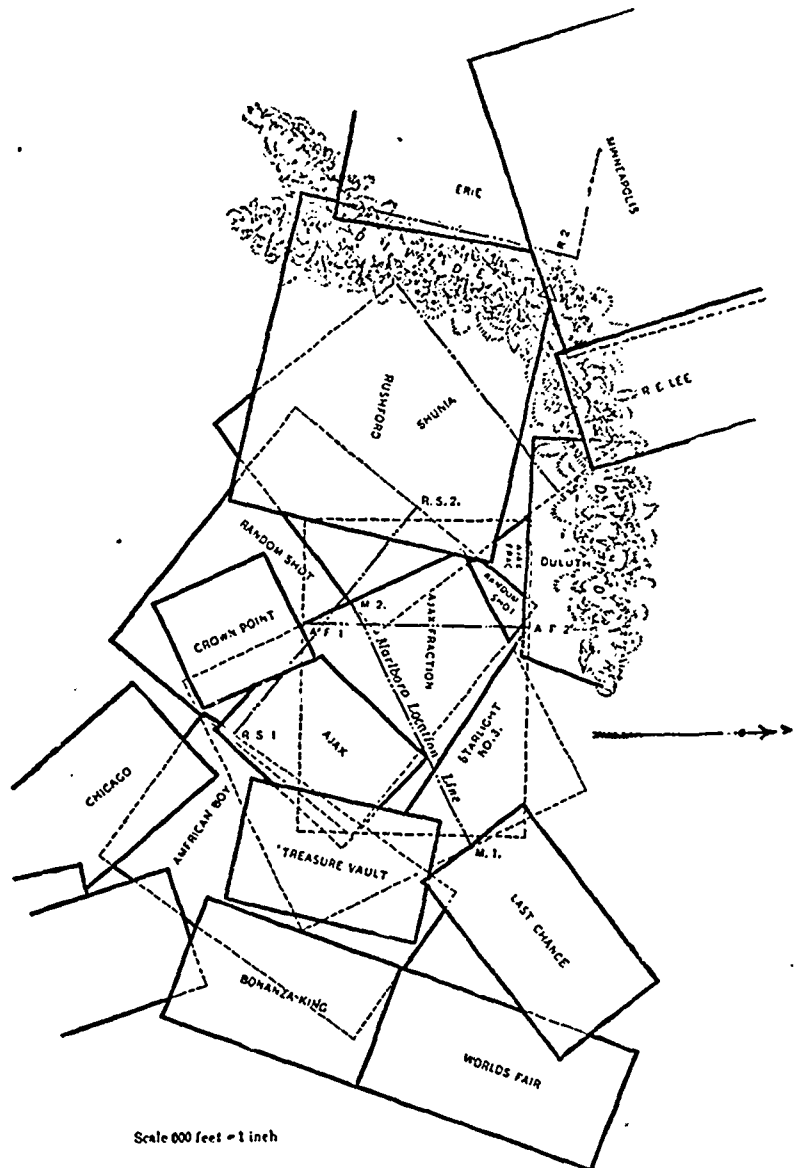
Within fifteen days after the location of a claim it must be recorded with the Mining Recorder of the district in which the claim is situated. To hold such a claim, after location and record as above, in each year from date of recording, \$100 worth of work must be performed and recorded, or in lieu thereof \$100 must be deposited with the Mining Recorder. Any free miner or company owning adjoining claims may perform the annual assessment work for all such claims on any one or more.

After \$500 worth of work has been performed (including \$100 for the survey of the claim), a "Certificate of Improvements" may be applied for, and after sixty days' advertising, in case no adverse claim is filed, the said certificate of improvement is issued by the Gold Commissioner of the District. Application may then be made to the Gold Commissioner for a Crown grant, which gives a title equivalent to that of the U. S. Patent; such Crown grant being impeachable only upon proof of fraud in connection with the issuance thereof. Surface rights, for mining purposes only are conferred by this grant; and all surface rights, including timber, may be acquired from the government in addition at \$5 per acre. If desirable, in securing a certificate of improvement, \$500 may be paid to the Gold Commissioner, in lieu of that quantity of work on the claim.

Of course, the change in the law came too late to prevent troublesome consequences. The titles acquired between 1884 and 1892 can-

not now be deprived of the vested extralateral right they have secured. As an illustration of the complications thus created, Fig. 2, showing a group of claims in the Slocan district, West Kootenay, B.C., is presented. Of the locations in this group, the Last Chance, World's Fair, Bonanza King, Crown Point, Treasure Vault, Ajax, Chicago and R. E. Lee, were all located prior to the revision of the mining law, and consequently have 'extralateral' rights, the boundaries of which must depend upon mining developments, conflicting testimony, expert opinions, jury verdicts and judicial rulings. After that revision, the American Boy, Starlight No. 3, Duluth, Minneapolis, Erie (location lines not shown in the drawing), Rushford, Marlboro, Shunia, Random Shot and Ajax Fraction were located in the order, as to date, in which they are here named.

The Marlboro is no longer an existing claim, title having lapsed through failure to perform assessment work. The Ajax Fraction was located subsequently to cover this ground. The Marlboro having been located before the Shunia and Random Shot, the Ajax Fraction, though a later location than either of these, takes such parts of their claims as conflicted with the Marlboro. This proposition may sound strange to American ears; but the explanation is simple. All these claims were located after the abolition of the extralateral right; consequently their rights are confined within vertical planes through the boundaries of the surface actually appropriated. The Shunia and Random Shot locations having been, ignorantly or otherwise, so made as to overlap the Marlboro, their locations were entirely void as to the areas thus overlapping; and upon the lapse of the Marlboro title the whole of the Marlboro ground reverted to the public domain, and was open to a new location, unaffected by the imaginary boundaries of earlier claims.



Locations in the Slocan District, British Columbia.

The Rushford, having been located before the Marlboro, takes all the area within its normal boundaries except the parts covered by the Minneapolis and Erie, which are still older. It will be seen that from these conditions no disputes as to title can possibly arise under the mining law which simple surveys and reference to dates upon record cannot settle. The situation presents no greater complexity than a similar division of agricultural land.

Suppose, however, that each of these claims had an extra-lateral right, like those lying further east in the group. The lode-lines of the Shunia (S 1, S 2), Random Shot (R S 1, R S 2), Ajax Fraction (A F 1, A F 2), etc., indicate lodes of widely different courses, and the resulting extralateral rights would be inextricably confused.

No doubt trouble may hereafter arise in this district, in which some claims were located under the old law and others under the new; but the confusion cannot be as great as if they were all in the former category; and, apart from such local conflicts, the present system will satisfactorily prevent fresh occasions of controversy, and, in new districts, will work out, unhindered, most satisfactory results.

The simplicity of this system is its chief excellence. Difficulties of interpretation are entirely done away. In the complex cases of cross veins, blind veins, faulted veins, unting veins, or other irregular deposits, the rights of the miner are clearly defined. The liberality with which he is allowed to make his surface location, with the vein anywhere within it conformable to one of the location lines (see Fig 1), gives him every incentive to a careful preliminary exploration of the real strike and dip of the vein, and rewards his industry and skill in this respect with a grant which goes far to compensate him—indeed, in most cases, more than compensates him—for the loss of the delusive, indefinite and precarious extralateral right.

There is a tendency to perpetual small amendments of the law, which works much temporary annoyance. After nearly every session of the Provincial legislature new rules are promulgated. The unnecessary annoyance of such frequent changes is an evil which should be avoided. So far as possible, changes in a mining code should be thoroughly considered by experts, and being found advisable, should be made final. The experimental manufacture of mining laws is emphatically to be deprecated. This principle should be borne in mind in any revision of the U. S. law, whether radical or partial.

Notes on Gold Dredging.*

Miners accustomed to exploit the gold-bearing gravels upon river-banks, and tantalised so often by being obliged to cease following some rich "run" of ground on account of it having dipped underneath the stream, have always desired a method which would enable them to baffle the water and prosecute their industry upon the river-bed. They may frequently be seen to look with longing towards the rich treasure which they believe to lie concealed there.

A consideration of the general geology of river-basins would seem to encourage them in this view, and tends to show that the submerged gravels should certainly be as rich, if not richer, than any found elsewhere in the valley. In many valleys we have evidence of the number of times the river has changed its course in the deposits of gravel and other detritus which are situated at various distances from the flowing water. The extent of these deposits, the altitude at which they occur, and calculations as to the rate of erosion, enable us to relatively measure, or at any rate form some rough idea of, the age of the river; and upon these data geologists have come to the conclusion that many streams have been flowing over constantly changing courses for immense intervals of time. The process of building up a gravel bed is no sooner

completed than that of decay commences. The disintegration may take place rapidly, as when the erratic river returns once more to one of its old courses, or it may take place so slowly as to be scarcely noticeable within a man's lifetime. However, it is always going on, and after a certain interval has elapsed—it may be many thousand years—the constituents of every bed will be once more travelling down the river to a new resting place, and finally a new cycle of changes will commence.

Now, I think it will be apparent that I have been describing a natural process of sluicing. The miner will recognise that the crumbling beds of stranded detritus represent the ground in the face of his claim, and that the river may be looked upon as a great sluice-box. He will understand why, as a general rule in the case of auriferous drifts, the younger beds in the valley are richer than the older ones, and why we should look for the richest ground in the river itself where the *youngest deposits of all are to be found*.

Before the practice of dredging was introduced, it was only possible to win the gold from those portions of the river-bed from which the water could be diverted. Sometimes the stream was confined within smaller limits by means of a wing-dam; or a spot would be selected where the river flowing back on itself formed a "horse-shoe bend," so that the whole of the water could be diverted from a portion of the bed by means of a tunnel driven through the narrow neck of land.

The industry originated and has been brought to its present state of perfection upon the Clutha River, in the province of Otago, New Zealand. It has made considerable progress within the last few years, and has done much towards creating an era of increased prosperity in the province. Many mining townships which were ailing a short time ago, on account of gold-getting from ordinary sources having decreased, have had new life infused into them, and have once more become important centres of activity. About fifty dredges are now at work upon the Clutha and its tributaries.

I intended to have given particulars of the gold yields obtained by the various companies who publish returns. I find, however, that many of the most successful machines are privately owned, and no returns are available, so to do this would be to convey a wrong impression altogether as to the magnitude of the industry. A few remarkable yields recently obtained, and selected at random from those who came under my notice, will show how quickly the capital sunk in the industry has been in some instances recovered. The Electric No. 2 dredge, working near Cromwell, which cost £5,000 to build and launch, obtained more than this amount of gold within seven weeks after she started to work. A small "current wheel" machine, working about a mile below Alexandria, obtained gold to the value of £3,570 during two months of last winter. The "Moa," belonging to the Clyde Dredging Company, Limited, a company which has only a capital of £4,000 for nine months' work, ending in September last year, obtained gold to the value of £10,156.

The quantity of gold which escapes the well-equipped modern dredge is small, and it is not possible under ordinary circumstances to profitably rework ground, so we may expect the rich bed of the Clutha to be worked out in a few years' time. However, the dredging industry will not cease with the exhaustion of this treasure. To such a state of perfection has it been brought that ground containing only a grain or a half of gold per cubic yard can now be worked at a profit; and moreover, under certain conditions a dredge is able to cut a channel for itself through the river-bank and wander at the will of the engineer in charge over the bordering flats; or it may be launched to work lying auriferous flats, far removed from any river at all. Under the new conditions the yields of gold are not likely to be so sensational, but they will probably be more regular than they have been in the past.

*Excerpted from the Report by J. B. Jaquet, A.R.S.M., F.G.S., to the Department of Mines and Agriculture, New South Wales.

WORKING EXPENSE OF DREDGE.

The weekly cost of running a large dredge in New Zealand is as follows:—

	£	s.	d.
Fuel—16 tons of lignite at 12s.....	9	12	0
Labour—5 men at £3 and 1 at £5.....	20	0	0
Repairs, office expenses, &c.....	20	0	0
	49	12	0

A large dredge working favourable ground is capable of elevating and washing at least 90 cubic yards of gravel per hour. For instance the buckets upon the Molyneux Hydraulic Company's dredge have a capacity of $4\frac{1}{2}$ cubic ft., say $3\frac{1}{2}$ cubic ft. when inclined at an average dredging angle, and twelve bucket-loads are delivered per minute, so there should be 93 cubic yards delivered per hour. Suppose such a dredge to work twenty-two hours out of every twenty-four, and six days per week, then it will treat 12,276 cubic yards per week. Now, as the gravel in the buckets will be loosely packed and occupy a larger space than when in situ, an allowance must be made, and I propose to reduce the above amount by one quarter, this will leave it at 9,207. Suppose the gravel to contain gold at the rate of a grain (in round numbers a value of 2d.) per cubic yard, then the value of the precious metal won per week would be £76. Deduct 10 per cent. for loss in treatment (the loss under ordinary circumstances is nothing like as great as this), and the amount becomes £69. Again deduct the working expenses of the dredge £50, and £19 will remain. Hence it is possible by means of a large dredge to work ground containing only a grain of gold per yard at a profit. It must always be remembered, however, that the quantity of material which a dredge is capable of raising within a certain time varies considerably with the nature of the ground.

As an instance of the profits obtained in dredging low-grade ground, I will quote the published returns of the Jutland Flat (Waipori) Gold-mining Company for two years:—

	1896.	1897.
Dredging wages time for period.....	6,171	5,846 hours.
Actual lifting during same period.....	5,678	5,518 "
Estimated quantity lifted.....	402,919	398,608 cub. yds.
Gold obtained.....	1,135	1,177 oz.
Average yield of ground.....	1'35	1'41 grs. per yd.
Paid in dividends.....	£1,125	£1,875

During 1896, £707 was expended in litigation. If this amount is added to the dividends paid, the actual profit for this year, after deducting all working expenses, will stand at £1,832.

GOLD DREDGING IN MONTANA, U.S.A.

I am indebted to an article contributed to the *Engineering and Mining Journal* by Mr. E. B. Braden, for all the information contained under this heading.*

Two varieties of machine are being employed—floating dredges, which have been constructed after the fashion of those working upon the Clutha River, and "Traction" dredges, which travel upon wheels, and are designed to work upon dry land. "River (floating) dredges are successfully operating on Grasshopper Creek in Beaver Head County; Traction or land mining machines are working satisfactorily at Washington Gulch, Deer Lodge County, and in Alder Gulch, near Virginia City."

The raising of auriferous gravel by means of suction pumps was tried first of all, and resulted, as was the case in New Zealand, in failure.

The first attempt to use a bucket dredge was made three years ago, but it was not until the dredge had been rebuilt twice that satisfactory results were obtained.

"The 'A. E. Graeter' was launched for the Bannock Dredging Company last June, and a plant for the Bon Accord Mines is almost completed. It is 102 ft. in length, 32 ft. wide, and draws 3 ft. of water. With the engines, boilers, and other machinery carried, the total weight is nearly 700,000 lb. Steam is generated by two tubular steel boilers, of the locomotive type, with grates arranged to use pine and fir wood for fuel. There are thirty-five buckets, with a capacity of 5 cubic ft. each, and excavations can be carried to a depth of 38 ft."

The dredge only seems to essentially differ from the larger New Zealand machines in regard to the arrangements for shifting and moving. "It is equipped at the rear end with two spud timbers 42 in x 18 in. x 50 ft. in size, and weighing 11,000 lb. each. These are each fitted with a pointed steel wearing shoe at the lower end, and with the necessary gearing for raising and lowering. These spuds are for moving the dredge forward or backward, being alternately raised by means of hoisting cylinders of 24 tons capacity and dropped after the dredge has been swung by the engineer in the pilot-house through the cables passed around the front corners of the boat to a lateral anchorage. The boat is thus walked ahead. While excavating, one of these spuds rests in the gravel at the bottom, and forms a pivot, around which the boat is swung as the gravel is taken up. By means of the suspensory cables carrying the bucket-ladder, this ladder is lowered about 6 inches with each swing of the dredge around the anchored spud. Thus with the drag of the bucket a segment of gravel 6 inches deep and 8 feet wide is excavated. This lowering of the ladder continues until bedrock is reached. The bedrock, if yielding, is torn loose and brought up until barren of values."

The percentage of gold extracted is stated at 98 per cent. The cost of working gravel when steam is employed has been found to be 9 cents ($4\frac{1}{2}$ pence) per cubic yard. This includes labour, supplies running repairs, and superintendence. On the "F. L. Graves," where electricity is employed for power, this cost has been $4\frac{1}{2}$ cents ($2\frac{1}{4}$ pence) per cubic yard.

"The traction dredge or land-mining machine at Washington Gulch has been designed to work in ground that is unusually flat, and where but little water is obtainable. It is owned and operated by W. M. Johnston & Co., of Chicago, who also designed the plant. The builders were the Marion Steam Shovel Company, and the Gates Iron-works. It works dry gravel, and where the machine cannot sufficiently clean the bedrock, this work is done by hand labour. The entire plant is supported on four bogie trucks which move on double tracks 12 ft. apart, laid on the bedrock. No jack-arms, side braces or spuds are used. Steam is supplied by one 50 h.-p. boiler to a set of dredging engines of the same capacity. These perform the excavations, handle the car, run the washer and trommel, and move the plant forward when required. The part of the machinery by which the excavating is accomplished is similar in design to that used for such purposes on steam shovels. The boom is 40 ft. long, and carries a dipper or shovel of $1\frac{1}{4}$ cubic yard capacity, and handles 70 cub. yds. per hour. The water supply to this plant for all purposes is 20 miner's inches.

In this gulch the bedrock lies some 16 ft. below the surface. Above this is the auriferous gravel on which is a considerable overburden of barren material. This latter is first stripped off and disposed of at the side without washing. The pay gravel is then taken up by the shovel and dumped into a car at the other side of the plant which runs on an incline. One end of this incline rests on a shoe set in solid ground on the bank of the cut, and the other terminates on the roof of the dredge. The car, when filled, is handed up by a cable, operated by the engines and pumped into a hopper on top of the plant. The gravel passes into a washer and trommel, when complete disintegration is effected, and the coarse gravel and rocks passed out at the rear end

*Gold Dredging in Montana: Eugene B. Braden, *Engineering and Mining Journal*, Nov. 20, 1897, p. 605.

of the plant. The finer gravel, sand, gold, and water pass through the perforations of the trommel into a sluice box originating immediately below. The sluice extends some distance behind the plant, being carried by suspensory chains for regulating the grade. The saving of gold accomplished in this system is 97 per cent. and 98 per cent. The machine has operated ten hours every day since May 18th, with the exception of Sundays and one day while awaiting material with which to make repairs. Eight and sometimes nine men have been employed, three of whom do the work of cleaning the bedrock by hand. About 1½ cords of fir wood are consumed per shift of ten hours.

This dredge is the first of this design to be constructed. Others are being built which will embody improvements that have been suggested by the work being done here."

DESCRIPTION OF PLATES.

PLATE I.

The Chicago Dredge.

A tailings elevator is here seen at work, and the variation between the height of the loosely stacked tailings and the face of ground being attacked is apparent.

Designed and built by Mr. K. S. Sparrow, engineer, Dunedin.
From photograph by W. Esquilant & Co., Dunedin.

PLATE II.

The Moa Dredge.

It has been one of the most successful dredges upon the Clutha. The picture shows it working in the Clutha River a short distance below Alexandria.

Originally constructed according to the design of Mr. E. Roberts, and recently altered by Messrs. Cutter Brothers. From photograph by W. Esquilant & Co., Dunedin.

PLATE III.

The Molyneux Hydraulic Co.'s Dredge.

This is probably the largest machine working at the present time upon the Clutha. The great length of the elevator (60 feet) enables the tailings to be stacked at any height not exceeding 35 feet. These are two revolving screens.

A nozzle has been erected upon the bow of the pontoon, so that when a steep bank is being attacked the ground can be "hydraulicized" in advance, and the risk of the ladder and buckets being buried beneath heavy falls thereby minimised. It is doubtful whether the advantages accruing from the use of the nozzle compensates for the large amount of power which it consumes.

At the time of my inspection the dredge was working into a face of gravel 25 feet high.

Designed by Mr. E. Roberts, consulting engineer, Dunedin. Reproduced from photograph by W. Esquilant & Co., Dunedin.

PLATE IV.

The Earnsclough No. 1 Dredge.

This dredge is represented leaving the Clutha River, and commencing to attack a river flat.

Designed by Mr. E. Roberts, consulting engineer, Dunedin. Reproduced from photograph by W. Esquilant & Co., Dunedin.

PLATE V.

The Manorburn Dredge.

Here a dredge is seen exploiting an auriferous flat away from the river altogether. It is cutting a channel for itself, breaking down the bank of gravel in front, and stacking it, when delivered of its gold, behind.

The ladder, with the system of gear pulleys used for raising and lowering, are well shown.

Designed by Messrs. Cutten Bros., consulting engineers, Dunedin

PLATE VI.

The Enterprise.

An historic interest is attached to this dredge, in so far as it was the first one to be supplied with an elevator for the tailings. The elevator is shown at work.

Designed by Messrs. Cutten Bros., consulting engineers, Dunedin.

PLATE VII.

The Perseverance Dredge.

A "current wheeler" is here shown at work in the centre of the Clutha River, a short distance above Alexandria.

These machines being dependent upon the current for power can only work where the stream flows rapidly.

PLATE VIII.

A portion of the Manukerikia River, with alluvial flats which are about to be exploited by dredges.

PLATE IX.

A flat upon the Clutha, showing Hyde and party's No. 1 and No. 2 dredges and the "Perseverance" at work.

PLATE X.

Electric Company's No. 2 Dredge.

The galvanised iron house not having been erected, the general arrangement of the machinery upon the pontoon can be seen.

The machine is remarkable on account of its long ladder. It can dredge to depths of 60 feet.

Two pairs of grab hooks, which enable boulders up to a ton weight to be raised, will be seen upon the bucket belt.

From photograph given to me by Messrs. McGeorge, of Cromwell.

PLATE XI.

Plan and sections of the A. E. Graeter dredge, which is working at Bannack, Montana, U.S.A. It differs from any of those upon the New Zealand rivers in being provided with two pivots, by means of which it can be anchored or moored short distances backwards or forwards.

The plate has been reproduced from that which accompanies the article on Gold-dredging in Montana, by Eugene B. Braden, "Engineering and Journal," 20th November, 1897, p. 605.

PLATE XII.

Plan and section of Matau Dredge, showing general arrangement of machinery

This dredge has been designed by Messrs. Cutten Bros., consulting engineers, Dunedin. When completed it will be launched upon the Clutha River to work ground about 3 miles above Alexandria.

Reproduced from a photograph by W. Esquilant & Co., and supplied to by Mr. W. H. Cutten.

PLATE XIII.

The Kawarau dredge, designed by Mr. J. C. McGeorge, consulting engineer, Dunedin, to work very deep ground. It has the longest ladder of any machine in New Zealand. When launched, it was supplied with an elevator 25 feet long, and the revolving screen was lengthened 4 feet.

Drawings of an elevator with chain of buckets detached, have been added. The plate has been prepared by Mr. O. Trickett, draughtsman to the survey, from the tracing which was supplied to me by Mr. A. McGeorge, engineer, Cromwell.

REFERENCE TO PLAN AND SECTION.

- A. Gantry, with gear-pulleys for raising and lowering ladder.
- B. Ladder.
- C. Winches.
- D. Anchor winch.
- E. Engine.
- F. Boiler.
- G. Tumbler, driving bucket belt.
- H. Revolving screen.
- J. Screen pipe.
- K. Screenings shoot.
- L. Gold-saving tables.
- M. Pump.
- N. Starboard mooring lines.
- O. Port mooring lines.
- P. Head mooring lines.

[Plates, &c.]

DREDGING FOR GOLD.

PLATE I.



THE CHICAGO DREDGE.

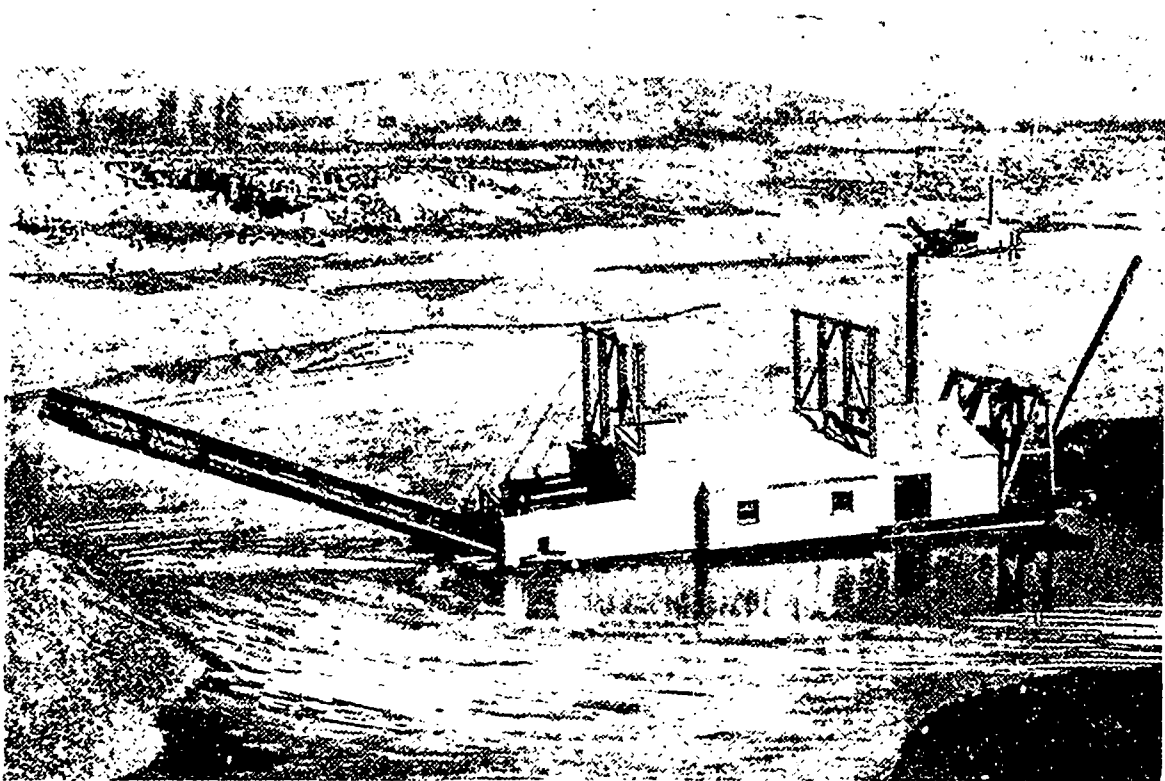
PLATE II.



THE MOA DREDGE.

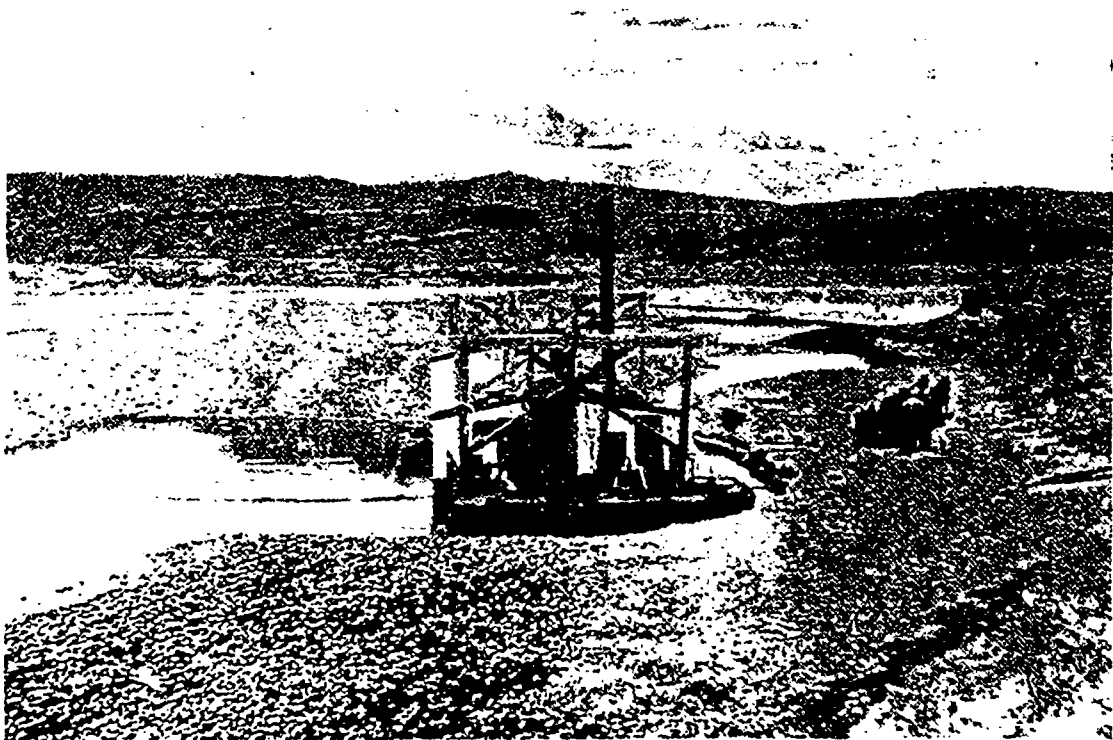
DREDGING FOR GOLD.

PLATE III.



THE MOLYNEUX HYDRAULIC CO'S DREDGE.

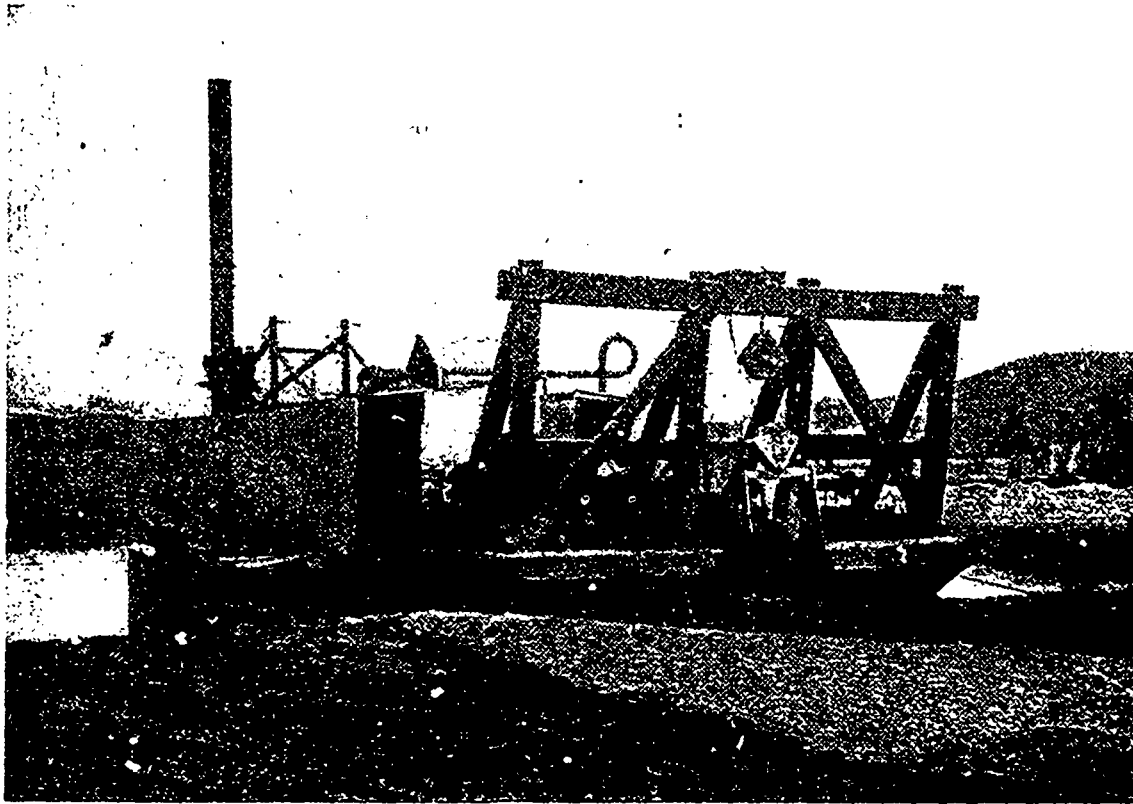
PLATE IV.



THE EARNSCLEUGH No. 1 DREDGE.

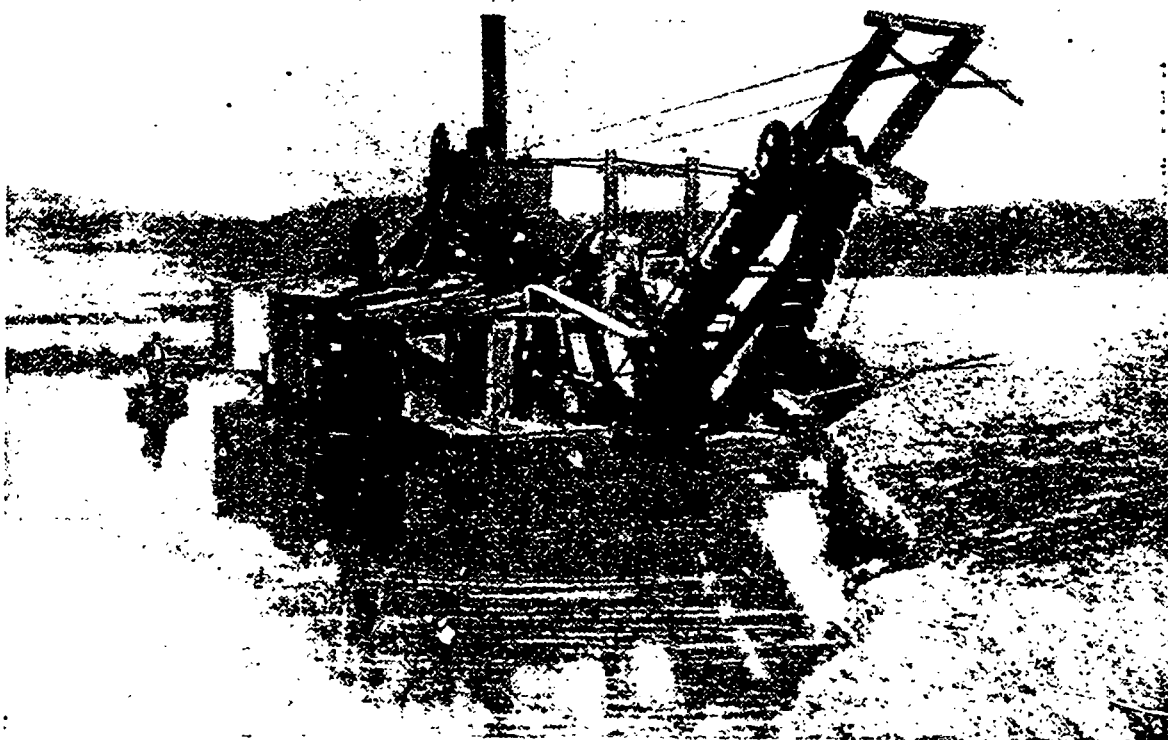
DREDGING FOR GOLD.

PLATE V.



THE MANORBURN DREDGE.

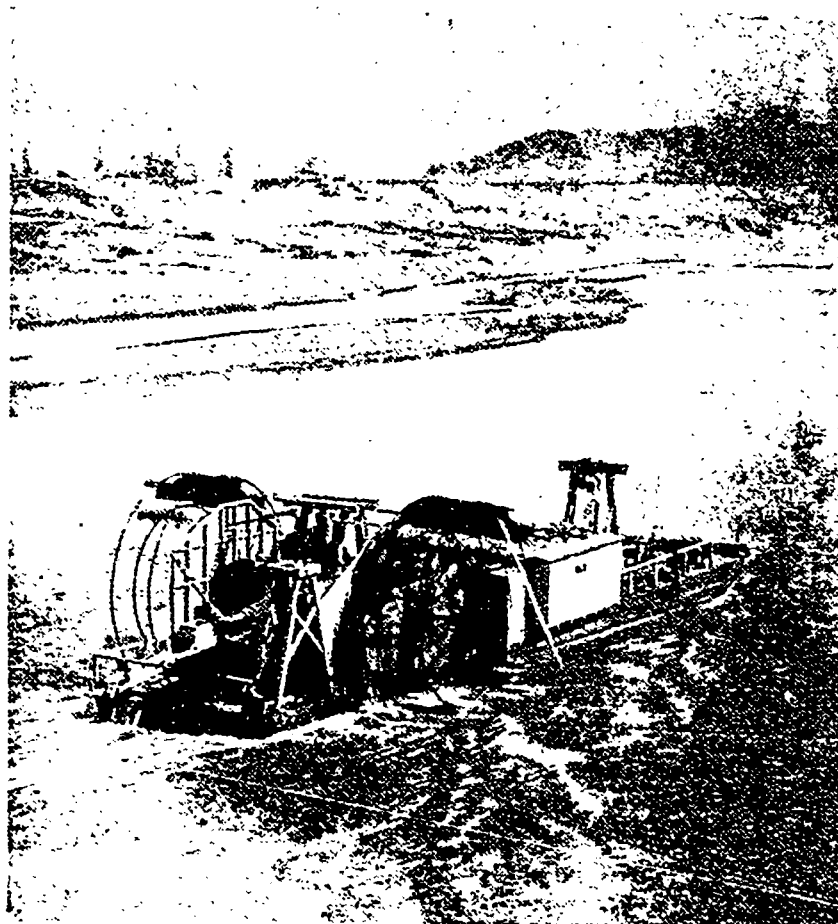
PLATE VI.



THE ENTERPRISE DREDGE.

DREDGING FOR GOLD.

PLATE VII.



THE PERSEVERANCE DREDGE.

DREDGING FOR GOLD.

PLATE VIII.



MANUKERIKIA RIVER.

PLATE IX.



A FLAT UPON THE CLUTHA.

DREDGING FOR GOLD.

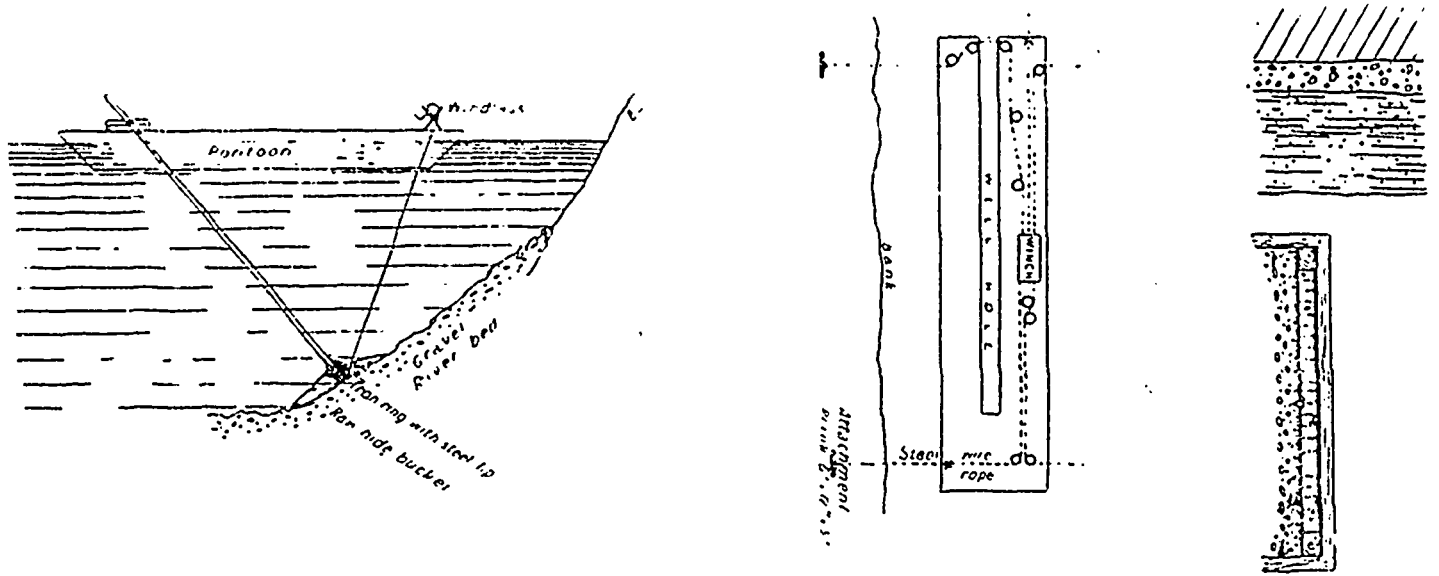
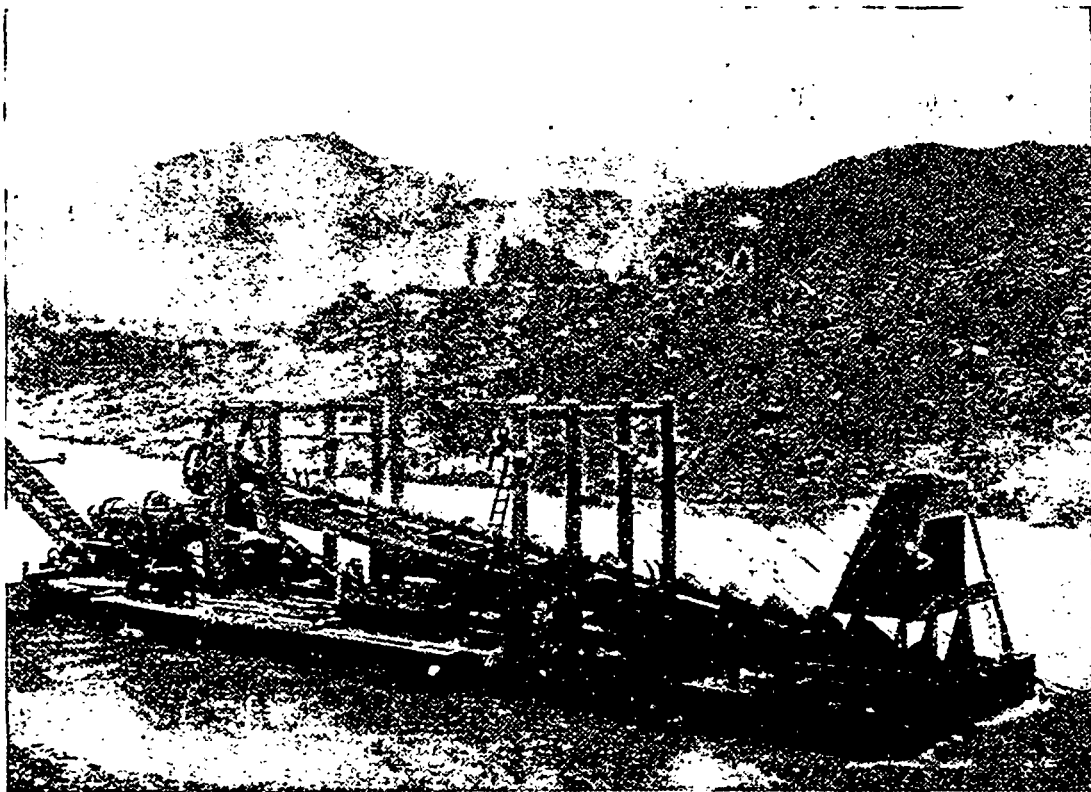


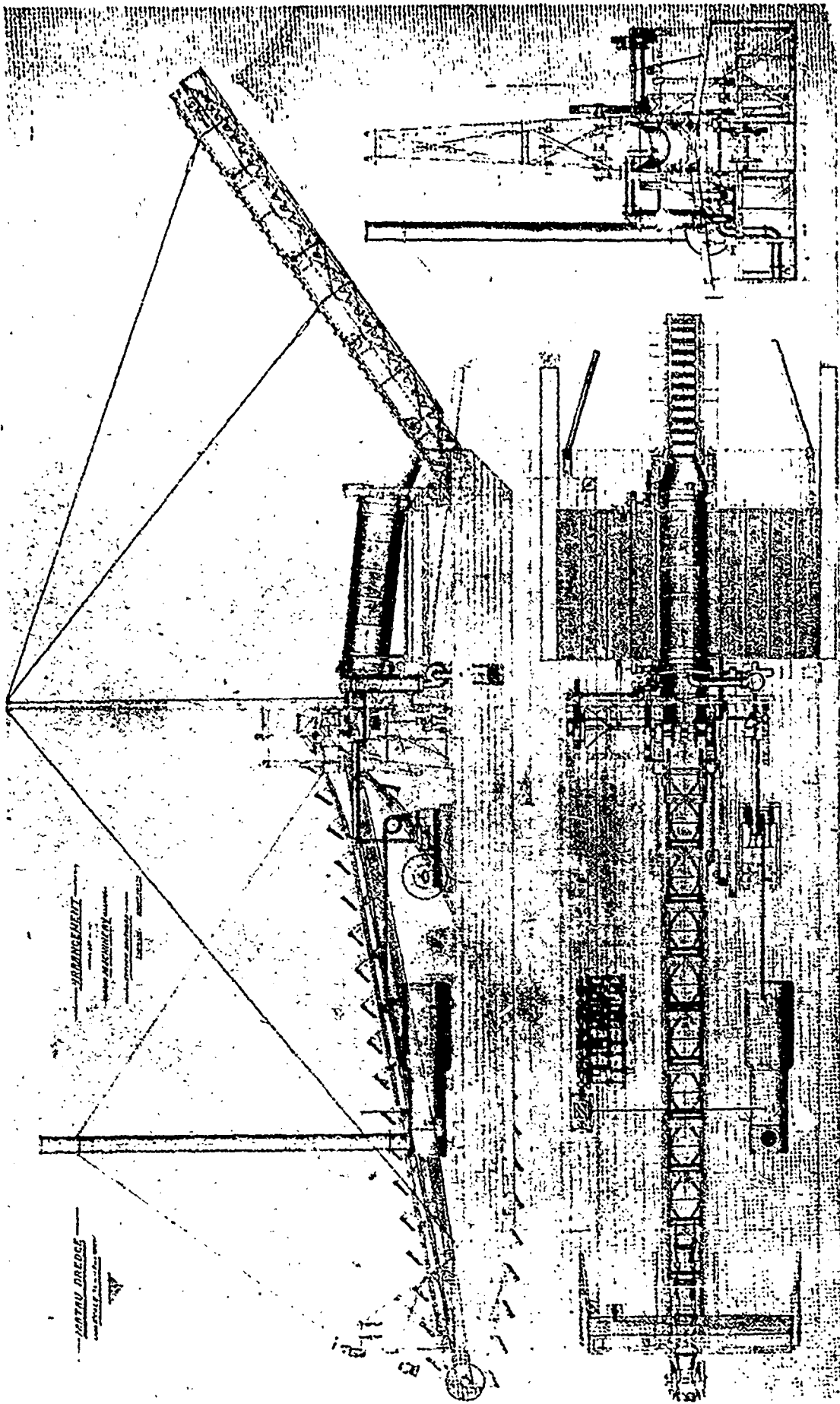
PLATE X.



ELECTRIC CO'S No. 2 DREDGE.

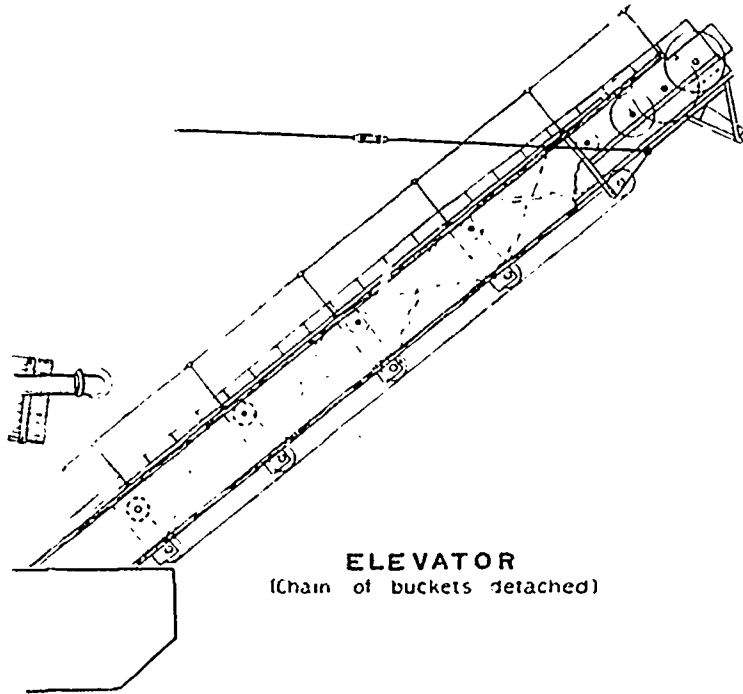
DREDGING FOR GOLD.

PLATE XII.

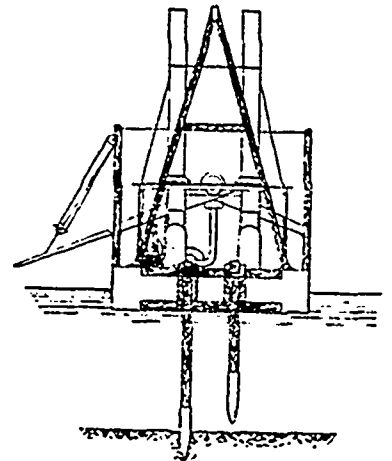
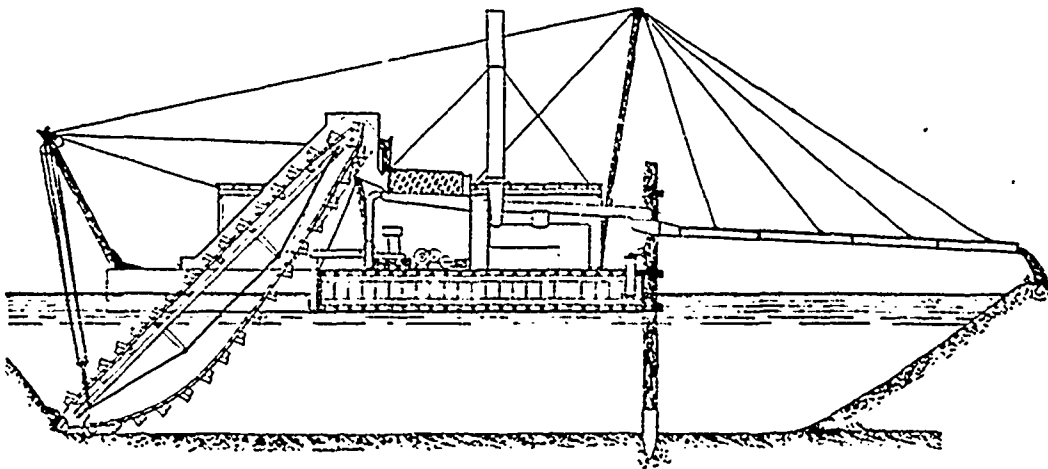
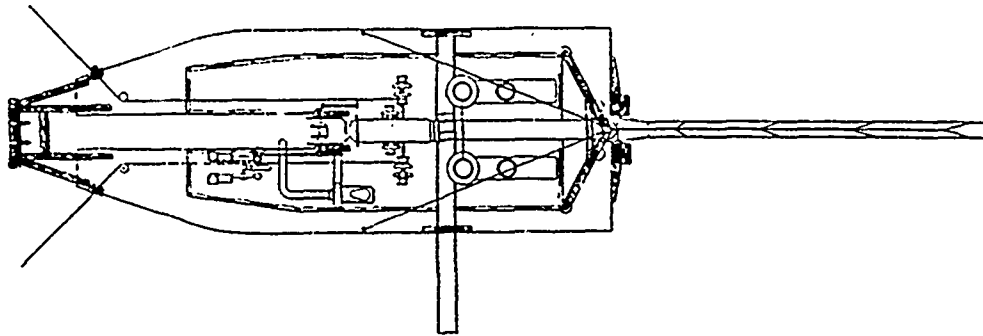
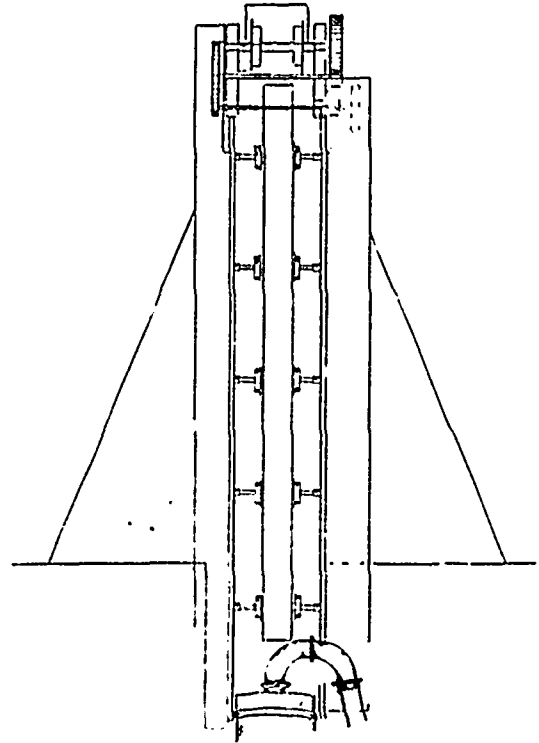


MATAU DREDGE.

DREDGING FOR GOLD.

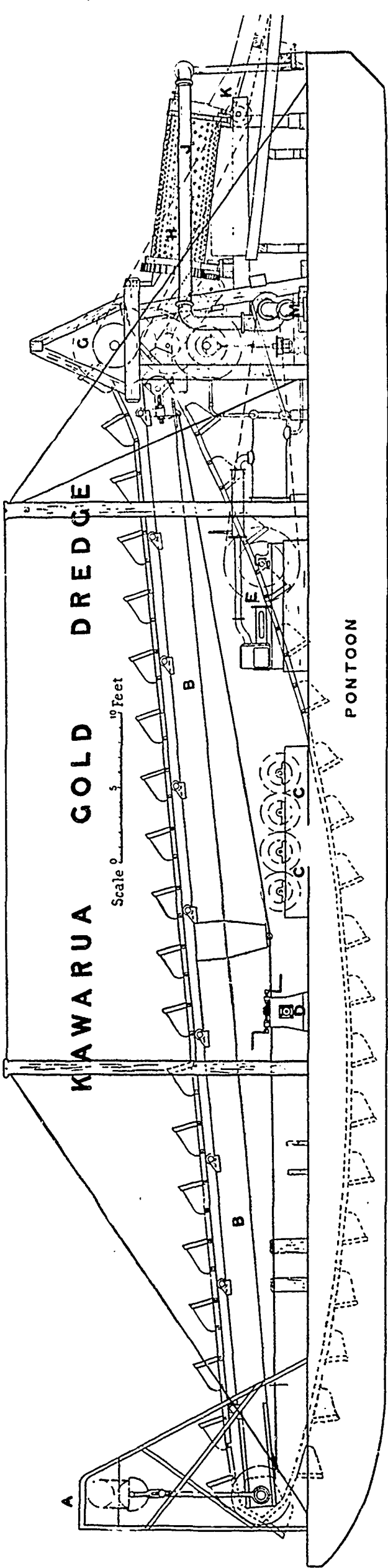


ELEVATOR
(Chain of buckets detached)

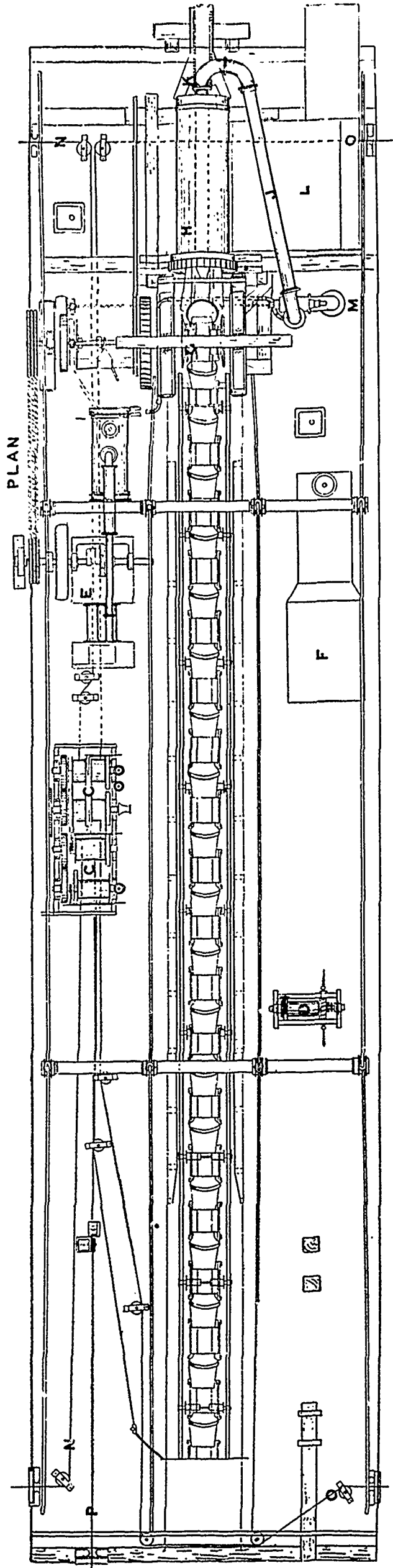


Plan and Sections of "A.E. Graeter" Dredge.

DREDGING FOR GOLD.



SECTION



War Eagle Report.

The following is excerpted from the statement submitted to the shareholders of the War Eagle Consolidated Mining and Development Co., Limited, at the annual meeting on 15th ulto. :-

DIRECTOR'S REPORT.

GENTLEMEN,—The directors have much pleasure in again meeting the shareholders of the War Eagle Consolidated Mining and Development Company, Limited, at this, the second annual general meeting of the company.

Submitted herewith is a statement of the accounts and a report on the mine, the former being brought down to the 30th of September, and the latter to the 31st October.

We trust that both will be found so complete as to call for little by way of comment or explanation.

Freight and Treatment of Ores.

At the last annual meeting the directors were compelled to announce that they "having found it impossible under existing conditions to obtain any reduction in the cost of freight and treatment of the company's ores, and feeling that the present rate could not be long maintained in the face of improving railway facilities and the competition likely to ensue thereon, determined in July last to stop shipping altogether, and to devote their energies to putting the mine in shape to ship freely when rates were satisfactory." It is gratifying to be able to state that this policy of delay has been amply justified by a subsequent reduction in the rate of freight and treatment from a maximum charge of \$11.00 to \$7.50, with a further rebate of 50 cents per ton, provided the company ship an average of 175 tons per day for six months continuously, which it has so far been able to do without difficulty, notwithstanding the limited capacity of its machinery.

In reference to the steel gallows frame, and the air compressing and hoisting plants, with their accompanying electric motors (to which the general manager, Mr. J. B. Hastings, has referred more particularly in his report), the directors have to say, that while it may have appeared to the shareholders that some unnecessary delay has taken place in the installation of these plants, the Directors consider that the fact that this is the first time Canadian workshops have been called upon to turn out so large a mining plant, ought in a measure to be accepted as a satisfactory explanation. In addition to this it has been found that the transportation facilities in a comparatively new camp like Rossland, were inadequate to the rapid handling of such massive pieces of machinery over a mountain road which had to be constructed for the purpose between the terminus of the railway and the top of the War Eagle mill.

The West Kootenay Power and Light Company having installed a plant capable of delivering in Rossland from five to fifteen thousand horse power, and being prepared not only to sell the same at a price below the cost of steam power, but to agree to make a further reduction as the price of coal came down, the directors felt justified in adopting electricity as a motive power, especially in view of the fact that this form of power has been found to give good satisfaction in many mining camps throughout the United States. It is only fair, however, to say that so far as the directors are advised, in no place have motors of such capacity been installed, and therefore, as regards the size and capacity of the motors, the undertaking is experimental. Every effort has been made by the Canadian General Electric Company and by the West Kootenay Power and Light Company, as well as by our own engineers to make this experiment a success.

Should it prove such, it will not only effect a material reduction in the cost of operating the mine, but will afford a stimulus to the development of other mines in the vicinity which are now awaiting the result of the experience of this company before installing suitable mining plants.

Exploration and Development.

As might be expected, the exploration and development work which had proceeded with great rapidity, and with the most gratifying results, from January, 1897, down to May of the present year, could not be kept up at the same rate after the company commenced shipping on a scale that taxed the capacity of its machinery. This, however, is unimportant, in view of the fact that the mine had already been developed in excess of its requirements, and that the amplitude of the new plant will enable the company at all times hereafter to keep its exploration and development work well ahead of its requirements.

The directors are fully alive to the necessity of making every effort to lower the cost of mining and reduction of ores in view of the fact that the production of the mine increases in inverse ratio to the cost. Whether the policy of the Canadian Pacific Railway in operating its own smelters for the purpose of securing the reduction of ores at cost, will procure ultimately for the miner as low a rate as would be secured by open competition, remains to be seen. In the meantime it is gratifying to know that it continues to be the policy of that company to smelt at cost, and the directors feel that it is in the interest of the War Eagle Company to give this experiment a full trial before considering the propriety of investing a large amount of capital in the construction and operation of a smelter.

It will be observed from the statement of accounts that the capital stock has been increased since the last meeting from \$1,650,000 to \$1,750,000, being an increase of \$100,000. This stock realized the handsome sum of \$270,000, which has enabled the directors to wipe out the obligations of the company, including most of the cost of the new plant, leaving, with the surplus earnings, \$135,334.99 on hand.

In conclusion, the directors can only again express their high appreciation of the judgment and untiring energy their manager, Mr. John B. Hastings, M.E., F.G.S.A., has continued to bring to the administration of the company's affairs, in which he has been ably assisted at the mine, as will be seen from his report, by Mr. John Fitzwilliams and Mr. Chas. V. Jenkins.

At the head office Mr. E. J. Kingstone has discharged his duties in a faithful and efficient manner.

GEORGE GOODERHAM,
President.

Toronto, Ont., Nov. 15th, 1898.

FINANCIAL STATEMENT FOR TWELVE MONTHS ENDING 30TH SEPTEMBER, 1898.

		<i>Assets.</i>	
Mines and Mineral Claims.....			\$1,650,000 00
Cash, on hand and in Banks—			
Bank of Montreal, Rossland.....	\$30,784	51	
Bank of Toronto, Toronto.....	104,462	37	
On hand.....	88	11	
			135,334 99
Mines supplies and stores on hand as per inventories.....			14,556 90
Permanent improvements.....			6,536 25
Hoist, compressor, and other plant.....			40,049 04
Furniture of offices.....			669 20
Invested in "War Eagle" Hotel.....			14,400 00
Debts receivable.....			450 85
			<u>\$1,861,997 23</u>

		<i>Liabilities.</i>	
Capital Stock paid up.....	\$1,750,000	00	
Dividend No. 5, payable 15th October, 1898.....	26,250	00	
Profit and Loss.....	85,747	23	
			<u>\$1,861,997 23</u>

		PROFIT AND LOSS.	
To balance September 30th, 1897.....	\$40,779	61	
" Cost of mining and developing—War Eagle mine..	\$210,813	63	
" " " " Crown Point mine	12,036	31	
" " " " Richmond Group.....	503	91	
" " " " Pender damage suit.....	1,301	48	
" " " " Other legal expenses.....	3,798	56	
" " " " Toronto office expenses.....	1,528	12	
" " " " Travelling expenses.....	737	50	
" " " " General expenses.....	2,894	55	
" " " " Interest and exchange.....	8,439	93	
" " " " Directors' compensation.....	10,000	00	
			252,053 99
" " " " Indebtedness of the Crown Point Gold Mining Co. assumed....	20,013	14	
" " " " Dividends Nos. 1 to 5.....	\$125,250	00	
" " " " Unappropriated profits.....	85,747	23	
			<u>210,997 23</u>
			<u>\$523,843 97</u>

By net proceeds of ore sales (five months only).....	\$353,269	52	
" " " " Transfer fees.....	574	45	
" " " " Premium from sale of 100,000 shares of Capital Stock.....	170,000	00	
			<u>\$523,843 97</u>

GENERAL MANAGER'S REPORT.

Development for the Year. Since October 1st, 1897, date of my last annual report, up till October 1st, 1898, the following work has been done at the costs specified, exclusive of assaying and ore sorting, properly chargeable to ore production of headings:

3,480 feet of tunnelling, average cost per foot, \$21 15	
451 " raising " " " " 29 78	
185 " sinking " " " " 96 25	

4116 feet, Total.

From driving these headings, 2,316 tons of ore were produced and shipped.

Total Headings on the Mine.—The work done during the past year, added to former headings, makes a total of:

Tunnelling.....	8,304 feet.
Raising.....	851 " "
Sinking.....	665 " "

Total, 9,820 feet.

This does not show 250 feet of the Main working shaft timbered through the stopes, from the 250 ft. level to the surface.

Ore Extraction for the Year.—As you know the smelting conditions were such that regular stopping in the mine and ore shipment was not begun during the year until May. Besides the ore just mentioned, there was produced and shipped from stopes 26,559 dry tons at an average cost per ton of \$3.24, the total shipments for the year aggregate 28,875 tons. Average gross value, \$20.01. Total Smelters' gross value, \$570,744.23.

The "Gross Market Value" per ton of the ore in metals was: gold, \$18.90; silver, \$1.15½; copper, \$3.46½. Total, \$23.52.

Total Product of the Mine.—The following table gives the total production of the Mine, the gross market value is the actual value of the gold, silver and copper contained in the ore. The gold at \$20.60 per oz., silver at New York quotations, and copper at New York price for casting. The difference between this column and "Smelters' Gross Value" is really a smelting and marketing charge, and the amount is shown under the heading of "Indirect Smelting Charge."

PRODUCT OF THE WAR EAGLE MINE.
Charges and Values per Ton.

Year	Net Value	Direct Smelting Value	Smelters Gross Charge	Smelting Charge Indirect	Actual Total Smelting Charge	Gross Market Value
1894.....	24 41	12 50	36 91	6 63	19 13	43 54
1895.....	29 05	10 87	39 92	7 41	18 26	47 33
1896.....	21 29	9 89	31 18	5 79	15 68	36 97
1897.....	13 35	9 96	23 31	4 33	14 29	27 64
1898.....	12 51	7 50	20 01	3 51	11 01	23 52

CHARGES AND VALUES PER ANNUM.

Year	Net Tonnage	Net Value	Direct Smelting Charges	Smelters Gross Values
1894.....	46 93	\$1,145 55	\$586 62	\$1,732 17
1895.....	9,980 93	289,951 30	108,486 32	398,437 08
1896.....	8,920 29	189,944 38	88,222 41	278,166 79
1897.....	7,406 30	98,896 10	73,752 42	172,648 61
1898.....	28,523 00	356,843 98	213,900 25	570,744 23
	54,877 45	\$936,791 46	\$484,948 02	\$1,421,729 48

Year	Indirect Smelting Charges	Total Smelting Charges	Gross Market Value
1894.....	\$321 39	\$908 01	\$2,053 56
1895.....	73,925 83	182,412 15	472,393 51
1896.....	51,611 07	139,833 48	329,777 86
1897.....	32,034 22	105,786 64	204,682 83
1898.....	99,991 05	313,891 30	670,735 28
	\$257,883 56	\$742,831 58	\$1,679,613 04

No. 1 Raise Stopes.—This stope fully justified my expectations. From the map it will be seen that it is not entirely gone, but the remaining areas are lower grade. The total net product during the year was 9,030 tons at \$21.34; smelters' gross value, \$192,700; deducting transportation and treatment, net value, \$124,975. As the area extracted, including the No. 1 Raise, from which 170 tons were shipped, is 8,424 square feet, and the ore averages 9 cubic feet to the ton, the average width of the ore was 10 feet.

West Stope.—The shipment of the year was 3,813 dry tons at \$20.45, \$77,974.85 gross value; deducting smelting and transportation charges, \$49,378.35 net value. The area extracted was 4,140 square feet. After deducting 530 tons from the year's product, as this amount was broken in the stope at the beginning of the year, at 9 cubic feet to the ton an average width of 7 feet is found. The value and width fairly represent the present condition of the stope.

West Raise Stopes.—We only drew on the West Raise Stopes for 224 tons during the year, and the work done was to break down about 1,000 tons of ore and leave it in the stope. The 224 tons averaged \$23.40; \$5,241.60 gross value; deducting transportation and treatment, \$3,561.60, net value. My last year's report said they contained, as far as worked, 6 feet of continuous ore. We are now shipping heavily from here, the October output being 1,100 tons, gross value, \$24,200.

375 East Stopes.—This ground has materially improved during the year. The best showing before that period was 5 feet of \$20.00 ore. The stopes shown on map, inclusive of the level, cover an area of 4,176 square feet, from which 4,513 tons have been shipped this year and 90 tons last year, indicating 9½ feet as the width of ore. This 4,513 tons averaged \$19.80; \$89,357.40 gross value; deducting transportation and smelting charges, \$55,509.90 net value.

Winze Stopes.—The Winze Stopes are really a part of the 375 East, as their position on the map shows. The area stoped is 2,844 square ft.; the production 3,418 tons, which, at 9 feet to the ton, gives 11 feet width of ore. The value per ton averaged \$24.35; \$83,228.30 gross value; deducting transportation and smelting charges, \$57,593.30 net value.

375 West Stopes.—This ground has yielded lower in value than the rest of the Mine, but there is such a large area left, and especially the rich ore along the bottom of No. 2 level, that I hope during the ensuing year the average value will greatly increase. The area stoped is 3,420 square feet, yielding 2,926 tons of shipping ore, at 9 feet per ton, giving width of 8 feet. The average value was \$13.80; \$40,378.80 gross value; deducting transportation and smelting charges, \$18,433.80 net value.

500 Foot Level.—This tunnel has been continued 450 feet to the shaft and 250 feet further, making it at present writing ½ mile long from mouth to face. The tunnel was run on hanging wall without finding ore of value, so 200 feet east of the shaft a cross-cut was put to foot wall, proving the vein was 42 feet wide, with 32 feet of mixed ore. A careful sample of the west side of this cross-cut in 5-foot sections gave 20 feet of \$10.00 ore, and 12 feet of \$25.00 ore, total values. A raise has been made from this cross-cut to the 375 East Level. The whole raise is in ore of varying value; it started in good ore, the first 140 tons shipped assayed \$19.88 gross value; the last 259 tons, \$6.74. By special arrangement with smelter we were allowed \$1.74 per ton on this lot. As the head of the raise comes out north of the good ore on the 375 East level, it is probable the main body of rich ore is south of the Raise. The tunnel west of the shaft has been in low grade ore; 158½ tons shipped as broken assayed \$13.18; giving by special smelting terms \$8.18, and 451½ tons shipped as broken from other portions, assayed \$16.40.

East Raise.—This working did not discover any bodies of ore.

South Drift.—Nothing has been done here for the year, and the ore body, 50 feet long, 30 in. wide, assaying \$20 gold per ton, with the same width and values in the face, remains intact. This drift was run 500 feet south, and an ore body 40 feet long, 2 to 10 feet wide, encountered, which produced, when driving through it, 192 tons, assaying \$18.47, \$3,546.24 gross value; and from stope above tunnel 326 tons, assaying \$14.85, \$4,841.10 gross value. A total of 518 tons, averaging \$16.18; \$8,387.34 gross value; deducting cost of transportation and smelting, \$4,502.34 net value. There are yet 50 tons of the best ore piled in the tunnel. The ore body gave out going up, but is in bottom of tunnel.

625 East.—In running this drift 90 feet easterly on the vein from the south cross-cut from the main shaft on the 625 foot level, 347 tons of rock broken in driving, shipped without sorting, assayed \$14.10, \$4,892.70 gross value. No drifting has been done west on the vein at point of intersection by the cross-cut, it averaged 6 feet wide, and \$25 in value.

Ore Reserve.—There are large bodies of ore ready for extraction, of which the aggregate will run lower in value than the past product of the mine. I place it at 100,000 tons; smelters' gross value, \$1,700,000. With the usual amount of development and shipping what could be conveniently stoped, I would again place the cost of extraction at \$3.25 per ton. The ore estimated as available is between the 250 ft. level and the bottom of the mine.

Surface Improvements.—The present plant of compressor and hoist proved quite insufficient for our needs during the past year, and the development has been slower than with a more complete plant. The new plant, consisting of an electrically driven double drum hoist with capacity for lifting 16,000 lbs. at 750 feet per minute, a 24½ x 48 so-called 40 drill compressor, and a 20-horse power blower, will be in operation by the first of the year.

The new steel gallows frame, 100 feet high from collar of shaft to centre of sheave, and iron shaft house 185 feet long, 40 feet wide, 120 feet high, with large ore bin capacity, crusher and sorting belts, is practically completed.

A water and drainage system, containing 6,000 feet of pipe, has been put in, and wooden tanks built to hold a domestic and fire supply of 75,000 gallons, 45,000 with 140 to 250 feet pressure above the buildings.

Commodious and substantial general offices, assay offices and stables have been built; the War Eagle Hotel Company has erected handsome board and bank houses for our employees. Easy wagon roads have been built from the railroad and the timber to the main shaft.

Development for the Year.—The following are the most important features: The making of a Main Incline Shaft of the No. 2 Winze by carrying the latter to the surface at an incline of 58° from the 250 ft. level upwards and downward in triple compartment, at 64°. The 375 East and West drifts have been extended and stilled for stoping, and raises made from them to the 250 ft. level. A raise No. 6 has also been made from the 500 ft. level to the 375 ft. level, and a raise No. 5 in the east end of the Mine from the 500 ft. level to the 250 ft. Large pockets have been put in on the 500 ft. and 625 ft. levels to load the skips from.

Crown Point.—A fair amount of exploring was done on the mine above the main tunnel. The large surface ore body was found to gradually pinch out, and in view of the expenditures on the War Eagle, with your permission, I discontinued prospecting on the claim.

Richmond Group.—The necessary assessment work has been done on the claims and they have been surveyed and advertised for Crown Grant, which I believe will be immediately issued. Acting on your instructions, the Company's holdings have been increased by purchase of ¼ of the "Summit," a contiguous claim, of which it now owns half, and the purchase of the whole of the "Mineral Hill" and "Eureka," also contiguous claims, these last having the Slocan Star vein for about 800 feet.

Costs of Mining.—I believe these will be found to be minutely and comprehensively explained, as far as may be, in suitable compass by the tables forming part of this report.

Conclusion.—Finally, I will again call the attention of the Board, as it was my pleasure to do last year, to the capable and energetic services of Mr. John Fitzwilliams, foreman, and Mr. Charles V. Jenkins, accountant. I am, dear sirs,

Yours truly,

JOHN B. HASTINGS.

WAR EAGLE MINE.

Comparative Statement of Costs.—Showing average cost per foot of work, and extraction per ton of ore for period from October 1st, 1897, to September 30th, 1898, as compared with costs for period from January 20th to September 30th, 1897.

Nature of Work	Period	Work Accomplished.	Cost per Foot.
1. Tunnelling, drifting, etc.....	Oct. 1 to Sep. 30, '98.....	3,480 ft...	\$21 15
	Jan. 20 to Sep. 30, '97.....	2,303½ ft...	20 11½
2. Raising.....	Oct. 1, '97 to Sep. 30, '98..	451 ft...	29 78
	Jan. 20 to Sep. 30, '97.....	421 ft...	30 33
3. Sinking.....	Oct. 1, '97 to Sep. 30, '98..	185 ft...	96 25
	Jan. 20 to Sep. 30, '97.....	175 ft...	92 28½
4. Ore Extraction..	Oct. 1, '97 to Sep. 30, '98..	26,559 tons	3 24
	Jan. 20 to Sep. 30, '97.....	4,810¾ tons	3 24½

Exclusive of cost of assaying and ore sorting in tunnelling, drifting and sinking, which is properly chargeable to the ore produced from these headings.

NUMBER AND WAGES OF EMPLOYEES ON "WAR EAGLE" AND "CROWN POINT" MINES.

These have averaged, at 358 days to the year, 144, exclusive of office ore and boarding house employees, with daily wages of \$3.21½. The list comprises the following:

Miners.....	74½
Carmen and Shovellers.....	22½
Timbermen.....	7
General Labor (Foreman, Engineers, Machinists, Blacksmiths and Helpers).....	31½
Surface Laborers.....	8½

TABLE OF MINE COSTS
For Twelve Months, Ending September 30th, 1898.

	WORK ACCOMPLISHED			ORE EXTRACTION
	Sinking	Raising	Drifting	
Total No. of feet.....	185	451	3,480
Tons of ore stoped.....				26,559
<i>Average Cost for</i>				
Drilling.....	\$43 42	\$11 91	\$8 05	\$1 23
Tramming and shovelling.....	3 22	3 10	2 81	46
Timbering.....	8 03	2 73	02	24
Hoisting.....	4 35	17	38	4 1/2
Smithing.....	5 41	1 43	1 11	13 1/2
Ore sorting.....		40	14	02 3/4
General labor.....	6 84	2 16	1 78	19
Air.....	6 52	1 89	1 48	17
Candles.....	97	37	28	03 1/2
Oil and Waste.....	27	09	06	01
Explosives.....	4 03	2 26	2 25	23 1/2
Drills and machine fittings.....	1 61	49	35	04 3/4
Mine supplies.....	1 53	41	31	05
Stable expense and teaming.....	06	02	01	00 1/2
Assaying.....	01	25	25	06 1/2
Surveying.....	98	04	01	00 1/2
Salaries.....	3 73	1 22	97	13 3/4
Office expense.....	42	12	11	01
Legal expense.....	27	03	08	00 1/2
Lumber expense.....	26	20	17	00 1/2
General expense.....	95	30	25	04
Depreciation of plant and machinery.....	3 38	84	65	10
Total cost per unit...	\$96 26	\$30 43	\$21 54	\$3 24

Tilt Cove Copper Company.—The following is excerpted from the report presented to the shareholders on the 17th ult. :—

A copy of the report and accounts presented by the Cape Copper Company at their last general meeting, embracing a description of the progress and result of their operations on this company's property for the year under review, was sent to each registered shareholder of this company. They showed that the mines made a gross profit of £32,835 5s. 8d., leaving after charging the account with the interest and discount payable to the Cape Copper Company and the rent representing the interest on this company's debentures, a net profit of £23,262 13s. 3d. This sum has gone in reduction of the debt due to the Cape Copper Company. Reference was made in the last report to the notice which had been given to terminate the supplementary agreement with the Cape Copper Company, fixing a basis of price for the Tilt Cove Ores and Regulus taken over by that company for its own smelting works. A fresh agreement has now been made between the two companies which, owing to the increased price agreed to by the Cape Copper Company, is already adding considerably to the profits of the Tilt Cove establishment.

The Directors congratulate the shareholders upon the success which has attended the operations upon the company's properties during the year under review, ending on the 31st August, 1897, by which the indebtedness of the Tilt Cove Company to its lessees, the Cape Copper Company, was reduced from £78,684 10s. 7d. to £53,985 4s. 0d. The result of the yield from the Mines to 31st August of the present year will doubtless further greatly reduce the debt, and it is hoped that by the 31st August, 1899, the whole of that debt will have been liquidated, and that the Tilt Cove Copper Company will from that date be entitled to receive half profits. It now, however, becomes necessary that steps should be taken to relieve the company of its other floating debts, amounting to about £6,000. For some time past the payment of these debts has only been held over by the reliance of the company's creditors, on the promise of some members of the committee, that at this opportunity means for their liquidation should be adopted.

For this purpose the committee has decided to issue a further 3,061 preference shares of £2 each, making the total number issued 10,000 shares, out of the 20,000 authorized at the Extraordinary General Meeting of 20th November, 1889. The shareholders are now invited, as per circular herewith, to take up these shares, and in the event of their not doing so, any portion thus remaining unallotted may be disposed of at par in such manner as the committee shall deem desirable.

TILT COVE ESTABLISHMENT ACCOUNTS.

BALANCE SHEET.

From 1st September, 1896, to August 31st 1897.

Dr.	
To sundry creditors.....	£ 7,259 10 1
Balance due to the Cape Copper Co., Ltd.....	53,985 4 0
	<u>£61,244 14 1</u>

EAST MINE COSTS AND RETURNS ACCOUNT.

To Mining costs.....	£16,194 13 10
Smelting costs.....	7,491 10 2
Freight, insurance and Swansea charges.....	31,306 3 5
Balance profit.....	32,835 5 8
	<u>£87,827 10 1</u>

PROFIT AND LOSS ACCOUNT.

To Balance from last year.....	£26,074 15 4
Rent.....	4,400 0 0
Interest and discount to Cape Copper Co., Ltd.....	5,173 15 10
	<u>£35,648 11 2</u>

Cr.	
By Boden's Level—for expenditure.....	£ 2,716 16 0
Sundry debtors.....	7,245 10 7
Buildings and machinery.....	35,131 13 1
Stock of materials at Mines and other establishments.....	13,338 12 4
Cost and Returns account for balance account.....	2,812 2 1
	<u>£61,244 14 1</u>

EAST MINE COSTS AND RETURNS ACCOUNT.

By Ores and Regulus.....	£87,827 13 1
	<u>£87,827 13 1</u>

PROFIT AND LOSS ACCOUNT.

By Balance brought down.....	£32,835 5 8
Commission and exchange.....	1 3 5
Balance (to balance sheet).....	2,812 2 1
	<u>£35,648 11 2</u>

Dominion Mining, Development, and Agency Company.—The report of the directors of the Dominion Mining, Development, and Agency Company, Limited, with accounts from the commencement of the company's operations to June 30th last, shows that a very satisfactory profit of £27,992 has been earned. Considering the smallness of the capital employed and the unfavourable condition of the markets, the directors feel assured that the shareholders will be satisfied with the result as they are. In July last a dividend of 50 per cent. was distributed in fully-paid shares of the Queen Bess Proprietary Company, Limited. The shareholders are, therefore, asked to confirm the distribution of the above profits as follows: Dividend of 50 per cent. on £53,276, being the amount paid up on capital account on July 15th, 1898, £26,638; payment to the directors of the 5 per cent. on same due to them under Article 91, £1,332; which leaves a balance to be carried forward of £22. The group comprising the Queen Bess Proprietary Company was acquired in September, 1897, and in the following month a company under the above name was successfully floated, and started with a full working capital in cash of £15,000. A large amount of development work has since been done, showing the most satisfactory results. Arrangements have now been made for shipments throughout the winter on a large scale, and the directors have every reason to believe that the payment of dividends will commence during the first quarter of 1899. In March, 1898, a company was floated with a capital of £20,000 under the title of the Pyramid Copper Syndicate, Limited, to acquire and develop a group of claims comprising some 800 acres in the East Kootenay division. In this syndicate the company holds 5,250 shares of £1 each. Development work has been steadily pursued during the summer, and will be continued during the winter. Reports received from the engineer in charge continue of a very satisfactory nature, and the directors have reason to feel sanguine as to the results. Space will not allow a full reference to the numerous other properties acquired by the company; but we note that the company has entered into an agreement for the sole use in B. C. of Taylor's air compressor, and their representatives have recently acquired half interest in 2,400 acres of placer claims in the Atlin Lake District.

The Fairfield Exploration Syndicate.—For the information of the shareholders the Estate, Finance, and Mines Corporation has issued an interesting report, embellished with photographs, explaining the position of the Fairfield Syndicate. The corporation holds a share interest to the extent of over nine-tenths of the capital of the syndicate, which was incorporated in 1897 for the primary object of prospecting for gold and other minerals in British Columbia. The nominal capital is now £33,000, but as it will be necessary to increase it very shortly to £50,000, the Estate Corporation has agreed to take up, in conjunction with others, the additional shares. At present, operations are concentrated on the Doratha Morton Claim, well situated, and fully equipped with plant, including cyanide works. Development has shown that the whole of the reef matter is more or less auriferous, and assays have yielded \$26 and \$28. The syndicate has secured an option on the Alexandria, Highland Laddie, Duke, Duchess, Empress, and Comox, which last abuts on the Doratha Morton, and on the west of the latter six claims—four of which are on the known line of the reef, namely, Eva, Banker, Jack, and King. The syndicate thus holds, with the exception of one claim, a continuous line of thirteen claims, which extend for about 22,000 ft., or over four miles, along the reef, on which at the most westerly and most easterly, as well as at several intermediate points, ore has been found of precisely the same nature as on the Doratha Morton.

Dundee Gold Mining Co.—A meeting of the Dundee Gold Mining Co. was held in Toronto for the purpose of devising ways and means for paying for the aerial tramway, the concentrator and hoisting and drilling plant. The shares of the Dundee Company were placed principally in the London market and, owing to the dullness there at present, it was deemed inexpedient to place the treasury on sale there. It was decided that each director should take shares at the prevailing market price to the extent of \$2,000 each. There are eight directors and this will give the company \$16,000. With this sum it is calculated that the plant can be paid for and the mine placed on a paying basis: The directors are: Messrs. William Galliher, Charles Dundee, Ernest Kennedy, J. L. Parker, C. F. Conybeare, N. D. Barclay, Donald Kennedy and Colonel Robert Scott.

Golden Cache Fiasco.—At the annual meeting of the shareholders this month the Vice-president, Mr. Skene, reported as follows:—

"Although the result of the crushing in December and January last had proved the bulk of the ore in the upper workings to be low grade, it will be remembered that the presence of 5 tons of very rich ore gave hope of increasing quantities at further depth, and in January this was so far verified by the following of a rich lode for 10 days, extending 25 feet in length, which led the superintendent to write most hopefully of the future prospects, believing at the time that he had struck the true ledge, and that development only was needed to find these broken bodies of better grade quartz continuous.

"This fact and the possession of our magnificent water power, together with the very great cost of drilling by hand, in the extremely hard rock of the mine, decided the Board to proceed at once with construction of the dam, flume and power house, and to advertise for tenders for air compressors, turbine, and other machinery. Mr. W. M. Mackinnon, C.E., was called in as consulting hydraulic engineer pro tem., and during March the contract to Mr. R. H. Woods for dam, flume, etc., was awarded

in the first instance in October, 1897, confirmed and issued. On April 7th tenders were accepted from the William Hamilton Manufacturing Company for a Rand drill, compressor plant and turbine wheel, all of which were in due time erected and have been successfully operated during August and September. Wood fuel for steam power being very expensive, and the visible supply on the company's property being very limited, the engine was arranged to be driven by compressed air, and was found to work quite satisfactorily, this alone assuring a large future economy, in milling account. To provide for this machinery and the working expenses of the mine, the remaining 50,000 treasury shares were sold; and, notwithstanding depressed prices obtainable for the company's stock in the open market, were taken up at par, net to the company: 18,500 shares in Vancouver by President Mackinnon and his friends, and 31,500 in England, producing together \$50,000.

From January till the end of April a good deal of development work was done in the mine, and of so fairly encouraging a nature that, when mining was resumed in August, after the installation of the turbine air compressors and machine drills, and the readjustment of the tramways and the erection of the necessary ore bins, etc., it was confidently believed that sufficient ore could be obtained from the upper workings to run the mill for 3 months necessary to drive in the new tunnel at the 240-foot level, and thus of sufficient average value to, in the worst instance, pay all expenses for the time being, but unfortunately, gentlemen, this did not prove to be the case, and at the end of a month's run the superintendent was obliged to advise the president, when the latter was in Lillooet on September 1st or 2nd, that the ore was on all sides extremely low grade, and so limited in quantity that the mill could only be run some days longer.

The then position is categorically described in a letter from Superintendent Rives dated September 5th, which I will presently ask the secretary to read and it is much to be regretted that the president did not, on arriving in Vancouver, at once communicate with the Board and adopt active measures to cut down expenses. Instead of this, he let matters drift and was out of town at the Board meeting of September 13th. However—a quorum being then present—it was resolved to telegraph the superintendent to at once close down the mill, clean up, and discharge all hands except drillmen in the lower tunnel, it being the intention of the Board to continue this work if at all possible.

On September 13th, we were advised by telegraph of the robbery of amalgam. I myself went to Lillooet to investigate, and on my return a meeting was held on September 29th, at which I presented a report, and it was decided that, on account of the robbery and the poor result of the clean-up, we had no option but at once to discharge all hands and the superintendent was instructed by telegraph, leaving only a watchman on the premises.

Such, gentlemen, is the unfortunate position in which we stand. During the recent mill-run 900 tons of ore were crushed, 44 tons of which only were of the better quartz, the balance assaying barely \$2 per ton, and the gross average being \$4.50. The problem we have now to face is, what is the best course to pursue?

At last we have apparently a ledge to follow, the location of which is shown on the plan now before you; very low grade, it is true, at present, assaying \$1.75 per ton, but having good walls, we are advised by Superintendent Rives. It certainly seems worth following, and with every appliance at hand, it will be most unfortunate if some means cannot be found to provide the necessary funds. Whether, if these can be found, this work should be done now without extraneous advice, or whether, as a first step, the opinion of a reliable first class expert should be taken on the property, is for you to decide. The question is entirely one of funds.

At the moment the company has liabilities of about \$2,000, and has a suit pending with the late trustee, Dr. Carroll.

The estimated expense necessary to prove the ledge now visible, by sinking a winze and running the lower tunnel, to connect which work would take 3 months, using machine drills, is, as estimated, by Superintendent Rives, roughly \$8,000, for labor power, etc., so that \$10,000 at least would be required, and may be considered as dead work before we would commence to get out any ore for matting sufficient to start upon the work; of course, the chance remaining that it may even then be labor in vain if values were not found at depth.

There is now, I am informed, snow on the ground, which would not hinder tunnel work, but would prevent any expert examination of the whole property for six months, and were an expert merely sent to examine the actual present workings, it would seem as if the money, were such available, had better be utilised to sink a winze, and follow the ledge. Should it be thought best to close down for the winter and do nothing till a thorough examination of all the company's claims is possible, we have then to consider how are the present liabilities to be met, and what arrangements should be made to safe-guard the property.

BALANCE SHEET.

The balance sheet up to November 16th, 1898, showed: Assets, \$506,785.47. The liabilities were set out as follows:—

Sundry creditors	\$ 2,302 87
Capital stock account, 500,000 shares of \$1 each—fully paid	500,000 00
Profit and loss account	4,482 60
Total	506,785 47

The items in the assets include the "property account," which represents \$506,693.69, including \$26,126.08 paid for hydraulic and compressor plant; amount paid for five claims bought from Golden Eagle Syndicate, \$387,328.80, cost of acquiring additional claims and of developing the properties, \$96,092.80. From these amounts is deducted the sum of \$2,853.99 for interest and bullion. Book debts were set down at \$6.30 and balance in hand \$85.48.

The accounts were audited on November 16th, by Mr. W. Stein, chartered accountant.

A report made in June, 1897, by J. A. Macfarlane was read. In this the condition of the property is given as "in the highest degree disappointing." It reads: "As far as I can see, our main vein is simply a blowout or large pocket on a comparatively small vein of poor ore. This pocket tapers down to almost nothing to east and west, as also to north or north west as we advance in the mountain. In the incline shaft, following the hanging wall down towards the vein now only measures about three feet and consists of pure looking quartz and slate, carrying only traces of gold. The total amount of millable ore in sight is so small and its grade so low that I do not see how we can manage to run the mill for any length of time."

Mr. Skene stated that he was ignorant of Mr. Macfarlane's report up till October 20th last. In reply to a question he said the position of the company was that it was \$2,000 behind, and wanted \$10,000 to go on with.

After a great deal of talk a resolution was carried appointing Messrs. I. O. Benwell, Creary, G. B. Harris, J. J. Buntell and A. H. Chaldecott to confer with the directors and report at an adjourned meeting to be held on the ensuing Wednesday.

Hall Mines, Limited.—The following is excerpted from the report submitted to the recent annual meeting of shareholders:

"The Directors beg to submit to the shareholders the statement of accounts and balance sheet for the year ending 30th September, 1898, duly certified by the auditor, being the fifth balance sheet issued since the formation of the company.

"This balance sheet shows a gross profit amounting to £28,861 13s. 11d., which, together with £47 18s. 8d. brought forward from 1897, makes a sum of £28,909 12s. 7d. Out of this amount the directors have already (on the 21st April last) appropriated the sum of £12,500 to the payment of an interim dividend of 5 per cent., being 1s. per share on the ordinary shares of the company, and £1,750 to the payment of a dividend of 7 per cent. on the preference shares, which appropriations you are asked to confirm. After deducting these two amounts there remains a balance of £14,659 12s. 7d. from which the board have thought it advisable to write off the sum of \$6,052 2s. 5d. for depreciation on buildings, plant, and machinery, and £7,361 17s. 2d. for cost of prospecting work at the company's mine, prior to 1st October, 1897, and on a copper claim since abandoned, leaving a balance of £1,245 13s. 0d. to be carried forward to the credit of the account for the current year.

"Although the result of the year's business is disappointing in view of the expectations entertained at the date of the last general meeting, the board have reason to believe from indications shown by the development work which has been in progress for some time past, and from the report of the mine superintendent, as also from the report of Mr. John E. Hardman, President of the Canadian Mining Institute, a mining engineer of high repute in Canada, who has recently, by the board's direction, inspected the company's property, that the output from the mine will shortly be increased in quantity and value, although temporarily diminished during the last few months.

"Mr. Hardman's report is circulated herewith, and will be found to fully confirm the confident opinion that the board have all along felt in the management of the company's property, and in its economical working, and they are glad to say that after a thorough examination of the mine, Mr. Hardman is able to express a very high opinion of its prospects; the only exception that he makes being that the development is too much behind, and consequently the cost of working has been higher than it need be if the mine were more fully opened out.

"Hitherto, as the shareholders are aware, the object of the board has been to so work the mine that it should be practically self-supporting; that is to say, that development and output should be carried on concurrently, and so long as the ore continued of a fairly high grade, that course was possible, the yield being sufficient to meet the working expenses and pay dividends, but the loss of connection with the richer deposits in the mineral zone, temporary only as it is believed to be, has for the present made that plan impracticable, and rendered it necessary to adopt the course which Mr. Hardman recommends, viz., to make the output for the time being subservient to a more extensive development of the mine. To do this, however, more capital is needed, and in order to provide this the board have decided to issue first mortgage debentures to the amount of £50,000, bearing interest at 6 per cent. Particulars of this issue will be found in the papers forwarded to the shareholders.

"The insufficiency of copper in the ore in the new south ore body has been a disappointment, but the board have reason to expect that in the property called the "True Blue" mineral claim, situated at Kaslo, which is at the head of the Kootenay Lake, and within easy reach of the company's smelting works, they have secured a property carrying a high percentage of copper which will serve as a useful flux to the "Silver King" ore.

"Owing to the difficulty of keeping up a full supply of ore from the mine while there was so much development work going on, the large blast furnace was in blast 261 days only, but its working continues to give great satisfaction.

"The second reverberatory furnace and roasting oven which were in course of construction at the date of the last meeting were completed in January, and the refining works have continued to give satisfaction.

"With a view to still further economise the cost of tramming ore from the mine to the smelter, the board have adopted improvements which, when the mine is more extensively developed and a full and continuous supply of ore obtainable, will reduce the cost to about 25 cents per ton, as against the present cost of 44 cents.

"In accordance with the wishes of the shareholders as expressed at the last general meeting, the board, with the valuable assistance of Mr. George Freeman, obtained an official quotation for the shares of the company, which are now regularly quoted on the official list of the Stock Exchange."

ENGLISH LETTER.

LONDON, E.C., 9th December, 1898.

The Canadian Mining Market in London has been dull and invertebrate during the past month, and practically the only feature was the revival in Globes and B. A. C's. which preceded the flotation of the Le Roi by the Whitaker Wright group. During the absence from town of the retiring gentleman, who in conjunction with certain titled people, looks after the affairs of the different companies constituting the group the bears had taken liberties with the respective issues driving London and Globes and B. A. C's. to about the same low level, viz., 12s. 6d. As it was, however, necessary to secure a successful debut for the Le Roi, Mr. Whitaker Wright and his friends speedily put a different complexion on the market appearance of their own particular stocks. The capital of the Le Roi is £100,000, in £5 shares, and with that haste which is such a feature of latter day promotions, the Market, or those who look after the Whitaker Wright interests, have created a premium of about ¼ for the £5 Le Roi share. In other directions business has been practically non-existent. Now and again bargains booked, but there is no "speculative market" in Canadian Mines, and even the very best shares such as London and B.C. Gold Fields, Alaska Gold Fields, and Whitewater Mines command but modest premiums. Occasionally alterations, generally very fractional in amount, are recorded, but these are only done at the instance of the various promoters in order to make those interested think there is business going on in the particular property in which they may be shareholders. It is an old promoter's dodge, but investors in this country benefit so little by past experience, that it serves now as well as formerly. The New Goldfield group are all at a discount, and the Goldfields of B.C. Cos. have fallen to mere shadows of their former quotations. Thus the parent Co. is priced at 2s. 6d., and Waverly's are nominal at 3s. 6d. or so. Colonel Anstey is home again, and we shall, no doubt, soon hear the result of his recent visit to the properties of the various companies. I am told that the London and B. C. Gold Fields are going strong, and that the Alaska Gold Fields has earned enough to pay a 50 per cent. dividend upon its issued capital. The B.C. Development Cos. have, like Humpty

Dumpty, had a great fall, the parent concern being valued now at about 1s. 4d., and its offspring the Fairview at half even that modest figure. The shares of the Lillooet and Fraser River Gold Fields have been little in demand. The third annual general meeting of this unfortunate Co. will be held at Cannon Street Hotel on 15th inst. Poor Hall mines have been selling, I believe, at as low as 8s. 9d. each. Can you tell us what is wrong with this company? The headlong fall in its shares has been one of the incidents of the year. Probably the weakest spot in the whole Canadian market is the Klondyke and Columbian Gold Fields section, that coterie with which the Premier of British Columbia, and Mr. Pooley associated themselves. This group comprises the company mentioned, the Dawson City Trading, the New Golden Twins, and the Rainy River and Ontario Exploration ventures. They are all quoted at heavy discounts from their nominals, varying from 60 to 75 per cent. It will interest British Columbians to learn that the wonderful Dawson City Trading Co.'s shares, £1 each, with which their late Premier is so closely allied are quoted at about 5s. a piece here. It is not flattering to Mr. Turner. I hear that he has decided to join the board of another company which is shortly expected to make its appearance. If I mistake not it will ultimately be found to be a horse from the same stable. The Dominion Mining, Development and Agency Co., has issued a report covering its operations to date, and showing a considerable higher profit. An effort has been made apparently to put the shares up a bit on it, and they have been quoted—whether business was marked at that price I should not care to aver—at about 1½, or ¼ less than L. and B. C. Gold Fields. If I were asked my candid opinion of the relative merits of these companies, I should be inclined to say that they belong to different classes, and that their difference in class is not correctly defined by ¼. The Queen Bess Company may be doing all right to quote them about 5s. dearer than the B. A. Co., seems to me ridiculous, when we remember the very important interests the Corporation possesses. Klondyke companies are out of fashion, and the fiasco about the Klondyke Hydraulic Company, which I severely criticised on its inception about a year ago is hardly likely to reassure investors. The whole prospectus seems to have been built up on the fraudulent statements of a man named Camble, whose efforts to obtain a large quantity of cash for visionary statements and unconvincing documents were luckily frustrated by the good sense of the directorate. This was the concern where the vendor was supposed to have a large can full of gold stored away in a cabin, which he was ready to transfer as well as his claims for a small cash sum paid in London. The whole thing appears to have been a swindle, and although the board do not appear to be wholly free from blame, I am pleased to be able to compliment them upon their decision not to part with a penny until they had had tangible proof as to the value of this Yankee property. Another Klondyke company has been a bit of a frost, and I hear that it is believed that developments will show that quite a number of those floated here in the boomlet of August, 1897, will prove barren propositions, if not rich swindles. The Trading Cos. should do fairly well, if there are not already too many of them, and the Yukon Gold Fields—one of the London and B. C. Gold Fields—is also a sound honest company, which should be able to give its shareholders a good return upon their capital, if honest and capable management can do this with a Klondyke property. Ontario properties never move, even the lively Golden Twins are dismal and dejected. This is the company you "slated" rather badly back in the summer. Vancouver Syndicates are no better than 10s.—not so long ago they stood at £7 10s. I hear that they have shut down the Galena Mines, which was brought out by the Vancouver Syndicate. It affords some satisfaction to be able to say a good word or two about one Canadian property, this is the Canadian Pacific Exploration, Ltd., which will shortly issue its first annual report. The company originally acquired the properties, options and cash assets of a Syndicate, and altho' it has thrown up some of the options, it seems to have acquired a "Mine" in the "Porto Rico" at Ymir. Mr. Corbould, the managing director, is out at Rossland, and while out there is examining some Arizona property in which the company has a large interest. The Porto Rico commenced crushing I hear to-day. It has a fine plant, and seems to be spoken of well locally. The people at the back of this are as sound as a bell, and it is significant that there have not been—so I understand—a half a dozen deals in its shares since the inception of the company. The meeting is to be held on the 21st inst. When Mr. Corbould comes home the shareholders will be called together again to hear an account of his visit to the properties in which they are interested. Among local Cos. transferred to London Cos., I hear the Athabasca—of which Messrs. Whitehead & Chown are brokers—well spoken of by those who should know what they are talking about. Dealings here, however, in local shares are practically nil; people won't look at dollar shares, and affairs like that of the Buckingham of Rossland, are not likely to make them look more kindly upon this method of introducing the home investor to Canadian mining enterprise.

THE MINING EXHIBITION IN LONDON IN 1899.

With the turn of the year the preparations in connection with the above—briefly referred to in my last letter—will begin to assume definite shape. It is hoped that Canada will be worthily represented. To-night I saw Mr. Dyer, the secretary of the body which is making the necessary arrangements, and he told me that Canada seemed to be waking up at last. Even economical reactionary B. C. seems to have sent a delegate to see if they would be doing wisely in supporting what should be a most useful Exhibition. Mr. Dyer was, however, surprised when I told him that I believed your Mr. Bell had arrived in London. He (like myself) was—little sorry I think—that Mr. Bell had not called on him earlier seeing how short is the time which is left to intending Exhibitors to make their final applications as to space, &c. Mr. Dyer supplied me with the following interesting information regarding next year's Mining Exhibition:—

The Council of the Chamber are glad to announce that the second allotment of space has taken place, and almost all the covered space in the mining courts has been allotted. About 800 square feet remain for further application in the working Machinery Hall, but, without counting upon future exhibits, those already arranged will constitute one of the most valuable and interesting exhibits of mining machinery in notation ever held in London. Manufacturers know that the Head Offices and Directorates of upwards of 3,000 of the leading mining companies of the world are in London, and that these are large buyers of machinery chiefly purchased in or through London. The Directors and Chief Engineers reside in or within easy visiting distance of our great city, and purchase the mining machinery for their respective companies. It is, therefore, as plain as the proverbial "pikestaff" that London is pre-eminently the place for an exhibition of mining machinery, and it is due to this view being widely held that so many of our leading mining machinery manufacturers have applied for space.

Though there is not much space left in the working Machinery Hall for dilatory exhibitors—in prospective, there is a fairly large area of open space round the lakes fronting the Brompton Street entrance and alongside the Queensland and Victorian Mining Sections, upon which arrangements have already been made to erect further buildings for Mining Exhibits, amongst which it is expected that British Columbia

will occupy a prominent place. It is also proposed to erect the Mining Engineers' Club room on a portion of this space. Applicants for space, too late for other parts, will be accommodated in these special buildings, but, it is positively and finally announced that *all applications for space must be in on or before December 30th.*

In view of absurd reports in circulation concerning the part taken by the Chamber in connection with next year's exhibition at Earl's Court, it may be as well to make the following statement:—

The Chamber takes no part in and has never concerned itself with any other portion of next year's programme at Earl's Court, excepting that of the Mining Section. It should be known that the Chamber had intended holding an International Mining Exhibition in London next year, and had been preparing for this for nearly a year before arranging with the Earl's Court authorities last August to "embody their Mining, Metallurgical and Machinery Exhibition with the Greater Britain Exhibition to be held at Earl's Court next year." This statement was approved by the Earl's Court proprietors, who further stated in their contract of August 11th with the Chamber—Clause 1, that "the control and arrangements of the Mining Exhibits in the Mining Courts of the Greater Britain Exhibition to be left in the hands of the London Chamber of Mines" (subject, of course, to the necessary approval and compliance with rules, &c., of the proprietors).

Up to date the Chamber has actually received application and deposit cheques for 26,000 square feet, and by requesting the Local Chambers of Mines to wait in Deputation upon the Colonial Governments, has succeeded in inducing the Governments of Victoria and New South Wales to apply for large areas of space for mining exhibits. As regards Queensland, the Chamber has a letter from the Premier in answer to the Chamber's representations through its delegates agreeing to send exhibits long before any other London Exhibition for next year was thought of. These colonies sent their applications direct to Earl's Court with the fullest approval of the Chamber, and as a matter-of-fact, according to the Chamber's agreement with the Earl's Court authorities. Including the approximate space to be occupied by the Colonies, including British Columbia's expected application and that occupied by other mining exhibitors, the total space expected to be covered by Mining Courts will probably exceed 100,000 square feet. The West Australian Court not mentioned in the above is 19,000 sq. feet.

B.C. MARKET.

The following is from the *Daily Mail* of yesterday:—"It is probable that a British Columbia market will be a necessity in the Stock Exchange. It was tried a little time ago, and proved a failure; but now, with the extensive dealings in Le Roi shares, and with the further Le Roi and British Columbia companies that are promised, there will, in all probability, be a clique of dealers to take the shares in hand. It will be remembered that the "B.C." market, as it was called, was killed by a prominent dealer bidding higher prices in the West Australian market for the shares than the jobbers in the new section could venture to offer." I had not heard of the decease of the B.C. market, and I think I should have done. I fancy my friend Mr. Rose will have very much surprised Messrs. Boyer, Paul & Co., for we were always under the impression that limited as was the market it was still embodied in the gentlemen in question. Mr. W. Wright's action in having his properties the B. A. C. and Le Roi dealt in the West Australian section was only on a par with some of his other decisions. Instead of supporting the new market as he should have done, he seems to have rather overlooked it. But then promoters were never particularly mindful of any one else's interests than their own.

LE ROI FLOTATION.

The feature of the month has been, of course, the Le Roi flotation with a capital of £1,000,000, in £5 shares. It is said that the capital has been subscribed twice over, but this I presume includes the underwriting, and so may not amount to much for I understood from the outset the issue was well underwritten. The premium on Le Roi's, which had been £1, equal to 4s. on a £1 share, fell back yesterday to 15s. and the rest of the W. Wright group were easier. By the by as you will see from the prospectus, the new Co. apparently does not get the Smelter, so that they are paying £950,000 for the Mine alone. The group probably are keeping back the Smelter for subsequent disposal.

Among new Canadian Cos. registered during November are the following:—

British Canadian Gold Properties, Ltd., Capital	£100,000
Chemarus (B.C.) Mining and Smelting Co., Ltd., * Capital	100,000
Felix Klondyke, Ltd., * Capital	60,000
Smelting Co. of B.C., Ltd., Capital	50,000

The moderate dimensions of this list will show you that for the moment the promoter is giving Canadian mining matters a rest. In view of the large number of Cos. already in existence, and ready to be launched at the psychological moment this is perhaps just as well.

LAKE OF THE WOODS.

In reviewing the mining operations on the Lake of the Woods and vicinity for the past year, one cannot point to any very striking success at any one property, excluding consideration for the present of our three producing mines. Quite a number of prospects that were working a twelve month ago are now closed down, and although new prospects have come into the mining field and are being developed with encouraging results as far as the work has gone these have not materially added to our knowledge of the underground geology of our gold field. What is needed is deeper working. In numerous shafts on temporarily abandoned properties the veins at varying depths of from 30 to 50 feet have materially changed in character from quartz to slate or crushed country rock, with the quartz reduced to threads or stringers. In other cases it is believed that the vein has been lost—through a "slip" e.g. When this discouraging state of affairs supervened the owners went ahead for awhile on the small amount of mining faith that was in them, but in most instances soon lost heart and shut down in order to further study the situation.

Whilst the above remarks apply in a broad and general way to the season's operations, there are some exceptions which must be noted, as e.g., the Triumph, Stella, Cameron Island and Sirdar.

TRIUMPH.

The shaft is down 250 feet, and some drifting also has been done. The vein is of good width, well defined, and of fair values. This property is about ready for a stamp mill. Dissensions amongst the owners is said to be the cause of its lying idle.

*Pro pectus since issued.

STELLA.

In the Stella shaft work was carried on for a good while under discouraging appearances whilst the great depth of barren ground was being sunk through. At a depth of 30 or 60 feet the quartz in the shaft gave out, being replaced by black altered wall rock, the quartz being confined to strings and pockets. This continued until the 128th foot, when the quartz came in again to a thickness of 4 feet, when work stopped. The history of the last few days in the shaft is worth recording. A "slip" joint plane—presented itself which seemed to be a portion of the hanging wall, and was maintained to be such by some who saw it; they averred it was the hanging wall straightening up. The miners, however, were of a different opinion and put in a blast which disclosed the true hanging wall beyond. After this loose ground was met containing cavities lined with crystals of pyrite, chalcopar, etc, there being at the same time an unusually strong flow of water. Shortly after this the quartz made its appearance, and at this point the work was suspended.

CAMERON ISLAND.

At this property also valuable work was done during the season by sinking and drifting, in the way of proving the permanence of our quartz deposits in depth. Testimony along the same line is being accumulated by the operations at the

SIRDAR.

The shaft is now more than 100 feet deep and work going steadily forward, the vein having greatly improved upon what it was at the surface.

Upon the whole then, although a good deal of the work must be admitted to have been of a tentative character, the net result is an increase of confidence in the country, especially when we look at the three established mines, and also at the developments in other parts of the Rainy River District.

A notable feature in milling on the Lake of the Woods has been the installation of seven Tremaine mills at the Regina, while the operations at the Burley mine in Bald Indian Bay constitute a novelty in shaft-sinking. The gold area has been extended towards the south-east by the rich finds at Deer and Sturgeon Lakes, east of Regina. Although there have not been many transactions in the way of sales during the year, there are a number of claims so far advanced in development as to be almost in shape for offering to capitalists.

WILKINSON LOCATIONS.

Work has been stopped and the men paid off. The Cliff and the Vulcan shafts are each down about 55 feet. Mr. Purchase, who was directing operations, is going to England this month.

MIKADO.

A very rich chute of ore has been struck between the 150 ft. and the 200 ft. level of No. 2 shaft, and many highly exciting stories are afloat which are of too extraordinary a nature for printing yet. Some large nuggets have been found and a quantity of the ore is so rich that it is being put up in bags for shipment direct to the United States assay office in New York, it is said, but no doubt to a gold-refining establishment first. Men are said to be constantly on guard at the place in the drift where the rich stuff is taken out.

The Mikado horse team with a load of supplies for the camp broke through the ice and went to the bottom in 60 feet of water at the west end of Clearwater Bay on the 5th inst. There were 1,200 lbs. of iron in the load and thus dragged down horses and everything, nothing being saved except a few unimportant articles that floated. Good and thick ice was very late in being formed this winter, owing chiefly to a fall of snow soon after the first freeze.

THE FYCOON.

The work of the diamond drill upon the islands that form part of this property appear to have disclosed a rich strike. An aggregate of 80 ft. of quartz was pierced, averaging high in gold, it is said. This aggregate is made up of a number of veins. The granite country rock between the veins assayed well, too. A well known English syndicate is reported to be negotiating for the purchase of the property.

SENTINEL.

The main shaft is down about 90 feet on the dip, and work going vigorously forward with a force of eight miners. A Denver whim is used for hoisting. The shaft will probably go down 150 feet before drifting commences. The vein has a beautiful hanging wall with narrow clay parting.

The town of Rat Portage is a tolerably fair example of the prosperity that is generally diffused throughout a community by the existence of a mining industry. Originally of no importance except as being a divisional point on the C.P.R., saw-mills were built which added to its business population. But there was little or no expansion of lumbering, and the weak and spasmodic attempts at gold prospecting—of mining there could not be said to be any—added little to the general wealth of the place. In the summer of 1896 the Mikado property was sold to an English syndicate, and the exceedingly rich returns from the trial sample of the ore put through the Rat Portage Reduction Works, together with the successful issue of the prolonged prospecting that had been going on at the Sultana—not forgetting, of course, what had been achieved at the Regina—these happy issues, I say, gave rise to a wave of mining development which marked an altogether new era in that industry in this district. In fact, in comparison with what had been accomplished up to that time, the mining industry may almost be spoken of as having been then created. The effect on Rat Portage has been most marked, for it has risen from being a considerable village to be a large town, its population having more than doubled, while its wealth in buildings and real estate increased in even greater proportion. The outlay for improvements in the town this year has been about \$230,000. As types of buildings of different kinds that have gone up, chiefly during the last two years, may be mentioned the Robinson-Brydon three-storey stone building, offices, etc., the Rose three-storey brick, hardware, the Hilliard opera house, Shaw's hotel, the four-storey brick veneered convent-school, a cold storage building and three handsome brick and stone churches.

In addition to the great growth of the town must be mentioned the large increase in the amount of customs dues collected at this port, the great increase in the railway business, and the increase in the tonnage of the lake craft—the s. s. *Aconora* is a large boat and first-class in every respect. All, or very nearly all, of this increase in wealth and prosperity has been due to the inception of the mining industry nearly three years ago. And yet the average man amongst the comparatively small number of Ontario people who take any interest at all in the matter, if questioned as to their opinion of the mining industry, would no doubt point to the page in the Bureau of Mines Report giving the amount realized from the sale of mining locations!

RAT PORTAGE, Dec. 17th, 1897.

J. M.

The Le Roi Mining Company, Limited.

The British America Corporation, Limited, having acquired the Le Roi Mine, have turned it over to the Le Roi Mining Company, the purchase consideration being £950,000, payable in cash or fully paid shares. The authorized capital of the company is £1,000,000 stg. The directors include the Marquis of Dufferin and Ava, Lord Loch, Whitaker Wright, all of whom are directors of the British America Corporation, Limited, and H. H. Andrews of the Toledo Steel Works, Sheffield. The statements of the following authorities as the condition, value and prospects of the mine are summarised from the prospectus:—

MR. CARLYLE, Cables:—Le Roi Mine 70 acres, title perfect; total dividends 995,000 dollars. A proof of average value is shown from treatment of 56,000 tons, which yield 85,000 ounces gold, 81,000 ounces silver, 700 tons copper, average thirty-one dollars per short ton. Propose to push development ahead of extraction and prepare the mine for increased shipments. Fissure vein extends quarter mile through property, dip 65 degrees, width has attained to 60 feet shipping ore, chute 500 feet long, varies from four to forty feet wide. Large amount ore standing in lower workings; 7,000 feet drives and cross-cuts; main shaft incline 800 feet deep; will soon drive level here; the lowest level 700 feet shows chute 30 to 40 feet wide, good pay ore on each wall six to eight feet wide, average for whole width will pay well when shipped in large quantities; chute here now 200 feet long west end not yet reached; hence large ore body extends 136 feet up to 600 foot level, a connecting winze being all in ore. 600 level slope 400 feet long with ore 2 to 30 feet wide, backs good, pay ore on both walls 4 to 10 feet thick—low grade shipping ore between new chute 100 feet west, 200 feet long—2 to 5 feet wide, good ore. Excellent air compressor plant, good hoisting engine, good buildings, two railroads at mine, good labour, good supplies, reasonable prices, pump little water, now preparing to develop thoroughly, mine to west and in depth. After completing my development plans will ship 400 tons daily, which I am convinced will net splendid results; and believe systematic development will provide immense ore reserves, from which handsome dividends can be paid. Large shipments possible after 800 foot level well advanced, and our smelter enlarged to treat 1,000 tons per diem.

MR. J. BREEN, Cables:—I confirm statement made to Hon. Charles H. Mackintosh, that upon the basis of 400 tons from Le Roi, at average values past three months, a profit of £20,000 per month will accrue to Le Roi Company. With development now proceeding and vast body of ore in various levels, I am able to say that treating of ore in sight will greatly enhance profits.

MR. JOHN M. LONG, Cables:—Le Roi shows three separate veins surface; all work confined to one, Le Roi vein. Mine developed by shaft 800 feet deep, started in ore body 200 feet long, averaging 5 feet wide, increasing to 15 feet before 400 level reached; this chute having yielded good pay ore, running in width as high as 60 feet. On 350 level west drift extended 850 feet from shaft, showing 3 feet ore in face. Above 500 level ore 30 feet long, 30 feet wide, 25 feet high. Above 600 level ore body 400 feet long, 40 feet high, 20 feet wide; face west drift 738 feet from shaft shows 4 feet vein. On 700 level west, magnificent body; also shipping ore 40 feet wide, 200 feet long. This body will likely extend much further west, and measures 135 feet to level above winze at centre ore body, connecting 700 with level above, all in ore. With systematic development, in my opinion possibilities of this mine are enormous.

MR. D. I. MALDONALD, Cables:—Examined Le Roi to-day; large amount virgin ground above 400, three veins exposed surface and below 400 level, but only centre Le Roi vein worked. Believe large bodies ore will be uncovered above this level. Considerable ore between 400 and 500 levels unstoped; between 500 and 600 large chute ore, 400 feet long, 40 feet high, 20 feet wide. In 600 west, 740 feet from shaft, new ore chute 2 to 5 feet wide, and 160 feet long. On 700 level, one of finest ore bodies I have ever seen, 40 feet wide, 200 feet long, still continuing west 135 feet high, shown by upraise, all in ore, to 600 level. Examined mine last January, when I was Government Mine Inspector. Can safely say double amount ore in sight to-day. Excellent plant, machinery. Mine as now worked is in good condition, and when further exploited I believe Le Roi Mine will stand second to none on this continent as gold producer.

MR. N. T. TREGGAR, Cables:—Le Roi Mine has 3 compartment shaft, 2 compartments for hoisting, 1 ladderway; vein pitches 65 degrees; stoped in places to width of 60 feet. On 200 east, ore 100 feet long, 5 feet wide; in 350 west, vein 3 feet wide; 500 level new vein discovered 35 feet south, pitching 45 degrees, crossing Le Roi vein between here and 600; this vein has been discovered on 600 by cross-cutting north, showing vein 3 feet wide; 600 level ore body 400 feet long, has been stoped 10 to 30 feet wide; ground available to slope at this point, 400 feet long, 35 feet high, with good ore showing on each side, centre filled with low grade ore; 100 feet west of this new ore body discovered 200 feet long, 2 to 5 feet wide, very promising. At end of this drift cross-cut driven south 25 feet looks very promising. 700 level shows ore 40 feet wide, 200 feet to face, with three strikes of better ore one on each side, one centre. Connecting winze sunk on this ore from 600 to 700 distance 136 feet all in ore. 800 level drifting on vein will commence forthwith. Virgin ground west of our present workings, 2,000 feet long, with three veins showing on surface? One on each side of main Le Roi vein. This ground will be developed by sinking vertical shaft west end of property, which in my judgment would discover ore bodies equal to any yet opened. Convinced development will uncover further large ore bodies in this magnificent property. Had charge of work for over two years.

MR. RATHBONE writes:—Having an intimate acquaintance with the mines situated on the Red Mountain, Rossland, of which the Le Roi mine is certainly the most important, and having recently made an inspection of its underground workings, I have no hesitation in stating that the Le Roi vein is a true fissure and will consequently live in depth.

At the lowest workings, at a depth of about 700 feet, the ore body has not only increased to a width of from 30 to 40 feet but has also well maintained its average value.

On the basis of the present daily output (equal to an annual production of 120,000 tons) taking the average grade of ore at £6 per ton (based on the result of smelting over 40,000 tons) and the cost of working, inclusive of mining, treatment, freight, and all other local charges at £3 per ton (the past actual working results), the annual profit should be £360,000.

With liberal development work and the opening up of other ore bodies, I see no reason why this profit should not be increased.

The Le Roi mine is undoubtedly one of the great mines of the world, and for full particulars in regard to its past and future working (based on facts, as proved by practical working results). I beg to refer to my detailed report.

The Sultana Mine, Limited.

This is the title of an English syndicate recently incorporated to acquire the well known Sultana mine, Lake of the Woods, Ontario. Comment held over until next REVIEW.

The share capital of "The Sultana Mine, Limited," is fixed at £200,000, the whole of which is taken by the vendors, the British Capital Corporation, who acquired the property from Mr. J. F. Caldwell, in part payment of the purchase price. In addition there is to be an issue of £300,000 in five per cent. first mortgage debenture bonds of £100 each at par, and it is these for which the British public is being asked to subscribe. The total issue, after meeting the purchase price, provides a working capital of £50,000.

The debentures will be redeemable in ten years by annual drawings of not less than £30,000 at the price of £110 per cent., the vendors making the requisite provision with a Paris Bank for the due fulfilment of this obligation. No public issue of the prospectus will be made until the condition has been made with the bank.

The trustees for the debenture holders are Colonel W. W. Knollys and Hon. D. Keppel. The London board consists of H. P. Clinton, John Simpson and Admiral L. C. Keppel. The advisory board in Canada is composed of Messrs. T. G. Black stock and James Carruthers, of Toronto.

What figure Mr. Caldwell actually gets for his property the prospectus does not say. The total amount to be paid by the new company under the contract has been fixed at £450,000 by the vendors, the British Capital Corporation, who are the promoters and who are selling at a profit. Of this amount £200,000 is payable in fully paid shares of the company, £10,000 in first mortgage debenture bonds, and the balance in cash, the vendors making the requisite provision as to guarantee previously referred to.

ENGINEERS' REPORTS.

Just about a year ago two English mining engineers, A Grover and G. Neustalder, were sent out specially to report upon the mine and spent several days examining the property. The report which they made to their principals, the British Capital Corporation, Limited, is dated January 19th last, the result being that on the 7th July the corporation acquired the property from Mr. Caldwell, but retaining his services as managing director.

The report of the mining engineers says the property comprises about 70 acres. The length of the vein northerly and southerly is about 2,200 feet, and a width of 1,500 feet easterly and westerly represents the area for parallel veins. At the surface the width of vein matter is about 30 feet. After the first level, 60 feet, is passed it widens out until at 150 feet (third level) it measures 55 feet between walls, and at 352 feet (the fifth level) it is about 30 feet wide again. From the top to the bottom it is one solid mass of ore, averaging seven dollars per ton right across. The tonnage of average class ore standing in the main shaft above the lowest level is approximately 25,000 tons of the average gross value of \$11 per ton.

OUTPUT AND PROFITS.

Mint certificates were produced by Mr. Caldwell, who proved that the net profits after the payment of all expenses were for the year ending 31st December, 1896, £10,600, and for the year 1897, £12,000.

The gross output of the Sultana for 1895, 1896 and 1897 has, according to the report of the Ontario Bureau of Mines, averaged \$3,000 per week, and this with an antiquated 10 stamp mill. On the 27th December last, however, a new 30 stamp mill commenced running, and in 144 days a net profit of \$75,000 was realized, being at the rate of \$151,000 per annum.

With the addition of a 70 stamp to the 30 now running it is estimated upon the basis of the present profits that the net profits per annum will be not less than £103,740, which is more than twice the amount required to pay interest and to provide for the redemption of the debentures. From this must be deducted

Interest on debentures, 5 per cent. on £300,000.....	£15,000
Redemption of debentures at 110.....	33,000
	£48,000

leaving a surplus of £55,740 for defraying the expenses of administration, management and dividend on share capital.

100 STAMPS PROPOSED.

It is proposed with the working capital of £50,000 to increase the stamp mill to 100 stamps, to sink another shaft 300 feet south of the present main shaft (on a large outcrop of the vein near the centre of the property), also to continue the sinking of the main shaft to the depth of 700 feet, and to drive distances of 750 feet on each of five levels running south, and to drive 200 feet in each of four levels running north, the latter work being for the purpose of intersecting the underlay of the newly discovered Pasha vein. The cost of sinking a shaft is given at \$50 per foot, and of drifting or driving at \$12 per foot. Taking the result of the workings of the mine for the past three years as a basis of calculation, the result of the projective developments will be to put in sight a body of ore where net value would exceed one million pounds sterling, and this in addition to the £750,000 already in sight.

NELSON NOTES.

Nelson is still pretty quiet, as has been the case most of the time since summer, and it is probable that no great stir will be made till the New Year has fairly opened as that is the time when fresh hope and renewed confidence appear to be shared by everyone. Looking back however, over the last 12 months, Nelson has every reason to be satisfied with the progress made, not only in mining matters but in the town itself, which is rapidly extending in all directions and now bids fair to become the most important commercial centre in West Kootenay. The practical completion of the Crow's Nest line will exert a most valuable influence on our prosperity, by opening up ready communication with other districts which have hitherto been very difficult to reach, and so enabling us to cater to the wants of a much larger population than we have so far been able to attend. Most particularly East Kootenay will be far more extensively populated, as the vast bodies of mineral well known to exist there will attract the prospector and the capitalist now that the country is rendered accessible by the new line. Another railway also is spoken of, to connect Nelson with the Great Northern line through Bedlington, which would make a considerable difference in time and distance travelled to reach points east of us in the United States; many people preferring to return to the old country by that line rather than by the C. P. R. on account of the time saved. When passenger trains are run regularly on the Crow's

Nest line, however, that will be by far the quickest route East, and as the road has been formally taken over by the C. P. R. it is not likely that a regular service will be long delayed; a large party of the prominent business men of the district having already been taken along the route as far as the very extensive coal beds a few miles this side of the actual Crow's Nest Pass. All the excursionists seem to have enjoyed the trip immensely, and speak most highly of the hospitality shown them by the C. P. R. during their three days expedition.

It is sad to have to report a serious accident on the Lake here. The steamer "Ainsworth" capsized in a heavy squall near Pilot Bay (which is a notoriously rough place) and no less than nine lives were lost. None of the bodies have been recovered, but the Kootenay Lake so seldom gives up its dead, that it is more than probable that those who perished will never be seen again. There has been a good deal of comment on the matter, some saying the vessel was leaky, and others that she was overloaded, both statements however, being emphatically denied by those of the crew who were saved, and probably an enquiry will be made and the blame, if any, fixed on the right party.

Much more pleasant it is to be able to announce that the Athabasca on Morning Mountain, is looking extremely well. The result of the last clean up was a gold brick valued at \$8,000, and in addition there is a large quantity of "tailings" which will give a good value on smelting. This company is doing remarkably good work, and the management is entitled to great credit for the way in which the property is handled.

A neighbouring claim—the Exchequer—is also looking well, and some rock lately taken from there has given very high assays. A large quantity of the stock has been issued to local investors, who thereby show their confidence in the property.

Adjoining the Exchequer is a group of 3 claims, of which the California is perhaps the one on which most work has been done, and a smelter test on this ore recently gave over \$20 per ton.—the rock appears to be quartz, with arsenial pyrites, zinc blende, and a little galena occasionally. This group has just been bonded to Hugh Sutherland for (it is said) \$50,000, so that capital is being attracted here to some extent, although it is quiet generally speaking.

The Silver King (Hall Mines) is still doing very much development work, and is shipping more or less ore all along to the Smelter, while the Smelter in town is busily engaged in converting ore into anodes which are shipped East for further treatment.

The Last Chance group—frequently mentioned in previous notes—is being steadily developed, and the indications seem to point to a very fine vein being struck before long—a recent assay gave some 7 per cent. copper, besides gold and silver, and the tunnel now being driven should tap this vein at a considerably increased depth, which will settle the value of the vein beyond dispute.

The old mining camp, Aainsworth, has been much more active the last season than for some time previously, the development now being carried on at the various mines being very considerable indeed, and in nearly every instance proving the continuity and value of the various ledges as depth increases. The Skyline and Number One, are both producing very high ore, often running as high as \$500 per ton in silver, while the Tamarack and several more are shipping with great regularity. Some of the old timers prophecy that this old camp will be in existence after others now more thought of will have vanished, and facts seem to point that way.

From the properties that are being worked by the Duncan Syndicate on Eagle Creek (near Nelson) very encouraging accounts are given.

The Royal Canadian is showing extremely nice ore, chiefly free milling so far, though, of course, it may not prove to be so at a greater depth—time alone can show—but the ore at present will assay \$125 to the ton, which is by no means a small value. On the Granite group adjoining, much development is being carried out and money very freely expended to work the property in the most efficient manner.

The Boundary Creek district, though hardly connected with Nelson, seems surprisingly rich in copper deposits, and these have been quietly developed for some time. Now that the branch of the C. P. R. known as the Robson and Penticton is being built, the value of that district will be immensely increased. Already indeed it is announced that the C. P. R. intend to build a 1,000 ton Smelter there, though the exact site is not mentioned. That is rather a large order, but from all accounts the district can very soon supply the ore even if it cannot do so at present, and the C.P.R. may be trusted to know what they are about.

At Ymir also, a vast amount of work has been done with highly satisfactory results, and while it is difficult among so many good properties to pick the best, it is safe to say that the Porto Rico, the Elise, and the Dundee mines are showing splendidly, while very glowing reports are to hand from the Emma, Kalispel, and Morning and Evening Star. This is another B. C. mining camp that appears to have a most brilliant future, and that the prosperity which has marked the whole of the Province during the past 12 months may continue and increase in the new year now so close at hand, is the firm belief and earnest hope of your correspondent.

A. H. HOLMICH.

NELSON, B. C., December 14th, 1898.

MISCELLANEOUS NOTES.

Mr. Obalski, Inspector of Mines for the Province of Quebec, has issued recently from the Department of Colonization and Mines, an excellent monograph on the Gold Fields of Quebec. Mr. Obalski estimates that gold to the value of at least \$2,000,000 has been won since mining began in 1847. It is gratifying to note indications of a revival of interest in these promising fields.

The Mining Society of Nova Scotia held a general meeting of members at Halifax, on 21st instant. Full particulars of the proceedings will be given in our next issue.

The Ontario Bureau of Mines estimates that the gold production of Ontario this year will be at least one third greater than in 1897, when the value reported was \$190,000.

In our next issue we will reproduce detail drawings of the fine new 60 stamp battery and mining plant recently installed at the Dufferin mine, Salmon River, N.S., operated by the Montreal-London Gold and Silver Development Co. This fine property will add very considerably to the value of Nova Scotia's gold output in 1899.

Commenting upon the promotion of the new Le Roi Mining Company, Limited, the *Evromist* makes the following pertinent remarks:—"We are puzzled to find any reason for the formation of this company as a separate undertaking from that of the vendors, the British America Corporation. That company has acquired the control of the mine by purchase of the shares and now offers the share capital of the Le Roi preferentially to shareholders in the London and Globe Finance Corporation and the British America Corporation. The prospectus states that only £50,000 out of the £1,000,000 capital is to be devoted to work the mine, and as the estimate of profit is £360,000 per annum, it is obvious that the former sum could be provided from a few weeks' working. It follows then, that the sale is made merely to produce a profit for the shareholders of the British America and London Globe Companies. But as these are also expected to be the purchasers, the position arises that they first bought the mine and are now selling it to themselves for the purpose, presumably of paying themselves a dividend. Truly a strange illustration of fin de siècle financial methods."

The Rat Portage *Miner* is authority for the following returns of the output of the mines of the Lake of the Woods, during the first ten days of the present month:—Sultana, \$6,400; Keginv, \$5,000; Mikado, \$18,000; Golden Star, \$5,000, with several other mills to hear from.

The Canadian Mining Institute will hold its annual meetings in the Windsor Hotel, Montreal, on Wednesday, Thursday and Friday, 1st, 2nd and 3rd March next. Among the papers already promised may be mentioned—"Mine Costs," by Mr. John Hardman, S.B., Montreal; "Notes in Hydraulic Mining," by Mr. John B. Holson, M.E., Quesnelle Forks, B.C.; "Metallurgic Standards," by Frederick T. Snyder, Peterborough, Ont.; "Smelting Conditions in British Columbia," by R. C. Campbell Johnstone, M.E., Nelson; "A New Dynamite Thawing Machine," by Mr. D. Smith, Kingston, Ont.; "A Review of the Iron Industries of the Dominion in 1898," by Mr. George E. Drummond, Montreal; "The Designing of Metallurgical Machinery," by Mr. A. McCallum, Peterborough; "Notes on the Iron Ores of Cape Breton and Newfoundland," by Mr. C. A. Meisner, Londonderry. Other contributors whose subjects are not yet announced, include the names of Dr. James Douglas, the well known Metallurgist of New York; Mr. Charles Fergie, M.E., Westville, N.S.; Mr. O. E. S. Whiteside, M.E., Anthracite, N.W.T.; Mr. J. Obalski, M.E., Quebec; Mr. Wm. Blakemore, M.E., Fernie, B.C.; Mr. J. B. Tyrell, M.A., M.E., Dawson, N.W.T.; Mr. J. D. Sword, Rossland, B.C.; Mr. Hille, Port Arthur; Prof. W. G. Millar, Kingston, and Prof. De Kalb, of Kingston, Ont. The annual dinner will be held in the Windsor Hotel on Friday evening.

Students who desire to contribute papers to the Students section, for which a gold medal and other prizes are offered, are requested to intimate the titles of their subjects to the secretary, as early as possible, but not later than 15th of February.

The following return shows the export of minerals from Newfoundland for the year ending June 30, 1898:—Copper ore, 38,915 tons to the United Kingdom; copper ore, 17,801 tons to the United States; copper regulus, 9,616 tons to the United Kingdom; iron pyrites, 15,724 to the United States; manganese, 1,500 tons to the United States; arsenical pyrites, 125 tons to the United States; iron ore, 44,627 tons to different places. These figures show a steady advance in the mining industry and sufficiently indicate that the product of the mines is taking an important place among the exports of Newfoundland. In the current year (1898-99) there will be a very large increase in the export of iron ore, for which there is an unlimited demand in Great Britain. Before the end of this year there will be 100,000 tons shipped from the iron mine at Belle Isle—or more than double that of last year. The shipping of ore from the new iron mine at Bay de Verde will commence by May next. Shafts are now being sunk, and a railway, five miles in length, to the port of Old Pelecan, is under construction, and the output is expected to be very large. In the same peninsula, half a dozen other deposits of iron ore have been discovered, and now await development. At Grote's Point, too, new discoveries are announced. In fact the whole district around seems to be highly mineralized. It is evident that Newfoundland will take a high place among the iron-producing countries of the world.

OUR ROSSLAND LETTER.

ROSSLAND, B.C., December 17.

Perhaps the affair which is most interesting to Rossland people at present is the pending deal on the Jumbo. This mine is located in the extreme west end of the camp on the hill just across Little Sheep Creek from Red Mountain. It is owned by a Spokane company with a capitalization of \$500,000, in \$1 shares, assessable to the extent of 10 cents a share, of which something like 7 cents have been paid up. The control is held by John A. Finch and M. R. Galusha, of Spokane, and the latter has been in Toronto for the last week or two negotiating a sale of a majority of the stock with a view to reorganizing as a Canadian company. George Stinson of Toronto, is said to be the broker, who holds the option which runs till Xmas week, and which is at 60 cents a share, with a 10 cent commission to him. The stock which he has been offered comprises about a half of the Finch and Galusha holdings, together with some blocks belonging to smaller shareholders.

The mine is considered one of the best in Rossland and has undoubtedly the largest surface showing. It is developed by three crosscut tunnels. The first opened up, besides an enormous quantity of low grade ore, a chute some 16 feet wide which has been explored for over 100 feet in length. This chute contains some high grade tellurides in stringers and bunches, and averages about \$20 per ton clear through. The No. 2 tunnel has so far developed over 250 feet of low grade iron ore containing three quartz ledges. The first is about 18 inches wide and only assays moderately.

The second is about 12 feet wide and averages \$12 to \$14 to the ton. The third was only cut a few days ago and is about seven feet wide, showing considerable tellurides where crosscut. It is believed to be the same chute cut in the No. 2 tunnel. No. 3 tunnel has not yet penetrated the vein far enough to reach either of these quartz ledges, but it will tap them at a depth of 450 feet.

THE GIANT.

This property closed down during the month and suspension of work is generally attributed to mismanagement. A few months ago there was an active market for this stock at 6 to 7 cents a share, but after a limited quantity of treasury stock had been placed the promoters seized the opportunity to market a lot of their holdings, and now the stock has declined to about 3 cents at which price the limited amount of treasury stock left cannot of course be sacrificed. The work in the upper crosscut tunnel also failed to disclose any ore body of consequence, and the shaft on the lower vein was not continued far enough to expect results.

THE GOOD FRIDAY.

About the only other deal of consequence pending in the camp is connected with the Good Friday. Ross Thompson is said to have taken a bond on this promising Red Mountain property at a big figure.

RAILWAY IMPROVEMENTS.

The C. P. R. seems to have abandoned all intention of standardizing its grade from here to Trail till next summer, and announces it has secured two more narrow gauge engines to enable it to handle the traffic offering. Work on the new lines to the Centre Star and War Eagle is, however, being pushed.

B. A. C. PROPERTIES—LE ROI.

During the past month the Le Roi mine passed completely into the possession of the British America Corporation. The sale of the mine was closed on Nov. 22nd, when W. A. Carlyle took charge of the mine as general manager, with Nicholas Tregear as superintendent as before. The Turner's netted for their stock approximately \$8 per share. Since then the Le Roi has been floated as a subsidiary company in London, with a capitalization of £1,000,000, and from all we can hear in Rossland the flotation has been a success.

When Mr. Carlyle took charge of the mine all shipments were suspended and work confined to timbering up the stopes and the new station at the 800 foot level. On December 1st 8 drills were put on development work, extending the drifts and running a raise from the 600 foot level to the inner end of the Black Bear tunnel, where it connects with the 350 foot level. This raise will be converted into a well timbered two-compartment incline, at the head of which will probably be a 75 to 100 horse power electric hoist and in the incline will be a standard cage with which it is expected all men, timber and supplies will be lowered into the mine at a very great saving, as the men now use the ladders altogether.

The beginning of December also saw the resumption of shipments at the rate of 200 tons per day to the smelter at Northport. At present every effort is being devoted to a much more extensive system of development, and shipments will not be allowed to exceed this figure for some little time yet.

On the 800 foot level, since the station is now timbered, sinking is being continued down to the 50 foot mark when this work will stop until the skips can be lowered to that level, after which crosscutting and drifting will be begun and sinking resumed so as to reach the 900 foot mark.

On the 700 foot level drifts are being run west along the walls of the vein, here 35 feet wide, and the stope is being strongly timbered, the headings now being nearly 400 feet west of the shaft.

The management expects shortly to begin sinking near the junction of the Le Roi and Black Bear mines, a new vertical shaft of large dimensions which will ultimately be the main working shaft of mine and also, in all probability, of the adjoining properties owned by the B. A. C. This will involve the erection of a hoist of greater capacity than any yet in the camp, as well as a larger compressor, and at the same time improvements on a very large scale will be carried out throughout the mine and its equipments. The smelter will also have to be enlarged at an early date.

WEST LE ROI COMPANY.

The Josie No. 1, Annie, Poorman, and several other minor claims in the vicinity comprise the property of the West Le Roi Company, one of the earlier subsidiary companies of the B. A. C., but not yet put on the London market. In the Josie on the 300-foot level, the lowest so far, the drift to the east has disclosed a good ore chute so far 50 feet long and three to seven feet wide, of good grade ore, in which a raise is being run to connect with the 100-foot level, now being extended to meet it, and later on to the level of the old tunnel. Some of this ore is solid chalcopryrite and pyrrhotite, assaying from two to three ounces to the ton. In the west drift, where it crossed with the Annie, ground cross-cuts were started north and south, and on the same day a vein was cut in each of them about 90-feet apart. The vein to the south, which runs east and west, is narrow but high grade, sometimes assaying 10 ounces in gold. The vein to the north, believed to be the Josie vein, is one to two feet wide, well defined and of good grade ore. Drifts are now being started on both these veins, and as soon as possible the sinking of the shaft to a lower level will be begun.

NO. 1 MINE.

The tunnel on the No. 1 is now in over 400 feet and shows about 18 inches of ore in the face, after having been for some time out of ore. The first ore chute struck was about 180 feet long, and from two to seven feet wide. In the shaft the first level was begun at the 200-foot station, where a large dyke obscured the vein. A short cross-cut from the east drift has developed a large ledge of mixed ore, the ore carrying fair values. In the drift to the west the ledge has not yet been picked up. In any event this drift will shortly be under the big ore chute found in the tunnel. The mine is equipped with a first-class shaft house and a temporary 40 horse power hoist. An Anaconda cage is now being put in, also a 60 horse power boiler. In all probability this hoist will shortly be supplanted by a powerful electric hoist. Power or compressed air for this and the Josie mine is being obtained from the Le Roi compressor, whence a four-inch main has been run.

All ore being taken from the Josie and No. 1 in the course of development work is being sorted and piled on dumps, which are now assuming respectable dimensions, to be shipped next spring to the smelter.

EAST LE ROI COMPANY.

The Nickel Plate and Great Western are the two working properties in the East Le Roi group. In the former, cross-cuts from the 200-foot level, have disclosed two veins 300 feet apart—small but persistent—being from six to twenty inches in width and carrying fair values. On the Great Western, drifts are being continued on the 200-foot level, and sinking will be renewed next month.

COLUMBIA AND KOOTENAY.

The lowest or No. 6 tunnel on the Columbia and Kootenay group is now running on the ledge which is highly mineralized and will be shortly prospected by cross-cuts. The No. 5 tunnel is 700 feet in and has lately run 60 or 70 feet in ore. A cross-cut is now being run under the first cross-cut in the No. 4 tunnel, and about 16 feet of mineral has been exposed. A raise to No. 4 tunnel will be begun shortly at this point and the tunnel continued on to explore the vein under the No. 2 cross-cut in No. 4 tunnel, where good shipping ore was found last summer. Tunnels Nos. 4 and 3 are now being run along the ledge without any special developments of late.

The B. A. C. is making experiments with Crow's Nest coal for both steam and blacksmithing purposes, so far with excellent results. The company is now employing 400 miners, and is constantly increasing its force.

THE WAR EAGLE.

At the War Eagle little has been doing of late in the lower levels, and what ore has been shipped (1,000 to 1,200 tons a week) has come from the upper workings. The new machinery has been delayed in transit, and it is now expected the new electrical machinery will not be working before the beginning of February. Fourteen machines are working in the mines, all above the 500-foot level. The timbering of the 2½ compartment shaft is almost finished to the 650-foot level.

THE CENTRE STAR.

The new three compartment shaft on the Centre Star has been completed to the tunnel level, and timbering to this level is also nearly finished. The shaft is now being continued from the tunnel level to the 550-foot level, and good progress is being made. Work is also being continued in the west drift from the north cross-cut on the tunnel level.

THE IRON MASK.

The Iron Mask is employing 36 men, the largest force on the pay roll for a good many months. The winze in the disputed ground is down 65 feet and is still, as it has been all the way, in fine shipping ore.

THE WHITE BEAR.

The shaft on the White Bear has been timbered to the bottom, and work will be concentrated at present in the drift on the 100 and 250-foot levels, and in a cross-cut at the latter level. In both drifts fair-sized ledges of \$15 ore have been developed, and in a month or so stoping and shipping will be begun.

THE MASCOT.

The lower cross-cut tunnel on the Mascot has been begun, the upper tunnel having traversed an ore chute 60 feet long, with an average width of eight feet, and averaging about \$20 per ton in all values. The property belongs to the Big Three Company, which also owns the Southern Belle, where in both drift and main tunnel there are at present faces showing two feet of good grade ore.

THE COXEY.

The west drift from the upper tunnel on the Coxe, now in 29 feet, continues to show fair grade ore in large quantities. Work on the lower cross-cut tunnel is being continued.

THE GERTRUDE.

The shaft is now down 140 feet, and the tunnel has made a connection with it at a depth of 90 feet. The work has not yet disclosed any ore body of consequence, though on the No. 1 War Eagle ledge.

THE VIRGINIA.

The Virginia shaft is down 430 feet, and a cross-cut will be started to tap the vein when the 500-foot level is reached.

SUNSET NO. 2.

The cross-cut on the 350-foot level is still being continued by contract, and is estimated to be about 40 feet from its objective—the discovery vein.

HOMFSTAKE.

No work is being done outside of sinking the No. 2 shaft, which is at present off the vein.

COMMANDER AND LILY MAY.

On both these properties sinking is being continued, but no news has been given out concerning developments in the past week or two.

THE IRON HORSE.

On the Iron Horse machinery has been installed and development work will be resumed this week.

THE DEER PARK.

It is claimed that the work on the 100-foot level in the Deer Park has opened a wide and continuous body of \$12 ore. If this is the case work will assuredly be resumed at once at the bottom of the shaft.

THE ABE LINCOLN.

The shaft on the Abe Lincoln having been completed to the 200-foot level, a cross-cut has been started to tap the stringers of ore cut by the shaft.

MINOR PROPERTIES.

The Novelty is still doing surface work in fair grade ore. The Jo-Jo, which is located near the Commander, resumed work in the main shaft during the month. The Grand Prize is continuing work in the same shaft to which work has been confined for the past two months. The Evening Star has not reported any startling developments in its drift from the lower tunnel. Monte Christo is still closed down.

SALMON RIVER DISTRICT.

Last month I told you that the north fork of Salmon river had two shipping mines, the Second Relief and the Arlington, and this month I have to tell you that the Ymir camp on the main Salmon river has now two shippers, the Porto Rico and Black Cock. The former is owned by the Canadian Pacific Exploration Co., Ltd., of London, and has made its first and most satisfactory clean up at its mill. The second is bonded to a leading mining man of this city, and is shipping about six tons a day. I will have more to tell you about both these properties next month.

Another new company to appear in the shipping list is the Golden Gate Development Company of this city, which has made a trial shipment of six tons of high grade copper ore to the Nelson smelter from the Mountain Chief on Dog Creek.

THE STOCK MARKET.

December has been a tolerably busy month for Rossland brokers. Republic stocks have attracted a great deal of attention, and some very extensive investments in these stocks have been made locally. This was due partly to the Republic paying its third dividend of \$30,000, and to the news of important developments in several other properties in that camp.

Republic stock itself has been a trifle weaker, as its price makes it a pure investment, and western people as a rule prefer to gamble in the cheaper stocks. When Republic gets on an eastern market it is bound to rise considerably. Jim Blaine is also lower and is now quoted about 55. San Poil is about the same as a month ago. Prince's Maude is a popular stock here and has been firm at 13 cents for some time. Tom Thumb at 30 and Lone Pine at 24 are also being largely bought locally. Some 25,000 relate were placed in Rossland last Wednesday at 15 cents, and now not a share can be got under 25. No. 6, the side claim to the Republic and an extension to the Princess Maude, is largely held here at 10 cents, and is expected to be one of the first stocks to advance.

In local stocks Jumbo has been most inquired for of late, and has improved to 50 cents with very little at that figure and most of the stock held at 65 cents or better.

Virginia is quoted around 40, and Monte Christo at 9 or 10. Deer Park hangs at 19 with little movement. Iron Mask has advanced from 74 to 88 and looks as if it might keep on going up. Iron Colt is much stronger as there is talk of resuming work. Le Roi is now at a big premium on the English market. White Bear is about 7½.

There has been less interest shown in Boundary and Ymir stocks, though Cariboo (Camp McKinney) is quoted at \$1.30, a gain of 20 cents, in spite of heavy sales by one of the principal shareholders.

H. W. C. JACKSON.

NOTES FROM THE SLOCAN.

With the advent of winter, attended by a copious fall of snow, rawhiding is again rendered practicable; and the annual exodus of ore, the accumulations of the summer months, has begun in earnest. The improvement in shipping facilities afforded by the numerous wagon roads which have been under construction during the year will account for a good many tons which would otherwise have perforce to remain on the dumps for a season longer. The late government made a good move when it decided to expend some of the public funds in the districts from which they were derived, even supposing it was done purely for election purposes. The end was attained at any rate, and that is all we need bother about here. On Four Mile, for instance, it is estimated that the taxes collected on the ore to be shipped this winter alone will approximate very closely the initial outlay on the part of the government. That there are mines on the creek, and no mean ones at that, will be amply demonstrated before Spring. The first concentrator to be erected in the lake district is now being built for the Comstock Mines; it is situated a little above the confluence of Four Mile and Fennel creeks, and will have a daily capacity of fifty tons when completed, which will be early in the new year. What this means is not fully comprehended by outsiders, but it requires a mine with large reserves to insure a continuous supply for even a small concentrator. The Wakefield and Vancouver are two other properties which will materially assist in pushing Four Mile to the front; both are taking advantage of the season, and it is the intention to ship at least 1,000 tons between them before winter breaks. The ore from the Vancouver is exceptionally high grade, invariably exceeding 200 and sometimes 300 ounces of silver per ton in car lots. At the Wakefield, in common with some other properties in the district, it is found that the zinc-blende associated with the galena is distinctly valuable as a source of revenue, and therefore, while an excess of zinc in the ore is to be avoided, by judicious handling and mixing of the various grades, it pays in the long run to ship everything to the smelter. The Bosun continues its prosperous career and is delighting the London syndicate who own it by turning out five cars a month on an average, each car netting in the neighborhood of \$1,500. A two-thirds interest in the Fidelity which lies adjacent to it was disposed of to Scott MacDonald, of the Payne, some time since, for \$10,000, and now he has virtually acquired the other third at a proportionate figure, so we may expect to hear of this mine also being operated before long. Owing to the contour of the ground it will probably be found advisable to work it conjointly with the Bosun through the latter's tunnels. Work on the California has been suspended for the winter, but it is refreshing to know that of so satisfactory a nature were the operations conducted during the summer, that after making a forty ton trial shipment the bond on J. Marino's three-eighths interest, amounting to \$15,000, has been finally disposed of and the cash handed over. It is an assured fact that next year development on a large scale will be undertaken, and cabins erected sufficient to accommodate a considerable force of miners. It is highly encouraging to those who have all along pinned their faith to this hill to note the fresh discoveries which are constantly being made. More men are at work there this winter than ever before, and one claim at least, the Marion, which is contiguous to the California and embraces the same vein, will be found in the shipping list this winter. A striking feature of the month has been the prodigious shipments from the Idaho, which is temporarily outdistancing even the Ruth and Slocan Star in that particular. The original buildings at the mine having been demolished in a snow-slide, new and commodious quarters capable of housing fifty men have just been erected in their place.

The Queen Bess, too, in the same basin, is turning out ore at the rate of a car a day, and under the new management is showing up remarkably well. Though one chute only has been discovered so far, it is of such dimensions as to almost insure the permanence of the mine. Several of the tunnels traverse ore for fully 250 ft., and if the chute is encountered in the No. 5, as it should be very soon, the reserves will be more than doubled at one bound. Development is proceeding with a view to the location of another chute, and with this object the No. 4 has been driven altogether nearly 1,000 ft. on the vein, and there is no intention even of stopping at that. It speaks volumes for this much abused mine when we observe that at present it stands fifth on the list of Slocan shippers, and that after an active existence of less than eighteen months the company operating it should be enabled to declare a 10 per cent. dividend, as they intend doing shortly; it is even more marvellous when we take into consideration the fact that some 400 or 500 ft. of dead work has also to be accounted for. It is quite unnecessary, I know, to refer to the Payne; suffice it to say that no diminution in its output appears to be entertained for a moment; the tramway gives every satisfaction, and materially lessens transportation charges to the railway. The mine which is so frequently spoken of as a possible rival to the Payne, namely, the Last Chance, is also now in a position to ship on a large scale, thanks to

the completion of the aerial tramway, which has the distinction of being the longest in the Slovan. The group has recently been incorporated as "The Last Chance Mining Company, Limited," with a capital of \$100,000. If all we hear concerning this property is true, the shares will not long remain at par. Increasing activity is noticeable at Whitewater; the concentrator has been started by this time, and the already large force of over 100 men has been considerably augmented. The company, who operate this mine in conjunction with others, is to be warmly congratulated on the recent dividend. Over 20 per cent. on the capital, during the first year of its existence practically speaking, is something to be proud of, and will doubtless stimulate further investments from the Old Country. Rumor has it that this same company is negotiating for the purchase of the Enterprise on Ten Mile, in opposition to the B. A. C., who are also reported in the field. Of the latter I cannot speak, but am rather doubtful of its authenticity; more than one engineer, however, has examined the property on behalf of the London and B. C. Gold Fields of which Mr. J. Roderick Robertson is managing director, and it is quite on the boards that a deal may ensue. In the meantime, operations at the mine, which is notable on account of the high percentage of zinc carried by the ore, are virtually at a standstill. At last the famous Mollie Gibson case has been settled to the satisfaction of all concerned, and there is now every prospect of these rich locations being worked in the vigorous manner which the surface indications warrant. It is quite within the limits of safety to assert that claims with such latent possibilities are not to be found elsewhere in the country, and although they are situated at an altitude of 7,000 to 8,500 ft. above sea level, the highest in fact in the Slovan, right under the nose of two towering glaciers, and away above the timber line, the chances of developing a fabulously rich property are distinctly enviable. That this is not merely a personal opinion may be gathered from the fact that the Hon. F. W. Peters recently closed the \$110,000 bond held on the property, by making the final payment of \$40,000; and also that the company acquiring it, of which Rufus Pope, M.P., is an active member, has already been incorporated with a capital of \$2,000,000, to continue operations on a huge scale. The vein is without exception one of the most persistent and well-defined in the country, and added to this the ore, which consists essentially of galena, is of exceptional richness owing to the presence of pyrrargyrite, or dark ruby silver, and other valuable accessory minerals. The talk of samplers becomes rather monotonous and even tiring after the late fiasco at Rosebery, but nevertheless I take this opportunity of repeating that persistent rumors are still afloat with reference to samplers somewhere on Slovan Lake and mysterious Colorado capitalists. It will be a great pity if one or another of the several schemes proposed does not mature, because if we totally ignore the benefits accruing to prospectors from such an acquisition, there are many large mine-owners who would welcome the idea with open arms and even guarantee sufficient patronage to make the affair self-supporting if properly conducted. It appears that it is not yet decided exactly what right to the surface a crown-granted mineral claim confers upon the owner. As is well known, the city of Sandon is located on a claim belonging to J. M. Harris of the Reco mine, and hitherto those living there have had to pay ground rent for the privilege of so doing. Now, however, the case has reached the courts and the dispute is in a fair way to being settled for all time. It seems to be tolerably well established that if the owner of the claim has, or had at the time it was crown granted, no right to the surface, certainly nobody else has, and in that case he is perfectly at liberty to compel settlers to leave or else come to his terms. The Hon. Joseph Martin, Attorney-General for the Province, is conducting the case on behalf of Harris, and an interesting precedent is looked for which will obviate the necessity for further litigation in the matter. It is possible, however, in fact very probable that there will be no need of such misunderstandings in future, as the Legislature intends to amend the Mineral Act in accordance with suggestions from the different mining centres, and this is a point which will certainly not be overlooked. By the way, here is an excellent idea on the part of the Government, and if it were adopted elsewhere might be found of mutual advantage. Ontario in particular would profit by a readjustment of the mining laws, and who better qualified to express an opinion on the subject than those who have found the disadvantages of conforming to poor laws in the past. Chinamen are not respected in the Slovan any more than elsewhere, but it has been reserved for the miners of this district to give practical effect to their dislikes. It certainly seems out of place, to say the least, for wealth producers like the Payne and Last Chance to go in for cheap labor by hiring Chinese cooks, but they are not alone by any means in this mode of procedure; the millionaire coal barons of Vancouver Island, the Dunsmuirs, are unenviably conspicuous in this direction. However, if they wish to employ Chinese, as the law stands at present, there is nothing to prevent them, and so those who intimidated the celestials in the Slovan to such an extent that they had to leave were very properly reprimanded by the magistrate before whom they were brought. Legislation in the matter is of course the only effectual way of barring their entrance, and it is to secure this latter, in conjunction with other things affecting their welfare, that a Miners' Union is now being formed in Sandon. Let us hope it will remain as law-abiding and peaceful as the opening speeches and preliminary assurances would lead one to anticipate.

NEW DENVER, 24th Dec., 1898.

HOWARD WEST.

NOVA SCOTIA GOLD MINES.

30 stamps of the fine new 60 stamp battery at the Dufferin will be dropping before another issue of the REVIEW goes to press. This mine is sure to be a large producer in 1898.

The Hurricane Point mine, Isaac's Harbor, is steadily improving in depth. Last month's yield from the 10 stamp mill was 265 ozs.

The Richardson mill has been undergoing repairs, yet the past month's brick was nearly up to the usual excellent return.

A new lead has been found on the "Plough" property at Wine Harbor, which is claimed to be very rich. The lessees have purchased the Harding 15 stamp mill on this property.

The 10 stamp mill now being erected on the Eureka property in this district will be in commission in January. Both the Eureka and the Charlotte leads on this property are looking well.

The Napier mine in the same district, belonging to Messrs. McPhay & Snook, of Truro, is bound to be one of the large producers in the near future. Recently a new belt 8 feet wide has been opened, two-thirds of which is milling material and runs \$7 per ton.

Recently several very promising leads have been found at Fcum Secum, situated between Salmon River and Goldenville, and a large number of areas have been taken up by R. Brownell and others. A shaft is now being sunk on a belt with several leads in it, all showing free gold. Indications now point to this place becoming an important district in the near future.

An important find of a very rich lead is reported from Montague on the Golden Group property, but particulars are not at hand yet.

There is also an important find reported from Beaver Dam, said to be on J. Howe Austin's property. The men reporting the find brought up \$650.00 worth of gold broken out with hammers.

W. G.

Halifax, 24th December, 1898.

Mine Management.

The minute details given in the issues of the 5th and 26th ult. by two California mine managers, illustrate a phase of the mining business often overlooked by corporate owners—the necessity for exact, specific information of the smallest details of the business. Even in gold mining, with no competition, no business rivalry, an assured market at an established price for the product, there is constant need of rigid economy, attention to little things and a thorough grasp of the most minute detail to insure profit or to guard against possible loss. In every shop, factory, store or commercial establishment of any kind, it is the little savings that make all the difference between profit and loss. The writer was recently told by the manager of one of the largest department stores in the United States that the cash discounts he secured on large purchases constituted almost entirely the firm's source of possible annual profit. In the big meat-packing establishments of Chicago it is the utilization of every shred of the animal that makes the profit: the sale of meat, alone, would entail a loss. And this brings us to the point that we would make, viz., that in this regard of mine profit or loss, all depends on the manager. If he understands his business he can, ordinarily, make a mine pay: if he doesn't, he can gouge its eyes out and cause assessments and closing down. This does not mean that he must take things out of the hands of the shift boss, or foreman, or superintendent, but that he must be a practical, experienced man who knows what ought to be fairly expected from every man in the mine's employ, what every bit of labor ought to produce; not in a niggardly, stingy spirit, but with full realization of the fact that anything and everything that costs money should produce money; that there should be no pets nor favorites, no drones nor "soft jobs," and that every dollar be spent as though it were his own. He should be able to do anything and everything in or around a mine and then be careful not to do it, but to surround himself with men who can each attend intelligently to his particular duty. Such a man is worth considerable to his employers, and even at a high salary is a good investment. The biggest mistake a mining company can make is to suppose that because a man is "sharp," or a "good fellow," or has made a success at something else, that he can run a mine.

—*Mining and Scientific Press.*

The Cause of Failures in Mining.

The question is often asked: "What is the most common cause of failure in mining?" The majority of answers probably are: "Want of a good mine on which to work." But one who is a close observer and has observed the methods of mine management in various regions might question whether a better answer would not be: "Want of good mine management." So many instances are remembered where failures can be attributed to this cause alone that the answer is at least worthy of consideration.

Bad management takes such a multitude of shapes that it is almost impossible to describe it, unless it is described in the general term "ignorance of mining." Its constant form is seen in the wasting of ore. A general proof of the facts is found in the hundreds of ore dumps which have been hand sorted over and over at a profit, and there are hundreds yet untouched that will pay handsome returns. There is an old saying that a workman can be known by his chips, and with equal truth it can be said a bad mine manager can be known by his dumps. One thing that is indispensable in a mine manager is an appreciation of the necessity of thoroughly understanding the nature and value of his ore. He may not be able to understand the ore himself, but if he appreciates its importance he can employ some one who does understand it to take charge of the necessary work.

The world sees the evidence of waste in the dumps that lie on the surface, but there is a still greater source of waste that is hidden from the public in the dark stopes of the mine. Every practical man knows how often the ore is knocked down in the stopes and there partially sorted, and the supposed waste left upon the stulls. If ore sorted by daylight loses much of its value in the waste, what is the loss liable to be in the dark, narrow and cramped stopes? Who that is competent to hand-sort ore gives, in the great majority of instances, any attention to this portion of the work.

As a rule the miner is allowed to have his own sweet will in this labor, and his own sweet will is too often to do that which is easiest, instead of that which is best, even if he knows what is best. This is but one kind of waste, and the commonest one, of bad management, where scores might be mentioned. It is not all mines that require the constant services of an assayer, but a good many more than receive them do require them, and would find them the most valuable of all possible investments.

Singular Accident to a Hoisting Rope.

At shaft No. 1, Robinson Deep mine, Johannesburg, South Africa, it was recently noticed that the skips which weigh about 2,000 lbs., and which are balanced, were not running smoothly. The hoisting engine was stopped and gradually reversed. On reversing, the rope must have become coiled on the top of the skip until the latter became free from the broken guide which jammed it; and when—having reversed itself—it fell, it did so through the light of the rope. It would appear that the falling skip, on being checked by the rope, broke the draw-bar short off and fell to the bottom of the shaft. On the rope being hoisted up, it was found that some 400 feet from its end there was a double loop or bow, and that the end of the rope

had formed a single hitch embracing the shackle, the thimble, and swivel on the hard knot. The rope is one and three-eighths inches in diameter, made of top of the skip. Moreover, some twenty-five or thirty feet from the end was a plough steel, and consists of six strands of nineteen wires each, and a hempen center: the breaking load is ninety tons; the weight is 3 lbs. per foot. The rope was untied with some difficulty, but was found at each spot where it had been knotted to be fit for use and is now in operation in the same shaft. Judging by the distance from the end of the rope at which the knot occurred, the total drop of the skip is estimated to have been about 90 feet.

Limit of Depth for Use of Balance Rope.—The depth of shaft down to which the use of balance ropes should be limited depends upon the condition of the shaft, the space at disposal, the distance apart of the headgear pulleys, and the atmosphere of the pit, which exerts considerable influence on the preservation of the ropes. The length of the balance rope is limited by the speed of winding, by the degree of cut-off in the cylinder and the amount of output. The maximum limit of depth for the use of a balance rope is put at between 600 and 700 metres (mean 355 fath.) by M. E. Tomson, General Manager of the Gneisenau, Preussen, and Scharnhorst Collieries, Westphalia, who observed to the Liege Engineers' Association that endless ropes for balancing may be employed with advantage in the case of a reserve equipment for winding that is only intended for use under exceptional circumstances; and in this case, when the headgear pulleys are very near together, as in the case at the Preussen shaft, it will be sufficient to arrange the balance ropes so as only to avoid a negative moment and the admission of steam at the back of the piston when the winding cage comes up to the surface. Twenty years ago Herr Kœpe devised a system of winding with endless rope, the great simplicity of which, with its inexpensive installation, soon attracted the attention of mine managers, and applications of it were made in all the mining countries; but yet the system has not come so generally into use as was at first expected, while quite lately, just when apparently abandoned, it has all of a sudden come into fresh favour.

Recovering a Broken Boring Rod by Magnetism.—In the borehole, about 300 m. (164 fath.) deep, put down near Ostroppa, in the Gleiwitz district of Silesia, by the Ober-Schleische Tiefbohr-Gesellschaft Zollner & Co., the end of a boring rod was broken off, so that it became impossible to continue boring, owing to the pieces of steel in the hole, because all the diamond crowns were ground off. After three weeks had been spent in the most various but unsuccessful endeavours to remove the pieces of steel, application was made to Engineer H. Degenhardt, of Gleiwitz, representative of the Electricis Aktien Gesellschaft (late Schuckert & Co.), who had the good fortune to extract the broken pieces in the following manner:—A bar magnet was constructed 1.5 m. (4 ft. 10 in.) long and of 70 mm. (2¾ in.) diameter, which was surrounded by a single winding of wire insulated with India-rubber, and was magnetized by the current of a small dynamo driven off the portable engine provided for the work of boring. The current was easily regulated by a simple water resistance, and kept to the constant quantity of about 30 amperes. The magnet was let down unmagnetized; and, after it had come into contact with the bottom of the hole, the current was switched on to the winding through the rope used for letting down the magnet. On the first day that the arrangement was brought into operation, the pieces of steel in question were drawn up, so that boring could be continued. The pieces stuck so fast to the end of the magnet, capable of lifting 50 kg. (1 cwt.), that they could only be released by the application of considerable force. Inasmuch as (observes the *Oesterreichische Zeitschrift für Berg- und Hüttenwesen*) the work of boring is often interrupted by pieces of steel being broken off and becoming tightly jammed in the hole, this method, which constitutes a valuable addition to the accessories of boring, will probably be often employed.

Hall Mines, Limited.—The following are the official returns of the company's smelting operations for the four weeks ending 2nd December:—18 days, 3 hours, smelting; 2,207 tons treated, containing (approximately) 53 tons copper, 45,960 ozs. silver.

ENGINEERING NOTES.

Transformation of Engines for Deeper Winding.—The increase in the depth to which working coal has been carried in Westphalia has necessitated the transformation of a great many winding engines fitted with cylindrical drums, which could no longer wind up a sufficient length of rope; and the Kœpe system lent itself readily to this transformation. Sometimes the compartments of air-shafts have been provisionally utilized for winding by equipping them as economically as possible; and in such cases also the Kœpe system has frequently been applied with good results, while it soon became advocated for entirely new and definite winding plants. This system is now applied to three shafts of the Consolidation Colliery, for depths of 500 to 600 metres (mean 300 fath.) with cages carrying six or eight tubs. At the Gelsenkirchen Colliery of the Hibernia Company, at the Centrum Collieries, Wattenscheid, at that of Ewald, near Herten, and at the Shamrock III and IV pits the shafts have been equipped with cylindrical drums for a depth of 500 metres (273 fath.), while the possibility has been reserved of changing them for Kœpe pulleys in the event of winding being required from a greater depth. At the Hansa Colliery winding is effected by the Kœpe system from a depth of 700 metres (383 fath.) with cages holding eight tubs; and at the Kaiser Friedrich Colliery, Barop, the engine is also designed for raising eight tubs from the above-named depth.

Electric Power Transmission in Mines.—Electricity is specially indicated for power transmission in mines because it can easily be adapted to local conditions; and it is therefore especially used for pumping, hauling engines, chain and rope haulage, sinking pumps and ventilators. With electrically-driven pumps the electro-motor is, according to the size of the plant, either coupled direct to the pump shaft or driven through gear, in which latter case the water column in the delivery pipe can be put into motion gradually; and for this purpose the pump is fitted with by-pass valves which are kept open on starting, and gradually close. For haulage plants and hauling engines, electrical transmission of power is chiefly employed for small underground engines up to about 70 h. p.; and the coupling of the electro-motors with the winding arrangement is effected in such a case with spur-gear or worm and worm wheel, change in the direction of motion being effected either by

reversing the engine or by friction couplings. The motors for haulage plants, hauling engines, fans, etc., are generally provided with current from a generating dynamo. For larger mining engines, however, where the load varies considerably from time to time—in the case of a large pumping engine for instance—a separate dynamo with its steam-engine will be erected in the generating station, so that its speed can be altered as required independently of the other engines. These observations are contained in a paper by Engineer W. Vogel, of Kattowitz, read at a meeting of the "Eisenhütte Oberschlesien," Königshütte.

Mine Signals.—The paper read by Mr. Clements before the South African Society of Engineers draws attention to the various systems of signalling. The old-fashioned system is the hand-pulled rope and bell, as used so much to-day in English coal mines, the objection to which is that in very deep mines there is apt to be an uncertainty in its indications, and the engineman cannot always tell if each pull of the rope has produced a sound. In America a pneumatic system is used, consisting of a line of pipe and an air cylinder about 6 in. diameter by 9 in. long, with a piston moveable by a lever which is employed to give a sudden push of air down the pipe to blow a whistle all over the system. The pipe should be at least 2½ in., and even more for long distances. It should be smooth inside, as it can then be talked through, which is not possible with rough pipe, although signalling can be effected through rough pipe. Electric signalling, though by no means perfect, seems on the whole to be the best. If there are, say, balanced skips for which to arrange signals, there are three wires run down the shaft, two being connected to the poles of a battery, and the third, or middle wire, being used to connect all bells in series and ring them simultaneously when a circuit is made through any push on the system. All bells are, of course, to be placed between the middle wire and the same pole wire, and the pushes between the middle and other pole wire. A separate signal should be arranged from the pit mouth to the engine room, and *vice versa*, for the driver could not otherwise tell whence the signal comes, whether from the top or the lower set of skips. A bell at the pit mouth keeps the bank-man informed as to what the skips below are doing. Communication with the signals below must only be possible *via* the engine driver's apparatus. The chief disadvantage of this system is, that the driver has no means of knowing the places of the skips except by the correctness of the signal given, but the writer has never known of an accident, as the bells ring simultaneously through the mine when rung from any one place, and those at any level know thereby where the skip is and what it is doing.

Case Hardening Ingots.—The process of case-hardening ingots at the Pamiers Steelworks consists in directly carburising one of the ingot's faces, at the time of casting, by lining one of the sides of the mould with carburising matters, and preventing this carburising from penetrating too deeply by cooling the side of the mould opposite to the carburising side, so that on contact with it, the molten steel will soon become pasty and cannot absorb the carbon, which begins to dissolve. The linings of the two vertical sides at right angles to the two above mentioned, affording transition between the bad and the good conducting sides, consist of prisms of refractory materials, the edges of which abut against the metal side, while the form of the mould, in which account is taken of the differences of cooling at the centre and at the sides of the ingot, affords a progressive cooling, so that the layer of cemented steel is almost uniform over the whole of the hard surface of the ingot. Mr. Gray, who gives these particulars in the "Revue Generale des Sciences," says that the case-hardened surface is rather rough; but all irregularity disappears in forging, which may be effected without special precaution and at a comparatively low temperature, by the press rather than the steam hammer. Ingots of half a ton to three tons have been cast in this manner; and a three-ton ingot 16 inches thick, reduced by forging and rolling to one-fourth that thickness, was found to contain from 1.78 to 1.5 per cent. of carbon between its hard surface and a depth of three-sixteenth inches; from .60 to .40 per cent. between one and two inches from the surface, and from .35 to .15 per cent. between three and nine-sixteenth inches and four inches.

A New Haulage Clip.—There are many haulage-rope clips in use, and a new one has been introduced by Rudolph Friedrich, of Königshütte. It is a cylindrical carrier in two equal parts, divided longitudinally and hinged together so as to open sideways, while the meeting edges form a halved joint, both having cylindrical chambers in the line of the running rope. In one of these chambers a bolt is pressed outwards by a spiral spring; and the corresponding chamber for receiving the bolt in the other edge is continued to the outside, receiving a loose pin that slightly projects. On the two parts of the clip being pressed together so as to embrace the rope, the end of the bolt will enter its recess and so hold the two parts tightly together; thus the opening is effected by the projecting end of the loose pin coming into contact with a stop at the place where it is required to release the tub.

The Timbering of Mines.—In a majority of mines the shafts, slopes, adits, levels, drifts and rooms must be maintained by artificial supports, for which purpose timber is employed. Upon the maintenance of these artificial supports depends the lives of those employed, and the permanence of the mine as a producer. It is only where the material to be extracted occurs in quite narrow veins or where the mineral itself is sufficiently rigid to form safe pillars, or where the walls confining the vein matter are amply stable, that the outlay for timbering underground workings and the shafts, slopes, gangways or tunnels leading to them, does not form a prominent item in the cost of mining. The other extreme is where practically every foot of excavation must receive support as work progresses, and these supports require frequent renewal or repeated relief from excessive pressure. The timber requirements at most mines, says Mr. John Birkinbine, in the November number of "Cassier's Magazine," demand the constant services of a gang of men above ground, framing, and a gang below ground placing new, or renewing old, timbers. To facilitate the handling of the sticks required, special timber shafts or slopes and timber chutes are not unusual. Some of the large mines maintain extensive wooded tracks from which the mine timber is cut, and well equipped mills in which the timber is framed by machinery.

Constant and Systematic Study of Firedamp.—The two objects to be pursued by the new Firedamp Section of the Belgian Geological, Paleontological, and Hydrological Society were thus defined by the General Secretary, M. Ernest Van den Broeck, at the meeting of the 5th July:—(1) Complete and systematic scientific study of firedamp, with utilisation of all previous investigations and synthesizing their results, while holding enquiries and especially having recourse to all new methods of investigation; and (2) special study of the relations that may exist between microseisms and firedamp disengagements. It should be remarked, he continued, that the independence of these two objects and the general character of the first will

have this great advantage that the section is in every way—and whatever may be the practical result of its special study on the second point, that concerning the relations between firedamp and micro-seisms—certain of greatly advancing the sum of knowledge as to firedamp. M. Emile Harze, Director-General of Belgian Mines, added that, among the points to be cleared up, he would point out one that had always caused him astonishment, viz., that sudden variations of the barometer are often announced beforehand by a recrudescence in firedamp disengagements; and this coincidence deserved the attention of observers. M. Gerard, Director of the Montmorency-Lévy Electrotechnic Institute, Laige, gave it as his opinion that the phenomena of endogenous meteorology are also related to magnetic variations, which should be studied both underground and on the surface. Ultimately a detailed discussion of the programme to be followed by the Section was relegated to the next special meeting.

Deep Coal Mining in Belgium. At the Henriette shaft at Fleny workings have been opened at a depth of 1,150 m. (3,772 feet). After passing through a depth of about 300 m. of distributed ground below the former bottom workings at 650 m., a feeder of salt water giving about 18 tons in 24 hours was cut in driving, and ceased the works to be stopped for some years until the new winding engine was erected. This has two horizontal cylinders 43.12 inch diameter and 82.32 inch stroke, working expansively with steam at four atmospheres, the expansions being controlled by the regulator, and making 65.4 revolutions during the lift. The total load is six tons, namely, three tons of coal and six tubs and cage, together three tons. Originally it was proposed to use flat steel wire ropes, but it was found impossible to design these so as to avoid a negative moment at the end of the lift, and also in fiber has been substituted. The total length of the rope for a depth of 1,200 m. is 1,350 m., and the section tapers from 420 by 48.5 mm. at the drum to 225 by 27.5 mm. at the cage end, giving an average weight of 11 kg. per meter, and a total weight of 14,850 kg. The minimum radius of winding is 1.62 m. and the maximum 4.22 m., the moments of the load being 17,116 meter-kilograms at the bottom and 450 meter-kilograms at the surface. The water which had considerably diminished during the time the working was stopped, having been taken out by the winding machine, exploring drifts have been commenced in two seams at 1,100 and 1,150 m. depth; but the total length driven is under 500 m. at present. The coal on the face is very hot, but owing to the powerful ventilation the work goes on regularly, about 18,000 cubic feet of air per minute being supplied to each end. Under these conditions, when the surface temperature is 3 F., that of the bottom shaft is 60 F., and that of the return air 75.2 F., and a rise at the surface to 45° only brings up that at the bottom to 62° F. With a greater extent of ground open it is, however, likely that the return air will become much warmer. The rock temperature when first cut in the sinking was from 113 to 118°. The coal gives off a large amount of gas, so that the length driven is restricted to 1 m. per day.

Rapid Development in Machine-Mining in the United States.—From the advance report of Mr. E. W. Parker, of the United States Geological Survey, of the coal production in 1897, it appears that the number of firms using machines in 1891 was 51, in 1896 the number had increased to 136, and in 1897 to 211. The number of machines in use has increased from 545 in 1891 to 1,446 in 1896 and 1,988 in 1897. The amount of coal won by machines has increased from 6,211,732 short tons in 1891 to 16,424,932 in 1896 and 22,649,220 short tons in 1897.

The most significant increase shown by these statistics, however, is in the percentage of the machine mined coal to the total product. In 1891 the proportion of the total product won by the machines was 5.49 per cent., in 1896 12.41 per cent., and in 1897 15.95 per cent. Since 1891 the product won by machines has increased by 265 per cent. The total bituminous product of the United States from 1891 to 1897 increased 25 per cent., of which 14 per cent. was represented by the increase in machine-mined coal.

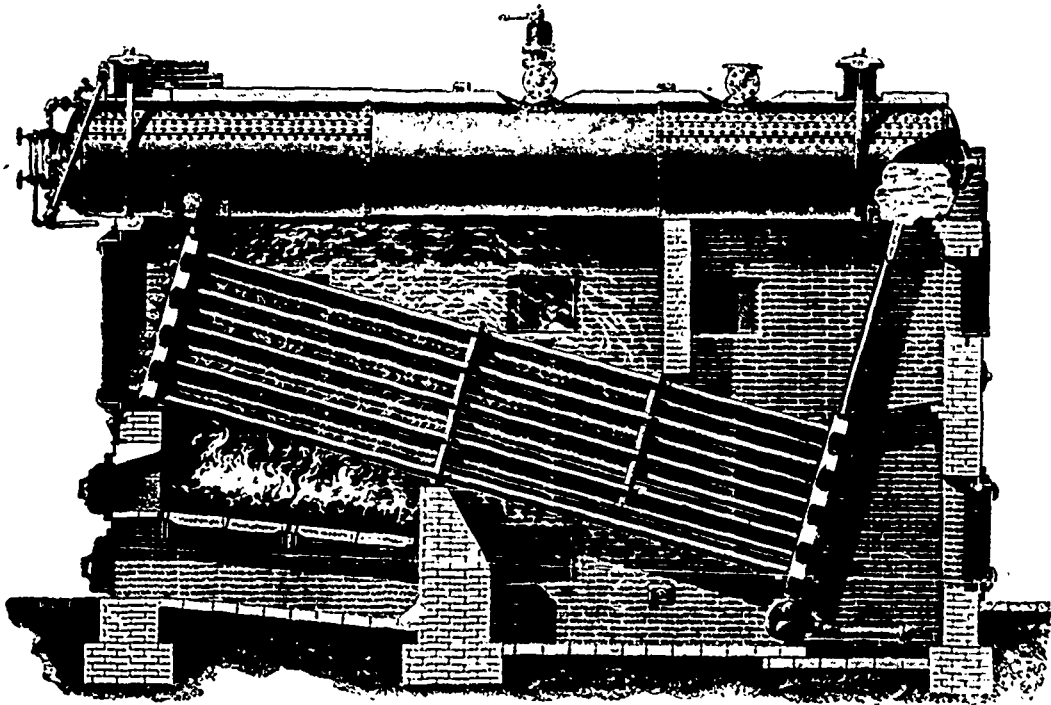
With the exception of Utah and Washington every State had a larger product from machines in 1897 than in 1896, and in only two other cases, Indiana and Missouri, was the ratio of machine product to the total less in 1897 than in 1896.

Practically all the coal mined in Alaska is extracted by machines, giving that territory a percentage of 100. Montana's machine-mined coal was 43.77 per cent. of the total in 1897, against 37.54 in 1896. Of Kentucky's product in 1897, 36.07 per cent. was mined by machines. These two States represent the most important development in machine-mining as compared to the total production. Pennsylvania, the largest producer, has also the largest machine tonnage, but the latter was only 12.29 per cent. of the total product of the State in 1896, and 16.35 in 1897. Illinois comes second, both in total output and machine product, the latter being a little over 19½ per cent. of the total output of the State in each year. Ohio, fourth in production, is third in the amount of coal mined by machines, its machine-won product in 1897 being within 3 per cent. of that of Illinois. West Virginia, the third state in amount of production, has an unimportant machine product. Kentucky ranks eighth in amount of product and fourth in machine tonnage.

The total product of the twenty-two States included in the table in 1891 was 113,199,882 short tons; in 1897 the product of the same States was 141,993,377 short tons.

The remarkable increase in the production of coal by the use of machines superceding a large amount of manual labor and cheapening the cost of production has undoubtedly had an important bearing on the prices of bituminous coal which have declined steadily for several years. In some cases selling prices have been lowered on account of the lessened cost of production; in other cases machines have been introduced in order to meet reduced prices caused by an already glutted market. In nearly all cases the benefit that might have been derived from the introduction of machines has been sacrificed in the effort to increase tonnage rather than to continue previous output with a shortened pay roll.

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Stamp Mill Practice.—A prominent mill superintendent has the following suggestions to make in regard to the dropping of stamps:—

Although stamp mill practice has made rapid advancement during the past ten years, there still remains considerable difference of opinion among manufacturers, as well as millmen, as to the best arrangement of its machinery and the best methods of running it. To even briefly describe these differences would take up too much of your valuable space for a single article; therefore but one of its features will now be considered, viz., the rotation of the drop of the stamps as usually found in the modern stamp mill.

The most common rotation (and probably the best) is where the stamps drop in the order of 1, 3, 5, 2, 4, or 1, 4, 2, 5, 3, which is the same in reverse order. Another quite frequently met with is 1, 5, 2, 4, 3, or its reverse order, 1, 4, 2, 3, 5. There are other eccentric variations made by the sometimes too original millwright, but we will confine ourselves to the two just mentioned. In either case where two stamps are run by one cam shaft, those in one battery are arranged a one-half drop in advance of those in the other, to better equalize the load, so the drop of the stamps in the first named system would be 1, 6, 3, 8, 5, 10, 2, 7, 4, 9, or the reverse, 1, 6, 4, 9, 2, 7, 5, 10, 3, 8.

The ideal rotation would seem to be that which would produce an even distribution of the pulp under the stamps and a corresponding even splash and discharge of the pulp through the screens. To reach this result in a five-stamp battery, no stamp should drop directly after the one next to it, but there should at least intervene one stamp. One reason for this is that, at the moment the stamp drops, those next

on either side of it should be raised sufficiently to allow the ore to be spread beneath them, at the same time equalizing the splash and discharge through the screens. It will be observed that five is the least number of stamps which can be so arranged. These required conditions are met in the first rotation stated, while they are not in the second, where No. 3 stamp follows No. 4 in its drop, whereby the pulp is violently splashed against the screen instead of being partially spread beneath No. 4. This concentrated splash causes excessive wear upon the screen opposite No. 3 stamp, rapidly enlarging the holes and allowing pulp and gold too coarse for close amalgamation to escape from the battery before the rest of the screen begins to show signs of wear.

The apparent intention of this second system of rotation is to work the ore from the ends of the mortar toward the centre; but in practice it will be found that No. 4 will generally begin to pound the die before any other stamp in the battery, for the reasons above stated. These remarks do not apply to a two-stamp battery, where, although the drop of one stamp necessarily follows that of its neighbor, the latter is partially raised before the former drops.

It is usually necessary to give the end stamps from one-half to one inch more drop than the others to prevent the pulp from banking at the ends of the mortar. Consequently the end stamps will soonest strike the cams, preventing the others from being run at the higher speed than their shorter drop would otherwise allow. The writer in his travels once came across a sort of picked-up five-stamp mill, in which the end stamps were heavier than the rest, allowing the drop to be the same for all five, which worked very well, especially when high speed or fast drop was required. The plan might perhaps be adopted with advantage by stamp-mill manufacturers.

DOMINION COAL COMPANY.—J. S. McLennan, secretary of the company, stated in a recent interview that the company will begin shipping on an 800,000 ton order to the by-product ovens at Everett, Mass., about May 1st, 1899. The output for 1898 he estimated at 1,100,000 tons.

HASTINGS COUNTY IRON.—Messrs. L. Sherk & Co. are shipping ore from a deposit near the old Wallbridge hematite mine to the Hamilton Furnace. The ore runs as high as 62% iron, but is carefully sorted. About 15 men are employed and the output is 50 tons daily. The ore comes from near the surface.



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N.B.—For further particulars inclose stamp. References: D. O. Stone, P.M.; John Robinson, Ag't C.M. & St.P. Ry; E. R. Ball, Ag't Amer. Express Co., Hawarden, Iowa.

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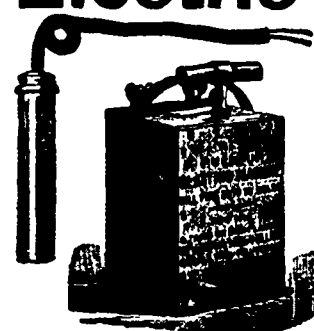
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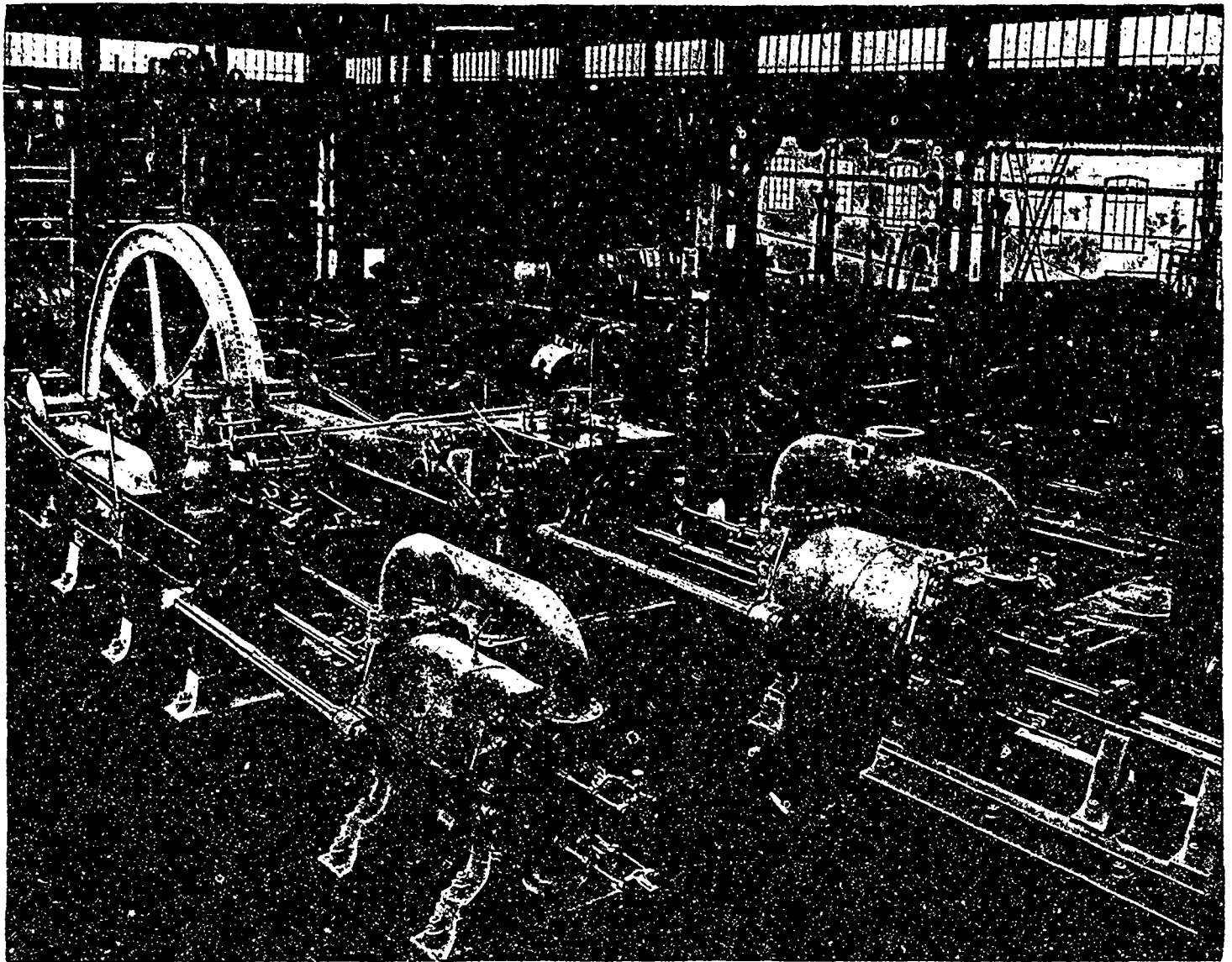
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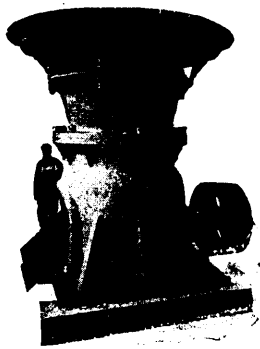
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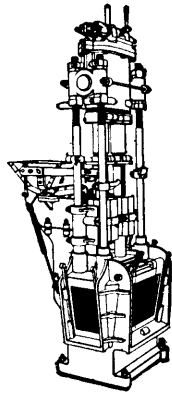
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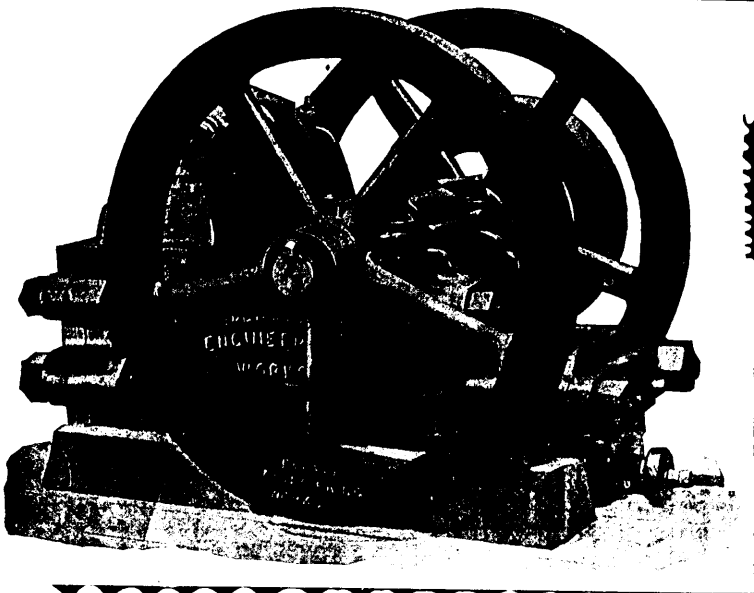
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Members who intend contributing papers are requested to intimate the titles of their subjects as early as possible. Entries for the Mining Students' Competition will be open until 15th February.

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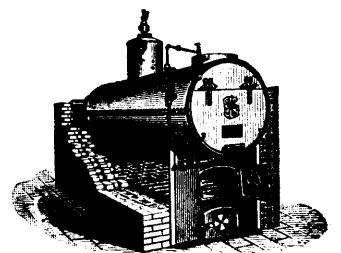
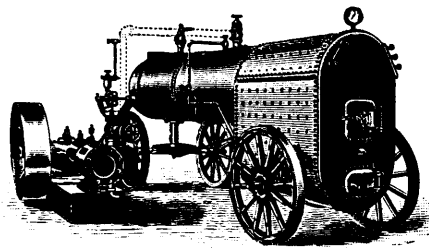
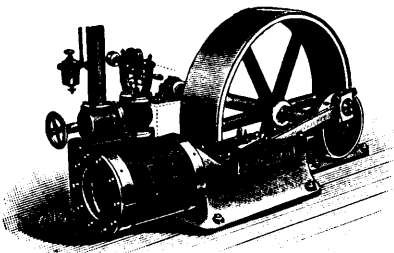
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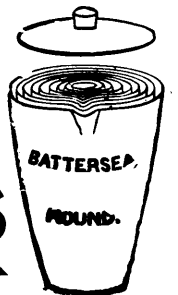
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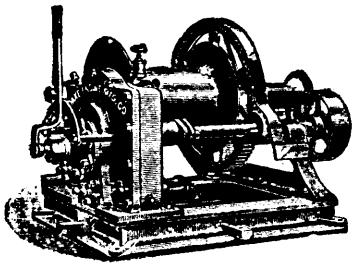
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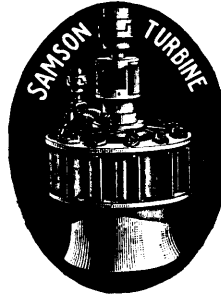
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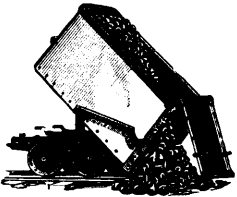
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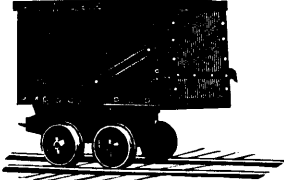
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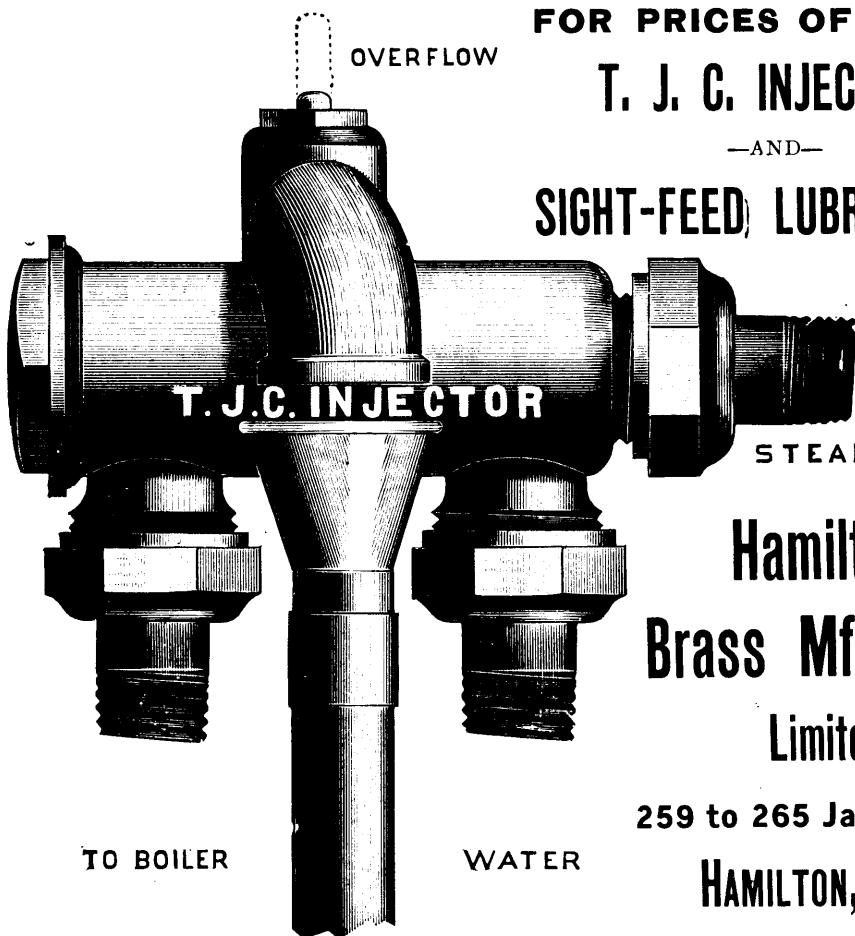
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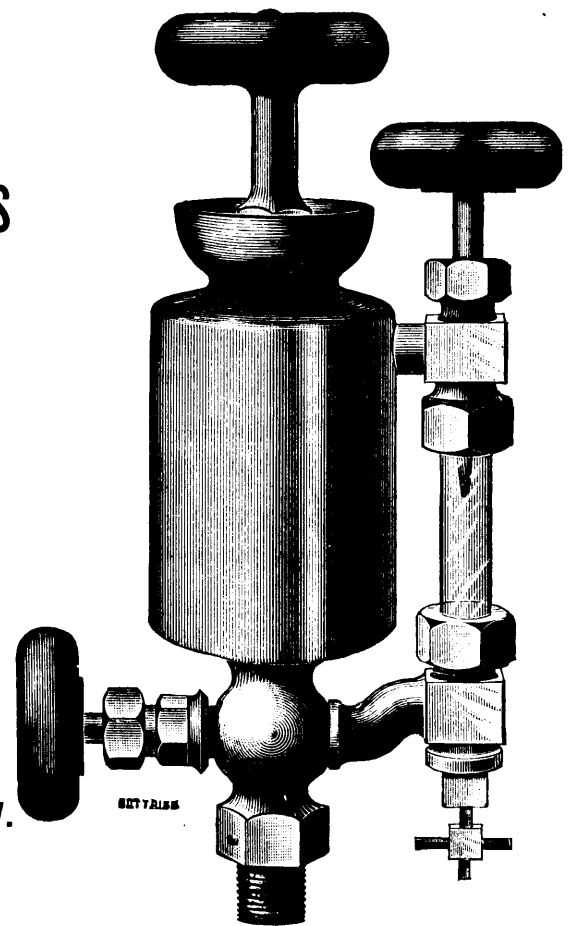
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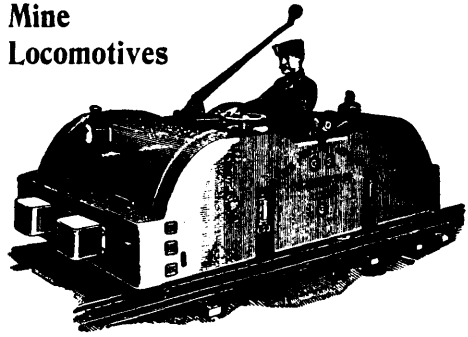
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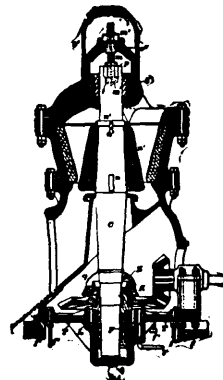
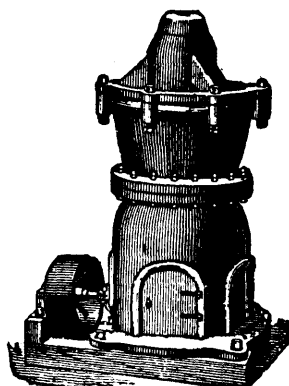
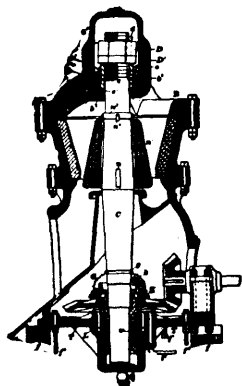
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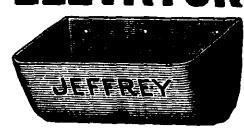
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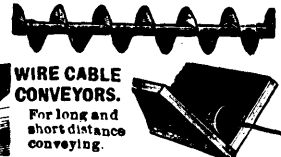
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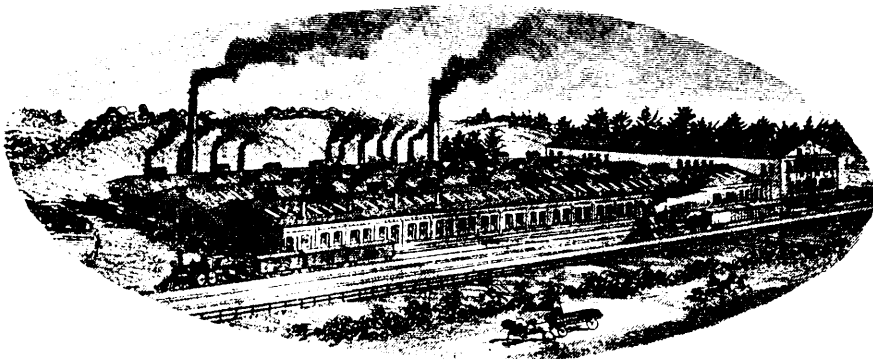
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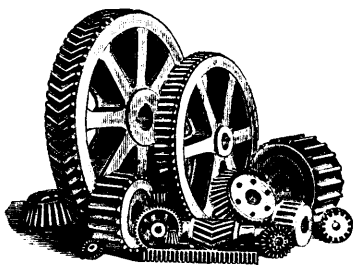
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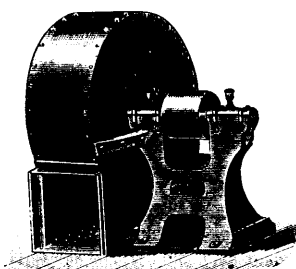
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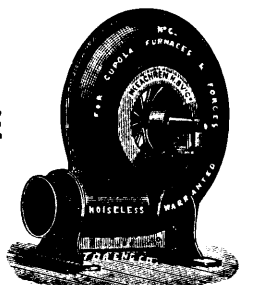
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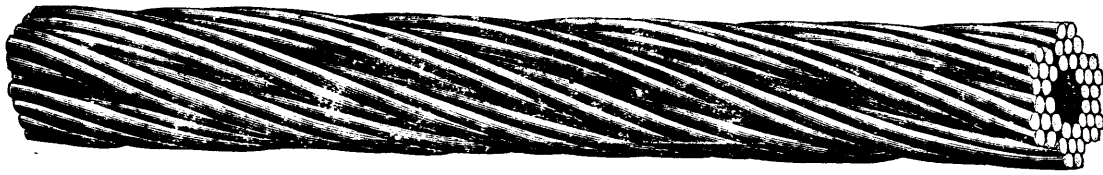
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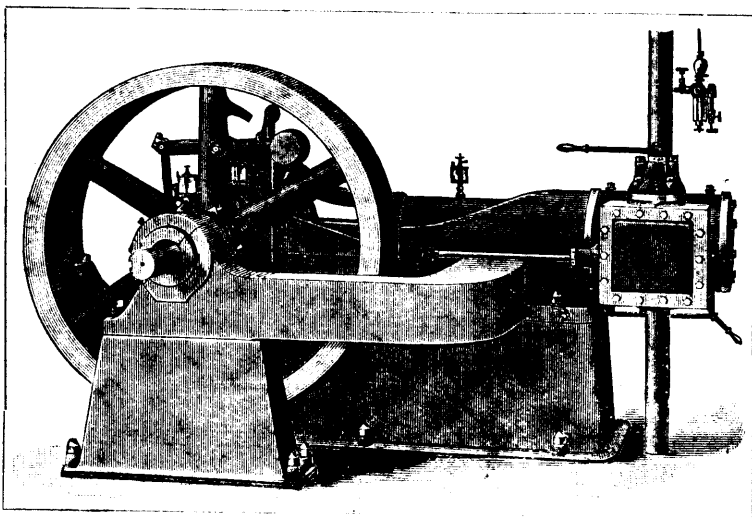


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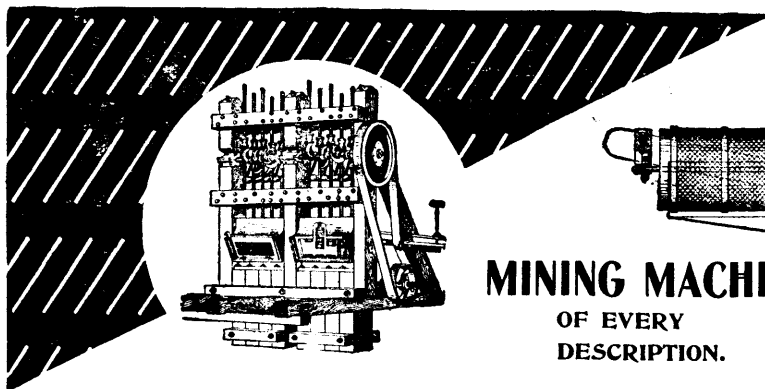
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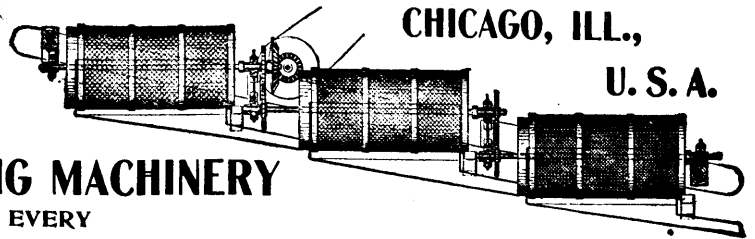
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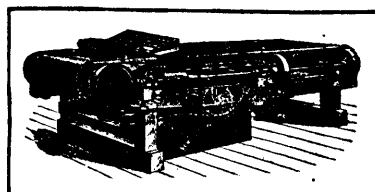
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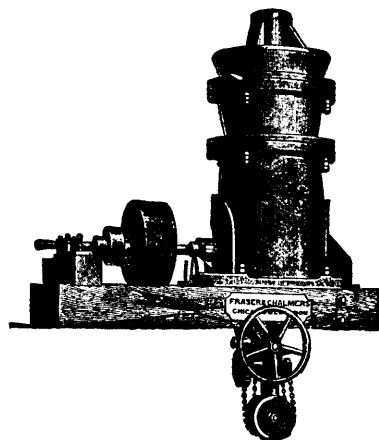
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