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CIRCULATION.

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THE KING.

When on the evening of Friday, May 6th, the news reached Canada that King Edward VII. had passed away, incredulity was succeeded by dumb sorrow. The blow was cruelly sudden—so sudden, indeed, as to be dazing.

Now the whole Empire over which Edward the Peacemaker ruled so well is plunged in sincerest grief.

Canadians have special reasons to revere the memory of King Edward. During his peaceful reign Canada has prospered as never before. Our industries have flourished. Our commercial life has expanded most notably. In all respects we are a stronger, more united, and infinitely more confident nation than we were ten years ago.

In large measure King Edward's unfailing tact, clear judgment, and strength of character made possible our progress during the last decade. A less wise monarch might have sanctioned the popular clamour for war. Fortunately for us, the monarch whose death we lament devoted all the prestige of his high office and all his rare personal abilities to the cause of peace.

Canadians will ever remember with unchanging affection the brief reign of King Edward VII. His successor, King George V., may confidently count upon Canada's unswerving loyalty.

THE MCKINLEY-DARRAGH-SAVAGE REPORT.

Not altogether illuminating is the usual mine manager's annual report. Not infrequently the manager regards his report as a superfluous duty that can readily be scamped. He writes a page or two of disjointed narrative with a few figures interspersed—and sighs a sigh of relief.

To many competent managers writing is an affliction. To others it is a means of disguising thought. All too rare is the manager who writes fully and appropriately the record of his year's work.

The report under consideration is a model. It is concise, interesting, informing. It is suitably illustrated. No important detail is omitted. The arrangement is logical. In brief, the McKinley-Darragh-Savage report is as nearly as possible just what a report should be. Before glancing at a few of its more striking features we must proffer our congratulations to Mr. P. A. Robbins, the general manager, to whom the credit of authorship is due; and to the company, whose directors are sufficiently enlightened to authorize the relatively large expenditure that such a report implies.

Mr. Robbins opens his report with a general tabular summary of silver produced and silver shipped during the past four years, and a general statement of costs for the year 1909. We notice that a total of 2,722,992.64 ounces of silver has been produced in the period 1906-1909, inclusive. As set forth under "Expenditures for Operations," the total cost per ounce of silver produced is 17 cents—a very creditable figure in view of the limiting conditions that affect the McKinley-Darragh. Under "Operations," Mr. Robbins includes all costs for shaft sinking, timbering, cross-cutting, raising and other development work. If these items were charged to capital expenditure as development, and this is the usual practice, the cost per ounce would be reduced to 14 cents. Mr. Robbins' method is to be commended.

A particularly interesting table is that giving itemized marketing costs. Of the five items—consular fees, insurance, freight, sampling, and smelter charges—the last is by far the heaviest, amounting to 4 cents per ounce. The total marketing cost is 5.3 cents per ounce.

The estimates of ore reserves, 110,300 tons, containing 5,725,000 ounces, are given in round numbers. Here Mr. Robbins avoids the meaningless refinement of arithmetic whereby reserves are estimated down to the odd ounce or even to a fraction of an ounce.

In dealing with the accidents that occurred during the past year, a careful classification as to causes is followed; and the resulting injuries are specified. This is not only sound engineering practice, but it is also good citizenship. Were this policy followed by all Canadian mine managers, there would be fewer accidents.

The extent and distribution of underground work Mr. Robbins sets forth fully. The amount of stoping is reported in cubic yards. The amount, also, of trenching is reported.

Commenting upon the character of the rock, the manager states that a man and helper in one shift of nine hours, using a 3 1-8 inch drill, will drill 25 to 30 feet in conglomerate, 30 to 35 feet in lower Huronian measures, and from 35 to 45 feet in slates, all holes being about five feet deep. The average charge of powder is about 2.1 pounds of 60 per cent. dynamite. The number of holes required for breaking a face, 5 feet 6 inches by 7 feet, varies from 9 to 13, according to the rock, the conglomerates being the toughest.

The mining, milling, and general charges are carefully analyzed. The wage schedule is given. We note that \$2.25 per day is the lowest rate obtaining. Drill runners are paid \$3.25 per day. The cost of supplies, such as meat, coal, lumber, and dynamite, appears on page 11.

Following this general information, the work done in each vein is stated, and provisional estimates of the reserves on each are furnished.

We could readily continue culling from Mr. Robbins' report, but space will not permit. Many items of interest we must be content to omit. Our readers will

find the report reproduced almost in its entirety on other pages of this issue.

The coloured maps, the diagrams, plans, and tables imply an immense amount of labour. The general text gives evidence of a critical choice of words and more than usual facility in condensation. In fact, Mr. Robbins has begun and ended his task with the clear intention of telling his directors and shareholders everything that they have a right to know. And he has succeeded in doing this within most reasonable limits.

We sincerely hope that our readers, especially those readers who happen to be mine managers, will study thoroughly the McKinley-Darragh report. Time thus spent will not be lost.

CONSERVATION AND COMMON SENSE.

On several occasions we have emphasized the fact that our sympathies are strongly with the work of the Conservation Commission. The desirability of educating the nation up to a point where ruthless waste of nature's bounties will be looked upon as a crime is beyond question. But so far as we have been able to observe, the personnel of the Commission leaves much to be desired.

In the first place, the Commission is not composed of men who possess first-hand knowledge of the resources to be conserved, or, rather, to be used economically. Lumbermen, farmers, and miners are, naturally, the persons who respectively possess the most intimate knowledge of the three basic industries. Yet not one of these industries is represented on the Commission. We should like to know the reason for this. Are lumbermen, farmers, and miners not to be trusted? Are they uniformly robbers and plunderers? Or are they ignorant children who, forsooth, must be led by the hand?

In one other respect the Commission must be criticized. The word "conservation" has become a shibboleth. The unthinking take it for granted that the present generation is the only one that has attacked the problem of utilizing properly the country's natural wealth. This, of course, is far from the truth. The fact is that "conservation" is merely a new label. In Canada, for instance, the Geological Survey and other Government bureaus have been engaged in the work of collecting and disseminating information for the last sixty-five years. And much of this information has had to do, either directly or indirectly, with various phases of conservation. The records and reports of the Geological Survey, for instance, constitute an almost exhaustless mine from which the Conservation Commission cannot do better than draw.

As we have remarked above, "conservation" is merely a new label. In all essentials the lumberman, the farmer, and the mining engineer (we mention these classes merely for illustration) have been and are becoming more and more the exponents of practical con-

servation. Every improvement in lumbering, farming, and mining implies a definite addition to the wealth of the nation. Every method devised for the utilization of waste products, such as sawdust, mechanical fertilizers, slag, creates new wealth and postpones the final depletion of our sources of raw material. In other words, our workers, our engineers, are essentially conservers.

We must conclude, therefore, that the Commission must guard against ineffective teaching or preaching; and must recognize that its real end is to supplement the efforts of others by giving timely and proper publicity to facts, figures, and ideas that are not available to the masses. Another important function, one that the Commission is not at present qualified to perform, is the promotion of restrictive legislation. Unless the membership of the Commission be made more representative, any attempt to formulate new laws will be utterly vain.

THE TIMMINS SAMPLE CAR.

It is by no means an easy matter to place in its proper light the meaning of a sample, whether that sample be made up of a few pounds of ore or consists of one or more carloads. Other things being equal, we are apt to accept results obtained from large samples more readily than those obtained from small lots of ore. However, mere bulk is no guarantee of accuracy.

The Porcupine gold fields are much in the public eye at present. Among the pioneers of Porcupine were the Messrs. Timmins and Dunlop. These gentlemen, by the way, signalized their confidence in Porcupine by paying a very large cash price for certain claims. From workings on these claims there was recently taken a sample carload of ore. The entire car of ore was crushed, sampled, and assayed by competent specialists in the United States. The assay value of the ore is reported as being \$202.75. This, of course, is most gratifying. But there is distinct danger of over-emphasizing this particular assay report.

While we do not doubt in any way the "bona fides" of the men who took the sample, yet there is every likelihood that the carload was, to some extent at least, selected ore. The taking of an absolutely fair sample is neither a simple nor an easy matter. Very few men, indeed, are qualified by experience, or fitted temperamentally, to undertake the sampling of a gold-bearing vein. But, granting that the announced results are probably too high to be really representative, yet there is ample reason for encouragement. The fact that a carload of such rich ore could be secured in restricted workings and with no conscious effort on the part of the samplers to select the rich and reject the lean, is a pleasant surprise.

EDITORIAL NOTES.

The Yukon dredging season has had the earliest opening on record. Dredge No. 1 of the Canadian

Klondike Company was put in commission on April 27th. Water is plentiful. Everything points to a prosperous year.

PERSONAL AND GENERAL.

Mr. S. N. Graham is paying a professional visit to Cobalt.

Mr. R. W. Brigstocke has been elected a member of the Institution of Mining and Metallurgy.

Mr. R. G. Drinnan has been engaged to examine and report upon coal lands on Graham Island, Queen Charlotte, B.C.

Mr. Martin Nordegg has returned to Toronto. For the last four months Mr. Nordegg has been travelling through Egypt and Turkey.

The sympathy of our readers will be extended to the veteran editor of the Transactions of the Canadian Institute, Dr. George Kennedy, whose wife died on Friday, May 6th.

Mr. J. B. Tyrrell has been elected president of the Canadian Institute, the oldest scientific society in Canada. The Canadian Institute was organized in 1849. Among the former presidents were Sir William Logan, Sir Henry Lefroy, Sir John Beverly Robinson, Hon. G. W. Allan, and Sir Sandford Fleming.

A special coal dust experiment station is used by the Vienna Committee on Fire-Damp for studying mine explosions. A masonry gallery 964 feet long has an arched roof about 7 feet high, increasing slightly in height toward the outer end, and is covered with earth varying in depth from 6 1-2 feet at the outer end to 70 feet over the explosion chamber. This chamber, forming the inner end of the gallery, is of concrete, 6 feet high, 6 1-2 feet long, and 4 1-2 feet wide. Racks of shelves for coal dust are placed at intervals along the gallery, and apparatus is provided for testing measures for preventing and limiting explosions, such as wet zones, water sprays, and zones of stone dust. The flame produced by an explosion is measured by matches placed along the gallery at intervals of forty inches. Loosely corked bottles, filled with water, are suspended bottom up about 35 feet from the explosion chamber, and strings attached to the nearest shelves draw the corks when the shelves are moved by an explosion. In this way the bottles are emptied of water, samples of gas from the explosion taking its place, ready for chemical and other examination.

The market for Baku petroleum covers Central Russia and the East. Maikop, the newly-discovered oil field, will probably supply Western and Southern Russia and may export its oil for foreign consumption.

In the Maikop oilfields bluff exposures of oil-bearing strata, sometimes 150 feet vertical measurement, are covered with soft asphalt, the result of oxidation of the exuding petroleum.

There are 9,700 stamps in commission in the Transvaal. The number of gold producers is 68.

THE MCKINLEY-DARRAGH-SAVAGE MINES OF COBALT, LIMITED.

ABSTRACT OF GENERAL MANAGER P. A. ROBBINS' REPORT FOR THE YEAR 1909.

[Editor's Note.—Mr. Robbins' report has been so carefully compiled and presents so many facts, not only concerning Cobalt, but also of interest from the mining engineer's standpoint, that we have thought it well worth while to reproduce the greater part of it in these columns.]

OUNCES OF SILVER PRODUCED.

	1906	1907	1908	1909	TOTAL TO JAN. 1, 1910.
McKinley-Darragh, - -	42673.07	706543.48	653590.38	1235340.37	2638156.30
Savage, - - - - -			22654.82	62181.52	84836.34
TOTALS, - - - - -	42673.07	706543.48	676245.2	1297520.89	2722992.64

OUNCES OF SILVER SHIPPED.

	1906	1907	1908	1909	TOTAL TO JAN. 1, 1910.
McKinley-Darragh, - -	42673.07	632983.48	701611.2	1265505.37	2642773.12
Savage, - - - - -			17432.82	59403.52	76836.34
TOTALS, - - - - -	42673.07	632983.48	719044.02	1324908.89	2719609.46

EXPENDITURES FOR OPERATIONS.*

	INSURANCE, TAXES AND MISCELLANEOUS.	LABOR.	SUPPLIES.	TOTALS.	COST PER OUNCE PRODUCED.
Administration and Management				\$32,657.90	\$0.0246
Operations, McKinley-Darragh,	\$6,777.58	\$96,322.10	\$48,443.20	151,442.88	0.1143
Operations, Savage, - - -	381.10	28,279.55	13,117.44	41,778.09	0.0322
Prospecting, - - - - -		2,719.24	337.53	3,056.77	0.0024
TOTALS, - - - - -	7158.68	\$127,320.89	\$61,898.17	\$228,935.64	\$0.1735

Under "operations" are included all costs for shaft sinking, timbering, cross-cutting, raising and other development work. If these items were charged as development and included under the head of "Plant," our operating costs would be reduced to approximately \$185,000 and the cost per ounce would be \$0.1426.

MARKETING ORE.

Ounces of Silver Shipped, - - - - - 1,324,908.89

	MARKETING COSTS.	COSTS PER OUNCE.
Consular fees, - - - - -	\$101.40	\$0.00032
Insurance, - - - - -	328.25	
Freight, - - - - -	12477.10	0.00942
Sampling, - - - - -	4440.50	0.00335
Smelter Charges, - - - - -	53070.50	0.04005
TOTALS, - - - - -	\$70417.75	\$0.05314

Average Value.

No. 1 Ore	3662.44 ozs. per ton.
Jig Concentrates	2176.04 ozs. per ton.
Sand Concentrates	957.85 ozs. per ton.
Slime Concentrates	294.03 ozs. per ton.
Gross value of silver shipped	\$679,813.06

Gross value per ounce	\$0.513094
Production cost per ounce	\$0.173199
Marketing cost per ounce	0.053149

Total cost \$0.226348

Net profit per ounce \$0.286746

Expenditures for plant extensions have amounted to:

	LABOR.	SUPPLIES.	TOTALS.
McKinley-Darragh, - - - - -	\$16183.98	\$30356.31	\$46540.29
Savage, - - - - -	2553.71	2829.87	5383.58
TOTALS, - - - - -	\$18737.69	\$33186.18	\$51923.87

Further analyses of costs will be found in the following pages, included in the reports on the respective properties.

Reduction in Costs.

The year 1910 will see our working costs reduced materially. With a cheap source of power available, a larger production of ore from McKinley-Darragh, the Savage emerging from a phase of development to one of steady, profitable production, and a more settled condition of affairs generally, the results are certain to be congratulatory.

Ore Reserves.

Our ore reserves have been increased by the year's work, and in the following reports you will find them estimated as at January 1st:

McKinley-Darragh	100,000 tons carrying 4975000 ozs.
Savage	10,300 tons carrying 750000 ozs.
Total	110,300 tons carrying 5725000 ozs.

Prospecting.

During the year our prospectors located a number of claims at Gow Ganda and Shining Tree. We have a controlling interest in eleven claims, upon one of which showings of native silver have been found, and upon several others smaltite and cobalt bloom.

McKinley-Darragh	Tons	Ounces	Value	Treatment Charges	Arsenic Penalty	Of 1000 paid for	Freight	Refining	Total	Net Return
nuggels	673	13,305.60	6,861.26	3394.6			9.00		348.46	6,512.80
#1 Ore	135.172	494,981.59	253,047.90	1084.27	1037.46	13194.32	1619.94	2474.90	19415.89	233632.01
jig conc	178.124	386,140.13	198,561.81	1424.99	1677.20	9,928.09	2232.63	1,930.74	17,193.65	181,368.16
Sand "	276.402	264,476.12	135,961.75	2245.31	426.58	6,798.09	3,450.55	1,322.38	14,242.91	121,718.84
Slime "	235.025	70,212.09	36,170.35	1880.24	2.06	1,808.52	3,015.35	351.06	7,057.43	29,112.92
Miscel	122.002	36,380.84	18,552.26	906.18	34.21	1,328.56	1,007.33	101.64	3,377.92	15,174.34
Total	947.348	1,265,505.37	649,155.33	7,885.45	3177.51	33057.38	11,335.00	6180.72	61636.26	587,519.07
Savage										
#1 Ore	23.658	51,840.91	26,822.03	189.26	228.71	1341.10	269.51	259.45	2288.03	24534.00
Screenings	65.170	7,512.61	3,835.70	521.37		191.78	872.59	37.56	1623.30	2,212.40
Total	88.828	59,403.52	30,657.73	710.63	228.71	1,532.88	1,142.10	297.01	3911.33	26746.40
Grand Total	1036.226	1,324,908.89	679,813.06	8,596.08	3,406.22	34590.46	12477.10	6477.73	65547.59	614265.47

Accidents.

Two fires occurred during the year, i. e., No. 3 Shaft house at the Savage, and the Hungarian quarters at McKinley-Darragh.

No serious accidents occurred to machinery or plant.

It is with regret that I report three fatalities which have marred the year's work, all on McKinley-Darragh.

Besides these fatalities there have been a number of minor accidents, which have been catalogued—first, according to causes; second, according to resulting injuries.

Summary of Injuries.

Injuries to head and face—16 cases (including 4 cases of eye injuries).

Injuries to hands—15 cases (3 cases entailing loss of digits.)

Injuries to feet and ankles—5 cases.

Injuries to body—4 cases.

Injuries to limbs—3 cases.

Typhoid.

Although Cobalt and the camp in general suffered greatly during the autumn from a severe epidemic of typhoid, we were extremely fortunate in not having a single case develop upon either the McKinley-Darragh or Savage claims.

Smallpox.

One case of small pox occurred on McKinley-Darragh, having been brought in by an arrival from England. An isolation camp was built under the Medical Health Officer, and the spread of the disease prevented. All costs in connection with the matter were met by us, neither the town nor township contributing.

General.

The character of the ground may be somewhat judged from the following notes:

Using a 3 1/8-inch drill, a man and helper in one shift of nine hours, when working on company account, drifting or crosscutting, will drill from 25 to 30 feet in conglomerate, 30 to 35 feet in lower Huronian measures, and from 35 to 45 feet in slates under the swamp, all holes approximately 5 feet deep.

The average charge of powder is approximately 2.1 pounds of 60 per cent. dynamite per hole.

The number of five-foot holes required for breaking a face, 5 ft. 6 inches by 7 feet varies from 9 to 10 in the Swamp drifts, 10 to 12 in lower Huronian, and 11 to 13 in the tougher conglomerates of the Blind Vein.

With two faces to work in, so that the drill runners do not have to do their own mucking, one drill working 13 1/2 shifts per week, will, in that time, advance from 18 to 20 feet in conglomerate, 22 to 24 feet in lower Huronian, and 25 to 35 feet in slates.

The foregoing figures represent what is considered fairly good work upon the part of our men.

Monthly Production of Shipping Ore and Concentrates for year 1909

Month	Nuggets		#1 Ore		Concentrates						Miscel.	Total				
	Tons	Ozs	Tons	Ozs	Flg		Sand		Slime			Tons	Ozs			
					Tons	Ozs	Tons	Ozs	Tons	Ozs	Tons	Ozs	Tons	Ozs		
January	602	3753	27152	8089324									85449	2990580	110603	10098657
February			1000	400000	8500	1529805	2400	300000	2000	66653	4050	240000			17950	2526458
March	124	251425	3805	1510040	14089	2862758	14458	2138185	7026	211327					39710	6973735
April	074	173088	8849	3058901	14354	3402460	23656	2082029	14624	505772					61559	9223250
May	084	203819	16161	5728951	19734	4611461	29595	2845753	22185	678544					87759	14185530
June	075	148047	13951	4844159	15652	3142845	35052	2667474	42670	1066909					108400	11869164
July	064	75944	4204	1533025	17845	3244231	23579	2441411	21489	760769					66579	8130280
August	058	100000	13600	5984000	19579	4723015	29864	2915823	24697	409033	6050	205600			95848	14837471
September	070	137581	7402	3265724	20404	4250800	37691	3504421	25821	785843	4100	150000			94888	11894379
October	028	52800	11947	5974	19456	4112263	29046	2836129	33017	889321	4300	212800			97764	13147826
November	090	182600	8668	3815533	17700	4158270	30040	2868080	31925	930000	3253	160000			91676	12114362
December	007	6603	4235	2274000	13411	3101015	23415	2200967	31961	867836	2500	78004			75259	8528420
Total	676	1335660	120972	45598159	180124	39194413	278466	26720212	259825	7639009	107702	3046984			448265	123534937
On Hand Jan 1 1909	003	4100	15000	4200000							15000	610000			30000	4819400
Total	679	1345060	135972	49798159	180124	39194413	278466	26720212	259825	7639009	122702	3656984			478268	128354337
Shipped on 1909	673	1330560	135172	44448159	178124	38614413	276402	26447412	255024	7021209	122002	3638084			447398	126550537
Jan 1 1910	006	14500	800	3000000	2000	580000	2544	272600	24800	617800	700	18900			36870	1803800

COSTS OF PRODUCTION AT MCKINLEY-DARRAGH.

	TOTAL.	PER TON OF ORE MINED.	PER TON OF ORE MILLED.	PER OUNCE OF SILVER PRODUCED.
Insurance, Taxes and General Charges, - -	\$28541.48	\$1.6965	\$1.5200	\$0.0231
Mining, - - - - -	85767.08	5.0979	4.5857	0.0694
Milling, - - - - -	37134.32	2.2072	1.9854	0.0300
TOTALS, - - - - -	\$151442.88	\$9.0016	\$8.0972	\$0.1226

Ore hoisted from mine during year.....16824 tons.
 Ore milled18703 tons.
 Ounces of silver produced.....\$1,235,349.37

During the year approximately 10,000 tons of waste rock have been hoisted from the mine. Including this tonnage with the tonnage of ore, the costs work out:

General charges.....\$1.064 per ton of rock
 Mining 3.197 per ton of rock
 Assume Milling 1.30 per ton of rock

This is indicative of what could be expected if we were to stop all exploratory work and limit our operations to the mining and milling of ore. In fact, were

we to pursue such a course, it is probable that the total cost of operations could be reduced to \$5.25 per ton, for the costs of surface trenching, and other contributing costs could also be eliminated.

A day's work consists of 9 hours, in the mine; 9½ hours, on the surface; and 12 hours in the mill.

The average number of men employed upon operations at the mine, exclusive of construction work, has been 112.

The standard rates of wages are:

Surface Labourers	.....	\$2.25	per day
Drill Runners	.....	3.25	per day
Drill Helpers	.....	2.75	per day
Mine Labourers	.....	2.50	per day
Mill men	.....	2.25 to 3.25	per day
Mechanics	.....	2.75 to 3.25	per day
Mechanic's Helpers	.....	2.25 to 2.75	per day

The men are charged 60 cents per day for bed and board.

Distribution of Labor and Supplies

	Labor	Supplies	Totals
Sundries	1981.76	675.47	2657.23
Mine Office	3468.88	315.54	3784.42
Superintendance	4629.02		4629.02
Trenching	2532.11	72.88	2604.99
Sinking	963.37		
Drifting	8421.86		
Crosscutting	4480.99	12,105.22	33,322.24
Raising	2803.21		
Sloping	4547.59		
Timbering	3859.11	1,247.90	5,107.01
Loading and Tramming	10905.60	199.97	11,105.57
Pipefitting, Pump Repairs	410.32	213.66	623.97
Hoisting, Lading, Dumping	6220.06	114.27	6,334.33
Stream and Air Plant Operation	4920.55	13,685.92	18,606.47
" " Repairs	406.09	385.01	791.04
Sharpening Drill Steel	4851.55	456.62	5308.17
Repairs to Air Drills	394.35	1,568.94	1,963.29
Sorting and Bagging Ore	1493.44	1,112.89	2,606.33
Mill Operations	13724.82	599.12	14,323.94
" " Repairs	2578.06	1,957.26	4,535.32
Mill Power plant Operations	5604.54	10900.74	16,405.28
" " Repairs	286.74	278.44	565.18
Sampling and Assaying	2878.60	434.18	3312.68
Operating Shops	621.77	408.29	1030.06
" " Compound Scales	2247.65	1,241.24	3488.89
Maintenance of Buildings	627.48	419.11	1046.59
Road making and Repairs	662.74	50.54	713.28
Totals	96,322.10	48,443.20	144,765.30
Construction work	16183.98	30,356.31	46,540.29
Operating Boarding House	2564.99	10,658.90	13,223.89
Prospecting	2719.24	337.53	3056.77
Totals	117,790.31	89,795.94	207,586.25

Indicative of the cost of supplies delivered at Cobalt, the following may be taken:

- Meats.....8 to 12 cents per lb.
- Penn. Bituminous Coal.....\$5.40 to \$5.80 per ton.
- West Virginia Bituminous Coal..\$5.80 to \$6.00 per ton.

- Lumber.....\$14.00 to 20.00 per M., B.M.
- Square Timber.....\$18.00 to \$22.00 per M., B.M.
- 3-in. to 5-in. Round Lagging.....2 cents per lin. ft.
- 12-inch Round Timber.....7 cents per lin. ft.
- 50 per cent. Dynamite.....14½ cents per lb.

MONTH.	TONS MILLED.	TOTAL OUNCES FOR MONTH.	OUNCES PRODUCED PER TON MILLED.
February, - - - -	715	25,364	35.47
March, - - - -	1,533	69,737	45.42
April, - - - -	1,520	92,232	60.68
May, - - - -	1,755	141,855	80.83
June, - - - -	1,627	118,694	72.95
July, - - - -	1,817	81,303	44.74
August, - - - -	1,870	148,374	79.30
September, - - - -	1,948	118,944	61.06
October, - - - -	1,976	131,478	66.54
November, - - - -	2,040	121,143	59.38
December, - - - -	1,902	85,284	44.84
	18,703	1,134,408	60.65

Mining.

We have continued our policy of doing a relatively large amount of crosscutting, and the results, in locating new ore bodies, have demonstrated the value of this method of prospecting.

STOPING.—While approximately 3,000 cubic yards of ore have been broken in the stopes during the year, but little over one-half of this has been removed from the mine, the balance being still in the stopes, ready to be drawn off and treated in the mill when required.

At the beginning of the year we had a large amount of ore broken in the mine, awaiting treatment by the mill.

Around our No. 1 Shaft, which is the hoisting shaft, there had accumulated a considerable tonnage of low-grade ore which was also destined for the mill. This broken ore in the mine and on the dumps interfered greatly with our development work, as it had to be removed before good progress could be made.

As you are aware, the No. 1 Shaft is located in a gully, with our discovery vein on the north, power plant on the west, T. & N. O. Railway on the south and a hill side on the east, leaving a very constricted area available for waste and ore dumps.

In order to carry on crosscutting it is necessary to have space in which to dump the waste rock, and it

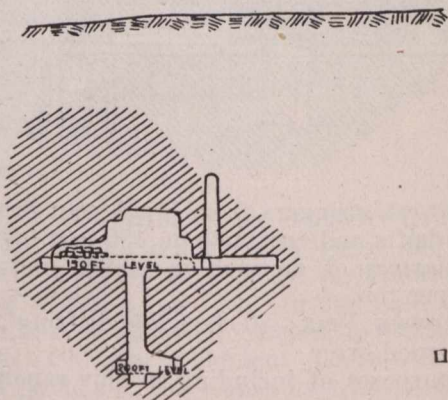
— McKINLEY-DARRAGH MINE —

— Cobalt, Ontario Canada —

— Vertical Sections —

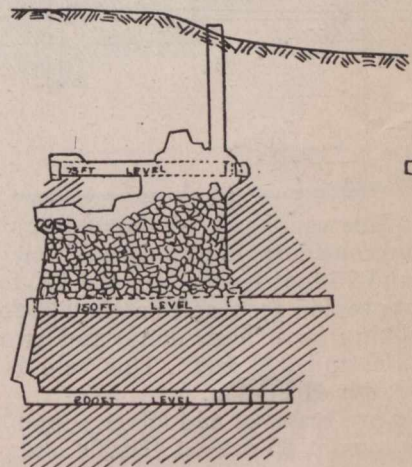
~ Blind Vein, North West Branch ~

Tons = 5000 Oz = 325,000



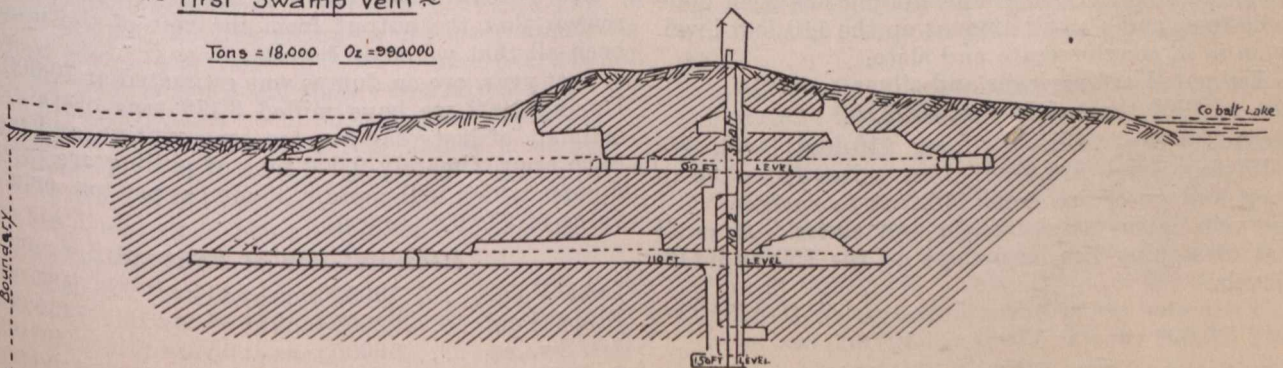
~ Blind Vein, South East Branch ~

Tons = 6000 Oz = 380,000



~ First Swamp Vein ~

Tons = 18,000 Oz = 990,000



— Payable Ore shown Hatched —

was to provide this space that we milled a quantity of ore which was lying around No. 1 Shaft.

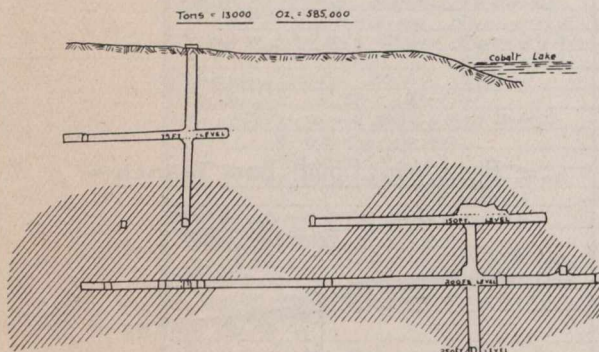
During the year we have overcome these difficulties and provided sufficient waste dump space to carry us through the coming year, so that we shall be able to carry on our mining operations under more favourable conditions.

Accompanying are plans showing the location of veins upon the property, and also sectional elevations showing development, stoping and estimated reserves of the principal ore bodies. Reference to these will guide you in understanding the following remarks:

LAKE VEIN.—Development work consists of 194 feet of drifting on 150-foot level; 480 feet of drifting on 200-foot level; winze from 150 to 250 feet. The vein cut off at 235 feet in the winze, but is almost certain to be picked up again at 250 feet by means of a cross-cut. This vein is in conglomerate and lower Huronian.

Estimated ore reserves and silver contents,
13,000 tons at 45 ozs.—585,000 ozs.

~ Vertical Section on Lake Vein ~



— Payable Ore shown Hatched —

BLIND VEIN.—This vein has been stoped out above the 75-foot level, and considerable stoping has been done between the 150 and 75-foot levels. On the 150-foot level drifting amounts to 545 feet, and on the 200-foot level 320 feet of drifting have been done, and two winzes sunk between 150 and 200 feet. This vein is in conglomerate and lower Huronian.

Estimated ore reserves and silver contents,
22,000 tons at 65 ozs.—1,430,000 ozs.

FIRST SWAMP VEIN.—Drifting 60-foot level, 384 feet; 110-foot level, 445 feet; 135-foot, 28 feet. Raise from 135-foot to 60-foot. Considerable stoping has been done above 60-foot, and a small amount on the 110-foot level. The vein is in conglomerate and slate.

Estimated ore reserves and silver contents,
18,000 tons at 55 ozs.—990,000 ozs.

SECOND SWAMP VEIN.—Drifting 110-foot level, 475 feet; 150-foot level, 390 feet; three raises from 150 to 110-foot, and one raise from 110-foot to surface.

This vein is in conglomerate and slates. A small amount of stoping has been done on the 150 and 110-foot levels.

Estimated ore reserves and silver contents,
20,000 tons at 55 ozs.—1,100,000 ozs.

THIRD SWAMP VEIN.—82 feet of drifting on 110-foot level with 30 feet of raise above this level. Good ore in the floor, backs and west face. This vein is in slate, as far as proven.

Estimated ore reserves and silver contents,
3,000 tons at 50 ozs.—150,000 ozs.

The foregoing constitute the ore bodies upon which the bulk of development work has been done.

Besides these there are:

No. 7 VEIN—stoped out under ground, but still a considerable amount of payable ore in open cut south of shaft.

FOURTH SWAMP VEIN—Trenched on surface 100 feet, shaft sunk 20 feet, and vein proved at 75 feet, by workings of Right of Way Mining Company.

Discovery vein at edge of lake, large tonnage of low-grade ore, and some good high-grade ore in cut, at present under water.

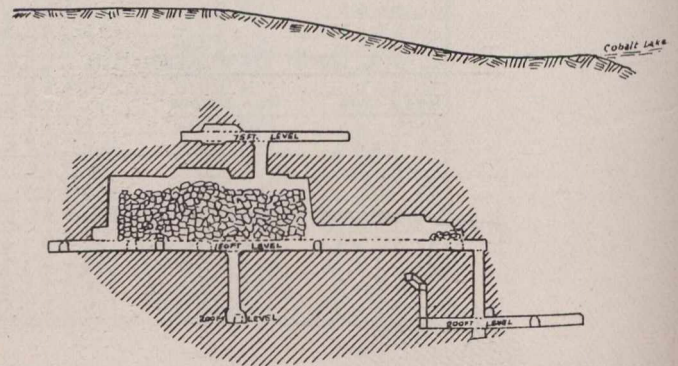
— MCKINLEY-DARRACH MINE —

— Cobalt, Ontario, Canada —

— Vertical Sections —

~ Main Blind Vein ~

Tons = 11,000 Oz. = 724,000



Northwest stringers from blind vein proved for 120 feet by drifts and crosscuts on 150-foot level, veins are three-quarters of an inch in width, and carry 1,000 ounces per ton.

SOUTHWEST VEIN—80 feet of drifting on 150-foot level in good ore.

For purposes of including in this report I estimate that these miscellaneous ore bodies will yield 15,000 tons, having a gross value of 30 ounces per ton, giving a total of 450,000 ounces.

Work upon these veins has not been pushed, for the reason that the output from the rest of the mine has been all that we could handle.

Last year, ore on dumps was estimated at 10,000 tons. During 1909 we have milled 3,178 tons of this. The estimate of last year was too conservative, and we still have approximately 9,000 tons of milling ore upon the dumps, which will contain 30 ounces per ton, or a gross value of 270,000 ounces.

Recapitulation of Estimates.

Lake Vein	.....13000 tons at 45 ozs.....	585,000 ozs.
Blind Vein	.....22000 tons at 65 ozs.....	1430,000 ozs.
1st Swamp	.....18000 tons at 55 ozs.....	990,000 ozs.
2nd Swamp	.....20000 tons at 55 ozs.....	1100,000 ozs.
3rd Swamp	..... 3000 tons at 50 ozs.....	150,000 ozs.
Miscellaneous	...15000 tons at 30 ozs.....	450,000 ozs.
Dumps	..... 9000 tons at 30 ozs.....	270,000 ozs.
	100000	4975,000 ozs.

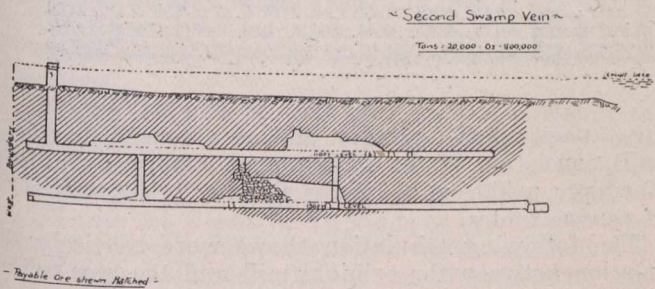
Having made arbitrary allowances for extensions of the ore bodies beyond the limits of our workings as at January 1st, it is obvious that exact figures would be misleading in regard to the accuracy of my estimates, and I have, therefore, used the nearest even thousands, as those figures are more easily carried in the mind and are sufficiently close to the truth for the purposes of this report.

Referring to the tabulated figures covering ore production for the year, and taking the months since we started milling, the yield per ton has been:—

These results are higher than we can hope to maintain throughout the life of the mine, and in order to place a more definite valuation upon our ore reserves, during the month of December we milled ore which could be taken as more representative of the whole mine, as follows:

1st Swamp Vein, 110-foot level.....	837 tons.
Blind Vein, 150-foot level.....	495 tons.
Southwest Vein, 150-foot level.....	36 tons.
Lake and Blind Veins, 200-foot level....	534 tons.
	1902 tons.

The recovery for the month was 85,284 ounces, or 44.84 ounces per ton, and the average mill tailings carried 6.26 ounces per ton, making a total value per ton of 51.10 ounces.



It is not possible without any extensive development work, and sampling, to accurately gauge the value of the ore reserves, owing to the great variations in values which occur within a few feet. In one case, the Blind Vein, at 75 feet, is about two inches in width and carries 4,500 to 5,000 ounces per ton. There is little silver in the wall rock, and the stopes have to be carried as narrow as possible. At 150 feet the vein is split into smaller veins which carry from 2,000 to 2,500 ounces per ton, and there is considerable value in the wall rock, permitting stoping widths of over ten feet in places. At 200 feet the stringers are more numerous, smaller, carry from 1,500 to 2,000 ounces per ton and the wall rock is not so heavily mineralized as at 150 feet. Like variations occur in the other veins, and it will, therefore, be understood that figures must be approximate, but I believe that those given above are a conservative estimate of our probable ore reserves, as they are based upon some hundreds of samples, and are checked by actual returns from milling.

To estimate the possible ore, as distinguished from the probable ore, is a still more difficult matter.

On the north, Cobalt Lake Mining Company is working two rich veins which run into our property and which appear to be continuations of our 1st and 2nd Swamp Veins. This being so, we could expect an addition of 300 feet to the known lengths of each of these veins. My policy is to leave the 4½ acres, which we own under the lake, until the rest of the mine is worked

out, so as to avoid any possibility of flooding our workings.

Near the northwest corner The Right of Way Mining Company is working a vein which is yielding good ore, and which appears to be an extension of our 4th Swamp Vein, upon which we have as yet done no development work.

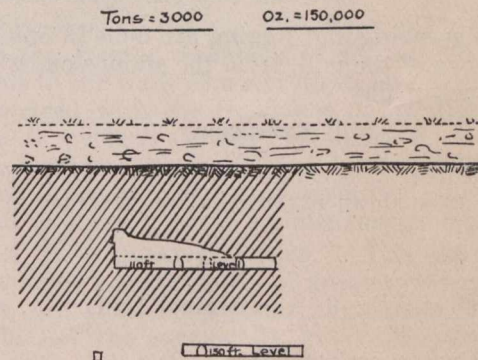
On our west, the Princess has two veins making toward our property. It is possible that one of these is an extension of our 1st Swamp Vein, which fact would add 100 feet to the length of this vein as developed at present.

Our No. 7 Vein, (an extension of the Kendal Vein of the Nipissing), constitutes another factor in possible ore reserves. There is still some ore to be stoped on the surface, and at 120 feet a strong calcite vein in diabase remains to be explored. During the past year only a small amount of work was done upon No. 7. We have in the southeast portion of the claim, several veins of smaltite, which carry small silver values on the surface. Nothing has been done to prove these at depth.

— MCKINLEY-DARRAGH MINE —

— Cobalt, Ontario Canada —

~ Vertical Section on Third Swamp Vein ~



In the western portion of the property we have found by means of crosscutting, seven small silver-bearing veins of calcite and smaltite, upon which no work has been done other than locating them by means of crosscuts; there is always a possibility that some of these will develop into good producers upon further development.

In the matter of depth, we have not carried on any exploratory work below 200 feet. One winze has been sunk on the Lake Vein to 250 feet, but nothing further has been done, as the development work on the upper levels has kept our plant going at full capacity. There are indications that the ore shoots of the Blind and Lake Veins dip to the south, which, if true, will give us ore at still lower levels. This, however, is a matter of conjecture at present.

From the foregoing, it will be evident to you, that while in the matter of estimating probable reserves, we are bound within more or less definite limits, the possibilities of the property may be discounted as having much wider limits, and there is every reason to expect that the life of the mine will be materially increased by the development of some of the factors at present

classified as "possibilities," or by the opening up of new ore bodies at present undiscovered.

Milling.

The new mill was started on February 8th, when ten stamps were put into commission, followed on March 11th by the remaining ten.

Record of Ore Milled and Extraction

Month	Ore Treated		No of Stamps	Average Run per day	Mill Heads	Mill Tails	Ounces of Silver recovered per mt	% of total silver recovered
	Mine	Dump						
February	715	715	1250	57.20			18,964.58	
March	1533	1533	2600	54.73			54,636.95	
April	1463	57	1270	25.50	4845	7.21	65,643.04	83.36
May	1427	328	1755	28.82	5632	7.82	80,365.74	81.42
June	476	1151	1827	28.90	5163	7.80	70,353.25	83.63
July	887	930	1817	26.00	6440	4.81	65,773.55	81.43
Aug	1816	574	1870	23.57	5560	7.20	83,834.71	83.15
Sept	1644	244	1928	25.55	7624	7.21	86,286.45	84.19
Oct	1567	409	1976	27.13	4778	6.62	80,733.13	85.12
Nov	2040	2040	2575	74.22	4782	6.23	82,488.30	85.07
Dec	1902	1902	2430	78.27	3488	6.26	62,344.25	82.45
Total	13,525	3,175	18,703				756,924.45	85.130

Considerable experimenting was required at first before the mill could be worked up to its full capacity, and it was not until May that satisfactory results could be depended upon. Since then there has been a steady increase in tonnage treated, and a corresponding decrease in costs.

The costs for the month of December were unusually high, due to the shutting down of the mill for two days at Christmas in order to make certain repairs, and also due to the laying in of a surplus stock of coal, the costs of handling which were charged into December operations.

During the first month of 1910, we have treated an average of 83.5 tons daily at a cost of \$1.48 per ton; a decided improvement over previous performances.

The mill is operated six days per week, which accounts for the comparatively high milling costs when compared with those of other camps.

Distribution of Milling Costs for 1909

Month	Concentrating				Reports to Mill				Power-Light-Heat				Graveling				Grand Total			
	Labor	Stores	Total	Cost per ton	Labor	Stores	Total	Cost per ton	Labor	Stores	Total	Cost per ton	Labor	Stores	Total	Cost per ton	Labor	Stores	Total	Cost per ton
Feb	7736	6750	8415	1.177					422.00	947.30	1369.40	1.915					11957	101520	221091	3.092
March	133675	60400	139715	.911	18776	30236	21746	.443	50643	1038.18	154440	1.008	10039	1595	11634	.075	213126	114474	227606	2.137
April	123845	8273	132118	.869	24347	16919	36264	.470	54753	102450	187214	1.034	10167	1447	11604	.070	228107	124038	257195	2.344
May	117516	8646	126012	.718	25700	13835	39544	.278	62237	98601	160838	.916	12385	1467	12852	.079	217647	122504	240246	1.438
June	137452	7231	144683	.889	35195	36600	70803	.435	50624	98015	148637	.913	11249	2425	13674	.084	233523	144272	277797	2.221
July	135078	2746	137823	.758	24240	21476	46226	.254	53008	104850	157838	.869	12279	2697	14976	.082	224655	132278	256033	1.963
Aug	100923	8107	109030	.743	21048	24895	45943	.245	51868	102074	158939	.823	10518	2280	12798	.068	214354	137356	251710	1.836
Sept	133688	3090	136778	.702	29146	19748	48892	.251	55278	103421	164142	.817	10729	2534	13263	.068	228843	129288	258121	1.838
Oct	126867	2471	129338	.705	22287	16868	39255	.498	47427	100613	147446	.748	2750	1287	4037	.056	216431	121120	237551	1.707
Nov	126288	8140	128428	.629	20528	13848	36370	.179	50633	102427	153060	.750	10422	3546	13968	.068	206868	124458	231326	1.626
Dec	120989	3279	124268	.653	22288	26066	48354	.252	60453	106516	166967	.777	10422	3227	13649	.072	211251	130089	251340	1.857
Total	13,72483	59912	14,32494	.705	257800	195726	453526	.243	579128	11,17918	1697044	.907	107950	22311	130460	.071	2,317,366	1,346,066	3,713,432	1.915

All coarse crushing and jigging are done in one shift, but the balance of the mill, from the stamps on, is operated 24 hours per day.

Mill Extension.

During the year it became evident that the mine was opening out to such an extent that an increase in mill-

ing capacity was desirable, and an extension has been built consisting of ten 1,250-pound stamps, one 8-foot Hardinge pebble mill, twelve shaking tables and a set of canvas tables.

The following tabulation shows more concisely the relation between the original mill and the new extension:

Apparatus.	Number in Original Mill.	Number in Extension.	% Increase in Capacity.	Total Number in Extended Mill.
Jigs	6	..	..	6
Stamps	20	10	50%	30
Sand Tables	4	6	100%	10
Tube Mills	1	1	100%	2
Vanners	4	..	..	4
Slime Tables	8	5 Slime; 1 Sand.	90%	14
Canvas Tables	..	10	..	10

It will be noticed that our stamping capacity has been increased but 50 per cent., while the tables and fine grinding tube mills have been increased 100 per cent. This gives us a better balanced mill, as in the past we have had insufficient tables to treat efficiently all of the product obtainable from the stamps.

The extended mill can treat 140 tons per day, but it is expected that only from 110 to 120 tons daily will be milled. The extension is almost completed and some of the tables are already operating.

Attached "flow sheet," plan and elevation of the mill illustrate the process of concentration in its various details. A photograph of the extended mill is also attached hereto.

So far, it has not been demonstrated that any other process of extraction possesses commercial advantages

over straight concentration as practised by us, but there is every hope that the cyanide process will be developed to a point which will insure increased profits from milling.

Within a few weeks we expect to be driving the mill by electricity, developed from water power, a change which will net considerable saving in the cost of power. This saving in power costs, taken with the increased tonnage to be treated, will enable us to reduce milling costs to approximately \$1.30 per ton.

A further economy will also be achieved through the installation of canvas tables, making possible a higher extraction of the values, and it is hoped that the values in our tailings will be cut down to between four and five ounces per ton.

(To be Continued.)

THE ELEMENTS OF SLIME CONCENTRATION.

BY WALTER McDERMOTT.

(Paper read before the Institution of Mining and Metallurgy.)

Introduction.

In considering the progress of concentration methods for the last thirty years, it appears possible to draw certain conclusions, which may be considered as elements governing the probable developments in the future. To those who have been in touch with this branch of ore treatment, it is very evident that there has been nothing revolutionary in the best practice for the period mentioned.

There have been hundreds of inventions; there have been some dozens of commercial introductions of new machines, which were expected to be revolutionary, but which have had only a short period of favour, followed by disappearance from use; and there have been a very few new types which have survived the struggle for existence. The most striking fact has been the very wide and increasing use of two types of machines, the shaking belt and the jerking table.

Inventors, of course, will invent, and they will hope; but very often they will not investigate what has been already done; and those persons who have been in the position to hear of and examine many new inventions, must be continually struck with the fact of the recurrence of exploded ideas, and the existence of certain limitations which must be considered in a successful slime saver.

It is easy enough to save the coarser particles of any mineral with a specific gravity admitting it into the concentration class, so that invention is more prolific in the means of saving the finest particles. Experience all over the world, on all kinds of ore, has certainly demonstrated a number of facts which enable one to decide pretty accurately the chances of success for any new invention by a mere examination of the principle on which it works, and of its details of construction, without any actual trial on a given ore. Many think that every new invention must be tried before it is judged.

Even on actual new inventions this is only partially true; because life is too short and capital too limited for trial always to precede judgment; but in the vast majority of inventions the novelty is only a novelty to the inventor: the machine itself is an immaterial modification of something already tried and condemned, or it is opposed in principle to established conditions of success.

The following notes are an attempt to put down certain elements which to the writer seem established by practice; and to draw certain conclusions which may be of service as indicating the most promising direction for improvements in the arrangement of old machines, or in the designing of new ones.

Definitions.

Although the chief subject matter of these notes is the discovery of slime mineral, some of the processes to be discussed cover a wider range of sizes than what are usually understood by the term "slime," and a number of machines are in present use which deal at one operation with this wider range. To restrict the field of discussion it is proposed to confine this paper to the treatment of material which has passed a screen equivalent to 40-mesh I.M.M. standard, that is, apertures of .0125 inch.

As the functions and efficiencies of a number of well-known machines are to be referred to, it is desirable to point out that to-day there are practically no master patents in existence on the best known types of machines; that these types are all (with varying details) manufactured by a number of firms; and, therefore, it is possible to refer broadly to types of machines without being misunderstood as referring to makes of machines. The following classification is herein adopted as covering all the machines necessary to refer to for the purposes of this paper:—

1. Fixed inclined tables (including slowly travelling tables).
2. Jerking tables (including bumping tables).
3. Shaking travelling belts.
4. Jerking or bumping travelling belts.
5. Shaking side-inclined belts or tables.

CLASS I.—"Fixed Tables" are illustrated by various forms of frames, with wood, canvas, blanket or other surface; by the old Cornish buddle; and by various forms of revolving buddles and side-inclined non-shaking belts. The slow revolution of a buddle or belt, and the intermittent automatic discharge of a Frame, do not affect the actual operation of concentration on the surface, so all are included in the class of fixed tables for the sake of simplicity and brevity.

In this class, all the machines depend for results simply on the greater resistance of the specifically heavy minerals to the wash of water down an inclined surface, as compared with the resistance of the lighter waste. The more perfect of these machines do not make a simple division between "Concentrate" and "Tailing," but they have to make an intermediate or "middle" product in order to yield a clean concentrate.

CLASS II.—"Jerking Tables."—This class depends for results on a combination of greater movement across a table, and greater resistance to wash of water down the table, of the specifically heavy particles, as compared with the motion and resistance of the lighter waste particles. For high efficiency this class, like Class I., must produce a middle product; because, in most cases, a hard line of division between Concentrate and Tailing is not possible.

CLASS III.—"Shaking Belts."—The operation of this class depends on a greater variety of conditions than need be considered in the preceding two classes; and a misunderstanding of these conditions has led frequently to hasty generalizations as to the requirements for most useful efficiency.

The shaking or vanning motion not only settles the heavy mineral on to the travelling surface of the belt, but it prevents the larger particles from clinging to the surface. The upward travel of the belt is in opposition to the flow of water; it tends to keep a bed of the coarser particles on the belt, and this bed checks the too-rapid flow of slime material down the incline. The shaking motion, by keeping the bed from packing on the belt, allows of much less inclination on this than on a Fixed Table, therefore of less rapid current of water. This class makes no middle product, which fact is a limitation on some ores, but a great advantage on others, where only one class of Concentrate is required.

CLASS IV.—“Jerking Belts.”—The actual concentrating process on this is the same as in Class II., but it is carried out on a side-inclined travelling belt, going in the direction of the “throw” of the concentrate, and so the discharge is assisted and does not depend entirely on the “throw.” This class makes a middle product also. In some modifications, owing to the nature and frequency of the jerking or bumping motion, a complication is introduced in the relative conditions as the settling motion approaches one of the conditions in Class III. machines and has less of the jerking action so important in Class II. machines. Such modification merges then into Class V.

CLASS V.—“Shaking side-inclined Belts or Tables.”—This type of machine is not much employed at present, though it has been re-invented a number of times in different forms. A slowly revolving buddle with a shaking or bumping motion works in effect the same way as a side-inclined belt. The shaking motion yields some of the advantages of Class III. by assisting the settling of the slime material, diminishing the inclination of bed and lessening the water required on fixed surface machines; but a middle product is produced; and the longer settling surface and thickening effect of the upward travel of the belt in Class III. is not obtained.

Conditions Affecting Efficiency.

To understand the conditions necessary for a close saving of fine mineral, it is advisable to begin by examining the action of the simplest (and at the same time the most perfect) appliance in use; and this is the vanning shovel, or some equivalent tool, in the hands of an experienced man. The quantity of material operated on is small; time is of no object; and the action of the tool can be varied to meet the requirements of the moment; so that all the conditions are in favour of the most perfect work.

For proper work, the shovel surface must be smooth; and it must be of a very slightly curved section in all directions. There are two distinct systems used with the shovel: the one for throwing up mineral which is not exceedingly fine, and the other system for separating the finest sizes of mineral from the waste. The first employs a motion which is in effect the action of the jerking machines of Classes II. and IV. The second movement (used for the slime mineral) is the washing back of the waste by a succession of waves of water from the fine mineral—previously settled on to the shovel surface, by a shaking motion. This second separation is in effect, but in varying degrees, the action of Classes I., III., and V. machines.

Passing by the question of the saving of the coarser particles of mineral, as being unimportant for the purposes of this paper, the second motion of the shovel may be further explained. To take it in its most refined work, it can be assumed that a sample of tailing, from a concentrator working only on slime, is under examination in order to see how much fine mineral is escaping. The shovel, having its charge of sample (as flowing from the concentrator) is nearly full of water, with fine waste and fine mineral in suspension. No separation of waste and mineral can be at once made; but the first operation is to settle all the solid matter possible on to the surface of the shovel. This settling is assisted by a circular steady shake of the shovel, which shake at the same time works down the heavier material, however fine, into actual contact with the surface, and below the lighter waste. A rapid shake assists in concentrating the settled mineral at one spot.

When the elements of settling time, and settling motion have sufficiently operated, a series of slower and wider sweeps of the shovel introduces the separating effect of gentle waves of the water, which gradually move the lighter waste along the shovel, and leave exposed the “head” of fine heavy mineral. In this final separating movement there is a combination of the shaking with the washing action, as facilitating the movement of the lighter waste over the surface of the shovel.

The perfect work of the vanning shovel is shown by the fact that it will always give, from the most perfect commercial concentrator, a definite head of the fine mineral which is going to waste. This perfection of work of the shovel being established, its conditions of working may be taken safely as a guide to the conditions necessary for close slime concentration in practice; and conversely, it can be accepted that machines which ignore the conditions essential to good work by hand vanning give only very imperfect results in the saving of slime mineral.

The conditions which are essential to good work, irrespective of the skill of the operator, can be stated as follows:—

- (A) Sufficient time for settling.
- (B) A smooth surface for final separation.
- (C) A gentle movement of the washing water.
- (D) A motion to assist in differential settling and in separation.

These elements deserve detailed examination as to their application to the construction and operation of concentrators of various kinds.

(A) TIME.—It is quite evident, if a very small sample on a shovel must be given a relatively long time to settle before any separation can be effected, that no machine will do close work on slime mineral unless the fine particles are given adequate time to settle from the water in which they are suspended.

As all commercial machines are continuous in operation, this function of settling time becomes in effect the ratio of quantity fed to surface and rate of flow. It follows conclusively, that if a new machine is produced for which a large capacity is claimed, while the settling surface is relatively small, no arguments based on motion or principles of construction will meet the immediate criticism that an essential element of success has been ignored by the inventor.

It is true that there is a point of difference between a continuous flow of pulp over the surface of a commercial machine, and the settlement of solid particles from a nearly stationary charge on a shovel. This difference lies in the fact, that a thin layer of pulp slowly flowing down an inclined machine surface will, by mere frictional contact of some of the particles with the surface, deposit such particles. This fact, however, does not affect the general truth of the proposition that feed must be adjusted to settling surface and speed of flow, so as to secure the element of settling time.

(B) SMOOTH SURFACE.—What is well-known to be an essential for satisfactory hand vanning—that is a smooth surface—has been proved by general experience in the use of concentrators for slime mineral to be also best in commercial work.

It is true that canvas tables and blankets are used under certain circumstances; but such surfaces cannot be considered in the list of perfected concentrators; they are either used for special purpose (as in the case of blankets for the saving of fine gold) or as supplementary catchers of a little valuable mineral from the tailings of more perfect machines. It is a constantly

recurring fallacy that a rough surface must be good for saving slime mineral. The fact that it is also good—and in fact relatively better—for saving fine waste, quite annuls the supposed benefit of its retaining power on the mineral. If a clean concentrate is required the current of washing water must be so great, to prevent the waste clinging, as to involve loss of fine mineral; and if clean concentrates are not required, the machine is not a concentrator: it is only a contrivance, like a settling pit.

The history of past practice and an inspection of the most successful working of the present day, show that the advantage of a smooth surface is generally recognized. Tables, buddles and belts have been made of wood, glass, slate, marble, cement, rubber, etc., all with a view to getting the necessary degree of smoothness.

The extraordinary clinging power of very finely-divided mineral, when once settled on to a smooth surface, is seen in the action of any of the machines of Classes I., III. and V., when an excess of wash water is turned on; for the lighter waste and the larger particles of mineral are driven off long before the finest mineral can be moved from the surface it has adhered to. To free a smooth vanning shovel from fine mineral after a test, it has to be immersed again and again in water, or put under a strong stream. The possibilities of rough surfaces, varying all the way from coarse riffles in a launder to a smooth close canvas, have been exhausted long ago; and therefore a new concentrator, for which some form of rough surface is claimed as the chief advantage, can be safely left for time to dispose of.

The action of stratification within definite cavities by a shaking motion, is quite different from the mere arresting effect of a rough surface above referred to.

(C) SPEED OF WATER.—The bad effect of an excessive rate of flow of water over a concentrator surface is two-fold. A rapid current is, of course, in the first place, unfavourable to the settling of fine mineral; and, in the second place, it is apt to re-float and carry off some of the particles which by rolling contact with the surface of the concentrator have succeeded in settling.

It is elementary that a too great inclination of a concentrator and an excess of water are both unfavourable to close work. It is unnecessary, therefore, to illustrate the effects of these conditions, combined under the head of "speed of water;" but the importance of the point is sometimes overlooked in the comparison of certain types of machines for certain work, and in the designing of new machines for obtaining large capacity.

(D) SETTLING AND SEPARATING MOTION.—It is difficult to explain to those unused to hand vanning, how important is the shaking motion imparted, and in how many varying ways it can be used, guided by the eye according to how the mineral and waste are settling and distributing over the surface of the shovel. The whole success of the operation, and the clear exhibition of the "head" of fine mineral separate from the body of the lighter waste, depend on the way the settling is accomplished, and on the way gentle washing waves of the water are made to travel. A proper motion keeps the lighter waste in semi-suspension in the water, free to move over the clinging, sluggish mineral particles; whereas if both waste and mineral are allowed once to settle fully on the shovel (to pack) the waste cannot be moved except by such a strong wave of motion as is certain to pick up and move much of the fine mineral also.

In considering the effect of the shaking motion in actual concentrators in practice, it will suffice to take a machine of the shaking belt class, and note the effect of stopping the shake. The machine becomes at once of the Class I. type; it is a self-discharging Frame. Its inclination must be increased, or water supply made much larger; its loss of fine mineral will be much greater, and its concentrates will be less clean than when running in its normal way on the same feed of material.

Another very important effect of the shaking motion is that unclassified material can be treated in a way not otherwise possible, both on the shovel and on shaking belt machines; and this will be referred to more fully below in treating of classification.

Direction of Probable Improvements.

If the above evidence and conclusions are accepted, it is perfectly justifiable to judge any proposed new concentrator by its agreement with, or departure from, certain principles. The design will doubtless fall within one or other of the five classes described above; unless it falls into one or other group of certain well-travelled and exhausted lines, such as rate of settling in water; resistance to upward flow of water; centrifugal separation; separation by air; separation in a denser medium than water; and flotation processes.

Putting aside the last-named group (flotation processes) as not really in the nature of concentration by specific gravity, and so not within the limits of this paper, it is worth while pointing out one of the great obstacles to the perfection of a machine for saving fine mineral by any of the other principles just mentioned.

No system of practical classification has yet been invented which does not in the end leave a great difference in the sizes of particles contained in the final class, the class in which the great loss occurs in concentration. As a consequence, separation by rate of settling, by upward flow of water, by a denser medium than water, all become imperfect and are usually quite impracticable.

It is well known that air separation—already tried in dozens of different ways—is most satisfactory on dust, and it is usually inapplicable for commercial reasons.

Many have been the attempts to employ centrifugal force, which on first thought seems eminently adapted to the saving of fine particles by its power of intensifying the function of specific gravity, but in practice its application becomes impracticable. With such fine and unequally-sized particles as are under discussion, a separation by mere form of trajectory is not possible; and, as a consequence, the action of a centrifugal concentrator must be almost necessarily one of packing the material against the sides of the revolving machine. This action of packing, or building up on the walls, is in its very nature absolutely opposed to any continued separation of particles of differing specific gravities when once fairly started; and hundreds of failures witness to the apparently insuperable difficulties of making a continuous discharge to this class of machine. Attempts which have been made to combine a washing separation by water (requiring a freedom of motion between particles) with the packing action of centrifugal force, seem to point to an inherent antagonism between the two forces which would require a delicacy of adjustment impracticable in practice.

From the above, it seems probable that new concentrators which require serious consideration will be modifications of established types; and to meet the expectation of doing work comparable with that of exist-

ing machines, they can pretty safely be judged by the extent to which they meet the conditions which have been referred to. Of course, all new machines are said to do wonderful work; but history shows how exceedingly difficult it is to get at comparable facts, and how very unreliable as a guide are the testimonials and figures of millmen in the matter of concentration. The great variety of practice all over the world, even on similar ores, in both the use and distribution of different types of machines, shows at once how difficult it is in this branch of milling to get rid of the personal element, and the limiting effect of special experience; and again, the influence of mere fashion is often apparent in the arrangement of mills.

It may be mentioned here that on ores from which a single concentrate is required (not, for instance, concentrates separate of galena and zinc blende from waste) it is not advisable to make a middle product. A middle product may be needed when the coarsest particles carry attached mineral and need regrinding; but on material finer than 40-mesh this is not often the case. Many concentrators do make middle products; and it is certain that losses are incurred, and are often obscured, by the fact that the middle product must be re-dressed; for a secondary loss is thus involved, and must be added to the loss in the Tailing of the first operation.

There are often good reasons in practice for using a middle product-making machine; but it should not be overlooked that, in principle, and for the conditions assumed, there is a definite objection to the system; and, therefore, in designing improvements over existing machines, it is a point which will count in actual commercial results in the end. Questions of capacity, cost, and expediency often influence the choice of the details of arrangement of mills; but the question under discussion is one of individual efficiency of work, which should be well weighed in the first instance. It is known that in modern concentration mill losses are often high; it is, therefore, no heresy to refer in detail to certain probable causes of loss in existing practice.

To sum up the conditions which seem from the above to be most favourable to the evolution of any new concentrator which may reasonably be expected to prove an advance over existing machines, it can be said that there must be a large and smooth surface; a regular settling motion which does not jar the finest particles from their contact with the surface when settled; and a delivery of clean mineral without the production of a middle class. The provision of a proper settling motion insures the other necessary conditions of slight inclination of surface, and the minimum quantity of water in pulp and for washing purposes. For example: a revolving buddle, which as ordinarily used, will require an inclination on its surface of $1\frac{1}{2}$ inches to the foot, can, with a proper shaking motion, work to better advantage with $\frac{1}{2}$ -inch fall, and will need less water.

Classification.

The necessity for classification before concentration is so marked in some cases and with some machines, that it is accepted by some people as a comprehensive dogma with full scientific warrant; but actual experience has shown very clearly, that in certain cases it is distinctly undesirable, and in other cases it is so imperfectly applied as to largely neutralize its advantages.

Bearing in mind the limitation in this paper to the consideration of material finer than 40-mesh, it is a clearly-demonstrated fact that machines of Class III.

(shaking travelling belts) give better results both industrially and theoretically without classification. At intervals of some few years new teachers arise to point out that the treatment of an unclassified pulp is in contravention of elementary laws of scientific concentration on any machine. It will be worth while here to push this argument to a conclusion: to see what, if anything, science has determined, and what practice has demonstrated.

In what scientific formula has it ever been attempted to lay down the relative values of the functions of specific gravity, inertia, surface resistance, speed of settling, friction of grains, rate of water flow, and adhesion to machine surface, in the case of a mixture of particles from 40-mesh aperture to impalpable slime, on a machine of Class III. type?

Such a formula might amuse a mathematician; it would be beyond the comprehension of the writer and of most people; and it would carry no conviction whatever in a practical sense. It is only necessary to fall back on certain results and details of actual operation, to show that some of the functions above named are so different relatively on different types of machines, as to make conclusions draw from one machine inapplicable to the results to be expected from another machine. An illustration will help to make this clear. If a silver or copper coin be put on a machine of either I., II. or IV. Class it will be delivered with the concentrate. If the coin be put on a machine of Class III. it will not be delivered with the concentrate. Any scientific formula which correctly accounted for these opposed results could never be construed into a dogma. Classification has led to some curious results. A very un- on classification in general, since the effect of the function of inertia is quite different in the two cases.

It is known that classification is not necessary for a sample treated on the vanning shovel; and as this treatment is taken above as a standard of work, and as a guide to investigation, it would seem to indicate in advance that classification is not a fixed law of perfection in concentration.

Furthermore, the experience of thirty years, on all kinds of ores, in many different mining fields, has established most definitely the fact that there is a distinct advantage in treating unclassified pulp on machines of Class III. The coarser particles form a bed on the belt owing to its upward travel; and the fine slime instead of flowing down in unchecked waves over the belt surface (as it would do if treated alone) flows more slowly, by a filtering process in part, and so has better chances for settlement of the fine mineral.

In practice, the blind adherence to the belief in satisfactory method of classification is usually adopted, that of simple pointed boxes. By this system the coarser or bottom discharge is of necessity accompanied by a stream of the finest slime; and this last goes to a class of machine not adopted to its treatment. In some modern mills, arranged specially with a view of keeping coarse and fine apart for separate treatment, the first step, that of classification, is thus most imperfect. A step in advance is made in some cases by the introduction of upward flow classifiers, with a disadvantage from the continued dilution of the stream of pulp for the final treatment. The experience obtained in some of these mills has led to the supposed discovery that machines of Class III. are not proper machines for slime treatment, and they are, therefore, given an intermediate product of the classification system.

This conclusion is quite opposed to general experi-

ence; because machines of Class III. were originally developed for, and are continuously used for, the direct treatment of ores crushed fine in batteries, and containing small quantities of finely-divided and brittle minerals, which are valuable enough to demand very close saving. Such ores, crushed under such conditions, must need close saving of slimes, and must make much slime value, and it would be a remarkable thing if a class of machine which is so successfully used for such work should be now discovered to be not adapted to slime saving. The explanation of this erroneous conclusion is simple, namely, that by attempting classification and then experimenting with the very diluted slime alone, the machines of Class III. are not working under the best conditions; and they have, furthermore, very little capacity when so improperly limited as to size of pulp, and when so overcharged with water.

In most of the large modern mills of the United States and Mexico, machines of Class III. are used for the finest sizes, and the slime losses due to imperfect classification already referred to, are sometimes diminished by a re-treatment of the Tailings of Class II. machines on machines of Class III. In some of these mills the finest overflows of classifiers or thickening boxes are run into settling pits, and treated as a concentrate for addition to richer products for the smelter; but such treatment is not available when clean products are essential to subsequent treatment, for example, with ores. Of late there has been a tendency to the use of fine screens in place of some of the water classifiers in a mill, to this extent avoiding the slime discharge of the ordinary classifier with the coarser particles, while making a separation by size alone, instead of by equal falling particles.

It is a very usual thing in mills to treat the tailing of one slime machine by another machine of the same or different construction; for example: buddles are often made double; or a convex surface may be fol-

lowed by a concave one; and frames or canvas tables may be used in a long succession, each saving a little. This double treatment can be used with great effect on machines of Class III. treating unclassified pulp, but is very seldom attempted. The loss in the tailing of the first machine is in part saved by the second, and in some cases (for instance, with tin ores) where the pulp from the stamps is fine enough to go direct and unclassified to the first machine, the double treatment will be most effective as compared with a classification and treatment on several types of middle product machines. To get the best results from the second machine, it is advisable to use a large pointed box between, to get rid of some excess of water introduced by the first machine; and an increase in belt surface on the second row will add to the efficiency. By this system the slime mineral has a double chance of being saved; there is no excessive dilution of the slime; clean concentrates can be produced; the losses due to re-handling of middle products are avoided; and the whole plant is the most simple and automatic in character. If the tailing of the second row of Class III. machines contains enough fine mineral to be worth additional treatment, a properly-arranged classifier will deliver this mineral in the fine overflow and in a condition suitable for treatment on revolving buddles or frames, or other wide surface appliances suitable for poor material.

When a screen is used in the battery too coarse for effective work by machines of Class III., an additional finer screen can be used to take out one or more sizes of particles for machines of Class II., or even for jigs.

Note.—The use of the vanning shovel is not very general, outside Cornwall, and most enquirers will find it easier to use a circular placque of white enamelled iron, or of china. Such a placque has the additional advantage of retaining a good, clean, smooth surface, and of showing up more clearly the "head" of most minerals, than a shovel.

OUR EUROPEAN LETTER.

LONDON'S MINING MARKET OVERSHADOWED BY THE RUBBER AND OIL BOOM. A FEW FACTS ABOUT THE RISING OIL MANIA. THE RUSH OF NEW MAIKOP COMPANIES. TWO WARNINGS. GERMAN INTEREST IN THE RAND. GOLD MINING IN FRANCE. THE SURFACE CONDENSER IN MINING POWER PLANT. RESCUE APPARATUS. PEACE IN THE BRITISH COAL-FIELDS.

Exclusive correspondence of CANADIAN MINING JOURNAL
London, April 20th, 1910.

The rise of the rubber boom with the temporary extinction, to all intents and purposes therefore, of interest in other sections of the Stock Exchange (the mining ones included) looks like being followed by an oil boom. Of course, no one expects this to be nearly so big an affair as the rubber mania has become, but tremendous profits are being made by speculators already.

The speculation largely centres in shares of companies in the Maikop district, on the Black Sea, concerning the potentialities of which shares many favourable reports are being received. Most of the com-

panies have been formed since the great "spout" occurred last September and ground is not now cheap to acquire in the oil district.

Russian oil, hitherto, has been drawn almost wholly from the Baku district. At one time in the history of the older field the bulk of the oil was consumed as fuel, its distillation for lighter oils being disregarded. There can be little doubt that it was due to English enterprise that Russian burning oils have been so largely imported into this country and a new department of the industry built up.

The new Maikop fields are looked to for the revival of the waning glories of the past. Should surface indications be justified, Maikop will have a brilliant future undoubtedly, not only from the point of view of actual production, but in its effects on the oil fuel question and the world's demand for additional supplies of illuminating oil. Russia has been, with the United States, the world's principal oil provider, but recently its condition had been giving rise to considerable disquiet and a second Baku has come along in good time. About twenty new oil companies have already been formed this year, and every week now two or three newcomers located in Maikop are being put before the British in-

vestor. As I write, nine new oil companies are announced for issue to-morrow.

As far away and as unknown to the ordinary Englishman as Maikop is, it has apparently already been found necessary to issue a warning as to titles and their validity. It is urged that care should be taken that on conducting agreements for purchases of claims in Maikop, original certificates issued by the Ekaterinodar District Department must be produced, certified copies being useless. Cases are reported from the oil field where people have sold their claims twice over, and having taken so well, no doubt some people will be quite prepared to sell them, on alleged certified copies, another half-a-dozen times each. It has been discovered that a number of Maikop claims now being offered in the London market, do not belong to Cossacks at all, but to so-called settlers. Such claims are declared by Verbitscheff, a leading Ekaterinodar legal authority, to be valueless.

Another thing to be remembered by the British investor in oil shares is that in spite of many romantic ideas to the contrary, oil is not a get-rich business. Immense sums of capital have to be expended on the preliminary borings and the ultimate workings, and a patient historical retrospect shows that hundreds of millions of dollars have been spent on the industry at various times without producing anything like a satisfactory return.

Perhaps the actual incident more than any other which started off the active price of oil shares of all kinds in the market here, was the publication of oil contracts given out by the Admiralty in the middle of February, a circumstance which is taken to mark the beginning of the adoption of oil as fuel in the Navy on a large scale. Efforts have been made for years past to impress the Admiralty with the utility of oil for the generation of steam power, and at last the Admiralty moved.

In the market for South African mining shares, despite competing influences, there has been fair business passing, and a curious side of this is the participation of German investors in this revival. A quick rise recently was followed by a halt, and wisely enough there was no disposition shown to rush in to buy upon the temporary reaction. This cautious attitude must contribute to solidify the basis of what is undoubtedly a carefully-planned "bull" campaign.

The view that the Rand industry is on the eve of a further period of steady progress is, however, rapidly gaining ground. Disinterested cablegrams from Johannesburg reflect also the confidence of those on the spot, and the optimistic feeling which is thus created facilitates the arrangement of "deals" between the leading finance houses and Stock Exchange circles.

According to views expressed by some of the most prominent bankers in London, Germany is displaying a keener interest in Rand affairs than at any time during the present movement. The various large amalgamation schemes which are now formulated, especially the advantages of working on a large scale with centralized management, appeal particularly to the German mind. A large turnover at a moderate, but satisfactory, margin of profit spread over a long period of years, removes mining propositions on the Rand from the speculative side to that of steady industrial working. Patience and well-regulated energy are required, but these essentials played also a prominent part in the growth of Germany's well-ordered home industries. The parallel is sufficiently close to explain German in-

vestment buying of Rand shares, and the determination of these buyers to wait and back their opinions uninfluenced either by moderate market fluctuations or minor changes in the industrial position.

For a long time people were incredulous with regard to gold mining in France, but now it appears that there are five mines in active operation and a large amount of prospecting is going on to find new mines. For the development and equipment of these money will be forthcoming on a liberal scale, and makers of mining machinery should not overlook this. The titles of the five gold mines at present working, are as follows:— Mine de la Lucette, Mayenne; Mine de la Bellière, Maine-et-Loire; Mines du Châtelet, Creuse; Mines de Salsigne, Aude; Mines de Villaniere, Aude. The first mine produces antimonial ore. La Lucette, La Bellière and La Châtelet are the most advanced in developments. La Bellière employs 70 stamps, crushing some 300 tons of ore daily for a yield of 9 hundredweights of gold per ton at a profit of \$400,000 in 1909, the production now being over 4,000 ounces monthly. Over 90 per cent. of the gold is extracted.

Several tube mills have recently been ordered, which are expected to be at work by the end of the current year. One shaft is down over 300 feet in depth. The Mines du Châtelet treat arsenical ore by Merton furnaces, tube mills and filter presses. At Bonnae the deposits increase in value in depth. Wolfram has been found in this ore. The mining districts are situated in Central France.

Speaking before the Institution of Mining and Metallurgy, W. A. MacLeod dealt with the question of the Surface Condenser in Mining Power Plant. During the last two years, he said, he had searched such engineering literature as was available to him with the object of obtaining information on the subject of intermittent condensation. The result had been somewhat disappointing, though he gathered, more by the way of inference than from direct statement, that condensation had been applied to winding engines in some places, but that the consensus of opinion seemed to be against the practice. He had had the opportunity of conducting tests on an intermittent plant of considerable capacity under ordinary running conditions, and had collected a considerable amount of information; and he thought that this, with a study of some aspects of the problem of particular interest to mining engineers, might stimulate a free exchange of views to the general benefit of the mining industry.

Though much of his work was, he realized, incomplete and demanded further and more accurate experimental investigation, yet the results he had obtained did not confirm the somewhat vague adverse stand that appeared to be taken by some engineers against the practice of intermittent condensation. On that account, therefore, he thought that a full consideration of the problem might lead to a clear understanding of its merits or defects from an economic point of view. In the rest of his paper, which was of an elaborate character, he discussed first the principles of design, as applied to the similar problem of what might be called "constant" condensation. Having defined the various factors of this problem and their relations to one another, he examined the variations introduced by the "intermittent" conditions, and then considered the altered relations of the various factors under the new conditions, which in ordinary mining practice were "constant" plus "intermittent;" that was, certain machines, such as the air compressors, were running con-

tinuously with an approximately constant consumption of steam, whilst others, as, for instance, the winding engine, ran intermittently, the intermittent periods being brief and frequent, causing sudden demands on the steam, and at the same time on the condenser.

An exhibition of mining rescue apparatus was recently held in the Mining Department of the Birmingham University, Bournbrook. The inventions shown included the "Meco Shamrock" apparatus, which was exhibited by the Mining Engineering Company, of Sheffield; the Draeger apparatus; the "Aerolith," in which liquid air is used; and the Fleuss, Davis, and Hill patents, shown by Messrs. Siebe, Gorman and Company. Most of the firms also exhibited pure air supply tubes and pumps which can be used by men engaged in extinguishing local or "gob" fires in mines, or entering places where the atmosphere is foul. Some of these arrangements were combined with a speaking tube and telephone. Oxygen reviving appliances for restoring persons suffering from the inhalation of poisonous gases were also shown, as well as stretchers and litters, and other first-aid requisites. The exhibition was held under the auspices of the coal-owners' associations of the Midlands. The members of the Rescue Stations Committee inspected the various appliances and witnessed demonstrations of their value.

The exhibition may be regarded as the first step towards organizing rescue stations and brigades to serve the South Midland coalfields. The matter was first brought to the attention of Midland coal-owners by the recommendations of the Royal Commission on Accidents in Mines, and the result was the formation of a general committee representative of the South Midland coal-owners. An Experiment Committee, which they appointed, is requested to examine various forms of apparatus with a view to the recommendation of one or more for use, and further, to embody in a report to the General Committee such suggestions as may enable that committee to formulate a scheme for the establishment of a station or stations for the storage of apparatus and for the training of men in its use.

After having been on the verge of a Titanic struggle the coal miners of South Wales have arrived at an agreement with their employers, although there is still strong resentment against the three-shift system. The matters at variance will now be dealt with by the new conciliation board to be formed under the new agreement, the old one having expired. This dispute has been continuous ever since the Mines Eight Hours Act came into force at the beginning of July last year.

On the Durham and Northumberland coalfields the Eight Hours Act was not introduced until the 1st of January this year, and at once provoked trouble. The miners' union officials, however, arrived at an agreement with the colliery owners and, although a section of the coal miners at first kicked against the official arrangements and several local strikes broke out, peace has now been restored. It is very clear, however, that taking the whole of the coal-mining districts there is a vast amount of discontent simmering beneath the surface, and if the men are not tightly held down by penalty clauses, there may be an outbreak at any time. This will be disastrous to the industries of the whole country.

Inspection of mines in this country at last looks like being put upon a sound footing and both the coal and metal mines are to come under the control of the reorganized government inspection staff. The recommen-

dations of the Royal Commission on Mines are to be adopted. In addition to the existing inspectors and assistant inspectors of mines a superior grade is to be instituted to have charge of each new district, the old territorial classification having been abolished. These officials will be styled divisional inspectors. The general scheme foreshadowed is good, although many people hold that our inspection system, especially as regards safety in coal mines, is already good, despite the fact that some of the lines of progress foreshadowed earlier have not been followed.

KOPPERS' BY-PRODUCT COKE OVENS AT BIRMINGHAM, ALABAMA.

Two hundred and eighty Koppers' By-Product Coke Ovens have been contracted for by the Tennessee Coal, Iron & Railroad Company for its Birmingham, Alabama plant. These ovens will be 37 feet long between doors, 9 feet 10 3-8 inches high, and will have an average width of 19 3-4 inches. Each oven will produce 11.25 tons of coke every 24 hours. With a coal containing 30 per cent. of volatile matter, the daily output of the plant will be 3,145 tons of coke besides 22,000,000 cubic feet of 500 B.T.U. gas, 35,000 gallons of tar and 44 tons of sulphate of ammonia. The ammonia will be recovered from the gas by the Koppers' direct process.

With this plant of 280 ovens, the United States Steel Corporation will have a total of 1,120 Koppers' By-Product Coke Ovens. The first ovens of this type erected in America, were built in 1907 by the Illinois Steel Company at Joliet, Illinois. They have been in operation for nineteen months to date, and they are giving results superior to any previously obtained anywhere in the world, in the by-product coke oven industry.

This is the same type of by-product coke ovens that is being erected by H. Koppers for the Lake Superior Iron & Steel Company, at Sault Ste. Marie, Ontario.

J. H. Haynes, in the April number of the Western Chemist and Metallurgist, gives the cost statements of a concrete battery foundation, built for the Tanguay M. & M. Company, at Idaho Springs, Colo. The foundation base is 16 feet by 5 feet; height, 8 feet; top, 12 feet by 2 feet 4 inches. It contains 12.5 per cent. of rock. It supports ten 1,000-pound stamps dropping five inches, 108 drops per minute. A piece of 1/8-inch rubber packing is inserted between the mortar and the foundation. The cost was as follows:

Labour, excavating	\$32.30
Labour, foundation	68.30
Bolts and castings	50.00
Cement	33.70
Lumber	10.00
Gravel	30.00
Rock	7.25

Estimates published by the Western Canada Loan Company, Limited, (an English incorporation), place the initial cost of equipping the collieries of the Pembina Coal Company at \$250,000. This latter company is subsidiary to the Canada Land Company. A purchase price of \$500,000 was paid for the coal lands. The output counted upon is 1,000 tons per day. Messrs. Bambridge, Seymour & Company, of London, Eng., reported upon the Pembina fields.

THE PORCUPINE GOLD DISTRICT.

HAMLIN BROOKS HATCH,

The Porcupine gold area comprises about 216 square miles, surrounding Porcupine Lake, in New Ontario. The lake is forty miles due west of the 222-mile post of the Temiskaming & Northern Ontario Railway, which connects the Town of North Bay with the new Trans-Continental. Part of the area is surveyed and consists of the Townships of Tisdale, Whitney, Shaw, and Godfrey. The remainder lies in the Temagami Forest Reserve.

History.

The gold-bearing quartz bodies of the district first attracted attention in the late fall of 1909. The announcement of the discovery of auriferous quartz bodies was followed by an unprecedented rush of prospectors to the new field. This rush continued for perhaps two months into the winter, and during this time all the available ground was staked for miles in every direction. The means of transport were canoes and packsacks until the freeze-up, when roads were cut and sleighs and toboggans came into use.

Topography.

The Porcupine area is probably a portion of the great post-Laurentian and pre-Huronian peneplain. It is undoubtedly proven that the deposits of the Huronian and Cretaceous periods were followed by a period of erosion, which developed the peneplain. The area under consideration was concerned in all these changes and the continued erosion has so thoroughly worn away the hills that the present surface has all the aspects of a characteristic peneplain.

The present surface is traversed by low-lying quartz-bearing schist ridges, the highest elevation attained being in the neighbourhood of seventy feet. The surface is even, and the overlying drift in most cases is extremely light. In parts of the district there are sand and boulder moraines, which are of both the terminal and lateral kind. It may be said that the whole gold-bearing area has been so eroded that the only formation which has exerted any resistant influence, whatever, upon the topography, has been that of the quartz bodies themselves, which, on account of their extreme hardness, did not lend themselves readily to the agents of erosion.

Geology.

Owing to the recent discovery of the district and to the fact that until very recently the country was snow-covered, only a very general idea of the geology of the district has been obtained. The only formation so far met with in the gold-bearing area are of igneous origin and may be classified as follows:

1. Schist—green in colour, and showing marked schistosity.

2. Igneous eruptives—diorite, diabase and porphyry.

It may be said that the geological history of the district began with the plutonic formation of a basic igneous rock, which later by metamorphism took on its present schist form. The gold-bearing quartz bodies, so far, have only been found in the schist formation, which covers the greater part of the whole prospected area. This schist is undoubtedly of igneous origin and presents all the characteristics of being an altered plutonic diorite. It is green in colour and the schistosity runs parallel to the general strike of the whole formation, which is northeast. In the vicinity of the quartz bodies

it is heavily pyritic, and in all specimens examined by the writer, pyrite was present. In mineralogical composition it is closely allied to the eruptive diorite, the only difference, as nearly as can be determined by the naked eye, being one of structure. In places the writer has noticed the gradation of the schist formation to that of almost typical diorite, the transition being so gradual that the line of contact was not discernible. Further investigations and further development of properties may, perhaps, alter this hypothesis, but at present all indications are that it is correct. The extent of this schist is practically over the whole gold-bearing area, it being approximately 18 miles east and west, and 12 miles north and south. Dykes of some of the basic eruptives cut it occasionally, two of these dykes having been noted in Shaw Township cutting across the strike of the formation. In Whitney Township diorite dykes have also been seen. In contrast to the diabase dykes, these appear to cut the formation parallel to the schistosity. Also in Shaw Township there has been reported to the writer a quartz porphyry intrusion, but as yet this has not been verified.

Ore Deposits.

The auriferous bodies of the district so far discovered may be divided into three classes:

1. Segregated veins.
2. Fissure veins.
3. Fahlbands.

The segregated veins are a series of overlapping quartz lenses, which vary greatly in size. In some cases the lenses form extended deposits, although each of itself is of no great extent. They appear to be formed along certain well-defined lines of weakness, which are lines of local faulting. In many instances they are auriferous and carry pyrite in greater or less quantity. The general strike of the veins of this type appear to be northeast and follow the schistosity.

Fissure Veins.

These are quartz veins, which cut the formation in all directions and vary greatly in size. The writer has observed them from one inch up to well-defined veins of fifteen feet. Some show native gold, and practically all give assays. Their longitudinal extent is not known at the present time as this type of deposit is almost invariably covered with drift and has only been exposed in places where assessment work has been done.

Fahlbands.

These deposits are beds of foliated schist, impregnated with sulphides. Copper sulphides and iron sulphides are common. As a rule they are from 100 to 200 feet in lateral extent, and in certain instances have been followed longitudinally for 500 feet. Shaw and Whitney Townships, and the Temagami Reserve—just south of Tisdale—furnish the best examples of this type. In some cases free gold has been found in minute quantities on the surface of these deposits, and in several instances assays of the sulphides have also yielded values.

Economic Possibilities of the Porcupine Area.

At the present stage of development of the district it is, of course, impossible to determine definitely whether Porcupine will or will not become a paying gold camp. There are several fine looking properties

in the district, notably the Wilson Dome, and the Timmins option, which undoubtedly have all the aspects of becoming paying mines. Both of these properties have on the surface enormous quartz bodies carrying spectacular free gold in quantity. In so far as development has proceeded on them, the ore bodies have shown no lessening of values. The Timmins people are at present down in the neighbourhood of 100 feet, on their ore body and have sacked ore and have sent a car-load to the States for a mill run.* The returns from this mill-run will go far to prove or disprove the worth of the district. On several other properties where development work has been done it is encouraging. It would be of benefit to the different claim holders and the investing public at large, if the results of the work now being done would be frankly stated. The writer knows that results so far are encouraging and that the chances of the district becoming economic are more favourable each day. It must be understood that there is very little ultimate chance of the district being other than low grade. It may be added that the question of power is one of moment and will probably be solved eventually by the utilization of two water powers, which are within easy striking distance of the district.

In conclusion the writer wishes to say that the encouraging results so far obtained on those properties on which development has gone ahead, makes him of the opinion that this newest Ontario gold field will eventually become a paying producer.

*Editor's Note.—This carload is reported to have averaged \$200 per ton. As to the value of this shipment sample from an engineering point of view, the reader is referred to the editorial on another page.

ELECTRIC MOTOR DRIVEN MINE HOISTS.

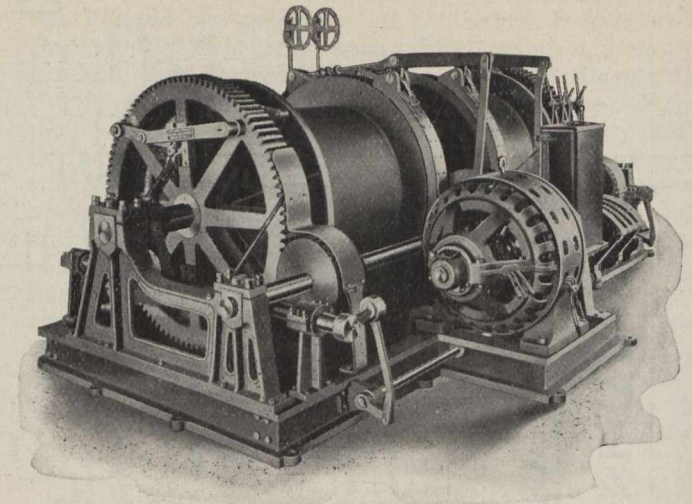
Since the cycle of operation in any hoisting proposition is of an intermittent character, the power is at a maximum only a part of the time, even though the hoist be operated practically continuously. In many cases the hoist is in operation only a very small part of the day. These conditions offer special advantages from an economical point of view for the use of electric motor-driven hoists. The electric hoist is always ready, and uses power only in proportion to the load handled when it is in actual operation.

The bearings are self-oiling and the motors seldom require any other attention than an occasional inspection and cleaning. There are no complicated parts to get out of order or to require continual oiling, packing, etc. The electric hoist may be operated by almost any one, as no previous experience or mechanical knowledge is required and an engineer's license is unnecessary.

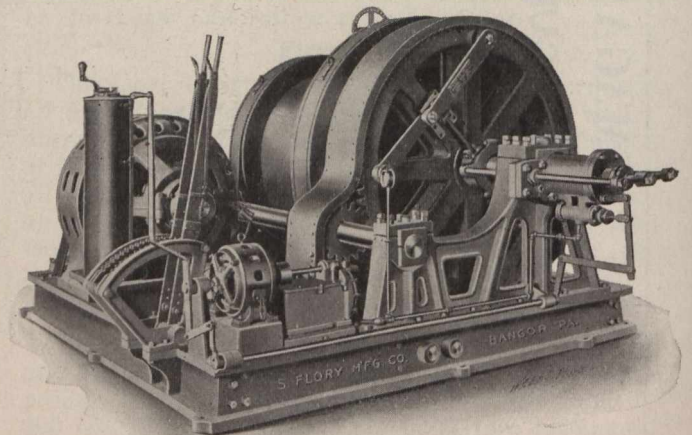
The single and double drum motor-driven mine hoists of the S. Flory Manufacturing Company, Bangor, Pa., are well shown by the accompanying pictures. These hoists which are especially designed for mines, quarries, planes, shafts, etc., are equipped with the I. O. Werner patent band friction and are driven by Westinghouse motors.

The patent band friction is of special design and possesses many features of superior merit. It is actuated through different members: the gear, drum, rocker shafts and strap bands. The strap bands tighten on a cast rim on the drums and are actuated by shafts which have double stub ends and are connected to the ends by jaw ends and turnbuckles. The lever arms are

keyed to the rocker shafts on opposite ends and are actuated by the levers which move around fixed points on the gear. Slides are secured on the gear supporting the lever arms. The slides are actuated through a sleeve on the main drum shaft, and two radial arms which are secured to the slides. The frictions are thrown in and out of contact by means of hand levers in a battery, as shown by the cut of the double drum hoist, or by an air cylinder using an equipment similar



to street railway car compressors, as shown by the picture of the single drum hoist. By moving the sleeve to the gear the slides are actuated in a radial direction that operates the stub levers and rocker shaft; this causes the band to grip or tighten on the brake flanges of the drums. The reverse motion of the sleeve releases the friction. A strong claim is made for the gripping device. After the frictions are thrown into contact, they will positively remain in this position until released. The drum and gear form a unit and can be operated as a reverse motion hoist without producing



any end strain on the bearings; the value of which is obvious. When the frictions are thrown out of contact, the drums are loose on the shaft and will revolve free at high speed when lowering or paying out the rope.

The single-drum hoist is shown with a Westinghouse electric railway air compressor and air reservoir mounted on the base of the hoist. The reservoir is connected to the air cylinder at the end of the drum shaft. The air valves are actuated by a lever shown

close to the battery of two levers and controller. Very little exertion is required by the motorman to throw the friction in and out of contact as it is of the toggle type. After the air compressor is put on the contact continues until the friction is reversed by the reverse motion.

The drums are turned off smooth or machine spirally grooved for any size wire rope, and mounted on a self-contained cast iron base arranged to receive the motor and controller. The drums for long planes or heavy lowering are equipped with asbestos brakes made out of long fibre material. The blocks are formed in sectors with iron flanges, securely bolted under high pressure, and treated with oil. They are secured between cast iron flanges and surrounded with steel bands of the differential type. The brake bands are operated with hand levers in notched quadrants fitted with thumb latches, and are thereby securely held in any position. The advantage of asbestos brakes for long planes or shafts is decided.

The single drum hoist shown by the photograph was installed at the Bliss Colliery of the D. L. & W. Com-

pany. The drum is 60 inches in diameter; 48 inches long between the flanges, and is designed for an 8,000-pound rope strain at a speed of 500 feet per minute. The hoist is operated by a Westinghouse type "HF" 150 horse power alternating current motor. This type of induction motor is especially suited for application where a strong starting effort is needed. It is well adapted for use on circuits carrying lighting loads, as the starting of it does not appreciably affect the voltage regulation. These motors are controlled by standard Westinghouse single handle, reversing, drum type controllers which insert resistance in the secondary at starting, and gradually cut it out as the hoist speeds up; the controller has a large number of points that gives smooth acceleration. When the controller is in the off-position, the motor is entirely disconnected from the line.

The double-drum hoist shown was installed for the Bessemer Coal, Iron & Land Company, Messins, Ala. It is connected to a Westinghouse 125 horse power motor of the same type.

CORRESPONDENCE.

*DR. HAANEL'S LETTER TO THE TEMISKAMING MINE MANAGERS' ASSOCIATION.

Ottawa, April 7th, 1910.

DEAR SIR:—

I am in receipt of a letter dated March 31st, 1910, entitled "Statement by Temiskaming Mine Managers' Association," from which I learn that the Association in question has thought it advisable to criticize me personally for certain statements which were included in an address delivered by myself, at the request of the Honourable Clifford Sifton, before the Canadian Conservation Commission. In making this statement, the Cobalt Mine Managers' Association has acted without a full knowledge of the facts. Considering the statements seriatim:—

1. That the statements "and in the Cobalt Region . . . the mortality was simply astounding, the death rate per 1,000 men employed being 24.8," is absolutely without foundation or fact.

The figure given above was supplied to me by a trained mining engineer who had been especially engaged to make statistical investigations of this nature. That he misinterpreted the data published in the 18th Annual Report of the Bureau of Mines for Ontario is no fault of mine. Officially, I am responsible for his work; personally, I have no responsibility as I cannot be expected to personally check all data supplied to me by my subordinates. Had his figures been correct, my remarks would have been truly justified. As it happens, this officer is not alone in having made this error, for the same data have also been misunderstood by a number of other parties. Precisely the same figures were given independently by Honourable Clifford Sifton in his opening address before the Conservation Commission, and data for Mr. Sifton's address were not supplied from my office.

2. "That knowledge of its incorrectness was known by those responsible for it, two months previous to its publication in the above periodical."

This statement is without foundation in fact, as the following correspondence will show:

*See page 241, C. M. J., April 15th.

26 Wellington Street, Ottawa,
December 8th, 1909.

T. E. Corkill, Esq.,
Inspector of Mines, Toronto.

DEAR SIR,—I am looking up statistics on mine accidents and have read with much interest your remarks on this subject in the Annual Report of Bureau of Mines, 1908.

In your report I do not see any information given as to the number of persons employed underground, and above-ground, or total employed.

In Part IV. Colonial and Foreign Statistics for 1907 the total number of men employed is given for Ontario, as also the number of deaths, and death rate per 1,000.

I would appreciate your kindness very much, if you could supply me with the following information, form of which I enclose.

Yours truly,
(Signed) J. G. S. HUDSON.

DEPARTMENT OF LANDS, FOREST AND MINES.

OFFICE OF THE BUREAU OF MINES.
Cobalt, December 13th, 1909.

Jos. G. S. Hudson, Esq.,
Department of Mines,
26 Wellington Street, Ottawa, Can.

DEAR SIR,—I am in receipt of your letter of the 8th instant, asking for information regarding the mine accidents in Ontario for 1908. I will look into this matter as soon as I go to Toronto and give you the data asked for.

I must say, however, that the number of men employed underground in the Cobalt Camp in 1908 was more than 1,089. You have received this number from Mr. Gibson's statistics which is quite correct for the producing mines. I would draw your attention to the fact that there are only some thirty or thirty-five producing mines in the Cobalt Camp, which would not be half of the number of mines that are in operation.

Your truly,
(Signed) E. T. CORKILL.

You will note that Mr. Corkill writes: "I will look into this matter as soon as I go to Toronto and give you the data asked for." Mr. Gibson stated, both publicly and privately, in Toronto, that he personally had had no correspondence on this matter from this Department. I, also, can state that I had no correspondence on the matter, and can add that I had no personal knowledge of the correspondence noted above. I was surprised to learn from Dr. Wilson, on his return from Toronto, that there had been any correspondence. You will note that the two letters which have been exchanged are entirely unofficial. You will also note that Mr. Corkill promises to send the information for which Mr. Hudson asked. These letters were referred to both publicly and privately by both Mr. Corkill and Mr. Gibson in Toronto, during the meeting, but the information asked for in Mr. Hudson's letter and promised in Mr. Corkill's letter of December 13th, 1909, has not yet been received at this office.

Further, Mr. Corkill's letter is dated December 13th, 1909, the address was delivered on January 19th, 1910, and the same day the manuscript was handed to the representative of "Industrial Canada," at his own request. Proof was never submitted to me, and at the time of its publication I was not even aware that an error had been made.

3. "That notice of their error has still more recently been brought to their attention, both publicly and by the Ontario Government."

My attention was drawn to the error by an officer of this Department, and, subsequently, under my direction, this same officer, acting officially, made personal inquiries in Toronto with respect to this matter. The Ontario Government has not otherwise held any official communication with me on the matter, and has not sent a written statement officially drawing my attention to the error. Such information as we now possess has been obtained as the result of our own initiative and by personal inquiry.

4. "That in issuing no formal correction, those responsible for the statement are to be condemned for their silence and defensive attitude."

Dr. Alfred W. G. Wilson, who made the inquiries for me in Toronto, made a written report to me on March 7th, the date of his return from Toronto. The same morning the substance of this report, correcting the error, and giving the rate of 11.94 fatalities per thousand for the "Silver-Producing Mines" of Cobalt, was transmitted to the Honourable William Templeton, Minister of Mines. A report by another officer, dealing with mine accidents and which was in the printer's hands, was recalled and the necessary corrections were made. That these reports have not yet been published is not due to the inaction of this department. It did not appear to me that any further action was immediately necessary. Public attention had been called to the matter officially by an officer of the Ontario Government. No sensible person would think for a moment that such a mis-statement was made by me or by any one else in this department intentionally. Why should a special public statement be issued by me withdrawing the figure in my personal address on the authority of another party, and substituting therefor one equally startling, Equally startling because, if we accept, as you have done, Mr. Gibson's statement that there were thirteen fatalities in the "Silver-Producing Mines" of Cobalt, then there were fourteen fatalities in the non-producing mines of the same locality, and obviously there were fewer men working underground in these non-producing mines, although we have no pub-

lished data as to this number. To strike any ratio for these non-producing mines would be a mistake under the circumstances, but what advantage would there be in correcting the former error and leaving the matter open to still greater error? Moreover, we already had in press, in the form of a report, a document in which there is a correct statement based on Mr. Gibson's own figures. Why then recall the former figure when the correct figure is given in an official report to be issued by this department?

The purpose of the statement in the original address was not to draw attention to the precise fatality rate of Cobalt. That is an abstract matter and incidentally of little importance. The statement was made purposely to show that the death rate was abnormally high and to draw attention to the matter, that it might be remedied. In such a connection, the precise rate per thousand is a matter of little moment. It would seem that the original purpose of that portion of the address which referred to mine accidents has been abundantly fulfilled.

5. This statement gives what purports to be the official figures on fatalities.

As already stated in section 2 above, Mr. Corkill promised, unofficially, in his letter of December 13th, 1909, to give us data asked for. These data have never been received either from Mr. Corkill or from Mr. Gibson. This table in your statement of the ratios is the first that has been seen either by myself or by any officer of this department. The figures are not given in any official publications of the Ontario Bureau of Mines that have been received at this office. That officers of my department, officers of another department not connected with the Mines Branch, and certain independent citizens of Ottawa, Halifax and elsewhere, have failed to clearly understand the data published in the reports of the Ontario Bureau of Mines is due either to their stupidity or to the manner in which the information in these reports is worded. Which is to blame is a matter of opinion. You will note, on referring to a statistical table subjoined herewith, that Mr. F. L. Hoffman, Statistician of the Prudential Insurance Company, of New Jersey, strikes a ratio of 9.94 fatalities per 1,000 employees for the silver and cobalt mines of Ontario in 1908. Evidently, authorities can honestly differ even when working with the same data.

6. Nothing in this statement was intended to reflect in any way on the excellent work which is being done in Canada at the smelters referred to. You will find, however, from the reports of the Ontario Bureau of Mines and from the reports of the Temiskaming and Northern Ontario Railway Commission, that these smelters export a large percentage of ore for further treatment. On page 12 of the 18th Annual Report, it is stated: "Through these works there were passed an aggregate of 6,958 tons of ore, containing 11,658,008 ounces of fine silver, of which 8,972,938 fine ounces were recovered, the remainder, 2,685,050 ounces, being contained in the speiss product, reserved or exported for further treatment."

On analysis, this shows that 23.03 per cent. of the silver in the ores received by these smelters is recovered elsewhere. The same report is my authority for the statement that a large tonnage of low grade ores is exported, and that at present the elements other than silver are of comparatively little value, at any rate to the miners of the ore.

7. With regard to the statement of this section, it is only necessary to remark that no officer of my department should be blamed for obscure statements publish-

ed in the reports of the Bureau of Mines. Other persons entirely outside of this department and independent of it have misunderstood these reports in precisely the same way.

Here follows an illustration of Dr. Haanel's point, taken from a contemporary.

We recognize the excellent work of the Province of Ontario and her inspectors as regards the mining and inspection laws. The high mortality figures, as compared with foreign countries, and especially with Germany and England, show that there is still room for further improvement, and Ontario is not the only province in which this improvement is required.

8. This statement requires no comment.

In conclusion I would ask your association to consider the circumstances under which the address, afterwards published in "Industrial Canada," was delivered. The purpose of the meeting was to consider Conservation in all its aspects. Is it not desirable that throughout our mining districts there should be greater care of human life and property? Are not the fatality rates in our mines, particularly underground, unnecessarily high? Can this rate not be reduced? And in regard to the treatment of the Cobalt ores, are not methods of treatment which will enable us to recover the whole of the silver values in Canada desirable? Would it not be of direct benefit to the miner and to the country at large, if the Cobalt content of these ores could be recovered and economically used in Canada? As it is, practically all the cobalt, except the very small percentage saved as a pigment, is lost to Canada. Are not these fit subjects for discussion before such a convention as the Conservation Commission, and are they not worthy objects in investigation? The mere fact that a slight error was made in quoting a mortality figure, an error entirely unintentional and due to causes beyond the control of the speaker, should not be allowed to detract from the force of the argument there set forth, nor should it call for more than passing comment.

I hope that you will see fit either to give this letter the same publicity accorded the statement which has caused it to be written, or that you will reconsider the statement in the light of the facts here set forth.

Yours very truly,

EUGENE HAANEL,
Director of Mines.

PRESIDENT PARK'S REPLY.

Dr. Eugene Haanel,

Director, Mines Branch, Ottawa, Ont.

DEAR SIR,—In reply to your letter of April 7th, regarding statement made by this Association.

While appreciating the detail of your reply, we cannot see that it alters or rectifies any of the statements taken exception to. We see no necessity of our replying at length and becoming involved in controversy. We cannot pass over, however, the fact that the copies you give of correspondence between J. G. S. Hudson and E. T. Corkill, are not complete, on the part of Hudson. He especially mentioned 24.8 as the result of his calculations, and it was to this letter and result that the reply of Corkill, which you give, was intended.

We recognize that improvement is always possible in metallurgical treatments. We believe that Thorold and Deloro are recovering practically all values of all marketable constituents, even to the point of exceeding the demand. That such is not done in Canada, at Copper Cliff, we believe, is entirely a matter of indus-

trial conditions, and which is also governed largely as to the location of their markets. The fatality percentages are those as given by Mr. Corkill, who after all, is the only person competent to determine them.

We believe you lay too much stress on what is official and what is unofficial. Although you acknowledge an error on the part of one of your assistants, we see no reason why, in a public matter receiving a public protest, you prefer to place the correction in the hands of a printer of an official document, to appear at an indefinite date.

According to your request for equal publicity, we are sending copy of your letter to the CANADIAN MINING JOURNAL.

Yours truly,

H. PARK,
President.
J. G. SHEWAN,
Secretary.

Cobalt, April 26th, 1910.

The Editor, CANADIAN MINING JOURNAL,
Toronto, Ont.

SIR:—Mr. S. G. Forst, of Toronto, a director of the Peterson Lake Silver Cobalt Mining Company, has recently issued a circular letter to the shareholders, in which he casts insinuating reflections upon the character of his co-directors and also against the secretary-treasurer and solicitor of the company. Many of your readers have probably seen the letter, and it is probably too long to be printed in its full text.

In this letter Mr. Forst states that I rendered an account of \$4,800 to the Peterson Lake Company for the work done in connection with the Nova Scotia investigation last year, and that I am still the holder of a lease on Peterson Lake granted to me in 1908. Both these statements are absolutely false. He also intimates that Mr. R. F. Segsworth in his capacity as secretary-treasurer, was instrumental in having me appointed and in paying me a large fee for work done, and was using his influence to have the leases extended on account of his relation to me.

I do not need any defence with those who have known me during my fourteen years' mining experience, but to those who are not acquainted with Mr. Forst and his methods, or with myself, the following plain statement of facts is due.

After some pressure I was induced to undertake (at the personal solicitation of the president), the investigation, and was appointed on the 8th day of June, 1909, on the motion of Mr. Forst, and my fee for the work arranged. I returned to Toronto and made a partial report to the directors, and on the 30th day of June, on the motion of Mr. Forst, was instructed to return to Cobalt and make a more extended investigation. On the completion of the work, Mr. Forst moved the acceptance of the report, and it was also adopted by the shareholders at a general meeting held on October 6th, 1909. I did considerable work during the fall and winter in connection with the litigation and my account was not presented until March, 1910, when Mr. Forst attempted to repudiate the whole transaction and began the personal attack above referred to, apparently to gain full control of the company for himself.

I obtained a lease from the Peterson Lake Mining Company in April, 1908, and in the same year sold it to the Kerry Mining Company, and from that time have had absolutely no connection with the management or financing of that company. My brother is not a direc-

tor of the Peterson Lake Company, and has no vote on the board, and accepted the position of secretary-treasurer at the personal solicitation of Mr. MacLaren and Mr. Scott, and was appointed on the motion of Mr. Forst some time after my own appointment.

Mr. Forst says in his letter, "One of the leading engineers of Cobalt has informed Mr. Forst that he would have done the required work for \$1,200." It is unusual for prominent engineers to state the cost of this class of work before its execution, and it is more unusual for them to comment upon the cost of extensive examinations made by others unless they take pains to inform themselves of all the work done. In this case I am sure that the engineer's so-called prominence exists in Mr. Forst's imagination, or that he was misquoted.

A slight consideration of the above facts will show that Mr. Forst must have some ulterior motive for repudiating his own actions just five weeks before the annual meeting. He holds to be unjust and iniquitous acts in which he was the prime mover, and the results of which he moved to accept, and then states that they were wholly the acts of others. His position is so false and unjust that further comment is unnecessary.

Yours truly,

WALTER E. SEGSWORTH.

Toronto, May 4th, 1910.

THE GEOLOGICAL SURVEY FIELD PARTIES SO FAR ARRANGED FOR ARE AS FOLLOWS.

Mr. D. D. Cairnes will examine the ore deposits of the Atlin district. Since the early days of placer mining a number of mineral veins have been discovered.

Mr. R. G. McConnell, assisted by G. O. Malloch, will study the country at the head of the Portland Canal. This district has recently come into prominence, and a mining boom is now setting in.

Mr. W. W. Leach will continue his explorations in the Hazelton district, on the Grand Trunk Pacific Railway, up the Skeena River.

Mr. C. H. Clapp will continue his geological investigation on the southeast end of Vancouver Island.

Mr. R. H. Chapman will continue topographical work on Vancouver Island.

Mr. Chas. Cassell will complete the geological mapping of the Tulameen district.

Mr. L. Reinecke will continue the mapping of the Beaverdell district, West Fork Kettle River.

Mr. O. E. LeRoy will complete his study of the geology and ore deposits of the Slocan district and investigate Deadwood Camp, Boundary Creek district.

Mr. W. H. Boyd will be engaged in topographically mapping these districts.

Mr. R. Schofield will continue work in East Kootenay.

Mr. J. Allan and Mr. Shimer will make a geological study of the Ice River district.

Mr. D. B. Dowling will continue his investigations of the coal areas of Alberta, near the Grand Trunk Pacific Railway.

Mr. W. McInnes will explore in the country north of Prince Albert.

Mr. H. Ries and J. Keele will be engaged in a study of the clay deposits of the Northwest Provinces.

Mr. J. D. Trueman will map the geological formation about Gunflint Lake.

Mr. W. H. Collins will be engaged in a geological study of the country west of Gow Ganda.

Mr. W. A. Johnston will complete his mapping of the Lake Simcoe district.

Mr. C. R. Stauffer will make a detailed study of the rocks of the southeastern peninsula of Ontario, which are important on account of oil, gas and salt.

Mr. M. E. Wilson will explore the country near the Transcontinental Railway east of Lake Abitibi.

Mr. J. Dresser will continue his investigations in the Eastern Townships.

Mr. E. R. Faribault will spend part of the season in the Chibougami district as a member of a geological commission sent out by the Quebec Government.

Mr. J. W. Goldthwait will study the Pleistocene geology of the St. Lawrence valley.

Mr. G. A. Young will geologically survey the Tobique district.

Mr. M. Y. Williams will be engaged in a geological investigation in the Arisaig district.

Mr. E. R. Faribault will have a party continuing the investigation of the gold-bearing rocks of Lunenburg County.

In addition, it is hoped that a number of competent geologists will be secured to undertake pressing work in the Northwest, in Ontario and in Nova Scotia for the new Museum.

SAND FILLING OF STOPES.

At the Robinson gold mine on the Rand the hydraulic sand filling of stopes was undertaken last year on a small scale, and the consulting engineer now reports that arrangements are being made for the application of the scheme on more extensive and practical lines. "This system," he says, "provides security in the old workings. It will enable us to win nearly all the rich pillars left on the main reef leader and south reef, and will assist in the economic working of the main reef." Other Rand mines are also about to employ the sand filling process to a much greater extent than hitherto. Mr. Schumacher, at the Rand Mines meeting last month, suggested that in the course of the next five years the unsightly sand dumps of the Central Rand will have partially disappeared. The plants now in course of construction or already complete will, at an early date, be dealing with sand at the rate of about 4,000,000 tons per annum. As soon as these are in proper working order steps will be taken to increase the capacity of the sand-lowering equipment until the dump heaps of the Central Witwatersrand will be depleted at the rate of 30,000 tons per day, or, approximately, 9,000,000 tons per annum, an amount which is more than double the total tonnage mined by the Rand Mines, Limited, last year. The plan required for carrying out these operations is very simple indeed, and consists of a sand-bin at the top of the shaft, into which dry sands are filled from the nearest dump. A pipe is led from this bin down the shaft and along the drives, etc., to the point at which it is desired to pack. Down this pipe the sands are flushed with water, under a free flow. The water is drained off at the top of the beds of sand packing and is re-pumped to surface for use again. This water is kept wholly apart from the mine water. The preceding remarks apply, of course, to accumulated products only. For the time being it is deemed inadvisable to employ current sands for the packing work, as they naturally carry a considerable amount of free cyanide, and are, moreover, not sufficient in themselves to provide all the material required. Experiments are, however, being carried out with a view to neutralizing the contained cyanide in current or recently dumped products.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay, May 3rd, 1910.—The Close of the U. M. W. Strike.
 In our letters which appeared in the Journal of the 15th of March and 1st of April we referred to the desire which was being shown by the management of the Dominion Coal Company to afford their striking employees an honourable way out from the mistaken position which, under the tutelage of the U. M. W. A., these men have taken up. We referred to the efforts of the clergymen of the Glace Bay district in this direction, and to the circumstances under which the company saw fit to withdraw a written statement from the general manager of the terms on which they were willing to re-employ the strikers, and we remarked: "Whoever counselled the men on strike to refuse the very liberal and honourable offer which was made by the management of the company in their desire to end a situation, disastrous to all alike, assumed a grave responsibility. The strike was always unnecessary, and those who called it were guilty of crime, but its continuance under present conditions is merely foolishness. The individual strikers are beginning to realize this, and the increasing outputs tell their own unmistakable tale." The reasonableness of the company's position was admitted on all hands, and the illegality of the proceedings of the U. M. W. A. was clearly laid down by Judge Lawrence's decision and the restraining order which he issued against the American union. The efforts which had been made two months previously to end the strike, to which the company had responded in a very conciliatory manner, were still continued by the clergymen, and the sentiment against further futile prolongation of the strike became almost unanimous, and too pronounced to be resisted. The United Mine Workers are face to face with a large strike expenditure in their own proper domicile, and they are also having trouble in the Canadian West. One of the most prominent of the U. M. W. leaders made the statement that the strike had been mismanaged and was commenced under a misapprehension of the true state of affairs, and in face of the action, which the Coal Company has entered against the U. M. W. for damages and conspiracy, and the large importations of men which the company was arranging for, the leaders of the U. M. W. appear to have concluded that the present time was not opportune for further prosecution of the strike, which on their own representations has absorbed the entire amount at the credit of their reserve fund in July of last year. The offers which the company has made from time to time to take back its striking employees and give them absolutely fair treatment have always been open to the men, and acting upon the advice of their leaders the strikers decided to return to work, relying on the good faith of the company to deal fairly with all its employees. The end of this ill-starred trouble, like its commencement came with remarkable suddenness and took people generally by surprise. The past ten months has been probably the most unpleasant period that Glace Bay ever experienced, and there can be no doubt about the sincerity of the general hope that the trouble is over, and that its memory will be as evanescent as that of a hideous nightmare. The strike was an ill-considered and ill-advised proceeding, taken with a blind disregard of the probabilities. Its utter failure was apparent the first week of the trouble, and it is a great pity that the fighting abilities of those who took part in the strike were not utilized to better advantage than to serve the aims of an ambitious labour leader and to destroy the livelihood of the fighters themselves.

A New Work on Nova Scotia Mining Industries.—Mr. C. Ochiltree MacDonald has enriched the mining literature of Canada by what is undoubtedly the most complete survey of mining in Nova Scotia which has appeared since Mr. Richard Brown

published the "History of Coal Mining in Cape Breton." Mr. T. J. Brown, in his presidential address before the Mining Society of Nova Scotia, recently deplored the fact that Mr. Richard Brown had apparently no successor in his literary labours in this connection, but it would appear as if the mantle of this worthy of former days had descended on Mr. MacDonald, who we believe is also from the "Old Country." A casual reading of Mr. MacDonald's book impresses one with the fact that he views the coal mining industry of Nova Scotia with a breadth of view and with a sanity proceeding from a complete apprehension of the facts and the history of the industry, and the work will repay perusal by anyone whose business touches coal-mining in this province.

Referring to the Dominion Coal Company, the author remarks: "The organization of the Dominion Coal Company has obviously very greatly benefitted Nova Scotia; and all Eastern Canada has similarly felt the beneficial effects of this timely amalgamation of the collieries south of Sydney Harbour." Mr. MacDonald states that had the Dominion Coal Company not been formed a shortage of coal must have come about "which would have abnormally increased the price of fuel to the Canadian consumer."

In connection with submarine coal-mining, Mr. MacDonald speaks from personal knowledge of the subject obtained at the Morien collieries. He refers to the great submarine coalfield lying off the shores around Sydney Harbour, which, "lying on the edge of the water routes to the most populous markets in the globe, is practically inexhaustible; and the Sydney coalfield may consequently be regarded as one of the world's greatest coalfields." It is a matter for surprise that many people do not realize the value of the Sydney coalfield. When it is considered that it is the only coalfield on the Atlantic seaboard of the American continent—the other Nova Scotian fields alone excepted—that the coal measures of Europe and the United States are becoming very sensibly depleted, and that the world's future coal supply lies mainly in Siberia and the Far East, there are, it would seem, very sufficient reasons to anticipate a marked appreciation in the value of the Cape Breton coalfields. Mr. MacDonald also refers to the wastefulness which would be occasioned by adherence to the regulations governing submarine mining which until lately were law in Nova Scotia. It was always understood, however, that these regulations were merely tentative, and would be modified as experience was gained in working submarine coal areas. Mr. MacDonald remarks very truly that submarine areas "can be more advantageously wrought by specific regulations applied to each as experience in the winnings accumulated, rather than by hard and fast rules equally applicable to all." Most people will agree with this point of view.

The book deals very sympathetically with the history and aims of trades unionism in the province, and traces the history of the Provincial Workmen's Association from its commencement under the direction of Mr. Robert Drummond. Mr. MacDonald refers to the changing conditions brought about by the recent industrial expansion in Cape Breton. He remarks that the mine workers of Nova Scotia have in the past "by their moderation, patience, and good judgment promoted the development of the Nova Scotia coal trade; and by the exercise of similar good judgment they can further promote this great industry." These remarks are peculiarly opposite to the condition now existing at the Glace Bay Mines, where the hitherto harmonious relations existing between the mine-workers and the operators have been disturbed by the intrusion of influences alien to the province. It is to be hoped that the present situation will be helped by what Mr. MacDonald terms "the pacific influences likely to be exerted by the hereditary intelligence of

the Nova Scotian mining classes, and the fair treatment the mine-workers enjoy from the operators. Mr. MacDonald is evidently among the prophets.

The book makes reference to the suitability of many of the fireclays associated with the coal seams in Nova Scotia for use as fire-bricks, etc. Considering the importance of the steel industry to Nova Scotia and the many uses to which such bricks could be applied it would seem as if there was reason to pay more attention to this matter. The use of bricks and stone generally will, of course, increase as the timber resources of the province become depleted.

A chapter is devoted to a history of the agitation against the Truck System in Cape Breton, in the abolition of which the author states he was largely instrumental. Another chapter deals with the co-operative movement among the miners. This movement has had several severe setbacks in Cape Breton, but several successful societies are now doing business in the mining districts, and there seems really no adequate reason why the principles of co-operation should not consort as well with the genius of the Cape Breton miner as they have with that of the miner in other countries, notably in England. The secret of the failure of many of the co-operative societies in the past in Nova Scotia appears to have been that they did not do business on a strictly cash basis.

There are several interesting chapters in the work on the iron industries of the province, but your correspondent's knowledge of this matter is too limited to enable comment thereon.

ONTARIO.

Cobalt.—Navigation has now been open on the Montreal River for some little time, and boats are running between Latchford and Elk Lake. The two navigation companies that were operating on this route last year have been merged into one company. At the beginning of the season a good deal of trouble was experienced at first on account of several of the boats being put out of commission on the initial trips, but they have now been put into service again. For the present only one trip a day is being made, but when the traffic warrants it two trips each way will be made daily.

The Kerr Lake people are optimistic regarding the Wettlaufer property in South Lorrain, which they have acquired. The development work being carried out is giving excellent results, so much so that the management will considerably extend the scope of their operations. When the new twelve-drill compressor is running, the cost of mining will be greatly reduced. It is expected that this mine will shortly become a regular shipper. The Keeley now has its plant running, and will carry on the work of opening up its property as rapidly as possible. At the Maidens property the shaft on the No. 2 vein is down about sixty feet, but the vein was dipped from working. Sinking will be continued for some distance farther before a cross-cut is run to cut the ore body. The vein in the shaft carried good values in native silver. The Mines Power Company contemplates installing a compressor of about fifteen drills capacity, somewhere in this district, in order to help out some of the smaller properties until they are in a position to install machines of their own. Five silver bricks, valued at between four and five hundred dollars, were found a short time ago on the Princess property. The silver had evidently been stolen, and had been hidden for some time. So far no owner for them has appeared.

Since the last statement of shipments from the Gow Ganda camp was given out, the Millerett, formerly known as the Blackburn, has shipped another car of high-grade ore. This makes a total output from the district for the year of about 325 tons, and from the Montreal River district as a whole, 345 tons. All of this output was high-grade ore, none of which ran less

than 1,000 ounces of silver to the ton. On the Rawhide property, near Shanty Lake, a discovery is stated to have been made in a winze about 35 feet from the tunnel entrance. The Temiscaming and Hudson Bay Company, in the same vicinity, are working the McAlpine claims and good results are reported. A small steam plant was installed just before the break-up. A shaft is now down about twenty feet, and there is about two inches of high-grade vein matter. The country rock is also plentifully shot through with leaf silver.

The Cobalt Lake Mine seems to be coming into its own at last, and never in the history of the property have the physical conditions been so satisfactory. In sinking the winze to the 280-foot level, another rich vein has been encountered. This makes the third high-grade vein that has been discovered in the past few months. The new ore body is several feet wide and running through it are several stringers of high-grade ore. The rock between these stringers also carries leaf silver and argentite. Shipments are now being made more or less regularly and it is probable that they will be considerably increased in the near future.

The German American Company, in South Lorrain, has decided to put in a steam plant during the summer to open up a big calcite vein on the property. A shaft has already been sunk 50 feet by hand, and this will be continued another 50 feet. The vein is calcite with some smaltite and low assays in silver. On the Harris Lorrain, which adjoins the Frontier property, a force of 30 men has been started prospecting. A small plant will be installed. Another plant is to be put in on the adjoining property known as the Wendie, where twenty men are already trenching the surface. The opening of navigation has been responsible for the renewed activity of this district, which is growing in importance every day. During the summer, considerable road building, which is very badly needed, will be done. The government has made a small grant to assist in this work.

The O'Brien has made another shipment of silver bullion to the Bank of England. The bars contained 18,250 ounces of fine silver, valued at \$9,675.

The Silver Cliff mill is now being operated with electricity supplied by the Mines Power Company, and the returns have been very satisfactory. It is, however, only being run to about half its capacity at the present time, as some of the motors installed were found to be too light for the duty required. As soon as the new motors are in the production will be much increased.

It is stated that the Cobalt Central is to issue between \$300,000 and \$400,000 worth of bonds. This will clear off their present indebtedness, and provide working capital for the future. The property is evidently suffering from too much New York mismanagement. The mine is in good shape, and there is several months' run of mill rock broken in the stopes. For the present all the miners have been laid off and only enough men are employed underground to supply the broken ore for the mill. The Bailey property adjoining has contracted for a mill run of 500 tons, and a small tonnage of the concentrating dump of the Crown Reserve is also to be treated at the Cobalt Central.

Blackburn and Jones, the men who were responsible for the fake rush into the Caribou Lake district, have fallen into the hands of the police. They have already come up for preliminary hearing, and have been committed to North Bay to stand trial.

One of the most interesting annual reports issued this year is that from the Nipissing Mining Company. This is the most favourable report yet issued, and shows an excellent state of affairs on the property. During the last year the net earnings were increased by \$775,000; the dividend payments were increased \$660,000; and the surplus increase was over \$100,000.

The value of cash on hand and ore on hand, in transit, and at the smelters increased \$400,000. The cost of producing silver was decreased from 20.7 cents to 16.39 cents per ounce. A total of \$1,500,000 was paid out in dividends. The ore reserves are now estimated at 6,538,000 ounces, valued at \$3,269,000. The reserves are, it is altogether likely, much greater than this, for when a vein is opened up by a drift without any raises or winzes, only ten feet of ore is allowed above and below the drift. At the beginning of the year the reserves were estimated at 2,156,000 ounces, and after producing 4,646,876 ounces, they were estimated at the end of the year at 6,538,000 ounces. The total production up to date has been 12,747,467 ounces. The gross profit on production for the year was \$1,687,228. During that time 33 miles of trenches were dug at a cost of \$806 per mile, the average depth being 3.4 feet. The report states that this is the most economical and satisfactory method of prospecting, but goes on to say that the management cannot hope to discover all the veins, unless all the overburden is removed. Plans are under way for carrying this out. A new vein was recently discovered, running parallel to No. 101 in the cross-cut between the Meyer and Fourth of July shafts, at a depth of 75 feet.

The mine owners of Gow Ganda have petitioned the provincial government to construct a road that will connect that district with some outside point that has railroad transportation. They also urge the construction of a branch line from the T. & N. O. Railway. There is no possibility of such a line being built for some time to come, but the government has appropriated the sum of \$30,000 to construct a wagon road from Charlton to Elk Lake. This will connect with the present road from the latter to Gow Ganda, and will aid materially in providing transportation facilities to the district. The lack of this has been the greatest drawback with which the new camp has had to contend and operators in that section feel that some action should have been taken long ago. The shipments from the district, which aggregated about 325 tons of high-grade ore, were greater than was expected, and the mining men point to these as a reason for government aid.

The shaft of the Agaunico property is being sunk from the 250 to the 300-foot level. It is stated that Huronian slates were encountered at a depth of 250 feet, and as these slates have been found to be very productive in this camp, the management will continue sinking in the hopes of opening up an ore body. Work was originally started on one of the largest cobalt veins in the district, but although they have the cobalt at depth, the silver contents are, as they always have been, very low.

A vein has been cut in the Tretheway Mine about 140 feet from the No. 2 shaft. The vein was opened up on the 65-foot level, and shows several inches of high-grade ore. The new concentrator is about completed, and will it is expected, start running in a few days. The new shaft near the Hudson Bay boundary line is all timbered, and in a short time the company will proceed to open up the veins discovered in that section.

A decided improvement has lately taken place in the La Rose properties, good ore bodies having been opened up on the Lawson, Princess and main La Rose workings. At the Lawson, a drift was run from the 88-foot level on the "Keewatin" vein. There is now between three and four inches of high-grade ore showing in the drift. This is practically the first important ore shoot opened up at any depth. The greatest development has, however, taken place in the main La Rose workings, where several veins have been proved to greater depths. There are now three veins on the Princess that are producing good ore, and in the near future some of the outlying claims are to be opened

up. At the recent annual meeting of the Nipissing, Mr. D. Lorne McGibbon, the president of the La Rose, was elected a director of the former company. This would seem to point still more plainly to the amalgamation of these two properties. Mr. McGibbon has for some time, been entirely favourable to such a scheme, although there are, however, many difficulties to be overcome before its culmination can be expected.

The Hargraves Mining Company has been notified that its petition to have the royalty reduced from twenty-five per cent. of the gross proceeds to twenty-five per cent. of the net profits, has been granted by the government. It was not generally known that this company had been trying for the royalty reduction, and with the exception of the Chambers-Ferland, it is the only one to get it direct from the Government. All the other companies that got the reduction, paid to the T. & N. O. Railway Commission. The policy of the government seems to be to collect the heavy royalties as long as the companies can manage to stagger along and still pay them, but where the company can no longer do that, then there is a chance of getting them reduced.

The Crown Reserve is having a hundred tons of the dump run through the Cobalt Central mill, in order to get an idea of its value. If the returns are favourable, it is possible that it may build a concentrator for itself. Its concentrating dump is estimated to contain approximately 25,000 tons and it is adding to it at the rate of about fifty tons a day.

At the Provincial Mine, which was bought from the government at the last sale of Gillies Limit lots, a good vein was encountered while sinking the shaft near the boundary of the Savage property. The vein was cut at a depth of 80 feet and shows about four inches of high-grade ore. It dipped from the shaft a few feet lower down, however, and a crosscut will be run from the 100-foot level to intercept it.

Several companies have lately commenced operations in the Gillies Limit, but so far the main operations are confined to trenching. At the Wyandoh, good ore is being found in the drifts at the 110-foot level. This is on the same vein that is being worked on the Waldman property adjoining.

The new machine shop of the Tretheway has been burned down. This will in all probability, somewhat delay operations in the concentrator, as a good many of the machine parts were being made on the property.

Porcupine.—The government has given notice that upon all claims staked in the Porcupine district, between the first of January and March fifteenth, the time for doing the assessment work, will be extended to June the fifteenth. This concession was made on account of the petitions asking for it, that gave as the reason the exceptionally early break-up, which practically disorganized operations in that section. Gasoline launches are now running and are proving to be a material aid in the transportation problem. A good summer road is, however, badly needed, and although several starts have been made, nothing of any importance has as yet been accomplished. Government aid is much needed in this undertaking, and the district as a whole will naturally suffer until it has been built. Although no official statement has as yet been given out, it is commonly reported that the returns from the car of ore shipped from the Timmins' property assayed in the neighbourhood of \$200 per ton. It is, however, too much to expect that this will represent an average of the vein, and the owners will doubtless be well pleased if they get an average of one-tenth of that amount. That they are well satisfied with their original investment is, however, evidenced by the large holdings they have acquired, as it is stated that they have purchased and have under option about forty claims.

GENERAL MINING NEWS.

NOVA SCOTIA.

Springhill Mines, May 5th.—Vice-President E. S. McCollough, of the U. M. W., who has been expected here since the settlement of the Glace Bay strike, arrived to-night, and was accorded a grand welcome. He addressed a public meeting held in the Drill Hall. Mr. McCollough referred to the satisfactory settlement of the difficulties in Glace Bay, but further said that the settlement in Cape Breton did not mean a conclusion of the labour disputes here. The strike here was called independent of Glace Bay and could only come to a conclusion when the matters in dispute were satisfactorily settled to all concerned.

He praised the miners of Nova Scotia for the splendid way they had conducted themselves during the strike, and told the men of Springhill that they would now receive more attention. The U. M. W. had spent over a million dollars in Nova Scotia since the strike commenced, and they were prepared to spend more, and that the Union would stand by the miners of Springhill until the whole affair was settled right.

New Glasgow.—A rich strike of gold has been made on one of the veins of the Egerton property, Fifteen Mile stream, Halifax County. Reports affirm that four feet of mill stuff has been exposed for eighty feet, carrying high values.

ONTARIO.

Port Arthur.—The Atikokan Iron Company's blast furnace will be put in commission in a few days. Coal for the coke ovens has already arrived.

Cobalt.—The blacksmith and machine shops of the Tretheway mine were destroyed by fire on May 4th.

Gowganda.—The following petition has been sent to the Hon. Frank Cochrane, Minister of Mines, by the mine operators of Gow Ganda:

"The petition of the undersigned mine-owners in the vicinity of the Gow Ganda townsite, humbly sheweth:

"1. That the amount and value of the ore already shipped, together with the amount in sight, additional mining machinery now being installed, and other actual development work, fully establishes the fact that this is a genuine and established mining camp of large extent and rich values.

"2. That owing to the lack of roads and other transportation facilities the growth and development of the camp is greatly handicapped and investment discouraged.

"3. That your petitioners feel that these facts will warrant your department taking into serious consideration the further extension of roads and transportation facilities.

"4. That particularly your department may see fit to take steps to shorten the road from Miller Lake by way of the present working mines, and to continue a government road westward across the east branch of the Montreal River to connect with or continue the Bisco road to the Wapoose River or other convenient point on the west branch of the Montreal River, thus giving highway facilities at all seasons of the year to the working mines and mine-owners on the west side of Gow Ganda Lake and across to the townsite.

"5. Your petitioners would further urge the early and immediate construction of a railroad, either by the government or by the granting of a charter to some company willing to undertake construction."

Dryden.—At the Detola mine the foundation for the stamp mill is just about finished and trips will shortly be made to the Glass Reef property for balance of the mill machinery which was unable to be brought on the ice owing to the early breakup.

BRITISH COLUMBIA.

Portland Canal.—The Big Casino group of claims in the camp has been sold to a Vancouver syndicate. The transaction was put through by the Mercantile Trust Company.

Stewart, May 3rd.—One of the largest companies so far incorporated to operate in the Portland Canal is that of the Roosevelt Mining Company, Limited, with headquarters in Vancouver. This undertaking has been formed to acquire the interests of D. J. Rainey and Graham Chambers in the Roosevelt group of five claims located on Bitter Creek, for which surveys have been made and applications for crown grant are now pending. The provisional board of directors has the names of Joseph Chew, lumber manufacturer of Vancouver; A. R. Davis, of the same city, and D. J. Rainey, of Stewart. Other names will be added after the preliminary meeting of the directors.

The Roosevelt group is among the oldest located in the camp and has a considerable amount of development work in tunnels and surface cuts.

Nelson.—News of much activity comes in from the Slocan, where with the opening up of spring, mining operations are general. At the Standard mine at Four Mile Creek, near Silverton, a silver-lead proposition, some fine leads have been struck, and it is estimated there is enough ore in sight to keep a crew of twenty men stoping it out for five years. The Standard, which is owned principally in Spokane, has been working for the past five years, but the present strike has been made in recent weeks. G. H. Aylard, New Denver, is manager.

The Van Roi mine at Silverton, one of the biggest silver mines in West Kootenay, has a force of 100 men at work getting out ore, besides a crew of five men on a diamond drill. Some very fine cores have come from the diamond drill, which indicates an abundance of ore in the leads now being worked, as well as in several parts of the area surrounding the workings. The Van Roi mine, owned by a company in the Old Country, promises to be one of the largest silver producers in the province. The manager is Douglas Lay.

Nelson.—Confirmation of the recently-reported strike on the Rossland War Eagle, of an entirely new ore body of high-grade ore, has been made. The importance of the discovery has been rather under than over-estimated. The shipments are said to average \$40 per ton in gold and about five per cent. copper, a much higher average for similar tonnage shipped in one bonanza production this year. The Le Roi hopes to attain similar results and is pushing its diamond drill work as fast as possible.

At the annual meeting here of the Nugget Gold Mines, Limited, operating at Sheep Creek, the old directors were elected and the report presented was decidedly satisfactory, showing solid financial management and excellent indications of a successful year at the mine. Last year 5,000 tons were milled, producing \$78,860. The concentrates averaged \$5,200 at the smelter. There are no developments of the strike among the British Columbia Copper Company at Mermon. The company has given the men until to-day to return to work.

Vancouver.—On the McLennan property, Moresby Island, a stamp-mill is being erected. The machinery was shipped early in April.

YUKON.

Dawson, April 28th.—The Canadian Klondike Company's dredge No. 1 started operations yesterday for the season, the earliest in the history of the camp. The company expects to operate 200 days before cold weather compels a shutdown.

The season here is more backward than was expected three weeks ago. A spurt of warm weather then laid the trails bare. It has since been very cold at nights, with the temperature moderating slowly. The real thaw has now begun and water is running freely. Ten inches of snow fell several days ago, which

means great benefit to the miners for hydraulic sluicing purposes.

Dawson, April 30th.—The striking of quartz claims continues one of the popular enterprises. Everywhere throughout the camp men are showing their faith by the planting of stakes, and not a few in the undertaking of actual development work.

Some of the most extensive staking of late has been done on Sulphur, Gold Bottom and Meadow Creeks by A. A. Knorr

and associates. The staking on Sulphur is on both limits of the creek and extending on the right limit well over toward Parker Creek, a tributary of Indian River.

Forty-one grants for quartz claims were issued at the gold office to-day.

One group of five claims was staked recently on the right limit of Bonanza, opposite Victoria gulch, by Paul Guite and others.

MINING NEWS OF THE WORLD.

EUROPE.

Hungary.

A system of wholesale theft has been brought to light at the Twelve Apostles gold mine at Brad, near Arad, in Hungary. The mine is the property of Count d'Harcourt de Gotha, and it is now known that the thefts of ingots and gold dust have been carried on for years, their extent being estimated at many million kronen. The thieves, it is alleged, formed a perfectly-organized band, recruited from among the workmen and officials, and under the direction of the local priest. The stolen gold was removed in various ways, often in emptied dynamite cartridge cases, and the amount of the plunder may be gained from the fact brought to light during the investigations that one of the workmen had recently been able to make a purchase to the extent of 70,000 kronen, while a gendarme had 80,000 kronen in a savings bank.

SOUTH AFRICA.

Johannesburg, April 16th.—The aggregate ore reserves at present developed by the mines of the Rand are valued by the latest estimate at £100,000,000, showing a profit on the basis of the present working costs of at least £40,000,000.

Profits on operations on the East Rand Proprietary Company's mines during March of this year are reported at £107,046. For March, 1909, the profits were £106,113.

MEXICO.

City of Mexico, April 29th.—The Real del Monte and Pachuca Company is reported to be confronted with the necessity of developing extensive ore reserves in the Real del Monte mines at Pachuca, due to the fact that up to this time the development work has been kept but little ahead of the mill requirements. The available ore supplies are diminishing, and the company's cyanide plants have ceased to operate at full capacity. Officers of the United States Smelting, Refining and Mining Company, which controls the Real del Monte enterprise, recently visited the mines, and the question of extensive development was gone into thoroughly with the general manager, C. W. Van Law. The Real del Monte controls more than seventy mines and at the present time only a few are being operated.

Chihuahua, May 4th.—M. F. Crosette, manager of the Promontorio silver mine for the Cusi Mining Company, of Chicago, states that when he gets the smelter returns for ore shipments

made last month, his company will have received the purchase price of the mine, all development work, cost of machinery and every other expense. The mine was purchased in July, 1909.

UNITED STATES.

Washington, D.C., May 3rd.—The senate yesterday amended and passed a bill which already had passed the house to create a bureau of mines in the interior department. In addition to carrying on a part of the mining work heretofore done by the Geological Survey, the bureau will investigate the causes of mine explosions.

Mr. Root opposed the bill on the ground that the measure was a step "toward the usurpation by the national government of duties which belonged to the states."

"I believe we have enough to do," he added, "in performing the functions conferred on the national government, and should not take upon ourselves duties not incumbent upon us."

Mr. Guggenheim predicted that from \$50,000,000 to \$100,000,000 would be saved annually by the legislation and said the people of the United States had much to learn regarding metallurgy.

To show the importance of the mining industry, Mr. Nixon said that the mines supplied over 60 per cent. of the freight carried by the transportation companies of the country.

The bill places the bureau in the hands of a director, with a salary of \$6,000 a year.

A portion of the work of the Geological Survey is to be transferred to the new bureau.

Goldfield, Nev., May 2nd.—Checks for dividend No. 7, payable to stockholders of the Consolidated Mines Company on April 30th, have been mailed from the company's office in Goldfield, and are accompanied by a statement setting forth the financial status of the company and showing that it is in a prosperous condition. The dividend is for 50 cents a share, being the company's regular dividend of 30 cents a share, together with an extra dividend of 20 cents a share, declared at the last quarterly meeting of directors. This payment involves the distribution of approximately \$1,780,000 and brings the total of profits divided among shareholders to the sum of \$7,468,348.

Birmingham, Ala., May 5th.—A report was received here late this afternoon that 150 miners had been entombed by a mine explosion in a coal mine near Palos, Ala.

The chief State Inspector and First Aid to Injured Society members are flocking to the place. A special train is now leaving Birmingham for the scene.

Palos is a hamlet in Jefferson County, 30 miles from here, and there is no direct communication.

COMPANY NOTES.

PETERSON LAKE SILVER COBALT MINING COMPANY— PRESIDENT'S REPORT.

To the Shareholders of the Peterson Lake Silver Cobalt Mining Company, Limited:

Gentlemen,—In presenting herewith the fourth annual report of your company for your consideration, I must congratulate you upon the improved condition of the company, both from a financial and physical standpoint as shown by the reports of the treasurer and consulting engineer, and also upon the successful issue of your action against the former management which resulted in the payment into the treasury of the company of \$53,000 cash and 160,000 shares of stock.

The consulting engineer's report shows that 111.32 tons of ore was shipped, netting \$11,312.92 in royalty.

The Bank balance is \$47,237.42, as against \$6,818.35 at the end of the last fiscal year.

The issued capital has been decreased by 160,000 shares and now stands at 2,401,820 shares, and the stock in the treasury has been increased by a like amount.

The physical condition of the Little Nipissing lease has been much improved during the past year and one other of the leasing companies has made a discovery of value which seems likely to lead to shipping ore.

Two complete power plants have been added to those already on your property.

The company has for some time been developing a vein on unleased land, which appears to be a continuation of the producing vein on the Little Nipissing and your management look forward with confidence to developing shipping ore on their own ground within a short time.

Power is now being supplied to the various lessees by the public power companies and with the advent of this cheap power it seems certain that the profits this coming year will be much greater than the past and that many new discoveries will be made on your property.

(Sgd.) A. F. McLAREN.

SECRETARY-TREASURER'S REPORT.

Issued capital, 2,401,820; treasury, 598,180 shares; authorized, 3,000,000.

Balance Sheet.

Assets.	April 30th, 1910.
Bank of Hamilton Current Account....	\$ 2,237.42
Bank of Hamilton Savings Account...	45,000.00
Accounts Receivable.....	3,585.67
Plant, Machinery and Buildings	2,917.31
Mining Properties	2,510,216.25
Road Allowance Patent	49.75
Commission on Stock Sold.....	5,532.00
Discount on Shares	30,910.00
Development Account, including	
Estimated value of ore on hand, April 30th, 1909.	\$38,717.19
Add Consulting Engineering, Interest, Travelling, Mine and Management Expenses, including Island development for year ending April 30th, 1910 ...	8,800.10
	\$47,517.29
Deduct Ore Royalties	12,203.95
	35,313.34
	\$2,634,761.74

Liabilities.

To Public—

Notes and Accounts Payable (including Accrued Interest on Notes).... \$ 31,998.71

To Shareholders—

Recoveries, Suit, Peterson Lake vs. J. A. Jacobs, Edward and D. M. Steindler, Cash\$ 52,999.99
Stock 160,000.00

\$212,999.99

Deduct Expenses 12,056.96

200,943.03
2,401,820.00

Capital Stock (authorized \$3,000,000)...

\$2,634,761.74

To the Shareholders, the Peterson Lake Silver Cobalt Mining Company, Limited:

Gentlemen,—We have audited the books and accounts of your company for the year ending April 30th, 1910. In our opinion the above Balance Sheet is properly drawn up so as to exhibit a true and correct view of the corporation's affairs, as shown by the books on the closing date.

All our requirements as auditors have been complied with.

(Sgd.) J. L. Thorne Audit & System Company,
Auditors.

CONSULTING ENGINEERS REPORT.

Toronto, May 1st, 1910.

The President and Directors, Peterson Lake Silver Cobalt Mining Company, Limited:

Gentlemen,—I herewith submit report of operations upon your property from May 1st, 1909, to April 1st, 1910. The figures for ore shipment cover the last twelve months.

Shipments for year.	Tons.	Oz. paid for.	Value Rec'd.	Royalty
Nova Scotia	67.157	56782.22	\$29,052.68	\$7,263.16
Little Nipissing .	44.160	30883.40	17,045.63	4,011.41
Total, Silver...	111.32	87665.62	\$46,098.31	\$11,274.57
Cobalt				38.35
				Total Royalties .....\$11,312.92

Development.

During the past year the leases, with one exception, have confined their work principally to underground development, the Cobalt Leasors having done a considerable amount of trenching and diamond drilling.

The underground work accomplished by the different leases during the past eleven months was, approximately, as follows:

	Sinking and Raising.	Drifting and Crosscutting.
Gould Consolidated	28	53
Kerry Mining Co.....	96	1171
Little Nipissing Mining Co.....	70	868
Nova Scotia Mining Co.....	110	278
St. Anthony Mining Co.....	111	50
Union Pacific Mining Co.....	35	...
Susquehanna Mining Co.....	120	858
	570	3278

Cobalt Leasors Co., 530, diamond drilling; 1015, trenching.
The following table gives approximately the total amount of work done by each lessee up to April 1st, 1910:

Name of Company.	Acreage.	Diamond Drilling.	Trenching.	Raising and Sinking.	Drifting and Cross-cutting.
Susquehanna Mg. Co.....	12	375	550	200	858
Kerry Mining Co.....	42	691	12200	472	1510
Little Nipissing Mg. Co...	15	...	500	345	1900
Nova Scotia Mg. Co.....	30	...	...	185	1208
St. Anthony Mg. Co.....	14	280	640	200	50
Union Pacific Mg. Co.....	10	...	450	148	15
Gould Consolidated Co....	23	...	1630	200	230
Cobalt Leasors Mg. Co....	9.8	1113	3350	10	...

In addition to the development work done as above, the Susquehanna and Kerry Mining Companies have complete new power plants, and the Little Nipissing, St. Anthony and Union Pacific Companies have each expended a considerable amount of money in buildings and in additions to machinery and plant.

You will notice that the lessees that have done the most work are the Nova Scotia Company, the Kerry Mining Company, the Little Nipissing Company and the Susquehanna Mining Company, and of these the first three have got silver values. On the disputed ground adjoining the Nova Scotia lease, as also on the leased ground, there is a considerable quantity of rich silver ore blocked out ready for extraction. The Little Nipissing Company has joined the list of shippers of high-grade

ore and promises well for the future, and the Kerry Mining Company, after a good many disappointments, has found good silver ore on the 200-foot level, which, when further developed, will possibly produce shipping ore in quantities.

In March a contract was let for sinking a shaft 150 feet from an island in the lake, and it is already down 35 feet, and has a strong 4-inch vein of calcite in the bottom. As this vein is about in line between, and on the line of strike of the Little Nipissing vein and the Nova Scotia vein, there is good reason to hope that valuable ore will be found in it.

Altogether the prospects for the future of Peterson Lake are much brighter than in the past. Owing to the much-delayed installation of electric power and air power the development work has been postponed from month to month, but now that power is available more vigorous development is promised.

I am,

Yours faithfully,

(Sgd.) J. W. ASTLEY.

COMPANY NOTES,

The directors of Bell's Asbestos Company, Limited, recommend a balance dividend of 1s. 6d. per share, making a total distribution of 12½ per cent. for the fiscal year. The amount to be carried forward is £14,168 9s. 4d. The usual bonus of 2½ per cent. has been dropped. This is attributed to the slack condition of the building trades.

STATISTICS AND RETURNS

RHODESIAN GOLD OUTPUT.

The total output of gold from Rhodesia for the month of March is cabled at 54,277 ounces, valued at £228,385, as against 48,443 ounces, valued at £203,888, in the previous month. This is an increase on the month of £24,497. There were 188 gold producers last month. The output of other minerals for last month was: Silver, 18,267 ounces; lead, 56 tons; coal, 12,272 tons; copper, 8 tons; chrome ore, 1,714 tons.

According to a Treasury return, issued April 20th, the total quantity of coal exported from the ports of the United Kingdom in 1909 amounted to 63,076,799 tons. The details show that the prices were as follows: Not exceeding 5s. per ton, 964,553 tons; exceeding 5s. to not exceeding 6s., 1,726,844; exceeding 6s. to not exceeding 7s., 2,162,768; exceeding 7s. to not exceeding 8s., 2,440,857; exceeding 8s. to not exceeding 9s., 9,500,552; exceeding 9s. to not exceeding 10s., 11,800,963; exceeding 10s. to not exceeding 11s., 8,041,973; exceeding 11s. to not exceeding 12s., 4,352,212; exceeding 12s. to not exceeding 13s., 4,258,478; exceeding 13s. to not exceeding 14s., 6,987,120; exceeding 14s. to not exceeding 15s., 5,226,273; exceeding 15s. to not exceeding 16s., 2,061,889; exceeding 16s. per ton, 3,553,317 tons.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending April 22nd, and those from January 1st, 1910, to date:

	April 22.	Since Jan. 1.
	Ore in lbs.	Ore in lbs.
Buffalo	58,900	644,078
Chambers-Ferland	41,950	164,250
Coniagas	78,000	512,096
Crown Reserve	200,700	1,792,070
Kerr Lake	240,000	2,397,523
La Rose	151,900	3,965,970
Nipissing	332,745	3,494,380
O'Brien	66,040	519,046

Right-of-Way	47,000	556,717
Tretheway	64,800	319,450

Ore shipments for week ending April 22nd were 1,282,035 pounds, or 641 tons.

Total shipments from January 1st to April 22nd were 17,619,415 pounds, or 8809 tons.

B. C. ORE SHIPMENTS.

Boundary.

	Week ending April 23.	Year to date.
Granby	23,408	401,669
Mother Lode	6,300	140,155
Oro Denoro	375	4,855
Snowshoe	376	60,643
Other Mines	163	.....
Total, week	33,813	607,407

Rossland.

Centre Star	437	61,947
Le Roi	493	972
Le Roi, No. 2 (milled)	300	4,800
Le Roi	367	47
I. X. L.	8	27
Other Mines	12	.....
Total, week	55,225	628,837

Slocan-Kootenay.

St. Eugene (milled)	2,775	44,400
Whitewater (milled)	600	9,600
Vanroi (milled)	800	12,800
Kootenay Bell (milled)	70	1,120
Granite Poorman milled)	250	4,000
Queen (milled)	420	6,720
Nugget (milled)	110	1,760
St. Eugene	405	5,977
Richmond Eureka	34	1,477
Yankee Girl	40	2,138

Nugget	14	127
Granite Poorman	28	207
Sullivan	203	3,111
Monte Cristo	4	4
Vanroi	31	357
Other Mines		21,844
Total	5,784	115,642

The total for the week is 45,122 tons, and for the year to date, 804,303 tons.

SMELTER RECEIPTS.

	Week	Year.
Granby, Grand Forks	23,408	401,789
Consolidated Co., Trail	10,017	161,125
B. C. Cop. Co., Greenwood	6,675	144,960
Total tons	40,100	707,874

TORONTO MARKETS.

Metals.

May 10.—(Quotations from Canada Metal Co., Toronto.)
 Spelter, 5½ cents per lb.
 Lead, 3.65 cents per lb.
 Antimony, 8 to 8½ cents per lb.
 Tin, 34.50 cents per lb.
 Copper, casting, 14.00 cents per lb.
 Electrolytic, 14.00 cents per lb.
 Ingot brass, 9 to 12½ cents per lb.
 May 10.—Pig Iron—(Quotations from Drummond McCall Co.)
 Summerlee No. 1, \$23.50 to \$24.00 (f.o.b. Toronto).
 Summerlee No. 2, \$23.00 (f.o.b. Toronto).
 Midland, No. 1, (Off the market).
 Coal, Anthracite, \$5.50 to \$6.75.
 Bituminous, \$3.50 to \$4.50 for 1¼-inch lump.

Coke.

May 6.—Connellsville Coke, (f.o.b. ovens).
 Furnace coke, prompt, \$1.75 to \$1.85 per ton.
 Foundry coke, prompt, \$2.25 to \$2.35 per ton.
 May 6.—Tin (Straits), 33.05 cents.
 Copper, Prime Lake, 12.80 to 13.00 cents.
 Electrolytic copper, 12.40 to 12.50 cents.
 Copper wire, 14.25 cents.
 Lead, 4.37½ cents to 4.42½ cents.
 Spelter, 5.07½ to 5.10 cents.
 Sheet zinc (f.o.b. smelter), 7.50 cents.
 Antimony, Cookson's, 8.37½ cents.
 Aluminium, 23.50 to 24.00 cents.
 Nickel, 40.00 to 49.00 cents.
 Platinum, ordinary, \$29.00 to \$29.50 per oz.
 Platinum, hard, \$34.50 per oz.
 Bismuth, \$1.75 per lb.
 Quicksilver, \$48.00 per 75-lb. flask.

SILVER PRICES.

	New York Cents.	London Pence.
April 21	53¾	24 1/8
“ 22	53¾	24 3/4
“ 23	53¾	24 3/4
“ 25	53 5/8	24 1/2
“ 26	53¾	24 3/4
“ 27	54 1/8	24 7/8
“ 28	54 1/4	24 15-16
“ 29	54	24 1/8
“ 30	54 1/4	24 15-16
May 2	54 1/4	24 15-16
“ 3	54 1/8	24 7/8
“ 4	54 1/8	24 7/8
“ 5	54	24 7/8
“ 6	53 7/8	24 1/8

SHARE MARKET.

Courtesy of Warren, Gzowski & Co.)

May 10, 1910.

Miscellaneous.	Bid.	Ask.
Amalgamated Asbestos	20	22
Dominion Coal Company	66	67
Dominion Steel Company	65¾	67
Nova Scotia Steel	78	80
Granby	42	45
Consolidated Smelting	75	81
Crows' Nest Pass	85	88

COBALT STOCKS.

Amalgamated .....	.03	.05
Beaver Consolidated .....	.34	.34½
Buffalo	2.50	2.75
Chambers Ferland .....	.28½	.29½
City of Cobalt .....	.30	.31
Cobalt Central .....	.09½	.11½
Cobalt Lake .....	.27¾	.27¾
Coniagas	5.00	5.60
Crown Reserve	3.00	3.05
Gifford .....	.09¾	.10¾
Foster .....	.18	.22
Green Meehan .....	.03¼	.03¾
Great Northern .....	.085/8	.08¾
Hudson Bay	102.00	108.00
Hargraves .....	.26	.29½
Kerr Lake	8.70	8.75
La Rose	4.05	4.10
Little Nipissing .....	.22¾	.23¾
McKinley-Darragh-Savage .....	.92	.96
Nancy Helen .....	.047/8	.05½
Nipissing	9.87	10.00
Nova Scotia .....	.35½	.36
Otisse .....	.057/8	.06¼
Peterson Lake .....	.24	.24¼
Right of Way .....	...	...
Rochester .....	.21¼	.21½
Silver Leaf .....	.07½	.08
Silver Bar .....	.06½	.07
Silver Queen .....	.10	.12
Temiskaming .....	.69½	.70
Trethewey	1.26	1.28
Watts .....	.09½	.13
Ophir .....	.43	.50
Wetlaufer .....	.80	.85

NEW YORK CURB.

Boston Copper	17½	..
British Columbia Copper	5¾	5¾
Butte Coalition	20	20½
Canadian Mines	67/8	7
Chino Copper	13¼	13½
Davis-Daly Copper	15¾	17½
Ely Consolidated	1/2	5/8
Gila Copper	6¼	65/8
Giroux Mining	7¾	8
Goldfield Consolidated	8½	8¼
Greene-Canadian	87/8	9
Inspiration Copper	77/8	7¾
Miami Copper	22½	22¾
New Baltic Copper	6	8
Nevada Con. Copper	19½	195/8
Ohio Copper	27/8	2¾
Rawhide Coalition	27½	28½
Ray Central	21¾	27/8
Ray Consolidated	187/8	19¾
Union Mines	1½	1¾
Yukon Gold	47/8	4½