EDITORIAL

Mines Regulation in Canada

In this issue is published a comparison of the statutory mining regulations of the provinces of Canada, copied from the November issue of the "Labor Gazette." The comparison has been carefully made, and should be useful for purposes of reference and annotation, as mining laws are constantly being changed and added to.

The provincial laws as they exist today—and ignoring purely local regulations and the so-called "Special Rules," which are a rather important part of all mines' regulation—are compared with a standard of uniformity and excellence, prepared by a Commission on Uniformity of Labor Laws, appointed as a sequel to the Industrial Conference of September 1919.

Insofar as the Commission has confined its recommendations to statutory regulation of mines, considered from the standpoint of the well-being of the workmen, the standard adopted is not out of line with actual practice and the trend of modern thought, but in some respects the functions of the provincial officers, to whose hands the statutory regulation of mines is entrusted, seem to have been encroached upon.

For example, it is suggested that in case of disagreement following upon the report of a dangerous condition by a mine inspector, the matter may be referred to a board of arbitration consisting of a judge, and representatives of the interested parties.

This, to our mind, reveals a misapprehension of the duties and the status of the government inspectors of mines. These officers of the law are considered in most British courts to represent the directly delegated authority of the statute law, and it is not by courtesy or by custom, but by legal right that these men are designated as "His Majesty's Inspectors of Mines." Loose thinking of this kind recently led to a mine inspector in Nova Scotia being placed on trial for manslaughter, the inference being that he shared the responsibility of the mine officials. To our mind, the inspector of mines cannot delegate his authority, nor allow of its abatement. He has one duty only, and one responsibility only rests upon him, which is to administer the law. The only tribunal of reference he can admit is his superior in office, the Minister of Mines, who represents the court of final appeal.

Another recommendation to which exception is taken is that providing for administration of first-aid and mine-rescue work by the Workmen's Compensation Board of such provinces as have established this authority. If this recommendation were confined to medical aid and the generally recognized scope of first-aid and accident prevention, little exception could be taken to it, but the inclusion of mine-rescue work, (a much misunderstood term) introduces a highly technical branch of the mining engineer's duties that in most well-regulated mine administrations is specifically dealt with by statute. The selection of such appliances as oxygen breathing-apparatus, fire-fighting devices, gas detectors, illuminating devices, signalling apparatus; the direction of rescue work, the supervision of men and materials; the formulation of rules of procedure, the training of men, and many other things that might be mentioned, come within the duties of the mine management and the mines inspectorate, and are certainly foreign to accepted conceptions of the duties of a Workmen's Compensation Board. The concluding paragraph of the Report of the Commission states: "The *administration* of first-aid and mine-rescue work is in no case entirely *within the hands* of the Workmen's Compensation Board."

Unless we entirely misconceive the viewpoint of the provincial departments of mines, and misinterpret both the intent of the workmen's compensation acts and the mines regulation acts of the several provinces, it will never be so.

The uniformity of mines regulation is not undesirable so far as this governs the social status of the mine-workers, but it is neither desirable or possible that uniformity should be attempted—for the mere sake of

uniformity—in technical regulations, as these advance with time and with the progress of technical invention. So far, the most effective spur to changes in the mining regulations of the various provinces of Canada, has been a spirit of emulation, and no literature is so avidly read by mining men as that which compares accident rates arising from mining in the provinces as they appear in the annual reports of the inspectors of mines. Nothing, moreover, is more instantly objected to than any attempt at unfair comparison, or slur upon the good name of any province, in regard to its mining accident rate, which we take to be a first-class indication of a commendable spirit of emulation in the good work of lessening accidents.

There could be little objection to the provision of funds for the purchase of first-aid and mine-rescue appliances; these having hitherto been provided at the expense of the mine owners, and, since the passage of compensation acts, possibly to be regarded as a fair charge against compensation assessments held by the compensation boards. This is the meaning we would give to the Commission's recommendation in Clause 14, but it is inconceivable that the "administration" of first-aid and mine-rescue work should in any case "be entirely in the hands of the Workmen's Compensation Board."

THE PUBLICATION OF TECHNICAL BOOKS.

We are reminded by a well-known New York publishing house, John Wiley & Sons, that the prices of technical books are advancing, and that they will not join the downward movement of general commodities. Since 1914 the costs of manufacturing books has advanced 132 per cent, and is still going up. Printers are now asking for a further forty per cent wage increase. The war caused a slump in the demand for certain classes of technical books, and in some instances necessitated the withholding of publication of books well advanced towards issue. The renewed demand has depleted the stock of books, and a general increase in the price of new issues will be required in technical books, as it has been required in novels and other books.

Of the making of books, the Preacher said, there is no end, and this is an ancient dictum that may be fittingly applied to the technical book of today, often out-of-date in its references before it reaches the public because of the rapid advance of human knowledge and recorded experimentation.

The publication of technical works has always ranked as one of the most honorable of professions, and it is fitting in this connection to note that the firm of Charles Griffin & Co., of London, has issued a centenary volume, with a foreword by Lord Moulton, F.R.S., to mark its completion of one hundred years of service to the technical professions. The list of publications mentioned in this volume, beginning with Rankine's classics in 1858, is actually a catalogue of British engineering and technological progress and the names of those who laid the foundations of progress.

Canada has not yet developed a publishing house that is equipped to produce technical works on a scale to compete with the large firms of London and New York, and it is hardly to be expected that such should be the case, but it is possibly not the happiest of omens that our large publishing houses have so far specialized in volumes of fiction or ephemeral literature. Notable among the few British book-publishing houses that has established a Canadian branch is MacMillan's, but perhaps the day is coming when such firms as Isaac Pitman & Sons, Griffin & Co., or some of the better-known New York houses may see fit to set up shop in Canada, or better still that some of our Canadian houses may develop a substantial technical-book business.

In one particular, that of elementary and high-school books, there is much need for preparation of manuals on distinctively Canadian subjects. For example there is no competent text-book on Canadian industries, on the association of regional geography and geology with industry and population, no understandable manual on Canadian minerals and mining, and no book that attempts to apply to Canadian life the principles—and not the dry-as-dust facts and figures—that animate the geologist, the geographer, the historian, the forester and the scientific agriculturist. Our school literature is largely clipped and borrowed material, and it is distinguished by the minimum of originality and the maximum of compilation.

Really worth-while school text-books of the nature above outlined cannot, of course, be originated by the individual provinces. They will have to be assured of a Dominion-wide circulation, and will probably have to originate outside existing educational authorities.

CANADA AS A PRODUCER OF PETROLEUM.

In the issue of the 19th November, exception was taken in these columns to an opinion of the "Petroleum Times," of London, which stated " it must not be imagined that Canada has the slightest hopes of ever becoming a great oil-producing country." It is pleasing to note that in the latest issue of our informative contemporary which is to hand, there appears a geological sketch-map of Western Canada illustrative of the oil occurrences and prospecting boreholes, and containing a note on the Fort Norman oil strike, and the interesting statement that the new oil-field "is probably of great extent and may be one of the largest in the world."

We congratulate "Petroleum Times on its quick publication of accurate information regarding the successful prospecting of the Imperial Oil Company, based upon Dr. Bosworth's researches, and its evident ap-

preciation of the real importance of the Fort Norman oil-flow, which follows so soon upon a previously expressed adverse opinion. The statement of Mr. Camsell, the Deputy Minister of Mines, that "Canada is a continental area, only partially prospected," is in these days being amply demonstrated.

THE INTEREST OF THE COAL PRODUCER IN COAL DISTRIBUTION.

Our British Columbia correspondent gives some particulars of the cost of marketing domestic coal on the Pacific Coast that are fairly typical of the customs of the coal trade in general.

The price at the mines to dealers is given as $8.93 per net ton, which seems high. The cost of mining coal in Vancouver Island is, however, quite high. Except in some favored localities, the Island coals are characterised by a high percentage of discard in the preparation process at the mines, running in some cases from 25 to 30 percent. The seams are also disturbed by rolls, and the work of development is extremely costly. The difficulties under which mining is carried on in some Vancouver Island districts are indeed such as would dishearten those accustomed to continuous, regular coal seams.

The process of getting the coal to market in Vancouver includes the following operations, towing and unloading scows, screening and sacking, cartage and packing. These total a cost of $4.37, or about half the mine cost of the coal, and they represent largely the cost of inefficient and superfluous handling. Customers demand screened lump coal, and to supply this demand, runmine is screened, leaving a residue of slack of little value. Ordinary runmine should be good enough for most domestic purposes. Sacking is another practice that is only necessary where coal has to be delivered in extremely small quantities. The items of towing, unloading scows, wharf rent and overhead charges, indicate that much could be saved by bringing coal cargoes to Vancouver in larger bulk, and unloading by modern devices.

The suggestion that Alberta coal should be brought to Vancouver and sold by the city in a municipal yard is not one that commends itself to many, but it does indicate that the effect of large areas of coal that can be very cheaply mined is commencing to be felt, and Vancouver people should not overlook the fact that some day their city is likely to be a point of much importance in the export of Alberta coal by water. The obvious remedy for any inefficiency that may exist as a result of competition among Vancouver Island mines in the Vancouver domestic trade, is the consolidation of the sales organizations, a concentration of the freighting, discharging and marketing arrangements; and the absorption of the business of the retailers by the coal companies.

Even on their own showing, the retail dealers in coal in Vancouver take a profit on $1.20 per ton on lump coal. It is safe to say that no coal company in Vancouver Island ever made such a profit over any representative period, after deduction of all legitimate charges. It is also safe to say that a coal company would consider itself justified in spending many thousands of dollars to effect a producing-cost saving of ten cents per ton, and they should not contemplate —without some consideration of its repercussion on their own interests—a charge of $1.50 per ton for "cartage and packing" of domestic coal. He may not deserve it, but the coal producer will always be blamed by the ultimate customer for the high cost of coal, and the necessity for action in self-defence is quite clearly indicated.

LOW FATALITY RATE IN BRITISH COAL MINES.

In pleasing contradistinction to the many difficulties that at this time beset British coal-mining is the fatal accident record, which in 1919, for the first time in its history, showed a ratio of mortality from accidents per thousand persons employed that fell below unity, the figure being 0.94 per 1,000 persons. The number of persons who lost their lives by explosions of fire damp and coal dust, was 27, out of 1,191,313 employed, or 0.03 per thousand, a record that was only bettered in 1917, when only 20 deaths occurred from these causes. Twelve of the deaths from explosions occurred in Scotland, where the use of naked lights is common. In the English mines, the practice may be said to be virtually extinct.

Another notable fact is that not a single person was killed in Great Britain in 1919 through breakage of ropes and chains in shafts, and only six fatalities are attributed to the use of electrical plant underground.

As compared with our friends in the United States, British mining engineers pay a high price in restrictions on output and in increased cost of production because of the operation of regulations forbidding naked lights, naked power wires, black powder, underground trolley-haulages, and other practices that are permitted in the coal mines of the United States, but while this journal shares in the innate dislike of coal miners to any appearance of congratulation upon freedom from fatalities, it can hardly be doubted that the very favorable record of the British coal-mines is to a large extent due to observance of the Coal Mines Regulation Act.

The owners and managers of British coal mines have been accused of carelessness in regard to the safety of employees, and it has been freely stated that the after-war conditions of the collieries was poor. The accident record does not bear out any such ideas, and altogether the achievement is one that reflects credit on all concerned, and particularly on the mines inspectorate.

The Mayo Silver Area, Yukon Territory

By GEO. F. JOHNSON, Vancouver.

The Mayo area in the Stewart River district of Yukon Territory, Canada, has attracted considerable attention within the last few years and more particularly recently, by reason of the extremely rich and promising lode-deposits of Silver-Galena Ore, which have been located in considerable numbers, extending over an area of fifty miles.

The writer, who has just returned from making a personal inspection of the Mayo District, submits the following brief report, which may be of interest to your readers.

The town of Mayo is situated on the Stewart River, about 180 miles from its mouth. The Stewart River flows into the Yukon and is easily accessible. Navigation opens early in May and usually remains open until middle of October. During the open season the White Pass and Yukon Route run regular passenger steamers there as the needs justify. During winter months, Mayo is served by a regular freight and passenger-stage from Dawson, Yukon Territory.

From Mayo good wagon roads radiate to nearly all of the important operations, which include those on Lookout Mountain, (Spur of Mount Haldane) Silver King, Galena Hill, Rambler Hill. Mount Cameron, Mount Hinton and Keno Hill, which is in the Gustaveson Range.

Previous to 1914 little prospecting for other than gold was done in the ordinary type area, but the opening up of the extremely rich silver deposit of the Silver King mine on Galena Creek, stimulated interest in lode deposits and since then vigorous prospecting has been going on, with the result that several most promising prospects have been discovered and are being developed.

The Silver King mine produced from a "pocket" approximately half a million dollars in Silver, with comparatively little effort or expenditure.

The next prospect to be developed, was that on the Lookout Claim, on Lookout Mountain, at an elevation of 3,500 feet.

This claim, with four adjoining ones, are under option to the Yukon Territory, for the purpose of developing this property.

Development work on the one claim has been going on for two years and results are 1,200 feet of adits and shafts, with a total depth of 450 feet on the original "discovery vein."

The country rock on this claim is gneissoid quartzite and quartz mica-schist. Greyish granite-porphyry and greenstone schists also occur.

The hanging-wall is usually well defined and marked by gouge.

The ore is of a disseminated character, the galena occuring in small streaks and masses. There are several zones in which this occurs, permitting of sorting a shipping grade of ore.

The vein follows a well defined but slightly irregular fracture in a gneissoid quartzite and quartz mica-schist, striking from 120 degrees to 150 degrees magnetic and dipping from 45 to 50 degrees to the north east.

The width of the vein varies from 6 to 33 feet, its length and depth being undetermined. The workings are entirely within the oxidized zone.

Dr. W. E. Cockfield, Dominion Geologist, in his 1918 report says that, in addition to the vein on Lookout claim, two and possibly three other veins as yet undeveloped, occur on the adjoining claim. From the outcroppings they were traced, by means of float, a distance of over 2,000 feet.

The development work on the Lookout claim proves the vein to have streaks of carbonates to 12 inches in width, carrying very high but somewhat erratic values in silver.

A sample shipment of 27 tons of ore sent to the Trail Smelter gave returns of 95.6 oz, silver and 59.4% lead.

A sample of 1800 pounds from discovery tunnel, gave 125 oz. silver and 62% lead.

The efforts of the Yukon Silver-Lead Mining Co, have had entirely the object of proving depth of vein, but since the wonderfully rich surface enrichment recently discovered on Keno Hill, the managment intend seeing if their property is not similarly enriched.

I have purposely given extended data about Lookout caim, for the reason that this was the only property which has been systematically developed and the district generally has been depending somewhat on this property to prove geology, etc.

Rambler Hill, situated about six miles east of Lake McQuestion, has some very promising properties with similar formation to that on Lookout claim.

The workings are at an elevation of about 5,000 feet and are entirely above timber line. The owners of property have outlined considerable work for this winter.

Mount Cameron, which is about 45 miles in a direct line from Mayo, has three claims upon which some development work has been done and it is claimed that in the adit the vein has a banded appearance, with alternating streaks of galena and sphalerite, the galena occuring in streaks from 2 to 6 inches wide. The general geology of the district is similar to that of Keno Hill and Lookout mountain.

The size of the outcroppings and the fact that streaks of pure galena carrying high values in silver occur, indicate that the property may have considerable value, but much development work is necessary to prove this.

Development work on this property has been retarded by reason of the fact it was the most inaccessible, but road conditions are now improved.

Keno Hill is one of the Gustavus Range of mountains lying between the head of Lightning and Christal Creeks, at an elevation of about 6500 feet. It is about 42 miles from Mayo. Discovery and location was made in July 1919. Six of the original claims were taken under option by the Yukon Gold Company (the Guggenheims). There was three main shewings of mineral on one claim and two on the other. Development has opened up nine separate leads on these claims. Values on discovery vein of 150 ounces silver from a series of samples, were obtained by the owners. Grab samples taken from the dump on one of the claims, ran from 100 to 1000 ounces silver.

The veins on some of the claims opened up shew a width of 15 feet of solid galena, the values in silver being phenomenally high.

The results of the development work done by the Yukon Gold Co. up until July proved sufficiently satisfactory for the management to authorize the statement that they will spend half a million dollars on

further development this winter. They have let contracts to haul 3000 tons of ore from mines to Keno Hill to Mayo this winter.

Dr. W. E. Cockfield in his 1919 report on Keno Hill says in part, 'On a number of other claims minerals have been reported, and it seems probable that mineralization has taken place over a wide area. It seems probable that further prospecting will add greatly to the area around Keno Hill where mineral has been discovered. The prospects already discovered all contain a high grade ore, which will stand mining and shipping even under adverse conditions and many of them could be worked by hand methods of mining."

The writer in July, saw ample proof of the truth of the above prediction, for hundreds of tons of pure silver-galena ore was stacked up in piles awaiting shipment, nearly all of which had been mined without the aid of power, merely by the use of pick and shovel.

Many other properties than those being developed by the Yukon Gold Co. have similar shewings.

Mining engineers and experts who have visited the Mayo District are practically unanimous in their verdict that the present shewing justifies the belief it will develop into a big camp.

The Mayo district is fortunate in having considerable winter and timber available from which power can be developed for operating.

The few properties mentioned above, do not by any means give an idea of the number located which have good shewings, to do so would take too much space. The area is large and intensely mineralised. Its greatest need is intelligent prospecting and development.

The distances by the present wagon roads from Mayo to the best known properties are as folows, Lookout Mountain 29 miles, Silver King 29 miles, Keno Hill 42 miles, Rambler Hill 45 miles, Mount Cameron 65 miles. These roads also serve the other properties which are being developed.

The open season on navigation on the Yukon and Stewart Rivers is of ample length to enable the necessary supplies to be shipped in, and the result of operations to be shipped to the smelters, in Canada or the United States.

Unlike most cold sections where considerable snow is encountered, which closes down operations, these conditions are an advantage here. The cold does not materially affect adit or stoping operations and the small fall of snow is necessary to decrease hauling expenses. Mostly all of the freighting is done during the winter season, with sleighs drawn by teams, over a hard-packed snow trail or road.

It is the intention this winter to put motor-trucks and tractors in competition with horse-drawn vehicles to demonstrate which is the most economical method.

My opinion is that the Mayo area will astonish the mining world by its richness. Have been a resident of Yukon since 1898 and shall be pleased to give information to anyone genuinely interested.

MAYO DISTRICT, YUKON, ANXIOUS TO BE KNOWN.

The preparations of one of the largest mining companies in the Yukon to ship something like three thousand tons of silver bearing ore from the Mayo district this season is attracting the attention of nearly every Yukoner, and inspiring prospectors of the territory to greater activity than they have exerted for years.

Nothing so stimulates the prospector as the openin of a paying property. That the one company now operating on Keno Hill has a paying property in its central group, at least for the present winter and possibly for several years, is admitted. The needful thing now to prove that property permanent is to prove depth.

To obtain depth, much earnest work is required. Diamond drilling and the sinking of shafts will tell the tale. It is understood that this work soon will be done by more than one now interested in the field, and there always is the possibility of others taking similar steps. Not only those directly interested in the mining game, but also those in other pursuits in the territory hope to see the prospecting pushed to a conclusion as rapidly as possible.

The federal government and the local government can do much to assist in encouraging the prospector, and much can be done toward hastening development by getting more genuine hard rock miners into the country. Men who are not miners and who are placing their funds in the Mayo region as grubstakes to assist the prospectors now there deserve every credit, and should share the returns as compensation for taking a portion of the early burden upon their shoulders. However, when it comes to proving the existence of veins and deposits, the trained and experienced miner is invaluable. Now that Yukon has such an attractive field mineralized over a large area, one essential thing is to make known the inducements of the region to men who affect the mining game and are eager for new chances.—"Dawson Weekly News."

DEATH OF A PIONEER OF NOVA SCOTIA COAL MINING.

With the death of Robert Belloni there passes a pioneer of coal mining in Nova Scotia. Mr. Belloni, who has recently died in New York at an age exceeding ninety years, formed in 1864, with his brothers Charles and Augustus, and his brother-in-law Havermyer, the "Blockhouse Coal Company" and opened a mine at Morien, Cape Breton Island, where he built a shipping pier at the pitmouth and loaded coal direct from the pit-tub into the vessel. Passing through many vicissitudes, the original company was reorganized as the Blockhouse Coal & Railway Co., and finally as the Blockhouse Mining Company. Since passing out of the hands of the Belloni family the mine and areas have been successively known as the Gowrie & Blockhouse Coal Co., and the North Atlantic Collieries, and are now owned by the Dominion Coal Company, which, it is understood, proposes re-opening of the property.

Mr. Belloni was a man of broad vision, and his plans forecasted some of the undertakings that have since been carried out by those who followed him. He had a railway route surveyed to Louisburg, and employed two eminent mining engineers, Prof. Lesley and Benjamin Smith Lyman, whose reports were among the first bringing the Nova Scotia fields to the attention of the outside world, and rank prominently in the early bibliography of the Cape Breton coalfields.

In 1864 the production of coal in Nova Scotia was less than 600,000 tons, and it included, moreover, the entire Canadian production. The span of Mr. Belloni's life and his connection with coal mining in Canada has covered the rise of the coal industry in Nova Scotia, and has been long enough to see the beginning of a coal industry in the West that will shortly leave the eastern coalfields far behind.

For the particulars of dates and other information in the foregoing note, the Editor is indebted to Mr. C. [illegible] of the Dominion Coal Company.

Flotation in the Mill Flow-Sheet

A Few General Remarks on the Milling of Ores That Involves the Use of the Flotation Process.

By P. E. PETERSON (Member).[2]

The sulphide minerals now recovered by the flotation process will practically all pass through a 60-mesh standard Tyler screen. A typical screen-analysis of flotation concentrate shows:

Flotation-Concentrate Screen-Analysis.

Heads—8.31 per cent. Cu.

Mesh.	Total p.c. Weight.	Cumulative p.c. Weight.	Assay p.c.Cu.	Total p.c. Contents.
40	3	3	..	..
60	6	9	6.40	7.0
80	6	15	6.48	4.9
100	3	18	..	..
150	13	31	7.68	17.5
200	19	50	8.52	19.6
200 (minus)	50	100	8.48	51.0

Thus, it is seen that the flotation process is applicable to the recovery of such minerals as are crushed through a minus 80-mesh, and, in general, is adapted only to the treatment of the so-called mill slimes.

In the crushing of ores to the various sizes required for the separation of minerals, there is always a part of the product that must be classed as slimes. For instance, the product from a Blake rock-crusher showed 40 per cent of the material on a 1-inch square opening; and 5 per cent of the total product passed through an 80-mesh screen. In the following cumulative screen-analysis of the ball-mill discharge, it is to be noted that 64.7 per cent is minus 80-mesh.

	Screen-analysis of the ball-mill discharge.
40-mesh	6.8 per cent
80-mesh	35.3 "
100-mesh	46.0 "
200-mesh	62.3 "

On account of the physical properties of the sulphide minerals, they are invariably crushed finer, and to a greater extent, than the usual associated gangue minerals. Thus in many instances, an ore that is ground quite coarse will have over half of its valuable constituents in the fines. In order to illustrate this point the following screen-analysis is given:

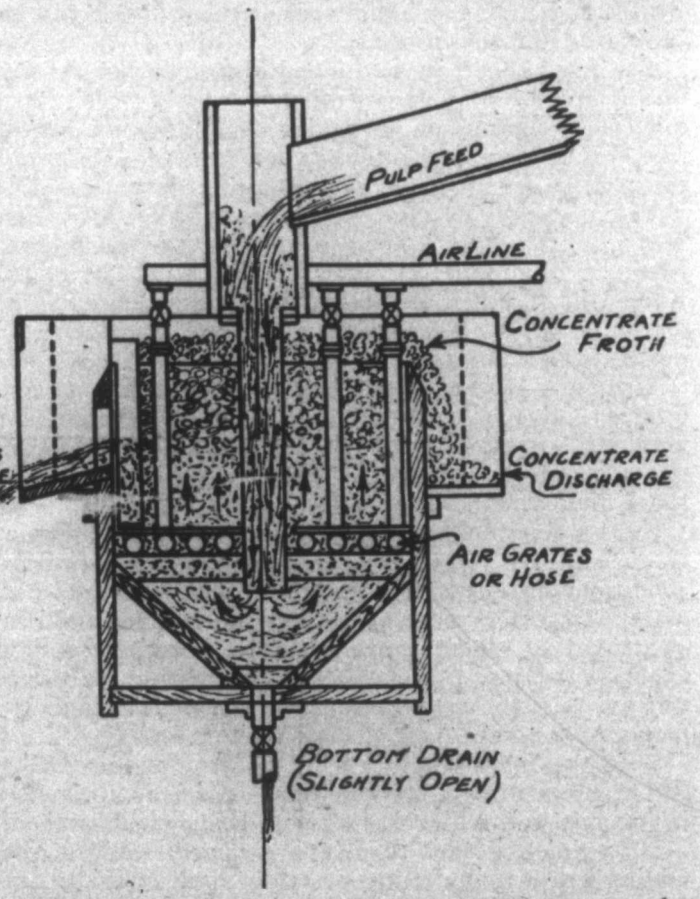
Flotation-heads screen-analysis.

Heads—1.38 per cent Cu.

Mesh.	Total p.c. Weight.	Cumulative p.c. Weight.	Assay p.c.Cu.	Total p.c. Contents.
20	5.9	5.9	1.00	4.2
40	13.0	18.9	1.06	9.8
60	15.5	34.4	1.30	14.4
80	9.6	44.0	1.36	10.5
100	7.0	51.0	1.52	7.5
150	11.0	62.0	1.58	12.4
200	6.2	68.2	1.56	6.9
200 (minus)	31.8	100.0	1.52	34.3

All the sulphide minerals that are minus 80-mesh can be recovered effectively by the flotation process.

In the evolution of the art of ore-dressing (which, one might say, had its origin in the simple separation by hand-picking), treatment of the fines has, up to quite recently, been carried on as an adjunct to the principal operation of coarse concentration by gravity. The introduction of the flotation process has, in many cases, modified the entire plan of operation, wherein coarse concentration was dispensed with entirely and the ores were crushed with a view to producing an all-slime product, suitable for flotation. The treatment of an ore entirely by flotation, involving as it does the all-sliming of the ore, can be done in a mill arranged



Sectional View of Petersen Flotation Cell in Operation.

with a simple flow-sheet. But this simplicity in mill-design is often obtained at the expense of higher crushing costs, and for this reason, gravity concentration is still considered an essential feature to be included in the design of modern mills.

In the milling of ores, wherein the valuable constituents are included with the sulphides, and it is desirable to recover all the sulphide minerals, a cust-

ment

[1] Presented at a meeting of the North Coast Branch, C.I.M. & M., Stewart, B.C., Aug. 31, 1920.

[2] Superintendent of Concentration, Granby Consolidated Mining, Smelting and Power Co., Ltd., B.C.

omary flow-sheet is one in which the crushing is done in stages, and the minerals separated by means of jigs and tables at the largest permissable sizes necessary for making a clean product, the slimes from each of these operations being separated by means of hydraulic classifiers and thickened in Dorr thickener tanks, to be subsequently treated by flotation. Each ore requires variation in the flow-sheet, but, in general, most ores require crushing through 20-mesh to completely free any appreciable quantity of the sulphide minerals.

Stage-crushing, with its complicated flow-sheet, is of doubtful advantage, unless it is possible to reject a certain proportion of coarse tailing. While it is true that a small saving can be made in the crushing costs by the recovery of a coarse concentrate and in some cases a slightly reduced smelter-treatment charge is obtained, these advantages are more than offset by the complicated mill flow-sheet. From the writer's observations of the size of mineral crystals in various ores, he feels safe in stating that in not many instances is it possible to reject a clean tailing coarser than 20-mesh.

The logical place for flotation in a mill flow-sheet is at the beginning of the separating process. That is, the first concentrate should be from flotation, and the values from the slime-portion of the ore removed, so that the tailing from flotation can be divided after classification into two products, viz., fines or slimes to be rejected as tailing, and the coarse products or sands to be the feed for concentrating tables, these tables making a clean concentrate, a middling to be re-ground and re-treated, and a barren coarse tailing to be rejected. This flow-sheet is simple and has been obvious to millmen for some time. The arrangement of a flow-sheet in this manner has been the practice of the millmen in the south-west for some time. However, they have been limited to the coarseness of their grinding, owing to the inability of the flotation machines to treat a product much coarser than that passing through 48-mesh screens. It has long been realized by the writer that a flotation machine that could successfully treat coarsely ground ores would be a valuable factor in simplifying and reducing the costs of the milling process. Numerous experimental machines have been constructed and tried out, and eventually a machine was developed that has proved satisfactory. This flotation cell embodies the principles of the ordinary hydraulic classifier and of pneumatic flotation. It is automatic in operation, the water-level being maintained at the desired level by means of an overflow tailing discharge. The banking of the pulp is prevented by a continual discharge through a spigot at the spigot at the bottom of the cell. Air is introduced through a hose-type of air-grate, inside of which is a spiral copper-wire coil to prevent the hose from collapsing. The hose is coiled into the flotation tank in such a manner as to leave spaces of approximately one inch between the coils, so as to allow free movement of the pulp. This Peterson cell has been in successful operation at Anyox for a period of two years.

There is no question, but that the type of flow-sheet described will be applicable in some modified form to the treatment of the gold and silver ores of the Alice Arm and Stewart districts. However, from experiments conducted at Anyox, the writer is of the opinion that flotation and gravity concentration, with the cyaniding of the tailings, and possibly the concentrates, will ultimately be the processes used for the recovery of the gold and silver.

SMASHING "SMELTERS" STOCK.

ALEXANDER GRAY, Montreal.

Speculators have been trying to shake public confidence in Consolidated Mining & Smelting stock.

The "bears" have it that conditions do not warrant the market price and that dividends may be suspended.

As the incident was to be expected, because "bears" fatten upon misfortune—and speculatively are not an unmixed evil—it is not inopportune to direct attention to the fact that this company is somewhat beyond the ken of the dolorous.

Whatever the immediate course of share markets may be, the Consolidated Company has become an outstanding feature of Canadian mining industrialism. Its capital expenditure is about ended; its mines are unexcelled ;its metallurgical problems have been solved —and the control rests with a directorate that is vitally interested in the development of British Columbia as a whole.

Undoubtedly there have been periods since the Armistice and metal markets were disrupted when the company did not earn the dividend. That did not deter the administration and management from the financing of plants, the development of power and mines—and from the quest for more mines. Dividends were maintained, for shareholders were patient throughout lean years, and the directors felt assured that the accumulating assets and earning capacity counted for more than temporary industrial reverses. The mining position became so strong, the metallurgy of the complex ores predominating, had to be perfected—and that goal having been reached, plant extensions were completed with all the greater confidence.

At any time, the Consolidated Company of late could dispose of its Sullivan Mine for a sum greatly in excess of its entire capital liabilities. The company, however, has no intention of selling a property with sufficient ore in sight to feed a mill for fifty years at the rate of one thousand tons per day—especially when it is understood that the metalliferous contents of those ores are being recovered in increasing quantities. Within this year, owing to the metallurgical advances due to flotation. the Sullivan moved higher in the list of the world's larges mines—and there are other properties held by the company which reinforce the optimism of the Board. If Sullivan ores did not appeal to American metal market masters when their refractory nature was unquestioned, that objection having been surmounted —half a century of activity at least being assured from that source—the vagaries of share markets need not disconcert shareholders familiar with the affairs of the company.

On the other hand, the attempt to unsettle sentiment toward "Smelters" securities is a national offence. Without Trail outlays and perfected metallurgy, British Columbia mineral resources might be relegated to future decades, whereas recent developments give to those resources a very much more profitable status. There is nothing exotic about Trail. It is as much of an institution as the contemporary metallurgical works of magnitude elsewhere. Through the medium of its expansive programme the Pacific Coast province has been given fresh impetus—and only now is this into effect. Consolidated zinc, despite high costs, onerous freights and slow metal markets, is going to Europe and the Orient. Consolidated products in more varied forms and greater quantities will remedy merely momentary influences. Trail is on the map—to stay there.

Legislation Relating to the Regulation of Mines in Canada

A Comparison of the Various Provincial Laws on the Subject.

(From November "Labor Gazette".)

This article is the fourth and last of the series examining and comparing the laws in force in the several provinces of Canada on the subjects covered by the Dominion-Provincial Commission on Uniformity of Labour Laws which met at Ottawa in April 1920.

This Commission found that many minor provisions in the various Acts throughout Canada were made necessary by local conditions and that concerning these no real uniformity was possible. They therefore directed their attention to those principles of a general character which are applicable to all provinces, and recommended that uniform standards be adopted as follows:—(1) A minimum age of 14 years for boys working above ground, and 16 years for those below ground; (2) A minimum age of 18 years for those in charge of power machinery for moving material and 21 years for those in charge of such machinery for moving persons; (3)The adoption of the 8-hour day; (4) The semi-monthly payment of wages and the prohibition of such payment in hotels and the cashing of pay cheques on licensed premises; (5) Legislation providing for miners' liens; (6) No deduction to be made from wages except sums for powder, coal, oil, rent and such doctor's and hospital fees as may be approved by the Workmen's Compensation Board, and supplies necessary to the carrying on of work; the prohibition of deductions for payment of any debt due by the employee without his written consent given individually or by collective agreement; (7) Where certificates of competency are required, examinations to be conducted by a board composed of a government inspector, a mine manager and a working miner; (8) All candidates for certificates as mine managers, pit-bosses, etc., to have at least five years' mining experience, to produce evidence of ability, sobriety and good conduct, and to be at least 23 years of age; (9) Mine inspectors to be holders of mine managers' certificates, with at least seven years' mining experience in the class of mine concerned. (10) Without limiting the powers of inspectors, an inspector to have power to enter, inspect and examine any mine or any part thereof at all reasonable times by day or night, to examine into ventilation and safety, and to give notice in writing of any thing which he considers dangerous and defective and of its immediate remedy; if disagreement follows, the defect to be referred to a board of arbitration consisting of a judge and representatives of the interested parties, the decision of the tribunal to be final; (11) All mines to be adequately ventilated and examined before the entry of the workmen, a report of such examination to be entered in a book which shall be always available to any employee of the mine; (12) The health of employees in mining camps to be fully protected and laws on this subject unified as far as possible; (13) Present laws regarding special investigations to be continued and extended to the other provinces; (14) Provision for first aid and mine rescue work to be made by the Workmen's Compensation Board of each province and special provisions to be made in those provinces where no such board exists.

The present article deals only with those provisions in the mining laws which refer to the subjects covered by the Commission's report.

Application.

Inspection and regulation of mines is provided for by law in the Territory of the Yukon and in all Canadian provinces except New Brunswick and Prince Edward Island. Nova Scotia and British Columbia have each two Acts the one referring to coal and the other to metalliferous mines. In the former province the Coal Mines Act applies also to mines of stratified ironstone, shale and fire clay. The Ontario law covers all mines, including those of coal and salt and all oil and gas wells. The Mining Act of Alberta applies to mines of coal, stratified ironstone, shale clay and other minerals, also to all places where coal is extracted by removing the overlying strata. If any question arises, otherwise than in the course of legal proceedings, as to whether any mine comes within the scope of the Act, the Minister of Public Works is empowered to decide. Manitoba excludes stone quarries and all mines where not more than six persons other than the owner are employed underground. Saskatchewan and the Yukon include all mines, and Quebec all mines and quarries.

Employment of Women and Children.

Quebec, Ontario, Saskatchewan and Alberta forbid the employment of women and girls in mines except for office work. The Metalliferous Mines Act of British Columbia prohibits their employment below ground, and the Coal Mines Act of the same province allows them to perform clerical and domestic duties only. The laws of Nova Scotia, Manitoba and the Yukon have no provisions on this subject.

With regard to boys, Ontario fixes 16 years as the minimum age of employment above ground and 18 years below ground. The Coal Mines Act of British Columbia and the Mines Act of Alberta prohibit work above ground by boys under 14 years of age, and below ground by those under 15 and 16 years respectively. The latter province, however, provides that no child under 16 years may be employed at all unless he holds a school certificate. This rule is in force also in Quebec where the minimum age for employment underground is 15 years and in Nova Scotia and the Yukon, where no boy under 12 years may do any work in a mine. Saskatchewan fixes 14 years as the minimum age for employment in any mining work and the Metalliferous Mines Act of British Columbia forbids work below ground by any boy under 12 years. The Mines Act of Manitoba has no provisions on this subject, but the Children's Act prohibits the employment of any child under the age of 16 years in any dangerous or unwholesome occupation.

Operation of Power Machinery.

The Territory of the Yukon does not demand any particular qualifications or fix any age limit for persons in charge of hoisting machinery, but all the provinces have made rules in this regard. In Saskatchewan and Alberta and in the metalliferous mines of British Columbia the minimum age for this class of employees is 18 years, while in coal mines in the latter province

no one but a man of 22 years of age or over may be in charge of machinery used to hoist persons, and he must have a medical certificate renewed every six months to the effect that he is physically and mentally fitted to perform his duties. Hoists for moving material may, however, be operated by a person 16 years of age. In the coal mines of Nova Scotia machinery used for conveying persons must be in control of a man 21 years of age or over who holds at least a third-class certificate as a stationary engineer. The Metalliferous Mines Act of this Province fixes 18 years as the minimum age for operators of any machinery used for moving persons. The Ontario law provides that no one under 20 years of age and no person who has not had at least one month's experience may have charge of any machinery used for moving persons, but a lad of 18 years may operate an engine for hoisting material. All operators must, however, be physically and mentally fit for their work. Twenty years is also the minimum age fixed in Quebec for employees in charge of a hoist used to convey persons in a mine.

Hours of Labour.

The Territory of the Yukon and all the Canadian provinces except Manitoba and Saskatchewan have limited hours of labour for some or all classes of mine employees. The Yukon has adopted the 8-hour day and the 48-hour week for workers under 16 years of age, while Quebec has fixed the same limit for those under 17 years. Nova Scotia allows employees under 16 years to work 10 hours a day and 54 per week in both coal and metalliferous mines. A week in all cases means the six days from midnight on Saturday until midnight on the following Saturday.

The 8-hour day and 48-hour week for certain adult workmen in mines is enforced by law in Alberta, British Columbia and Ontario. In Alberta it applies to all underground workers and in British Columbia to all workers, both above and below ground, except persons employed in the office, boarding house or bunk house of the mine. In Ontario it governs all underground workers, (except shift bosses, pumpmen, cagetenders, hoistmen, persons engaged solely in surveying or measuring, and workers in a mine where the number of persons working in a shift does not exceed six), in districts that are without county organization, which includes nearly all those parts of Ontario where mining is carried on.

In Ontario the 8 hours must be reckoned from the time the workman arrives at his place of work in the mine to the time he leaves it. In coal and metalliferous mines in British Columbia and in Alberta the period between the time a workman leaves the surface and the time he returns must not exceed 8 hours. In Alberta, it is provided that the time for the raising and lowering of each shift must be arranged by the owner, agent of manager of the mine in such a manner that every workman shall have an opportunity to return to the surface in the specified time. A conspicuous notice of the time so fixed must be posted at the pit head and all arrangements made for the observance of the schedule. The time allowed for the raising and lowering of each shift must not exceed what is reasonably required and must be approved by the Chief Inspector. The owner, agent or manager of a mine must appoint one or more persons to direct at the pit head the raising or lowering of workmen, and a book must be kept in which is entered the time of such raising and lowering, and any cases in which a workman is below ground for a longer time than is allowed by law, and the cause of his remaining under ground. The workmen may, at their own expense, station one or more persons at the pit head to observe the times of raising and lowering the workmen, and such persons are to be appointed in the same manner as the check weigher and bear the same relations to the owner, agent or manager of the mine.

In all provinces, with the exception of Quebec, overtime may be worked in case of accident or emergency. Nova Scotia and the Yukon, where, as in Quebec, the legal limitation applies to boys only, recognize no other grounds on which longer hours are permissible. In Ontario a Saturday shift may work more than 8 hours for the purpose of avoiding work on Sunday, or for changing shift at the end of the week, or to give any of the men a part holiday or to make necessary repairs. In the event of any grave economic disturbance the Lieutenant-Governor in Council may suspend the 8-hour law for such time as he deems advisable. The Mines Act of Alberta contains a similar provision. This province allows a repairing shift for the purpose of avoiding Sunday labour to commence their work period on Saturday before 24 hours have elapsed since the commencement of their last period, provided that at least 8 hours have passed since its termination. A workman may also remain below ground for more than 8 hours if any exceptional work requires to be done without interruption, in order to avoid serious interference with the ordinary work of the mine. The British Columbia Coal Mines Act provides that where more than two shifts are worked, the outsetter, bottomer or cager, pumpmen, stablemen and engineers in charge of constantly running machinery other than that directly used for the mining of coal at the face, and the fire boss or shift boss in charge, may be relieved at the place of duty, but in no case may any person remain underground for more than 8½ hours except when extra hours are necessitated by the weekly change of shift where more than two shifts are worked. A pumpman or engineer in charge of constantly running machinery may also be below ground for more than 8 hours to deal with anything which requires immediate attention, and which, if neglected, might necessitate the closing of the mine. The overman or manager may enter the mine at any time and remain there in the discharge of his duties. The Metalliferous Mines Act of British Columbia allows overtime in case of accident or emergency only.

Wages.

The mining laws of Ontario and Alberta direct the semi-monthly payment of wages, and in British Columbia the Semi-monthly Payment of Wages Act applies to all mines, while the Mineral Survey and Development Act of 1917 makes provision for this method of payment of workmen on mining properties under bond or option. In Nova Scotia all wages except those fixed at a regular monthly rate must be paid weekly in all mines to which the Coal Mines Regulation Act applies. The other provinces make no rulings on this subject.

The Truck Act of British Columbia and the Coal Mines Regulation Act of Nova Scotia direct all wages to be paid in currency, but there are no rules to this effect in the other provinces.

The Coal Mines Regulation Act of Nova Scotia and British Columbia, and the Mines Act of Alberta provide that where the wages of miners depend on the amount

of mineral produced by them, they shall be paid according to the weight of such mineral, which is to be weighed as near the entrance to the pit mouth as is practicable. These three Acts and the Mines Act of Saskatchewan contain sections permitting the employees thus paid to station at their own expense a representative called the check-weigher at the place appointed for the weighing of the mineral. In Nova Scotia the check-weigher is elected by ballot at a meeting of the employees interested, and cannot hold office for more than one year unless re-elected. The British Columbia law does not demand any special qualifications for this position, but the other provinces require that candidates should be working miners with at least three years' experience. In Saskatchewan and Alberta appointees must be residents of the province, and in Nova Scotia they must have certificates and at the time of their appointment be employed in the colliery in which they are to serve. In all cases the check-weigher must be given every facility for the proper discharge of his duties, and Nova Scotia, Saskatchewan and Alberta direct the owner, agent or manager of the mine to provide him with a shelter from the weather and a desk at which to write. The laws of these provinces forbid the check-weigher to impede in any way the working of the mine, or to interfere with the weighing. There need be no delay on account of his absence. If he is guilty of misconduct, the owner, agent or manager of a mine may, on sufficient evidence, have him removed by order of a court of competent jurisdiction, and another check-weigher may be elected or appointed in his place. In Saskatchewan, Alberta and British Columbia the owner, agent or manager of the mine may, at the request of the majority of the miners, make a "pro rata" deduction from the wages of each miner sufficient to meet the wages of the check-weigher, and may then pay him in the same manner as the other employees. Wherever in these four provinces the workmen are paid by order of the Minister or by mutual consent, otherwise than according to the amount of mineral produced by them, they may at their own expense employ one or more persons to check the correctness of the measurements or method according to which payment is made, and the provisions in the Act applying to check-weighers shall apply to such persons.

The Mining Act of Alberta and the Coal Mines Regulation Acts of Nova Scotia and British Columbia permit the owner, agent or manager of any mine to agree with his employees that deductions be made in respect of stones and other material, such deductions to be determined by mutual agreement or by some person or persons appointed by the employers and employees for the purpose. In Nova Scotia and Alberta provision is made that where the representatives of the two parties fail to agree, they or the Minister or Commissioner, may choose a third person to act with them, and a decision of the majority of the three shall be final. In a mine where employers and employees have failed to appoint anyone to determine deductions, the Minister or Commissioner may appoint some person on their behalf.

With regard to other deductions the Alberta law allows any workman to authorize the employer in writing to apply the whole or part of the wages due him to the payment of any debt owing by such workman. The employer may also retain sums due by any employee for coal, oil, rent or other supplies. The Coal Mines Act of Nova Scotia adds to this list check-weighers' and doctors' fees, church, hospital and society dues, but forbids deductions for school or other rates, except with the written consent of the workman. This prohibition appears also in the Metalliferous Mines Act of this province and is the only reference to deductions from wages found therein.

In 1919, British Columbia passed an amendment to the Coal Mines Regulation Act providing for the appointment of a Board to fix minimum wages for coal miners. The Board consists of one representative each of employers and employees, with the Chief Inspector of Mines as Chairman.

Ontario, the Yukon, both Mining Acts of British Columbia, and the Metalliferous Mines Act of Nova Scotia, forbid the payment of wages in any tavern or place where liquor is sold. The Quebec Act does not contain any reference to this subject, but prohibits the sale of liquor within a radius of seven miles of any mine, and gives the Inspector of Mines control of all licenses in his district. This province also forbids the cashing of pay cheques in any tavern. In many provinces the clauses relating to this subject have been repealed by the temperance laws passed during the last few years. This has been the case in both Alberta and Saskatchewan where the prohibition of payment of wages on licensed premises and cashing of pay cheques in hotels was contained in the Liquor License Acts repealed in 1918 and 1917 respectively. The Ontario Temperance Act of 1916 repealed the Liquor License Act of that province which prohibited the cashing of pay cheques in hotels and the sale of intoxicants within six miles of any mine. Nova Scotia omitted from the 1918 Coal Mines Act the clause which in the old law forbade the payment of miners in hotels, etc. This was presumably done owing to the passing of the Temperance Act of that year, which is a prohibition measure.

In Ontario and the Yukon every person who performs labour for wages in connection with any mine mining claim or mining lands, has a lien thereon. The other provinces have no legislation on this subject.

Certificates.

The Coal Mines Regulation Acts of Nova Scotia and British Columbia, and the Mines Acts of Alberta and Saskatchewan contain sections relating to the examination and licensing of workmen.

In Saskatchewan examinations are held from time to time by an inspector of mines, while in the other three provinces they are conducted by a Board of examiners. The Nova Scotia Board consists of the Inspector of Mines with one mining and one mechanical engineer. In Alberta two managers and two working miners, and in British Columbia one representative each of the coal miners and the mine owners act with the Chief Inspector in conducting examinations for certificates.

There is considerable difference in the laws of these four provinces with regard to the classes of workmen for whom certificates are required and the qualifications demanded. Nova Scotia requires certificates of competency for a manager, underground manager, overman, mine examiner and stationary engineer; British Columbia for a manager, overman, shift boss, fire boss, shotlighter, and mine surveyor, and Alberta for a manager, overman and mine examiner. In Nova Scotia a candidate for manager, underground manager, or overman must be a British subject at least 21 years of age, with four years' underground working experience, part of which must

have been at the working face. A candidate for manager must have a certificate of competency as underground manager, or have had at least three years' practical experience and a degree as mining engineer from some approved college or university. A candidate for underground manager must have a certificate of competency as an overman. Those qualifying as first class stationary engineers must be at least 24 years of age and holders of second class certificates. In addition they must have served one year at mechanical work on machinery, or in charge of a hoisting or haulage engine or steam plant, or two years in charge of some other type of engine, or three years at mechanical work in a machine shop. Candidates for second class certificates must be certificated third class engineers with one year's experience, and have reached the age of 21 years, while anyone entering for the third class examination must be 18 years of age and have served six months as a licensed fireman, twelve as engineer, assistant engineer, pumpman, oiler or locomotive engineer, or eighteen months at mechanical work in a machine shop. A British subject, 21 years of age who has had at least three years' practical experience in a coal mine, holds a certificate of competency as a coal miner and has a practical knowledge of gas, explosives, ventilation and timbering, may present himself for examination as a mine examiner. All candidates must give satisfactory evidence of sobriety, experience and general good conduct.

British Columbia requires of a candidate for a mine manager's certificate that he be at least 25 years of age, and have either five years working experience or a degree showing a course in scientific coal mining at an approved university or college, together with four years' practical mining. Any person entering for examination for a certificate as overman must be at least 23 and have five years' experience, while candidates for shift boss, fire boss or shotlighter must have a similar age qualification and three years' practical mining; a certificate in first aid work is required of all applicants.

Both Nova Scotia and British Columbia provide for the holding of examinations for the granting of certificates as coal miners. In the former province the Commissioner of Public Works and Mines appoints for this purpose local boards of two persons having practical experience as coal miners in Nova Scotia, and one underground manager. In British Columbia the Inspector of mines for the district and one representative each of mine owners and miners from the Board of Examiners. Examinations must be held on at least one day in every sixty at each colliery designated by the Minister. Both provinces require one year's working experience of all candidates, and British Columbia adds the provision that they must be familiar with the English language.

The Alberta law requires that a candidate for manager's certificate shall have at least five years' practical experience either wholly or partly in Canada, or he must hold a diploma showing a course of two years or more in scientific or mining subjects at an approved college or university, together with three years' experience in a coal mine as above. He must also be at least 25 years of age. An applicant for a certificate of overman or examiner must be 23 years of age and have three years' working experience. All candidates must produce evidence of good conduct and sobriety, and also a certificate from a medical practitioner or a recognized ambulance society showing him to be qualified to render first aid, and applicants for certificates of the second and third classes must satisfy the board that they are able to speak and write English. All three provinces direct that a register of all holders of certificates be kept. They also provide that in case complaint is made to the authorities that any holder of a certificate is guilty of incompetence, gross negligence or any offence against the mining law a public inquiry into his conduct may be held, and if the charge is sustained, the Minister may cancel or suspend the certificate of such employee. The British Columbia law permits the granting of a certificate without examination to the holder of a certificate granted in any British Dominion if the standard is equivalent to that required by the Act. Saskatchewan allows the same privilege to holders of satisfactory certificates from the United States, and Alberta extends it to persons from any country where the standard is equivalent to that demanded by the Act. Permission is also given for the granting of provisional certificates.

Inspection.

The mining laws of Nova Scotia, Ontario, Manitoba and the Yukon do not contain any reference to qualifications of inspectors. In Quebec these officers must be mining engineers who have practised their profession for at least five years and are possesed of sufficient knowledge of mineralogy and metallurgy for the satisfactory discharge of their duties. The Coal Mines Act of British Columbia and the Mines Act of Alberta and Saskatchewan require all inspectors to be holders of mine manager's certificates, while the the Metalliferous Mines Act in the first named province demands seven years' practical experience in mining. It also confers on the Provincial Mineralogist all the powers of an inspector. This law forbids an inspector to act as manager, agent or lessee of any mining or other corporation, or to make any report on a mine or mining property with the object of promoting its sale. The Alberta law stipulates that inspectors may not act as mining engineers or mine managers within the province while the Coal Mines Act of British Columbia and the Mines Act of Quebec disqualify any person who has any interest directly or indirectly in any time in his district.

In all the Canadian provinces and in the Yukon the inspecter may enter the mines in his district at all reasonable hours in the performance of his duties but may not unnecessarily impede the working of the mine. In Nova Scotia and British Columbia he must visit each mine and every part of it at least once a month, but the other provinces and the Yukon do not contain any reference to frequency of inspection. The Yukon and all the provinces except Quebec have sections relating to the powers and duties of inspectors. They may examine into and make inquiry respecting the state and condition of any mine or any part thereof, the ventilation, the sufficiency of any special rules, and all things affecting the safety of the persons employed therein. In coal mines in Nova Scotia and all mines of British Columbia and Alberta the inspector must, after each visit, cause a copy of his report to be posted in a conspicuous place at or near the mine. In the Yukon and all parts of the Dominion, except in Quebec and the coal mines of Nova Scotia, the inspector must give notice in writing to the owner or manager of the mine of anything which he finds to be dangerous or defective and direct that it be remedied within a specified time. The Ontario, Saskatchewan and Alberta Acts and the

Coal Mines Act to British Columbia authorize any inspector to order immediate cessation of work and the departure of all persons from any mine or part of a mine which he considers unsafe, or to direct work to be carried on in such place with any precautions he may deem necessary. The British Columbia Coal Mines Act, the Metalliferous Mines Act of Nova Scotia and the Saskatchewan and Alberta laws provide that, in case of disagreement following such notice, the matter shall be arbitrated by one representative of each of the interested parties and an umpire. In British Columbia this third member of the Board is chosen by the other two, while in Alberta and Saskatchewan a judge acts in that capacity. The Nova Scotia Act names the Commissioner of Mines as umpire.

The Coal Mines Act of British Columbia empowers the inspector on his own initiative, or on written application of any three miners, to examine any employee of a mine in order to ascertain whether he is physically and mentally capable of performing his duties, and if he finds that the incapacity of any workman impairs the efficient working of the mine or endangers the safety of the other persons employed, he may order his removal.

Both Mining Acts of Nova Scotia, the Coal Mines Act of British Columbia and the mining laws of Alberta, Saskatchewan and the Yukon permit the workmen to appoint one or more competent inspectors to examine thoroughly the mine on their behalf and such inspectors must be allowed every facility for the carrying out of their duties.

Ventilation and Inspection.

All the Mines Acts except that of Quebec require that every mine shall have adequate ventilation. Saskatchewan fixes a standard of 100 cubic feet and Alberta 200 cubic feet for each person and animal, while the Coal Mines Act of British Columbia demands 100 cubic feet for each man and 300 for each animal. All air must travel free of stagnant water, stables and old workings. The inspector may, if necessary, direct that more air be supplied, and in this event the British Columbia law requires him to post a notice at the mouth of the mine stating the quantity of air which is necessary for health and safety. The Ontario law provides that where the ventilating current is not sufficient, mechanical appliances must be installed and operated, while the Coal Mines Act of Nova Scotia provides for the use of brattice where the natural air current does not suffice to keep working places free of all inflammable or noxious gases. All cross cuts made for width and height between the openings which they connect. The Coal Mines Act of British Columbia directs that where ventilation is provided by a mechanical contrivance the apparatus must be so placed that it will be uninjured by an explosion. This Act and the Saskatchewan and Alberta laws make provision for the division of each mine into districts or splits of not more than 70 men, each district being supplied with its separate current of fresh air, and in the two former provinces every place must be bratticed up to within four yards of the face. In British Columbia and Alberta these rules apply to all mines, but in Saskatchewen they need not be complied with where safety lamps are not necessarily used. In such mines, however, narrow working places must not be driven so far ahead of ventilation that the air becomes visibly foul, and in no case more than 40 yards.

Examination of all working places in a mine is provided for in the Yukon, Alberta, Saskatchewan and in both Mining Acts of Nova Scotia and British Columbia. The Yukon law and those governing metalliferous mines in Nova Scotia and British Columbia state that all working places must be thoroughly examined by a competent person at least one in every 24 hours, and the British Columbia Act requires the examiner to make a report which is recorded in a book kept for the purpose. The Coal Mines Act of Nova Scotia and British Columbia and the Saskatchewan and Alberta laws make provision for the appointment of stations at the entrance to the mine or to any part of it, and all portions of the mine beyond such stations must be examined before the workmen are permitted to enter. This inspection is to take place at least once in every 24 hours and in British Columbia and Saskatchewan immediately before the commencement of work. The Nova Scotia and Alberta laws stipulate that it must be made within three and four hours respectively of the time the workmen enter the mine. In all cases the examiner must make a report which is recorded in a book. In Alberta and British Columbia a copy of such report must be posted immediately in a conspicuous place ,while the other two provinces stipulate that the book bearing the record of examinations shall be open to employees at all reasonable times. The British Columbia law and those of Alberta and Saskatchewan make provision for a more frequent examination of any mine where inflammable gas has been found at any time during the preceding 12 months. If at the time of any examination dangerous gas is found to be present in any mine, Nova Scotia, British Columbia, Saskatchewan, Alberta and the Yukon authorize the withdrawal of all workmen until the danger is over.

Health of Employees in Mining Camps.

The question of health of employees in mining camps is in every case dealt with by the Public Health Acts, and all parts of Canada except the Yukon have laws on the subject. In Nova Scotia no person may establish, conduct or maintain a camp without a permit from the Medical Health Officer to the effect that its sanitary conditions are satisfactory. The Superior Board of Health of Quebec may by by-law require the employment of duly qualified practising physicians by proprietors of mining camps employing 25 or more men. In Ontario and British Columbia employers in camps may by regulation be required to retain the services of a qualified medical practioner, and in addition to provide permanent or temporary hospitals. Houses and premises for the accommodation of workmen are subject to inspection, and the British Columbia law further empowers the inspector to visit all camps in his district during the months of April and May in each year to examine the sanitary conditions and the water supply. The Public Health Act of Alberta provides for the sanitary control of all public places and all houses, temporary or permanent, and regulations covering mining camps have been issued thereunder. The Provincial Board of Health of Manitoba and the Commissioner of Saskatchewan are empowered to make regulations relating to mining camps. Although no mining act appears on the statute books of New Brunswick, the Public Health Act of 1918 protects the health of employees in mining camps, making provision for regulations regarding the inspection of all houses and places connected therewith, and for the erection of permanent or temporary hospitals and the services of duly qualified physicians. A 1919 amendment requires special precautions to be taken against smallpox.

Special Investigations.

All the mining laws except those of Quebec and Saskatchewan contain clauses authorizing the holding of special investigations. In Alberta and in both classes of mines in Nova Scotia, the Minister or Commissioner may appoint one or more persons possessing legal or special knowledge to act with the inspector in holding an investigation into any accident, or into any matter connected with the working of any mine. The Inspector may make the investigation in the way he considers most effectual, and he has right of entry to any place and power to require production of any document, and to take evidence under oath. He must make a full report of the inquiry which may be made public. The Mining Ordinance of the Yukon authorizes a similar investigation to be made by the inspector unaided. The British Columbia Coal Mines Act empowers the Minister to appoint any person scientific or other qualifications to make a special investigation and report upon any mining operations so far as they relate to the safety of life and property in any mine, such person to have right of entry and access to records. The report of such inquiry may also be made public. Under the laws of Ontario and Manitoba and the Metalliferous Mines Act of British Columbia, the Minister may require the inspector to make a special report of any accident which has caused loss of life or serious personal injury to any person, the first named province giving him power to take evidence on oath and compel attendance of witnesses and production of documents. Under the British Columbia Act, the report of such investigation may be made public.

The Canada Explosives Act provides for an investigation into the cause of any accident from explosion of an explosive occurring in any mine or quarry in provinces whose laws make no provision for such inquiry.

First Aid and Mine Rescue Work.

The Workmen's Compensation Acts of Nova Scotia, New Brunswick, Alberta and British Columbia provide that employers in any industries may be required to maintain such first aid appliances and service and transportation for injured workmen as the Board may direct. The Coal Mines Act of Nava Scotia also contains a clause to the effect that properly constructed ambulances or stretchers with splints and bandages shall be kept at all mines ready for instant use. The same law empowers the Commissioner of Mines to make any necessary regulations for the purpose of ascertaining the fitness and qualifications of and the granting of certificates to persons skilled in the use of mine rescue apparatus. Alberta requires every applicant for a certificate as manager, overman or mine examiner to produce a certificate in ambulance work from a qualified medical practitioner or a recognized ambulance society.

The Ontario Mining Act directs that a properly constructed stretcher and the first aid service prescribed by the Workmen's Compensation Board, and, where poisonous or dangerous compounds, solutions or gases are used or produced, proper antidotes plainly labelled with explicit directions for use, must be kept in an accessible place. Life lines, and belts in good order are to be kept ready for immediate use. At all blast furnaces, breathing apparatus and portable resuscitating apparatus of approved type with an adequate supply of oxygen and absorbent material must always be maintained. In each working shift one or more workmen appointed by the Superintendent and trained in the use of this apparatus must be always on duty.

The Mining Act of Alberta authorizes the Lieutenant-Governor in Council to make arrangements for the intallation and operation of mine rescue stations and cars, and to make regulations regarding the provision of emergency hospitals and any other matter that he may consider advisable in the interests of safety. This Act directs that properly constructed stretchers with splints and bandages be kept ready for immediate use.

The Ambulance Act of British Columbia requires that any employer of labour directly or indirectly operating any mine, (except those operating under the Coal Mines Act) or any camp, employing more than 30 persons situated more than 6 miles from the office of a physician, shall employ at least one person possessing a certificate of competency to render first aid, and also provide one or more good ambulance boxes. The employer must forward to the Provincial Secretary the name of the person in his camp who is qualified to render first aid and the number of such person's certificate.

The Coal Mines Regulation Act requires the owner, agent or manager of every colliery to establish such number of oxygen helmets or some form of mine rescue apparatus as may be approved by the Minister, and to keep them in workable condition and so placed as to be immediately available when wanted. This Act empowers the Lieutenant-Governor in Council to establish mine rescue stations for the purpose of supplementing, in case of need, the colliery installations of mine rescue apparatus, and also for the training of holders of certificates of competence in the use of such apparatus, and the owner, agent or manager of every mine must see that all physically fit certified officials, and such number of workmen as the Chief Inspector may direct, receive such training. The rescue stations are, subject to the order of an inspector, available in case of emergency for the use of any trained corps of mine rescuers, qualified medical practitioners, or trained first aid corps.

Conclusion.

From the foregoing account it will be seen that none of the mining laws of the Dominion conforms on all points to the standard set by the report of the Commission on Uniformity of Labour Laws. Two provinces have fixed the minimum age for boys at the age named in the report and five have adopted the 8-hour day either wholly or in part. Two provinces have laid down all the rules regarding payment of wages that the Commission considered desirable, and in one province and the Yukon provision is made for miners' liens. In two provinces examination of candidates for certificates are conducted by a board of three members, but only one province demands the qualifications which the Commission deemed necessary for such candidates. Two provinces give full power to inspectors and arrange for arbitration in case of disagreement. Four provinces provide for adequate ventilation and inspection, and all have some measure of protection for the health of employees in mining camps. Five provinces and the Yukon make some provision for special investigations. The standards laid down by the Commission regarding deductions from wages, qualifications of mining inspectors and the minimum age for workmen in charge of power machinery are not attained by any province. The administration of first aid and mine rescue work is in no case entirely in the hands of the Workmen's Compensation Board.

Northern Ontario Letter

The Cobalt Field.

Although at the time of writing, no rain of any importance is reported, yet the comparatively mild weather is having a favorable effect on the hydro-electric power supply. With considerable snow on the ground, and with more or less warmth still in the ground, the flow of water in the innumerable streamlets has increased, and this has at least prevented any further lowering of the water in the main waterway from which the hydro-electric energy is generated.

The Beaver Consolidated, which was the only producing silver mine to curtail operation is preparing to resume work, according to official advice to the Canadian Mining Journal. Advantage was taken of the slack period to make certain repairs to the mill, and the fact that work is now to resume is taken as an indication that the management anticipate the worst may be over in the power situation.

Following negotiations between members of the Temiskaming Mine Managers' Association and members of the Central Council of Workmen of the Cobalt mines, it has been arranged to organize an Employees' Sick Benefit Fund. It has been provided that the men shall each contribute 75 cents a month, this amount being deducted from their pay. The mining companies shall each pay an amount equal to that of their employees. The benefits to be provided will consist of $2.75 per day for the first 13 weeks of illness, and half that amount for a second period of 13 weeks. In no case will the benefit apply for more than six months in any one year. At death, the dependent of the deceased shall be paid $250.

In connection with the sick benefit scheme, a vote of the workmen was taken and resulted in a vote of 658, to 120 in favor of the plan. This vote included eleven of the more important operating properties. Incorporation is proceeding and a charter is being applied for at once so as to get the Fund in operation as quickly as possible.

After having been closed about five years, the transfer books of the Bailey-Cobalt Mines, Ltd., have been opened, and holders of stock are now given an opportunity to have it registered in their own name. Litigation involved the Bailey during the years in question, and the purchaser of stock found it impossible to record his holdings. This was one of the points of contention when contentious matters came up for trial, it being claimed by a certain faction of the litigants that control actually lay in different hands than would appear on the strength of the old records of five years ago. It is intimated in semi-official circles that W. J. Wright of Buffalo may be elected to the directorate of the Bailey at the next meeting. As regards the transfer of Bailey-Cobalt shares for stock in the newly incorporated Bailey Silver Mines which now controls the Bailey-Cobalt and the Northern Customs, nothing of a definite nature appears to have been sent out. The basis of transfer is ten of Bailey-Cobalt for one of Bailey Silver Mines.

Officials of the Chambers-Ferland mine of the Aladdin-Cobalt Company have declared it is their belief the recent new discovery of ore at the 385-ft. level may make a new mine out of the property. The extent of the mineralized zone is broadening out accordingly as work proceeds, and by basing calculations on former experience under somewhat similar conditions, the find is regarded as being among the most important in the history of the mine. The area under exploration and development is largely virgin territory and offers big scope for important results.

A report has just been issued on the Oxford-Cobalt Silver Mines. The statement is conservative throughout, and points out that low silver values have been encountered from time to time, with small sections showing high-grade milling ore. Particular emphasis is placed upon the similarity of the geological conditions as compared with the geological structure in the Beaver-Temiskaming area where large silver deposits have been found. The management is optimistic in regard to the future outlook on the property.

Gowganda and Elk Lake Areas.

The Sanderson Mines Syndicate is numbered among the new organizations which aims to develop mining property in the Gowganda district. This syndicate is preliminary to the incorporation of a $3,000,000 company which plans to take over and operate ten mining claims situated in the district, in the townships of Nicol, Haultain, Lawson and Chown. Representing the syndicate is a committee made up of Messrs. W. H. D. Miller, Chas. Ritz, and A. C. Wieland. This committee has added P. K. Brown to their number, and these four together with Stewart Troop will constitute a committee of management for the syndicate. The syndicate has its head office at Room 202, Southam Bldg., 128 Bleury St., Montreal.

Additional camps have been erected on the Cane Silver Mines, situated in the township of Cane. It has not yet been definitely decided as to whether a plant will be installed this winter, although the matter is now under consideration. No statement has so far been issued relation to returns from the recent shipment of about five tons of high-grade ore. The company's mine address is Kenabeek, Ont.

During the week ended Nov. 26th, ore shipments were again low from the Cobalt district, the Bailey and La Rose being the only two shippers, as shown in the following summary:

Shipper	Cars	Pds.
La Rose	1	87,289
Bailey	1	62,890
Total	2	150,179

During the corresponding period, the Mining Corporation was the only bullion shipper, this company sending out 60 bars containing 60,772 fine ounces.

Ore shipments over T. & N. O. Ry., during Oct. 1920:

SILVER ORE.

Cobalt Proper.

Ore shipments over T. & N. O. Ry. during October 1920.

		Tons.
1.	Coniagas	96.08
2.	Dominion Reduction	76.50
3.	Hudson Bay	31.87
4.	Kerr Lake	30.57
5.	LaRose	43.66
6.	Mining Corporation	520.17
7.	McKinley-Darragh	183.64
8.	Nipissing	554.94
9.	O'Brien	32.01
10.	H. F. Strong	30.00
11.	Temiskaming	139.79
		1,739.23

The above shipments were made to the following Companies:

Canada.

Deloro Smelting & Refining Co., Deloro Marmora	1,390.58
Coniagas Reduction Co., Thorold	160.69
Ontario Smelters & Refineries, Nigara Falls	30.00
	1,581.27

United States.

American Smelting & Refining Co., Pueblo	64.68
American Smelting & Refining Co., Perth Amboy	93.28
	1,739.23

Price of Silver.

Oct. 1st.	Highest	91.500
Oct. 19th.	Lowest	76.250
	Average	83.480

The Kirkland Lake Area.

The Lake Shore mine set another record in October by treating ore from which an average of $29.98 per ton was recovered. The report shows a total of 1,570 tons treated and a production of $47,078. The mill operated 89 per cent of the possible running time. The October output compares with $40.15 in September and $35,361 in August. Total output to date from this property amounts to $1,098,808. The main shaft has reached a depth of about 550 feet, the objective being to establish a main development level at a depth of about 550 feet, the objective being to establish a main development level at a depth of 600 feet and another at the 800-ft. level.

One of the new mining companies which promises to become active in the mining districts during the coming summer is the Thackery Gold Mine. This company has property in the Lebel township section of the Kirkland Lake gold area, as well as holding other groups of claims, in Thackery, Maisonville, and James townships. The company is capitalized at $2,000,000 made up of 2,000,000 shares of the par value of $1 each. The company's head office is in Toronto.

THE GOLD MINES

The Porcupine Area.

Mild weather has extended right up to the end of November, and the flow of water in the rivers is being maintained by an increase in the water flowing from the small streamlets which are fed by slowly melting snow. The power supply is not adequate to operate at full capacity, but the outlook is re-assuring.

This week the Hollinger has disbursed its 8th dividend so far this year, making a total of $1,968,000 for the period, with another $246,000 expected Dec. 28th. These figures are especially significant owing to the company having been able to secure less than two-thirds of the required number of workmen.

Attention has recently been directed to the fact that on the Millerton side of the Hollinger Consolidated, and less than the width of one claim from the boundary of the adjoining Moneta property is an ore body which measures 126 feet in width where crosscut at a depth of 55 feet, and with average gold values amounting to $4.80 to the ton. Forty feet of this averages $6.30 per ton, while 22 feet assays $6.50. The enormous width of this ore body would indicate the likelihood of the "glory hole" system of mining being adopted when dealing with it at some future date. This system of mining greatly reduces the cost, and the margin of net profit indicated is large. The large deposit is of more or less significance to the Moneta property in that its general strike is in that direction.

The question of increasing the capitalization of the Northcrown Mines is again being discussed. The large acreage held and the extent of the exploration and development scheme is believed to warrant adding another million shares and thus increasing the capital from $3,000,000 to $4,000,000. During the past summer, following the consolidation of the Porcupine Crown and the Thompson-Krist properties, difficulty was experienced in securing enough men. Later on, a shortage of power occurred. The result has been that revenue from milling operations has fallen below expectations. This encourages the belief that a capital increase might be resorted to as a means of preventing any modification of the extensive plan of operation outlined.

A recreation hall is being constructed on the McIntyre-Porcupine mine, the building being 50 by 110 feet, and being entirely modern. The basement will contain the heating plant, lockers, etc. The main floor will have two bowling alleys, two billiard tables and two pool tables. A lunch counter where light refreshments may be obtained will also be found on this floor. The second floor will be given over to a dance hall 50 by 80 feet, and quarters provided for the local G.W.V.A., for their exclusive use.

The McIntyre is also constructing a large store. It will be of modern design, among other things including a refrigerating plant for summer use. The ground floor will consist of a store of two departments, groceries and dry goods. The second floor is to have a large dining room with all the latest appointments and operated on a cost basis for the benefit of the employes of the company.

It is understood the Schumacher Gold Mines will resume full operations in the early spring. The underground workings, which are already down 700 feet will be extended to a depth of at least 1000 feet. The mill will also pressed into service as quickly as possible following a resumption of mining. The Schumacher mill is the fourth largest of its kind in the gold mining districts of this country, having a capacity for treating approximately 200 tons of ore. The company's plan is to dispose of 100,000 treasury shares so as to cover the cost of re-opening. A by-law passed two years ago authorized the sale of 100,000 treasury shares at 45 cents each, but no definite action was taken owing to the time being considered inopportune to start work.

Work is to be resumed early in December on the North Davidson property at Porcupine. Arrangments have been made to do 250 feet of sinking and approximately 1000 feet of drifting. Mr. George Henderson will be in charge of the work.

Arrangements are being made to commence an aggressive program of development and exploration work on the Davidson Consolidated property about the end of January or early in February. The plan includes sinking the main shaft to a depth of 1000 feet.

Barytes Mining.

A report has been issued to the shareholders of the Premier Langmuir Mines, Ltd., a company owing property in the township of Langmuir, some twelve miles or so south-east from Porcupine. In the report it is shown that the company has hopes of getting out of the financial difficulties which formerly developed. The scheme to extricate the company completely from this handicap is to sell five-year bonds,

bearing 8 p. c., these bonds to be exchangeable at the end of five years for shares in the company at the rate of 10 cents per share, or a case refund of the amount subscribed, and the property to be offered as security. Up to the present about $20,000 has been subscribed for bonds and the most pressing liabilities have been retired. It is stated in the report that : "Unless sufficient money comes in to meet the requirements of the company, your property will go into the hands of a receiver and be sold, which will mean that your stock will be worthless. The property then will belong to either the bondholders or someone else who might buy it."

It is announced that J. H. Dunsmore, of the Toronto Testing Laboratory, Ltd., made an examination of the property and made the following report :—

"We have made an examination of the Premier Langmuir mine, including buildings and equipment, and find same to be in very favorable condition.

"The bartytes ore is located in a vein running through an immense body of rock characteristic of the Porcupine district. We estimate that there is about 150,000 tons of barytes available, with good prospects of locating a further supply.....

"The equipment is adequate for the purpose intended and is satisfactorily installed, and at small expense could be put in operating condition. The Stroud Air Pulverizing Machine will not produce a marketable product, but we find that this machine in conjunction with a suitable bolting machine, will give you a marketable product containing a high percentage of pure barium-sulphate. The buildings and equipment installed in their present location could not be duplicated for less than $75,000.

"The present plant with a capacity of two tons an hour and equipped with a suitable bolting machine, and working on one shift for the year round, should yield a profit of about $100,000 a year, with ore selling around $35 per ton. The price of ground barytes to-day is around $45 per ton.

"Under proper management and with suitable bolting equipment, in our opinion, this mine could be made to produce a marketable product of good commercial value."

MINE EXPLOSION AFTER TEMPORARY SHUTDOWN.

A despatch from Jasper, Alabama, states that preceding a mine explosion near that place men went into the mine in the morning "when operations were resum-"ed following a shut-down of more than a week, and "when the first squad of workmen had progressed "about a half mile underground, a terrific blast oc-"curred. Rescuing parties were immediately organiz-"ed and fought their way into the wrecked mine, "removing the dead and injured."

How often has it been exemplified that the self-sacrificing heroism of the miner is greater than his realisation of the necessity of explosion prevention? The tale of the explosion of a coal mine that has been temporarily closed down has been all too often told. If half the wit, and half the willingness to rescue the victims of mine explosions were expended on their prevention it would be better. The man who will dare death to rescue a fellow-workman is also too often the same man that will use a naked light underground, and fight for the privilege.

LABOR AND WAGE CONDITIONS AT THE NOVA SCOTIA COLLIERIES.

Since the Wage Scale Committee of the United Mine Workers refused to accept the responsibility of accepting the agreement to which the executive officers of the union are parties, and decided to refer the issue to a referendum of the members of the union, there have been no developments. Although much opposition to the so-called Montreal agreement has been voiced, the unqualified recommendation of the international officers in its favor, and the growing feeling that the Secretary of the Union did not indulge in hyperbole when he said "the last cent had been wrung from the operators," indicate that there will be no stoppage of work at this time at the collieries.

The referendum is to be taken on December 14th.

The strike of the railwaymen at the Sydney Steel Plant and at Sydney Mines still continues.

At Sydney, the Steel Company has endeavored to maintain men at work in those operations requiring a minimum of transportation, such as the work of the Nail Mill, but the number of men for whom work can be found under the existing conditions is daily growing less. The seven hour ultimatum of the railwaymen threatened the equipment of the plant with disaster, and although, by the help of scratch crews of officials and others, the blast-furnaces, open-hearths and coke-ovens were cooled off gradually, yet the Company has issued a statement indicating that the No. 4 Blast Furnace may sustain a burst in the crucible portion as a result of expansion of the limestone in the furnace, which under the enforced stoppage of movement of coal and coke, it was not possible to flux off in the available time.

The railwaymen claim the status of passenger and freight line employees, and ask for adjudication of the dispute by the Adjustment Board provided for railway disputes, but the Department of Labor does not consider the employees on the steel plants to come within the category of railwaymen, and suggests a Board of Conciliation, which the strikers refuse.

The employees of the Sydney & Louisburg Railway, a subsidiary of the Dominion Steel Corporation, were given the advances prescribed under the McAdoo schedule during the Summer, and have recently also obtained the further advances under the so-called Chicago award. It is unlikely that any cessation of work will take place on this railroad, or that the operations of the collieries will be interfered with from this cause. At the present time, the strike of the steel railwaymen is causing a lessened demand upon the collieries for cooking coal to the extent of between 2,000 and 3,000 tons daily.

At Sydney Mines, where previously to the action of the railwaymen, the blast furnace and open-hearths had been closed down through trade conditions, the volunteer crews are keeping the collieries in operation, and little inconvenience has resulted from the precipitate strike.

Coal production has improved markedly during the past two weeks. The officials of the Dominion Coal Company look for an output in November of 295,000 tons, which, if obtained, will be the largest single month's production since August 1917. Outputs running over 13,000 tons daily have been obtained on a number of recent occasions. Should the improvement in production continue, the output of the Glace Bay collieries for 1920 may reach 3,250,000 tons, which will exceed 1918 by 170,000 tons, but will be smaller than any year of the war period, or its immediate predecessors.

The production from the Springhill Mines expected in November is 40,000 tons, a figure that has not been attained since 1909. Indications are that Springhill outputs may reach 420,000 tons in 1920, a figure that has not been approached since 1912.

For the first time since 1916 there is noticeable a strong upward trend to production of coal in Nova Scotia.

With the existing demand for coal, should the United Mine Workers accept the rate of increase proposed by the Montreal agreement, their opportunity for earning large wages has no precedent in Nove Scotia annals.

VANCOUVER NOTES.

Dr. Dolmage Farewelled by Vancouver Branch, C. I. M. & M.

Dr. Victor Dolmage, before leaving Vancouver for Ottawa to take up new duties there, was given a farewell luncheon by the Vancouver Branch of the Institute. Dr. Dolmage has been in charge of petrographic work in the Vancouver Office of the Survey, for two years, or since the office there was opened.

The luncheon, presided over by Dean Brock, was attended by members of the Institute and friends of Dr. Dolmage. Dean Brock said he regretted that Dr. Dolmage was leaving because his work has been of public benefit. Dr. McKenzie also spoke, referring to his first meeting with Dr. Dolmage in the field in Queen Charlotte Islands.

In reply Dr. Dolmage said there were three types of mining men to which the Vancouver office sought to help, namely, the mining engineer, in regard to branches of science in which he might not have specialised; the prospector, to whom great assistance could be rendered—and they were always an interesting type of men to help;—the small investor, to whom advice as regards a particular property was a delicate matter, but who could always be advised regarding the securing of proper reports from reliable parties. It had been his experience, Dr. Dolmage believed, to be of assistance to all these types. He would like to see the mines owned by Canadians, and not altogether by New York or Spokane people.

To Hold Monthly Meetings.

The Vancouver Branch is to hold a luncheon on the first Wednesday in each month beginning in December. The aim of these luncheons is to create greater interest in the Institute.

The February Meeting of the Institute.

Attention is being concentrated upon making the 2nd. Annual Vancouver Meeting a successful one, and it is hoped that any members of the Institute from the East who may plan on being within reach of Vancouver in February will endeavor to be present at the meetings. The invitation is extended to members of the American Institute of Mining Engineers also.

B. C. Chamber of Mines Popular.

The rooms of the B. C. Chamber of Mines, and the mineral exhibit there, attracts much attention, and visitors during one month, selected at random from the register, include well-known mining men from White Horse, Yukon, Prince Rupert, Ontario, Alberta, Quebec, Los Angeles, Arkansas, Arizona, England, and all the camps in the province itself.

TORONTO MINING STOCK QUOTATIONS.

Following are the closing quotations for active gold, silver and oil stocks on the Standard Mining Exchange for 1st December:

	Ask	Bid
SILVER		
Adanac Silver Mines	1⅞	1¾
Bailey	4½	3⅞
Beaver Consolidated	35	34
Chambers-Ferland	5½	4
Cobalt Provincial	45	..
Coniagas	2.20	..
Crown Reserve	19	..
Gifford	1½	1
Great Northern	2	1⅞
Hargraves	1⅞	1⅜
Hudson Bay	40	..
La Rose	..	24
Lorrain	5	..
McKin.-Dar.-Savage	44	42
Min. Corp. of Can.	1.66	..
Nipissing	9.50	9.00
Ophir	2¼	1⅝
Peterson Lake	11½	10½
Silver Leaf	2¼	1½
Temiskaming	27	25½
Trethewey	20	18¼
GOLD		
Apex	1¾	1
Atlas	19	17
Dome Con. Mines	..	12.75
Dome Lake	3½	2¾
Gold Reef	3¼	2¾
Hollinger Cons.	5.65	5.60
Hunton Kirl'd G. M.	9	..
Keora	15½	15
Kirkland Lake	40½	39½
Lake Shore M. Ltd.	1.06	1.02
McIntyre	1.92	1.91
Moneta	10	8
Newray	5	3¾
Porcupine Crown	19	..
Porcupine V. N. T.	..	19
Preston East Dome	3	2⅞
Schumacher	20	17
Teck-Hughes	..	7
Thompson Krist	6⅛	5¾
West Dome	6	5¼
West Tree Mines, Ltd.	8½	8
OILS		
Ajax Oil	25	..
Eureka	35	..
Petrol	40	35
Rockwood Oil, Gas	4	3⅛
Vacuum G.	26	24

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal Dec. 1st 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	18¾
Copper casting	18½
Tin	43
Lead	7¼
Zinc	8
Aluminum	34
Antimony	8

HIGH ASSAY VALUES REPORTED FROM PAINKILLER LAKE ORE.

La Santa Lucia Gold Mines, one of the group of Cartwright Gold Fields in the Painkiller Lake gold mining district, is attracting considerable notice just now by reason of the excellent showing made by numerous assays of ore taken from an exceedingly promising vein.

This vein which has been opened up for a distance of one hundred feet has an average width of eighteen inches and carries free gold for the entire length.

Recently ten bags containing six hundred pounds of ore picked up promiscuously from the vein were shipped to the Provincial Testing Laboratory at Cobalt and the report gave $84.15 in Gold and 7.43 oz. of Silver, proving that the main vein contains ore of a very high grade.

Numerous samples have been taken and indicate that the values are consistent.

It has been known for some time that gold was plentiful on these properties and a six and a half pound sample of ore tested recently at the Kingston School of Mining averaged $1,374 per ton in Gold and 9.6 ounces in Silver.

No less than seven veins have been opened up, all carrying visible gold and the veins vary in width from twelve inches up to three and four feet.

A contract has been let for diamond drilling to a depth of 2,000 ft, and if results justify, further operations will be carried on. Simultaneously with the diamond drilling surface work will be prosecuted with vigor.

Main Vein of La Santa Lucia Gold Mines from which sample tested at Government Laboratory was taken.

The camp is now well advanced in the way of equipment and working staff and work is proceeding rapidly. The main shaft is down 100 feet.

The Cartwright Gold Fields and La Santa Lucia Gold Mines control 520 acres around Painkiller Lake and it is fully expected that this camp will be the scene of great activity in the Spring of 1921 for the excellent results obtained are encouraging many other properties in the vicinity to consider operations.

Vein seven feet wide, on Cartwright Goldfields Property carrying high assay values.

GOLD INDUSTRY PROBLEMS.

ALEXANDER GRAY, Montreal.

Doubtful as it is whether American gold producers will accomplish their avowed purpose to push to passage the bill by which they would be bonused and encouraged that much to increase their output, it is manifest that more of the yellow metal will not be forthcoming unless operating conditions are altered, whether by the more plentiful supply of efficient labor, the lower cost of materials and metallurgical essentials, or by the modifications of taxation.

Artificial stimulants, however effective, are not included in Bankers' creed. Banks are jealous of their prerogatives when it comes to the gold standard. The market for gold is theirs. Special legislation that would tax gold used in the ornamental arts and the jewelry trade in general, meets with the objection that an open market is preferable. What premium there is upon the metal by reason of international exchange cannot be denied to those who are producing it—or whose grade of ore is such that they can produce it—that concession really is undeniable—and it does not assist low grade properties.

Were it not for this premium fewer gold mines would be working. In many instances the premium has provided something for shareholders who otherwise would be subjected to war-time conditions which still obtain. How close is the margin of profit at established gold fields is revealed in the October figures for the Witwatersrand where 26 mines milled 1,196,100 tons valued at £2,057,256, for an average profit of $2 per ton. In the eastern section of the Witwatersrand, 11 mines milled 591,000 tons valued at £1,531,881, for an average profit of about $6.50 per ton. All told, in October, 37 mines of the Witwatersrand milled 1,795,100 tons valued at £3,589,137, and were it not for the 11 mines of the eastern section the return available for dividends would not furnish enthusiasm enough to attract capital

to gold mining. A dozen mines were operated at a loss. Others reported a profit per ton of 25 cents to $1.00.

Calculating the value of the refined gold at £5, 17 shillings and 6 pence, the October output was at the rate of £43,069,644 per annum, without which exchange would be more demoralized than it is. Of course, as the Bankers contend, this gold is to be had by those who can buy it, and is available when they want it. American producers have talked of a Gold Bank for their own purposes, and yet the last word would rest with Threadneedle and Wall streets. Possibly a tax on gold diverted to jewelry could be allocated for the relief of lower grade properties. There, again, the special provision might prove obnoxious as a precedent.

Less taxation and the co-operation of labor really are the surest remedies for all precious metal mines. Once the equilibrium of international exchange is nearer to normal, the premium upon gold will not be so remunerative. It is what will happen meanwhile toward a lower level of working costs that gold producers are thinking about. Certainly shareholders are weary of being penalized by combined adverse circumstances beyond their control. Their capital is nearly "frozen"—their millions are too inactive to arouse further interest in mineral resources.

BOOK REVIEW.

Geology of the Non-metallic Mineral Deposits other than Silicates. Vol. I. Principles of Salt Deposition. Amadeus W. Grabau. First Edition, 9¼ by 6¼ inches by one inch; 435 pages with Index. McGraw-Hill Co., New York. Cloth Boards.

This book is really a hand-book of salt geology, if the term is used in a sufficiently broad sense to include nitrates, borates, phosphates and similar deposits. Consideration is chiefly given to modern deposits, now forming, or but recently formed, and line of study that it is hoped may lead to successful elucidation of the origin of older deposits.

A list of the chapter headings will give the best idea of the volume, which covers a world-wide range, and is extensively illustrated by maps, tables and photographs.

After reviewing the chemistry of salts and the physical characteristics of non-metallic salts, the chapters deal with the sea as a source of saline deposits, the condition of deposition of sea salts in nature, including salt secretion by organisms; sea-margin deposits of salt, salt deposits from evaporation of a cut-off portion of the sea; salts of terrestrial origin, connate salts, their origin and mode of concentration: salts leached from older deposits, and from decomposition products of older rocks; concentration of salt by plants. Similar arrangement is followed in discussing nitrates and phosphates. Salt deposits of mineral springs and fumaroles, or circulating ground water, and of igneous origin are dealt with. The concluding chapter discusses the conditions under which salt deposits formed in former geological periods.

Canadian references are not numerous, but include the Laramie lakes on the South Saskatchewan border, and notes on J. W. Dawson's theory of the origin of the Nova Scotia gypsums and the occurrence of gypsum in dolomites overlying the salts at Goderich, attributed to alteration of limestones by acid sulphate waters.

Canadian phosphates are referred to in the second volume, which is not yet pulbished. T. Sterry Hunt is quoted a number of times in connection with Canadian salt deposits.

The volume is well indexed, and has been carefully edited.

ASBESTOS PRODUCTION, GRADING & PRICES.

New York advices still forecast higher prices for all grades of asbestos fibre.

The following interesting table of the production of asbestos rock, the resulting tonnage of various grades of asbestos fibre and the increase in values during the past eleven years, is compiled by the Asbestos & Mineral Corporation of New York, and published by permission.

In explanation of the statistics it is stated that a classification of the selling price has been adopted which divides the Crude into two grades, and the Mill Stock, or fibre, into three grades. The crude is hand-cobbed, and the fibre recovered by mechanical grading after crushing, no two mines grading alike.

Fibres are divided into three classes, namely, Mill Stock No. 1, long or spinning fibre; Mill Stock No. 2, shingle and magnesia stocks; Mill Stock No. 3, paper stock and "short fibres".

The tables show the striking advance in the selling-prices of Canadian fibre, which is altogether out of proportion to the tonnage of fibre produced, this not having responded to the brisk demand and high prices in any very striking manner.

As was pointed out by the Superintendent of Mines for the Province of Quebec in the Report for 1919, the tonnage of asbestos fibre in 1919 was 4.6 per cent below that of 1918, but because of increased selling prices, the value was 21.2 per cent greater.

Tables of Production and Values of Asbestos produced in Quebec 1909-1919 (compiled by Asbestos & Mineral Corporation, N.Y.)

Year	Crude No. 1 Tons	Crude No. 2 Tons	Mill Stock No. 1 Tons	Mill Stock No. 2 Tons	Mill Stock No. 3 Tons	Total Production Fibre Tons
1909	1,087	1,471	5,757	19,029	36,620	63,965
1910	1,817	1,612	10,313	44,793	22,071	80,605
1911	1,400	3,382	6,340	35,991	55,111	102,224
1912	1,941	3,766	3,682	32,689	69,097	111,175
1913	2,140	2,870	14,056	29,525	88,018	136,609
1914	1,336	2,812	10,485	32,847	59,921	107,401
1915	2,734	2,631	12,502	36,945	58,303	113,115
1916	3,073	2,885	11,768	43,870	71,743	133,339
1917	1,761	3,603	13,197	54,072	64,609	137,242
1918	1,808	1,896	13,559	32,412	92,700	142,375
1919	1,103	2,991	13,764	69,868	48,136	135,862

Year	Total of Value $	Average Value Per Ton $	Total Rock Milled Tons	Rock Mined and Hoisted Tons	Per Cent Fibre Per Ton Rock Milled
1909	2,296,584	35.90	977,452	1,163,634	6.54
1910	2,667,829	33.10	1,709,992	2,035,705	5.03
1911	3,026,306	29.60	1,477,613	1,759,064	6.91
1912	3,059,084	27.52	1,571,310	1,870,608	7.08
1913	3,830,504	28.04	2,123,024	2,527,410	6.43
1914	2,895,935	26.96	1,808,285	2,127,395	5.94
1915	3,544,362	31.33	1,813,961	2,134,073	6.23
1916	5,182,905	38.87	1,947,424	2,291,087	6.84
1917	7,198,558	52.45	2,239,249	2,634,410	6.12
1918	9,019,899	63.35	2,078,883	2,445,745	6.85
1919	10,982,289	80.47	2,502,436	3,061,690	6.22

PORT ARTHUR NOTES.

By J. J. O'CONNOR.

Members of the Port Arthur and Fort William Boards of Trade, had a conference with the Hon. Harry Mills, Minister of Mines, in the Mayor's office Fort William, on Nov. 27th. The subject under discussion was the advisability of the Province granting a bounty on the mining and marketing of iron ore, without restriction.

The Hon. Mr. Mills stated that as a Minister of the Crown he would not advise against the granting of a bounty, but as an individual giving his personal opinion, he did not think the granting of a bounty would result in a solution of the iron ore problem of this Province, that something more was required, more preparation for the securing of additional knowledge of the various ranges, as to quantity, grade and variety of the ores, and the various forms of treatment to which they would be amenable. He made certain suggestions that he thought could be worked out to advantage. These suggestions amounted to a complete survey of the whole situation regarding the iron ranges of Northern Ontario, and the best methods to be adopted for their development and use in the furnaces of the Province.

The Hon. Minister's suggestion to have such a survey made is a good one. Aside from the question of a bounty or no bounty, it is clearly in the interests of Ontario to have the fullest and most complete knowledge of its iron-ore resources, and there is no more direct or efficient manner of arriving at that knowledge, than by such survey by competent men.

This policy has been advocated by mining engineers who are familiar with the iron ranges, and their requirements.

Captain H. E. Knobel, who has had a wide and intimate association with the iron ranges of Northern Ontario, estimates that such a survey could be made by a party of five live men, under a competent directing head, in one summer season. He, and many others, are strongly of the opinion that when such survey is undertaken, it should be in the hands of, and under the direction of, experienced iron-ore operators, men who have had actual commercial experience in the beneficiation of iron ores, such as may be found on the iron ranges of Minnesota, where beneficiation has been carried to the highest efficiency yet attained. No survey of this kind would be of value, unless it were carried out by men with the capacity and experience to enable them to forge the necessary link between the technical and commercial end of the iron-ore problem. Either our iron ores are of value, or they are of no value. If they have value, that value is immediate and present. If of no value, the suggested survey would demonstrate that feature, and end the matter. If, on the other hand, it proves their value and availability for our own use, no time should be lost in their exploitation.

The Hon. Mr. Mills would be well advised to proceed at once with preparations for the survey under the right auspices, so that the work may be undertaken in the Spring of 1921.

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