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FLOTATION PATENTS.

Aside from the suspicion of German control it is questionable whether the Minerals Separation patents are now of any great value in Canada. In our issue of Oct. 15, we pointed out that Canadian laws allow only a reasonable royalty and that the Minerals Separation corporations can hardly expect to be as successful in Canadian courts as in United States courts. We stated that if the American corporation threatens Canadian users of the process with claims for excessive amounts it must be only bluffing. It is provided under Section 44 of the Canadian Patent Act that in case a patentee refuses to grant licenses to others on reasonable terms, anyone may apply to the Commissioner of Patents for a license to make, use or sell the patented invention. As the claims of the Minerals Separation corporation and the conditions under which it issues licenses are unreasonable, it is obvious that Canadian Mining companies have good reason to assume that an application to the Commissioner would be successful.

THE REPORT ON IRON ORE OCCURRENCES.

We have just received from the Department of Mines the first volume of a report on "Iron Ore Occurrences in Canada." The report is a timely one, for there has seldom been so good a demand for iron ore as at present. Many enquiries concerning Canadian deposits are being made, and this description of the principal iron ore mines, few of which are now being worked, will help to answer questions that are being asked. The report was compiled by E. Lindeman and L. L. Bolton. The introductory chapter was written by A. H. A. Robinson.

Unfortunately, there has been great waste in the printing of this report, as in other reports printed in the Government Printing Bureau. Some time ago we referred to the waste of paper in reports of the Mines Branch. In this little book of 90 pages, 30 is pure waste. There is only 60 pages of printed matter and the book is padded out by 30 blank pages. Moreover, some of the photographs, such as III, are so poor that we wonder why they were used at all. Others, such as X, that contain objects of interest have not been properly used. If the useless photographs had been discarded and only those parts of the others that illustrate the text used, there would have been even less than 60 pages needed. Moreover, increased usefulness as well as saving in space would have been obtained by running the illustrations with the text.

THE RESOURCES COMMISSION.

In his letter addressed to the editor of the Bulletin of the Canadian Mining Institute, Mr. Geo. Mackenzie asks a question concerning our criticism of the circular sent out by the Munition Resources Commission.

Mr. Mackenzie wants to know to what end we are making argument. He is entitled to a frank reply and we will endeavor to be brief.

We believe that the work undertaken by the Munition Resources Commission could best be performed by a committee composed of representatives of the Federal and Provincial mining departments and the Canadian Mining Institute. We believe that the Commission, except along certain lines, is out of touch with the work of these departments, is poorly informed concerning our known deposits, and is not the proper organization to gather information. The Commission, if it wishes, might have a representative on a War Minerals Committee, but it should not undertake to itself act as the committee. Mr. Mackenzie would be a valuable man on such a committee, as the representative of the Commission or the Mines Branch. We believe further that we have all the necessary machinery for gathering information concerning our mineral resources and that it decreases rather than increases the efficiency of the machinery to have Commissions, such as the Munition Resources Commission, undertaking to do work which has been or can be better done by the established organizations.

The Work of the Geological Survey

At the last meeting of the Western Branch of the Canadian Mining Institute, which was held at Princeton, Similkameen, B.C., Mr. Charles Camsell, of the Geological Survey of Canada, said:

"I am pleased to be present at this meeting of the Western Branch of the Canadian Mining Institute, as it gives me a good opportunity to get into touch with mining men who are operating in various parts of the Province of British Columbia.

"The chief function of the Geological Survey of Canada is to assist as much as possible in the development of the material resources of the country, and since it is impossible for Survey officials to visit all parts of the country to determine what is required in the way of survey work, meetings such as this one afford excellent opportunities for acquiring that knowledge, so that we can best adjust and co-ordinate the work of the Survey to meet the needs of the mining industry.

"The territory over which I now have general supervision is very large and comprises, besides unexplored Northern Canada, the whole of British Columbia and Yukon Territory, the increase in responsibility being due to the recent death of Dr. D. D. Cairnes, who had charge of the work in the Yukon, and of Mr. O. E. LeRoy, killed lately in France, who had been in charge of the work in British Columbia. It will be seen, therefore, that under ordinary conditions it is well nigh impossible to keep closely in touch with the requirements of all parts of these extensive regions. I may add that for the time exploration work has been abandoned, but there still remains a large area and much work to be supervised.

"It is my desire to take advantage of this opportunity of outlining to you the amount and character of the work the Geological Survey has been doing, in order to meet certain criticism of our not having done enough, or, again, of having done too much. It must be remembered that our country is very large, while our appropriation for field work is comparatively small, for it is not as large as that of the United States Geological Survey for Alaska alone. But even if we had a larger grant, we could not at the present time use it advantageously, because we have not on the Survey staff a sufficient number of properly trained men. Our losses from death or through enlistment in war service have been high in proportion to the numerical strength of our staff. British Columbia and Yukon Territory have suffered most in these respects, for out of about seven geologists who used to work in this western part of Canada, three have gone to the front (and of these one has been killed), and, within the last year, two others have died. Among the topographers the proportion of enlistments has been even higher. In other parts of the Dominion we have had losses also by enlistments, and since these men cannot at present be replaced, the work of the Survey has had to be curtailed proportionately. It is, therefore, self-evident why we cannot now place as many men in the western field for geological and topographical work as in past years.

"To meet the other objection, namely, that we are doing too much, or not the right kind of work, I ask you to look at the programme of the Survey for last season. We had about twenty-two parties in the

field, all of whom were engaged in purely economic work, with a view to increasing the production of various kinds of minerals. Some of the members of our staff were doing special work, and others were engaged in making particular investigations in connection with materials required in the conduct of the war. In Eastern Canada investigations were made on deposits of gold, copper, molybdenite, iron ore, magnesite, petroleum, and other minerals. In Manitoba, the new gold and copper fields near the Hudson Bay Railway were examined, and some classification of the land, according to its agricultural value, was made in the northern part of that province. In various parts of the Dominion road materials were classified and mapped. In Alberta and Saskatchewan, gas and coal fields were examined in the southern parts, while in the northern parts work was carried on to determine what are the possibilities for the occurrence there of oil. In British Columbia and Yukon Territory there were six parties, all engaged in purely economic work.

"In several instances results of considerable value to the mining industry have been obtained, which certainly justified the expense of the work. It is gratifying to know that on the whole mining men are very appreciative of the work the officials of the Survey do, and it is their criticism that we do not do enough, probably meaning thereby enough in the parts of the country in which they are particularly interested. They must remember however, that we cannot supply every demand. We have to look at the situation in the light of the needs of the country as a whole, and, accordingly, arrange to do our work where the greatest good will be done to the greatest number of people."

Mr. Camsell then spoke of his own work in the Coast range, of British Columbia, along the line of the Pacific Great Eastern railway. That region had been assumed to be composed entirely of granite, but investigation had shown that on the Pacific Great Eastern section there are several belts of sedimentary rocks running parallel to the range and intruded by granite. The contacts of these belts with the granite are all more or less mineralized, chiefly by copper, and some of them give promise of being found to contain ore deposits of commercial importance. The significant feature of the results obtained along the Pacific Great Eastern railway is that what had been assumed to be a large area of granite nearly one hundred miles wide and several hundred miles long without any mineral deposits of commercial value may be proved to contain several important belts of sedimentary rocks throughout the length of the range in which the conditions necessary for the presence of deposits of gold, copper, silver, lead, zinc, etc., are favorable.

He next drew attention to the great length of coast line bordering the Coast range and which for purposes of transportation is as good as a railway line, and he strongly recommended prospecting along the coast. He also mentioned the necessity for more intensive prospecting along lines of railway where, by reason of favorable location, comparatively low-grade deposits of mineral could be turned to profitable account. In remote regions, or those difficult of access, only very rich deposits of the precious metals could be worked.

Another suggestion he made to prospectors was that they should search not only for deposits of metallic minerals, but as well for non-metallic minerals. The latter are too generally overlooked by both prospectors and engineers, but they form a large proportion of the mineral wealth of the country. Such deposits as mica, feldspar, silica, potash, bauxite, magnesite, brick-clays, phosphate-rock, abrasives, cement materials, and various others are all well worth being on the look-out for.

In closing, he expressed his gratification at the progress being made in the development of the copper deposits of Copper Mountain, Similkameen, a progress made in spite of enormous difficulties and due entirely to the faith and persistence of the men in charge of the development work. The future of the Copper Mountain mines now seemed assured. Finally, he expressed his heartfelt thanks to the people of Princeton and surrounding district for their kindly welcome on his return to what had been his field of work for several years.

Dr. W. F. Ferrier, of Toronto, also emphasized the advisability of prospecting for non-metallic minerals, many of which are now in demand for war purposes. He drew particular attention to the possibility of the occurrence of bauxite, a hydrous oxide of alumina, in British Columbia, especially in the Interior Plateau region, where the basaltic rocks, similar to those from the alteration of which the bauxites of some foreign localities have been derived, are widely distributed.

The different forms of this mineral, their composition, modes of occurrence, and uses were described, and some specimens of bauxite were exhibited. Some of the theories advanced regarding its derivation from various types of rocks were briefly outlined.

Attention was also called to the fact that bauxite is used not only as an ore of aluminum and in the production of many chemicals, but also, is in demand for the manufacture of artificial abrasives employed in the finishing of guns, cartridge cases, motors, and other war material.

INTERNATIONAL PETROLEUM COMPANY.

At the annual meeting of the International Petroleum Company, Limited, held at Toronto on Dec. 10th, Walter C. Teagle, owing to his recent election to the Presidency of the Standard Oil Company of New Jersey, retired from the board. The following were elected Directors for the ensuing year: G. H. Smith, Hon. W. J. Hanna, J. L. Englehart, Capt. Henry Keswick, Hon. Wallace Nesbitt, Sir Edmund Osler, C. O. Stillman and A. M. McQueen.

G. H. Smith, formerly Vice-President, was elected President. The Hon. W. J. Hanna and A. M. McQueen were elected Vice-Presidents of the company. J. R. Clarke was appointed Secretary and Treasurer, and H. W. Chapin, Assistant Secretary and Treasurer.

The Directors declared a dividend of fifty cents per share, payable on or before the 31st of January, 1918. Payment of this dividend will be advertised later.

The Granby News, issued for the information of the Granby Consolidated Company's employees in various parts of British Columbia and Alaska, stated in its November number that there were 815 men on the company's Anyox smeltery payroll on October 22, exclusive of all office, store, engineering, messhouse and marine employees. That was the highest number since construction days.

CANADA'S MINERAL RESOURCES.

Some outstanding facts concerning Canada's mineral resources were pointed out by Mr. A. A. Cole, president of the Canadian Mining Institute in an address before the Canadian Club of Montreal some months ago. Mr. Cole said:

"Our coal resources are among the greatest in the world.

"Our asbestos deposits in the Eastern townships of the Province of Quebec supply most of the asbestos of commerce.

"The greatest nickel deposits in the world are located at Sudbury.

"Ontario has the largest body of high grade talc on the continent at Madoc; the largest body of high-grade feldspar on the continent in the Richardson mine near Verona; the greatest mica mine on the continent at Sydenham and the greatest graphite mine at Calabogie.

"During 1916 also a molybdenite property was discovered within 25 miles of Ottawa that bids fair to outstrip all rivals.

"The tar sand deposits of Northern Alberta are the most extensive in the world.

"We also have one of the richest silver camps in the world at Cobalt, and the most promising of the younger gold camps on the continent at Porcupine.

"Our smelters at Deloro and Thorold also produce more refined cobalt than all the other refineries in the world put together.

"These are just a few of the lines on which we lead, but the remainder of our production is by no means insignificant."

The British Columbia correspondent of The Journal writes: "Recently there was published in Provincial newspapers a press despatch from Ottawa stating that 'the collieries in the Crow's Nest Pass district of British Columbia, which are being operated under Government control, are producing 23,000 tons of coal a day, the greatest output in the history of the Province.'" This, the correspondent points out, is a gross misstatement, for the total output of all the coal mines operating in that district for October was only 68,044 tons, and of those of the whole of the Province 230,996 tons. He adds: "Allowing for twenty-six working days, which, however, is probably more than any of the mines worked, the production of all the mines in the Province would have been less than 9,000 tons a day; if they worked an average of twenty days, a total of about 231,000 tons would mean an average of only 11,550 tons a day for the whole of British Columbia, so that it is quite evident the Ottawa correspondent was very far astray."

Northwest Mining Truth, published in Spokane, states that it "understands upon unofficial, though highly credible authority, that examination of the books of the Lucky Jim Zinc Mines, Ltd., has disclosed an alarming over-issue of stock. Just what figure it will reach is not yet known, but there are rumors that it will go as high as 2,000,000 shares. If this should prove true, the very serious position of all stockholders can easily be understood. The authorized capital is \$2,500,000 in \$1 shares, so that a total of 4,500,000 may be in existence at the present time. The question of criminal liability as well as the position of holders of over-issue are matters now giving much concern to the officers of the company." The company's office is now in Spokane.

Coal Trade of Nova Scotia During 1917

By F. W. Gray.

In last year's review of the Coal Trade of Nova Scotia the writer stated:

"In a period when the necessity for increased production of raw materials is being preached by the responsible statesmen of every belligerent nation the very considerable diminution in the production of our most important raw material is sufficiently serious, particularly so when the low figures of 1916 follow large recessions in output during the preceding years of 1914 and 1915, but a still more serious aspect is the probability that the tonnages of 1917 will show a further decline, probably to between 5½ and 5¾ million tons, or say, two million tons below the maximum possibility."

This forecast has in the actual event proved only too accurate. The production of coal in Nova Scotia during 1917 has been about 5,735,000 tons, comparing with 6,174,424 in 1916, or has declined a further 440,000 tons below the reduced figures of 1916.

Most unfortunately it is probable that the production of 1918 will decline to a still lower level, say to between 5¼ and 5½ million tons. From present indications it may be expected that 1918 tonnages will show a decline from 1917 figures of possibly 350,000 tons.

An indication of the disappointing trend of production may be obtained from the following table of annual outputs:

Annual Coal Production. of Nova Scotia. (Long Tons)	
1913	7,263,485
1914	6,650,038
1915	6,708,695
1916	6,174,424
1917	5,735,000 (about)
1918	5,400,000 (estimated)

The salient features of the year are those of last year, namely, the large decreases in the production of the larger coal operators, and the number of small operators. At least eight new coal companies have joined the producing ranks in Nova Scotia this year. These operations are small, but in the aggregate they account for 100,000 tons of coal output in 1917.

The activity of the smaller operators is of course a reflex on the high selling price of coal, and is one of the features of an abnormal situation which favors the commencement of new enterprises, as a rule requiring little capital expenditure, but on the other hand presents most serious difficulties to the larger companies, which in many cases have a lean past and an uncertain future outlook.

The enterprise of the smaller operators has aided in the supplying of local needs, and has to that extent relieved the general coal shortage, but the contribution of the smaller companies does not, and cannot to any appreciable degree offset the tremendous decline in the production of the larger operators.

The smaller operators are working on areas that have either been abandoned in times of depression, or even in what we call normal times in Nova Scotia, or areas situated on the outcrops of the main coalfields and easily accessible without large expenditure.

When it is considered—as was stated last year—that taking into account the selling price of coal, the cost of labor and materials, and the margin of profit left to the coal operator, the price of coal in Nova Scotia has never within the past 25 years (up to 1916) been sufficiently high to make coal-mining a reasonably paying investment or to secure the stability of the companies engaged in the mining of coal in this Province, the disappearance of many of the smaller operators from the producing lists may be expected so soon as the present unusual conditions pass away. But the larger companies cannot cease operations at will. They must take the good with the bad, and it is with much anxiety that the larger companies now view the future, and not without reason, as the following summary will show.

By a shortage of labor, the production of coal has been reduced by from 25 to 40 per cent. but no corresponding reduction has been possible in the overhead expenses of transportation, staff, financial burdens, such as interest on bonds and other loans, or in the fixed costs of mining, as pumping, ventilation and general maintenance. The amount of coal available for sale at current favorable prices is reduced by the drop in production, and by the operation of long-term contracts at lower prices than those now prevailing. Increases in wages have been granted more quickly and of greater extent than ever before, and further increases of a most drastic nature are demanded. Costs of all mine materials have increased. The practical cessation of capital expenditure since 1913 is now having its effect on the costs of mining, and the longer these capital expenditures are delayed by lack of labor and difficulty of obtaining materials the more costly will mining operations become. Neither men or materials are at all likely to become plentiful while the war lasts, and for many years after peace is declared the coal production of Nova Scotia will show the result of the period of arrested development through which it is now passing.

Accompanying this combination of adverse factors is the temporary loss of the Montreal market, because in 1917 the shipments to the St. Lawrence did not exceed 50,000 tons. Whether and when this market can be regained is a matter on which predictions cannot be hazarded.

The percentage of coal consumed in the manufacture of iron and steel is again very noticeable. The percentage is increased not only by the large amount of coal used at the steel works, but by the reduction in the total coal production. It would not be a surprising development of present onerous conditions to see some at least of the coal operators of the Province retire entirely from mining coal for general sale, and confine their energies to securing coal for use in metallurgical processes.

It may even be that a logical outcome of the rising costs of coal mining, and the difficulties which will attend the recovery of the lost markets will be a tendency to export manufactured articles, from Nova Scotia coalfields in preference to exporting the coal to distant manufacturing centres. It has only been the low costs of freighting in previous years that enabled Nova Scotia coal to compete in the Boston and St.

Lawrence markets, but the permanently increased costs of extraction and the improbability that freight rates will return to normal as rapidly as they increased to present figures, are factors which will seriously militate against quick recovery of the lost markets.

Cape Breton Island produced 77 per cent. of the provincial total output, which is a falling off from the record of the past six years, during which period Cape Breton maintained a steady proportion of approximately 81 per cent. of the total production. This temporary recession of Cape Breton Island is interesting as a reflex of the large enlistments from the Island, but when industry resumes its normal progress it is quite certain that a steadily increasing percentage of the Nova Scotia coal output will come from Cape Breton Island.

The year has seen an unusual number of political and legislative changes. At the beginning of the year a new Workmen's Compensation Act came into operation, by which administration by a Provincial Board and compensation payments out of a Provincial Fund were substituted for direct payments of compensation from the employer to the injured workman. A schedule of pensions was also substituted for lump sum payments at death. The cost of the assessments made by the Board will amount to probably ten cents per ton on the cost of coal. The legislation has had a disastrous effect on the colliery relief societies. The Nova Scotia Workmen's Compensation Act will in the long run probably prove a beneficial piece of legislation, but unfortunately sufficient attention was not paid by the Legislature to the probable effect upon the relief societies, although the matter was carefully brought to the notice of the Legislature by the representatives of the relief societies.

The enactment of weekly pays became operative in May. This innovation has certainly not increased the production of coal, but it has definitely increased the cost of coal. The effect on one coal company has been an addition of \$20,000 to the annual expenditure for clerical help and stationery, and the employment of 25 additional clerks. The legislation may be considered in line with modern ideas, but some consideration might have been given to the fact that the country is at war, and that the net result of weekly pays has been to reduce the production of coal, to increase its cost, and to increase the number of clerical employees, at a time when coal is scarce and dear, and men are needed for fighting and for actual production of materials.

The year was unfortunately marked by a mine explosion at New Waterford by which 65 men lost their lives. This incident has already been fully described in previous issues of the Journal, and need not be here dealt with in detail. As an outcome, however, of the verdict of the Coroner's Jury, indictments were brought in by a Grand Jury charging manslaughter against the Superintendent and Manager of Dominion No. 12 Colliery, and against the Deputy Inspector of Mines for the Waterford District. So far as is known there is no precedent for this sequence of events, and the position of the Deputy Inspector of Mines is particularly significant, as it has hitherto been assumed that this official was a representative of the Provincial Department of Mines, reporting to the Inspector of Mines. Mine managers and colliery officials, holding certificates of competency from the Department of Mines, have hitherto regarded themselves as responsible for the

Inspector of Mines and his Deputy Inspectors, and have not considered these officials as jointly responsible for the conduct of mining operations with the colliery officials.

It has not been usual for criminal proceedings to be instituted in connection with the responsibility for mining accidents without the intervention of the department of the Government charged with the oversight of the mining laws, or without some specific breach of the Coal Mines Regulation Act had taken place. The disturbing feature in the present incident is that criminal proceedings were instituted after a Commission of Enquiry under the chairmanship of the Inspector of Mines had found itself unable to assign blame, and so far no specific breach of any section of the Coal Mines Regulation Act had been charged.

One curious fact may be noted. The genesis of the explosion was a shot fired under conditions that caused the disaster. That much may be admitted without the necessity to particularize further. There is no regulation in the Nova Scotia C. M. R. A. governing the use of explosives in coal mines, except a series of regulations contained in the "Special Rules" of the Dominion Coal Company, which by compliance with certain rules as to posting and approval by the Inspector of Mines, have the force of the Act so far as the workmen of the Dominion Coal Company are concerned. It can scarcely be maintained under these circumstances that the operators of the Province have been lacking in a desire to improve the mining practice, when as a matter of fact the C. M. R. A. has been supplemented and improved by the careful formulation of rules that are the result of much thought, and incidentally of large expenditures.

The trial of the colliery officials who have been indicted will attract a great deal of attention in Nova Scotia, and the matter is one which should be followed by all mining officials in Canada as it has a most important bearing on the status of the profession. It has also a grave bearing on the technical progress of mining, as if the procedure which has been followed in Cape Breton becomes a precedent, and criminal proceedings commence to follow upon mining accidents without the intervention of the Departments of Mines, or those authorities charged with the regulation of mines, it will kill all individual responsibility and initiative among mining officials, who will either prefer to take no chances of any kind, or will seek professions which offer equal or greater remuneration with less onerous risks.

MINING CORPORATION PAYS \$1,556,296.

By an unfortunate typographical error the Mining Corporation of Canada was credited, in an item published in our last number, with paying dividends amounting to \$1,556 in 1917. The company distributed in dividends during 1917 \$1,556,296.

Two or three new coal mines have been opened recently on Vancouver Island, B. C. One of them is situated at Nenoose, a few miles north of Nanaimo. Its output of coal in November was 4,303 tons, bringing its total up to 22,872 long tons. While this is but small in comparison with the production of the large mines on the Island, it is an encouraging beginning.

FLOTATION-PATENT LITIGATION

An interesting article by R. C. Canby, on the Status of Flotation-Patent Litigation in the United States, appeared in the Dec. 1 number of "The Engineering and Mining Journal." Mr. Canby said in part:

It is unfortunate for the clearness of the situation that the majority opinion of the United States Circuit Court of Appeals, in Philadelphia, in the case of Minerals Separation vs. Miami Copper Co., was technically for the plaintiff, whereas, in actual point of fact, it was in favor of the Miami Company, in that it indicates that its present milling operations are not infringing the flotation patents of Minerals Separation. The opinion referred to was based upon a review of the record in the hearing before Judge Bradford in the United States District Court in Wilmington, Delaware.

The alleged infringing acts complained of by Minerals Separation, in its bill of complaint, occurred in experimental flotation tests carried on before the time that the Miami Company had introduced flotation into its actual commercial operation.

An important difference between the Hyde case and the Miami case should be particularly noted. In the Hyde case the flotation operations under consideration had been carried on in a machine having mechanical agitators or beaters, whereas in the Miami case the concentrating operations were performed in the Callow cell, an apparatus in which the necessary aeration is obtained absolutely independent of any agitation.

It was of the greatest help to the Court of Appeals in Philadelphia to have before it the Supreme Court decision in its consideration of the Miami case. This Supreme Court decision had been considered by Minerals Separation as a tremendous victory. But when applied to the bubble-column mode of flotation, such as takes place in the Callow porous-bottom cell, the decision is most embarrassing to the contention which Minerals Separation tried, unsuccessfully, to sustain.

The opinion of the United States Court of Appeals in the majority opinion of Judge Woolley, and particularly in its minority opinion, by Judge Buffington, is really in favor of the Miami, since the infringing features specified in Judge Woolley's opinion, although having been in the experimental plant, do not constitute a part of the operating plant of the Miami Company, except as stated. When the Court of Appeals opinion is applied to the actual concentrating plant of the Miami Company, none of the infringing features is found.

This article ought to make it clear that the broad claims that Minerals Separation is making to practically the whole flotation field have not yet been sustained by the courts.

In the presentation of its case, in the Miami trial, Minerals Separation laid no little stress upon the "acquiescence" indicated by the fact that the Inspiration, at first under its original contract, and subsequently under the Anaconda contract and supplemental agreement, pays royalty on the tonnage of all of the mill units, regardless of the type of machine.

It might appear, if one went into it, that there was "good business" in this Anaconda contract. One of the Anaconda subsidiaries, the Inspiration, was already under an irrevocable contract to pay the regular Minerals Separation royalty, so, as was brought out in the cross-examination in the Miami suit, it was not only partially a form of insurance, but may well have been

worth \$300,000 to release this subsidiary company from its existing Minerals Separation contract, for the benefit of the lower royalty of the sliding scale of the Anaconda "supplementary agreement."

The Anaconda contract and supplementary agreement may be criticized from many angles, but one cannot but notice that its "acquiescence" is dependent solely upon the Supreme Court's "final decision" in the Hyde case, rather than upon any subsequent decision of the Supreme Court affecting the patents at issue. But, if one considers all of the conditions involved, it certainly lessens materially the force of the Anaconda contract as an instance of "acquiescence."

I mention this matter of acquiescence somewhat at length, because such acquiescence has considerable weight, not only with the court to whom it is addressed, but more especially with the mining public as a whole. The mining public should pause and find just where it stands. It should consider what danger there is of doing an injustice, on the one hand, or of too readily acquiescing in an injustice to itself, on the other hand.

The Supreme Court of the United States had found a novel degree of agitation, greater than theretofore known, which produced a permanence of froth, of a character not theretofore known, and the use of a critical amount of oil. There was no testimony in the Hyde record to show that greater quantities of oil than the "critical" amount could be used successfully in the actual mill. It would now appear that the Supreme Court was misled by this record, since numerous plants are successfully using oil far in excess of the minute quantity characteristic of the claimed process, and slightly in excess of the limit named by the patent, one per cent.

In the most recent litigation, the Butte & Superior case, argued before the United States district court at Butte, Mont., one finds Minerals Separation taking again an entirely new and different attitude. Confronted as it now is by so many actual metallurgical operations in which oil in excess of 1% was being successfully used, it took precisely the position which its opponents had always argued in every prior case, and which Minerals Separation has denied in every prior case; namely, that "oil" used in any excess over that "which is attached to the metalliferous content of the concentrates" is "wasted," "unutilized," "and might just as well flow down the outside of the machine." This is the exact opposite to what Minerals Separation attorneys argued before the Supreme Court, in the Hyde case, and absolutely contrary to the contention upon which the Supreme Court sustained the patent and found the efficacy of the "critical quantity" of oil.

Flotation Takes Place in Modified Water.

In litigation certain assumptions of theories as to the underlying causes of flotation have been advanced by one side or the other, as, for example, in the Miami case, the moving-picture film of bubble-holder experiments in the Wilmington court, by the plaintiff, with the object of showing a different degree of attachment of air bubbles for sulphide with large amounts and minimum amounts of oil. The Miami company contended that flotation takes place in "modified water;" that is, water having a contaminant which reduces its surface tension, with the idea of illustrating that all of the various prior-art processes, as well as that of the patent in suit, No. 835,120, were fundamentally identical, all being dependent upon the same underlying principle; that it is the modifying of the

surface tension that is necessary, and that, having added sufficient contaminant to modify the surface tension, any excess, more or less, of the contaminant or modifying agent, is immaterial, apart from the question of economy.

I have been greatly impressed by the fact that since the Miami case was argued in Wilmington a number of papers have been written by professors and instructors in our technical schools discussing the underlying principles of flotation. These papers were prepared in the laboratories of the technical schools, the authors being unbiased by any particular interest and untrammelled by the necessity of sustaining a particular theory, and yet none of these writers has found the "critical quantity" of oil. At the hearing of the Butte & Superior case before the district court in Butte, several testified as to their methods of investigation, and reproduced their demonstrations before the court.

The quotations from the testimony of experts or the arguments of counsel, while enlightening, are not so important, now that we have the opinions of the United States Supreme Court and the United States circuit court of appeals as a guide. The decision of the Supreme Court, which is based upon the record in the Hyde case, absolutely limits the Minerals Separation flotation process to what is generally known as the agitation froth process, having "an agitation greater than and different from that which had been resorted to before," and a "resulting froth concentrate so different from the product of other processes." The decisions of the United States circuit court of appeals in Philadelphia, both majority and minority opinions, would unquestionably place any partly mechanical violent-agitation froth process, with less than 1 % of oil, within the scope of the patents.

When, however, one comes to the bubble-column form of flotation apparatus, with which 17 out of 18 units of the Inspiration mill, as well as a large number of other American flotation plants, are operated, a different proposition is presented.

Bubble-Column Machines Are Claimed to Be Without the Scope of the M. S. Patents.

These bubble-column machines, the Callow-type machine, the Inspiration-type machine, etc., are not agitation froth machines, and therefore do not come within the scope of any of the patents, Nos. 835,120, 962,678 and 1,099,699, as these patents were defined by the United States circuit court of appeals in Philadelphia in the Miami decision or as No. 835,120 was defined by the United States Supreme Court in the Hyde case. When these decisions in their relation to the bubble-column operations, such as the Callow cell, for example, are considered, the question becomes solely whether the result produced in the porous-bottom cell is the effect of agitation. I consider that it has been established that this is not the case, and that such a porous-bottom, bubble-column cell itself, therefore, operates entirely outside of the scope of these patents.

No sentences could be more clearly worded to state emphatically that the operation of the Callow cell is not the agitation of the patents in suit than those in the majority opinion of the court, as written by Judge Woolley and already quoted. In writing the minority opinion of the court, Judge Buffington says, in conclusion:

"I would hold that the step of the process 'agitating the mixture until the oil-coated mineral matter forms into a froth,' meant the novel air-entraining

agitation which the patentees disclose, and did not cover the novel air-releasing agitation which the defendants disclose."

Moreover, Judge Woolley says, in the majority opinion of the court:

"But in the process we are considering, and upon which the decree we are reviewing was based, the Callow cells were not the whole process, but were merely the last of four distinct parts of the process, the other three being the process of the patent or its fair equivalent."

This is an absolutely clear statement that it was "the other three" parts of the process, the centrifugal pump, the "break in the circuit" and the Pachuca tank, and not the Callow cells, the fourth step, which were "the process of the patent or its fair equivalent."

Looking back to the time of the supposed "discovery" of the process set forth in patent No. 835,120, it will be noted that the disclosures in the flotation art were already too numerous to admit of anything really basic being claimed.

I feel that the legal situation also has been cleared by the decisions of the United States Supreme Court and the United States court of appeals in Philadelphia, so that there should now be nothing to retard further the development of flotation along the lines so successfully pursued by our American engineers in bubble-column flotation.

The Butte and Superior Decision.

Since writing the foregoing, Judge Bourquin has handed down (Aug. 25, 1917) the opinion of the United States district court at Butte, Mont., in the Butte & Superior case. Because of the fact that the method of operating, which has been considered by Judge Bourquin and upon which his decision is based, is so entirely different from the method of porous-bottom cell, Judge Bourquin's decision has absolutely no bearing whatever upon the porous-bottom cell method of operation.

Judge Bourquin may have been completely confused by the plaintiff's new line of argument. What he says as to "self-agitation," agitation by the air particles "in merely rising through the mass," is in absolute conflict with the distinction made by the court of appeals in Philadelphia, and is actually nothing less than the reinstatement of the original claim 12, which was properly denied patentability by the United States Patent Office, and subsequently abandoned by the patentees themselves. The porous-bottom cell method of operation was not before Judge Bourquin, so he may not, therefore, have so fully realized the distinction between the two methods of aeration as would otherwise have been the case. He certainly could not have been conscious of how much the specious arguments of the plaintiff's counsel induced him actually to read into the patent, nor to what extent he was thereby placing his opinion in absolute conflict with the court of appeals in the Miami case.

There are unfortunately also many among the mining public who do not fully understand the legal distinction which exists between the violent-agitation froth method and the porous-bottom cell method of flotation, and who may not realize that Judge Bourquin's decision has no reference whatever to the latter, and thereby may be led to further misunderstanding of the real situation through the unwarrantedly wide scope claimed for Judge Bourquin's opinion by certain correspondents in financial and other journals.

CANADIAN IRON ORE MINES

By A. H. A. Robinson.

Discovery of iron ore in Canada is recorded as early as 1667; and in 1733 there was already one forge in operation. This earliest plant was succeeded in 1737 by a group of forges at Three Rivers, Quebec, which remained in active operation almost continuously until 1882, being at that time the oldest active iron producers in America. A number of other small plants were erected at various points in Canada during the latter part of the eighteenth and the earlier part of the nineteenth centuries; but the iron industry did not assume any large proportions, or commence to take on its modern form until 1896. Since then its growth has been rapid.

In the earlier days, when the iron industry was small, sufficient ore was available locally to meet all the demands of the furnaces. Since 1896, however, this condition of affairs has changed; both the production of iron ore and its consumption in blast furnaces have increased; but the latter so much more rapidly than the former that in 1916 the total production of iron ore in Canada was only equal to 15.5 per cent. of the total ore smelted in Canadian blast furnaces.

Practically all the imported ore comes either from Wabana, Newfoundland, or from the Lake Superior iron ranges in the United States. It might be noted in passing, however, that the word "imported" has not the same significance as applied in the two cases. The Wabana ore, on which the Nova Scotian iron and steel industry is based, comes from a sister British colony, and is owned and mined by Canadian companies for use in their own furnaces; on the other hand, the Lake Superior ores are owned and mined by United States interests, and are bought on the open market by the Ontario smelters.

At present almost all the Canadian ore produced is the output of two mines, the Magpie and the Helen. Both are situated in the Michipicoten district, in Ontario, and both are owned and operated by the Algoma Steel Corporation of Sault Ste. Marie, Ontario.

In any consideration of Canada's iron ore resources, a point that should not be lost sight of, is that the total area comprised in the Dominion is very large, and that much of it is practically unexplored so far as its iron ore possibilities are concerned. With very few exceptions, all the known occurrences are situated in the older and more or less settled and known districts. In the comparatively unexplored regions of the north, large areas of iron bearing rocks occur at a number of points, but, on account of their inaccessible location there is, at the present time, little to induce a thorough exploration of them in a search for ore bodies.

A summary review of the iron ore situation in the different provinces follows:

British Columbia.

Up to the present the production of iron ore in British Columbia has been an almost negligible quantity. The total recorded from 1886 to 1903, both years inclusive, was only 62,578 tons; since 1903 the only production recorded was in 1907, when 2,500 tons were shipped.

Most of the ore—practically all magnetite—was sent to Irondale, Washington, U.S.A., where it was used in the production of pig-iron in a small charcoal blast furnace. The balance went to lead smelters to be used as flux.

The small production of British Columbia has been due, not so much to the lack of iron ore deposits, as to the lack of a market for the ore. In the absence of a local iron smelting industry, there has been no particular incentive either to develop the known ore-bodies, or to search for new ones.

The different varieties of iron ore found in British Columbia include magnetites, hematites, limonite or bog ores, and clay ironstones. The most important of the known ore bodies are a series of magnetite deposits which occur on the islands along the coast in the western part of the province.

Alberta, Saskatchewan and Manitoba.

Up to the present time, no iron ore deposits of such size and quality as to make them of commercial value have been found in the Middle West provinces. There are, however, very large areas unprospected in all three, in which iron ores may be discovered in the future.

Several writers have drawn attention to the fact, that a steel plant located in western Alberta would have essentially the same location with reference to coal-fields and transportation routes as the Colorado Fuel and Iron Company's plant at Pueblo, Colorado. The favorable situation with respect to the coal-fields and the growing industrial market of the prairie provinces should, therefore, make the discovery of even a moderately good iron ore deposit in this district, or in the adjoining portions of eastern British Columbia, a matter of more than ordinary importance.

Ontario.

Previous to 1889, all the ore mined in the province, with the exception of such small quantities as were used in the earlier attempts at iron smelting, was exported to the United States. From 1889 to 1895, both years inclusive, production ceased entirely. About 1896, a system of bounties inaugurated by the Federal and Provincial Governments to encourage the manufacture of iron and steel from native ores, had the desired effect of stimulating the industry, and the following years witnessed the erection of blast furnaces at various points in the province: at Hamilton in 1895; at Deseronto in 1898; at Midland in 1899; at Sault Ste. Marie in 1904; and at Port Arthur in 1907. Strenuous efforts were made to use Ontario ores as far as possible and thus obtain the advantage of the liberal bounties offered; iron mining took on a new lease of life, and prospecting for iron ores became general.

In eastern Ontario old mines were re-opened, and for a time ore was shipped in small quantities. Unfortunately the quality of most of it was poor, and cobbing had to be resorted to, to rid it of sulphur and other deleterious ingredients, and bring it up to merchantable grade. As a result these mines have again, one by one, lapsed into idleness.

In northwestern Ontario, the discovery, in 1899, of the deposit of brown hematite that later developed into the Helen mine, together with the fact that throughout this part of the province there are widespread outcrops of banded jaspers, magnetites, and hematites, of the same geological formations as the Vermilion and Mesabi iron ranges in Minnesota, led to feverish activity in the search for iron ore. Very large sums of money were spent in looking for new deposits and in the exploration of the known ones. The net results of these efforts have been disappointing; we have, it is true, the Josephine mine (still undeveloped); Atikokan, with its high sulphur ores; the Magpie, Helen and other siderite bodies; and a variety of the lower grade, siliceous deposits of banded iron formation. But the only

large body, both high grade and of good quality, yet discovered in Ontario, is that at the Helen mines.

Quebec.

Iron ore was first mined and smelted in the Province of Quebec early in the eighteenth century, and from that time until 1883, the industry was carried on almost continuously at Three Rivers, in the St. Maurice district. Other furnaces using local ore were operated at Radnor Forges and at Drummondville, the last to shut down being the Drummondville furnace in 1911. The ores used were bog ores, with charcoal for fuel. The output of all the furnaces was small, and the industry derived its chief importance from the superior quality of the pig-iron made.

Furnaces have also been built at various times and places in attempts to smelt some of the other classes of ore found in the province, but all were short-lived, and none of them achieved commercial success.

New Brunswick.

New Brunswick, like all the other provinces in Eastern Canada, except Prince Edward Island, had in early days its small local iron industry based on local ores.

Between 1848 and 1884, about 70,000 tons of hematite, obtained from deposits in the neighborhood, were smelted in a small furnace near Woodstock, in Carleton County. The deposits were very shallow and the iron content of the ore low.

Some limonite from small deposits at Maugerville, a few miles southeast of Fredericton, was also smelted in the same furnace.

As a producer of iron ores, however, the province has never been prolific. From 1889 to 1909 no output is recorded; from 1910 to 1916, shipments to the extent of 202,850 tons were made, all from one mine.

The only known deposits that have any economic interest are those found near Austin Brook, in Gloucester County, about 23 miles southwest of the Town of Bathurst, and known as the Bathurst mines. They consist of fine-grained, siliceous magnetite, with which is intermixed some hematite.

Nova Scotia.

While next to Ontario, Nova Scotia has to its credit the largest aggregate output of iron ore of any province of the Dominion, the total tonnage from the earliest days to the present would not last a large modern plant very many years (in 1915, 840,394 tons of Newfoundland ore was used in Nova Scotia blast furnaces). Latterly, with the exhaustion of the workable deposits of better-grade ore, production has declined until now it has reached the vanishing point. The extensive development of the Wabana iron ore field in Newfoundland, and the ease and cheapness with which Nova Scotian furnaces can secure a supply of suitable ore from that source, have also operated to decrease interest in the development of local supplies.

A BARITE MILL AT PREMIER-LANGMUIR MINE.

At the Premier-Langmuir barite mine in the township of Langmuir, east of Porcupine, a 30-ton mill for the treatment of the barite is nearing completion. We may look for a production from this deposit in the near future. Considerable work has been done on the vein which is 4 ft. to 6 ft. in width and along one wall is argentiferous. Lack of a method of recovering the silver explains why this property was not on a producing basis 4 or 5 years ago.

HOW MINING BENEFITS THE COUNTRY.

Mining is one of our basic industries and it enters more or less into the lives of every one of us. You do not need to be a stockholder in a mine to be financially interested in its development. Take, for instance, the little camp of Cobalt. Of course, a camp to be successful must make profits. Cobalt does that, and the result is the dividends that are paid. If you are a shareholder, that is what you are most interested in. But let us look at Cobalt from another angle, that of a non-shareholder. It costs seven million dollars annually to run the Cobalt mines. After careful enquiry I am convinced that most of the seven million dollars eventually finds its way down to Toronto and Montreal. If you are a merchant or a manufacturer, does not a matter of an extra few millions annually coming into the city interest you? Remember that Cobalt is only one of a number of flourishing mining camps up North.—A. A. COLE.

DEEP EXPLORATION FOR NICKEL ORE.

A most interesting piece of exploratory work is in progress in the Sudbury nickel region, where diamond drilling prospecting is being carried on by the Mond Nickel Co. lot 2, concession I, township of Creighton. The Creighton mine, operated by the Canadian Copper Co., is situated on lot 10, concession I, Snider. The ore body dips northwesterly at an angle of about 45 degrees and it is hoped the drills will encounter ore at a depth of about 3,800 feet. Three holes are being put down on the north part of lot 2, near the boundary line between lots 1 and 2. Reference to the Creighton mine geological map which accompanied the report of the Royal Ontario Nickel Commission will make the situation clear. If this daring and expensive piece of prospecting is crowned with success development of the ore body will involve sinking a very deep shaft, comparable to those of the Rand or Keweenaw Point.

Mr. James Gray, at present manager for a coal mining company operating in Tasmania, expects to return to British Columbia next March. Several years ago he was manager of the Nicola Valley Coal and Coke Co.'s Middlesboro colliery, near Merritt, Nicola Valley, and afterwards for two years, of the No. 7 mine of the Comox colliery, Vancouver Island, owned and operated by the Canadian Collieries (Dunsmuir) Limited.

Mr. K. C. Laylander, of Hydraulic, Quesnel river, Cariboo district of British Columbia, expects to shortly leave for the Eastern States to meet the directors of the Quesnelle Hydraulic Gold Mining Company, with a view to expansion of the company's work in the Quesnel mining division, of which he is in charge. He states that he lately uncovered an immense deposit of black sand, running high in value, and it is with the object of making arrangements for the development of that deposit that he is arranging to go East. The leading men in the Quesnelle Hydraulic Gold Mining Co. are resident in either Pittsburg, or Philadelphia, Pennsylvania.

Many friends in Canada of Mr. A. B. W. Hodges, of Los Angeles, California, formerly for some years in local charge of the Granby Consolidated Company's mining and smelting enterprises in the Boundary district of British Columbia, will be interested to know that he is a member of the Sulphur Committee of the War Industries Board of the United States, which was pursuing its duties in Texas early last month.

FLOTATION AT COBALT, ONT.

Mr. W. E. Simpson, of Cobalt, has an interesting article in the Dec. 3 number of "Mining and Scientific Press" on flotation of Cobalt silver ore. He says in part:

Flotation has proved a useful auxiliary in the treatment of silver ores, and is now in operation at practically every producing mine in the Cobalt district. Mines originally equipped with plants for gravity concentration have bettered their recovery as much as 5 to 15 per cent. through the addition of flotation units, while the added cost is from 5 to 15 cents per ton. With the all-sliming process (grinding in cyanide solution), extensive experiments indicate that when recovering the refractory minerals by flotation, the usual revenue is maintained or improved, and that the consumption of cyanide is reduced one-third. The chief difficulty with flotation lies in the disposal of the concentrate, marketing to distant smelters being expensive and local treatment not yet having proved satisfactory. Threatened litigation by Minerals Separation, Ltd., is also seriously embarrassing metallurgical progress in the Cobalt district.

The earliest application of the flotation process to the treatment of silver ores at Cobalt dates from 1910, when some small-scale tests were made in the laboratory at the Coniagas mine, to note the effect, if any, of violently shaking representative samples of mill-pulp to which had been added a few drops of oil. No commercial importance was attached to the results obtained in these simple experiments and the matter remained in abeyance so far as that mine was concerned until quite recently.

The next attempt was made in 1914, when a former employee of the Minerals Separation Company constructed an experimental unit at the Temiskaming mine and demonstrated the feasibility of profitably treating the fine tailing, then being run from the concentrating mill to the waste-pile. The litigation ensuing over the use of flotation acted as a deterrent to the continuance of experiments.

While these tests were being conducted, a sample of slime, representative of what may be now called flotation-feed, was sent by the Cobalt Reduction Company to its consulting engineer in London to determine whether the flotation process could be introduced successfully in the Cobalt district. The tests were made in the laboratory of Sulman & Picard, metallurgists for Mineral Separation, Ltd., and the results were as follows: The sample assayed 5.5 oz. silver per ton, and the products obtained were a concentrate assaying 43.5 oz. containing 57.11 per cent. of the silver in 7.3 per cent. of the weight of the original slime, a final tailing assaying 1.99 oz per ton with 24.88 per cent. of the gross content left in 69.15 per cent. by weight of the slime, and a middling containing the rest. Alf. Tellman, who signed the report, concluded by saying: "I believe that if the slime can be successfully treated by cyanide, you will be able to make more profits than with flotation."

The serious adaptation of the flotation process to the Cobalt ores really started when T. R. Jones, manager of the Buffalo Mines, after conducting an extensive experimental campaign, installed the first treatment plant to operate on a commercial scale in October, 1915. This unit employed the Callow type of machine and had a capacity of from 50 to 75 tons per day. So satisfactory were the results that

additional plant was immediately erected, bringing the total capacity to 600 tons per day in September, 1916.

The first flush of success led to the statement by enthusiastic operators that flotation would entirely replace the gravity method of concentration, completely displace the cyanidation of Cobalt ores, and revolutionize the established practice of metallurgy. Further experience, however, has called for a modification of these views. A satisfactory recovery of the silver-bearing minerals by flotation is only obtainable from material in a fine state of subdivision, and the tendency now is to apply the process to the treatment of slime and to such portions of tailing as may be sufficiently rich to warrant the additional expense of fine grinding.

Applicability of Flotation—In reaching a decision regarding the adoption of a process and the installation of a plant, two factors exert an influence in favor of flotation at Cobalt more than in mining districts generally; these are (1) the winter is long and heating is costly, and (2) many of the mines appear to have already passed the zenith of their prosperity, their ore-reserves being now narrowly limited in extent. The most desirable process for the Cobalt mines therefore is one that can be housed in the smallest building and installed with the lowest capital outlay. Experience has proved that a flotation plant can be erected in a space less than one-fourth that required for either a group of gravity-tables or a cyanide-plant of equal capacity. In a modern mill for treating 100 tons per day it is estimated that a saving in capital expenditure of about \$20,000 can be effected by the substitution of the new for either of the older methods. The working profit also favors the newer method. The chief handicap to flotation is its inability to produce a finished article, that is, one easily marketable, such as high-grade bullion. Flotation in reality is a method for concentrating valuable mineral into small bulk, the ratio of the weight of material treated to that of the product being, in the Cobalt district, approximately between 50 and 100 to 1. This concentrate either must be treated locally or sold to distant smelters, whereas if cyanide bullion is produced no further treatment is necessary.

The litigation, with which the Cobalt district is being threatened, prohibits the publication of authoritative details for fear that they may be used subsequently in law-court proceedings. It may be stated, however, that, as a general rule, the recovery varies from 75 to 90% of the silver in the material treated by flotation and the cost of the actual operations from the time of receiving the slimed feed to that of discharging the finished concentrate is roughly 20c. per ton.

Minerals Separation.—In harmony with its attitude elsewhere, the Minerals Separation Company, through its subsidiary organization, the North American Corporation, has threatened proceedings against all users of flotation in the Cobalt district, so as to collect, if possible, the royalty of 2 1-2 per cent. of the gross value of the whole concentrate recovered, according to the usual demands of this patent-exploiting company. The success of flotation at Cobalt is due entirely to local enterprise, therefore this demand is resented bitterly. The indications are that a legal fight is to follow, and a campaign has been started to enlist Government action "with a view to having the patents annulled." Amid the legal turmoil, metallurgical progress is being seriously handicapped, the

free exchange of ideas has been completely stopped, and an embargo is being placed on valuable information. It is sincerely hoped that an equitable settlement may be obtained at the earliest possible moment.

Flotation is undoubtedly destined to play a part in all milling operations in the Cobalt district, although its scope will not be as extensive as was at first anticipated. As a competitor to the sand-table it has not met with the success gained in other localities for the reason that the valuable minerals are difficult to float and are easily recoverable by gravity-methods. For successful flotation, the arsenic, nickel, and cobalt minerals, with which much of the silver is associated, must be reduced to a fine state of subdivision in order to conform to some flotation law in which the ratio of surface-area to mass is an important factor. Fine crushing is expensive; consequently the best field for flotation lies in the treatment of primary slime. On this material, it has already completely superseded the slime-table, the additional revenue being greatly in excess of any additional cost incurred. One concentrating plant treating 150 tons of ore per day has been able to add to its recovery from 200 to 300 oz. of silver in concentrate daily, the additional revenue being directly attributable to the introduction of flotation for the treatment of slime. The approved type of gravity mill for Cobalt, therefore, should contain jigs for the extraction of the coarse metallic silver, gravity tables for the treatment of sand, and flotation for the slime.

MAGNESITE FOR FURNACE LINING.

Lately the Quebec magnesite industry has taken an important step forward. The two principal operators, the North American Magnesite Company, and the Scottish Canadian Magnesite Company, are now making dead-burned magnesite, containing a suitable percentage of iron, for furnace lining. The magnesite is being burned in the cement kilns of the Canada Cement Company, at Longue Point, near Montreal, and at Hull, near Ottawa. The product is very satisfactory and widely used. The North American Magnesite Company has obtained a lease on a promising property in Harrington township, and a gang of men is at work mining magnesite and storing it, awaiting winter roads to haul it to the railway.

Recently there was published in The Daily Colonist, of Victoria, B. C., some information along the lines of editorial comment made in this Journal on December 1 relative to the proposal that printing of the publications of the Canada Department of Mines be stopped. Writing to that newspaper, a resident of Victoria bore testimony to the value of at least one of the Geological Survey reports, information obtained from which, he stated, had led him to prospect in a part of Vancouver Island within forty miles of Victoria, with the result that he discovered copper ore and located mineral claims, the development of which has been undertaken by a prominent mining engineer who is known to be acting for mining men of wide connections and good standing in the United States. He gives his experience as a striking demonstration of the value of at least one of the departmental reports, and adds that "an ounce of fact is worth a ton of theory," especially as there is promise of a productive mine being the eventual outcome of his having read the Geological Survey report to which he referred.

OBITUARY.

On November 9 the news was published at Trail, British Columbia, that Major Kenneth Burpee Carruthers had met his death while serving his country in France. Major Carruthers was for ten years in the employ of the Consolidated Mining and Smelting Company, at its mines at Rossland, at Moyie and Kimberley in East Kootenay, and still later at its Molly Gibson mine in Nelson mining division. He was a graduate of McGill University and of the Royal Military College, Kingston. Shortly after his enlistment for active service he was made a captain of heavy artillery; and was officer commanding the 29th Field Battery, C. E. F. He had served between two and three years in France, in which country a brother was also killed. His age was about 36 years, and his death is widely regretted in the Kootenay districts of British Columbia, in which he had many friends.

Mr. Grant B. Schley, president of the Howe Sound Company, of New York, the holding company of the Britannia Mining and Smelting Company, operating in British Columbia, died at the age of 70 years at his home at Far Hills, New Jersey, on November 22, after a comparatively short illness. The Daily Province, of Vancouver, B.C., states that although his health had not been what might be called robust, it was not expected that his death was so near. Two months ago he had a serious setback, but his recovery was confidently looked for, so that his death was a surprise to many of his friends. It was in 1904 that the late Mr. Schley commenced to take a keen interest in mining in British Columbia, and, after lengthy negotiations, he secured control of what is now the Britannia Mining and Smelting Co., the property of which near Howe Sound, in Vancouver mining division, has since been developed into one of the large copper mines of Canada. The Province states, further, that during the time he has been connected with it, Mr. Schley has invested between \$7,000,000 and \$8,000,000 in the property, and the fact that its mining and concentrating operations are now on such an extensive scale, as compared with those of days gone by, is due in large measure to his foresight and energy.

The death occurred at Nelson, B.C., on November 19, of Professor Arthur Lakes, the well-known geologist and writer, at the age of 75 years. He was born in England, where he received his education. While still a young man he went to the United States, where, says the Nelson Daily News, he finally took up the study of geology and practical mining. Afterward he was a professor of geology in the University of Colorado. He had been, for many years, a frequent contributor to mining journals and other publications. For several years before his death he had resided in Nelson.

COST ACCOUNTING FOR OIL PRODUCERS

The U. S. Bureau of Mines, Department of the Interior, has recently issued Bulletin No. 158, on "Cost Accounting for Oil Producers," by Clarence G. Smith. This is the first treatise of its kind and is a simple explanation of the methods that may be employed in cost accounting for oil producers, who, on account of the peculiar and unusual conditions affecting oil production, require a much different system of cost counting than any other class of business men.

SPECIAL CORRESPONDENCE

BRITISH COLUMBIA.

As the year nears its close there seems to be good reason to think that there will be a considerable decrease in the value of the mineral production for 1917 as compared with that for 1916. One estimate published placed the probable total at about \$40,000,000, as compared with \$42,290,000 for 1916, but this was stated to be conditional upon an early resumption of operations at the smelting works and refineries at Trail and the production of ore at the mines that ship to Trail, which conditions, however, have not been fulfilled. Under the circumstances, then, it is unlikely the 1917 total value of mineral production will be nearly as large as that of the year immediately preceding. Without having gone into much detail to make a reliable estimate, the opinion may be given in a general way that while there may be an increase in total value of placer gold, and possibly of zinc, the decrease in value of other metals will be much larger than such suggested increase. Further, it is unlikely that the total output of coal has been any larger in 1917 than in 1916; in fact, the figures available at the beginning of December made it appear that there would probably be a small decrease in the year's gross production of coal as compared with 1916.

There had not been a settlement of labor troubles at Trail by the middle of December, so far as had been made known in Provincial newspapers, but Mr. W. H. Armstrong, of Vancouver, B. C., who earlier in the year had been given the duty of getting the coal mines of Alberta and Southeastern British Columbia into operation after a long suspension of work, has been at Trail endeavoring to bring about an agreement between the striking employees and the Consolidated Mining and Smelting Company. Perhaps before these notes shall have been printed he will have succeeded, but at the time of writing neither party to the dispute appears to be showing any sign of yielding. Besides Mr. Armstrong, there are Mr. McNiven, Dominion fair wage officer, and some officials of the International Union of Mine and Smeltermen engaged in negotiations looking to an agreement.

The closing of the Trail smeltery to receipt of ores from Slocan and other mines has necessitated efforts being made to find another market for them. District newspapers have reported that there is a possibility of arrangements being made for shipment of ores to United States smelting works, and in this connection it is stated that arrangements have been entered into between the Canadian Pacific and American railways for a joint freight rate on silver-lead ores from British Columbia mines to smelteries in the United States.

West Kootenay.

Ainsworth.—The Kootenaiian, Kaslo, states that the suspension of operations at the concentrating works at Kaslo has still further increased the number of unemployed men there.

Announcement has been made that the Utica Mining Co. is to acquire the Bell and Sunset mines for a consideration of \$70,000 in cash and \$800,000 in shares in the Utica company. The Utica mine is situated near the head of Twelve-mile creek in the western part of Ainsworth mining division. The Bell is in Jackson basin, about eight miles south of Whitewater, near the boundary line between Ainsworth and Slocan divisions, while the Sunset is on the mountains forming the

divide between those divisions. Both Bell and Sunset mines have been producers in past years, the former largely of zinc ore and the latter of high-grade silver-lead ore. They are neighboring properties at the head of Jackson basin.

Slocan.—While there has been but little ore shipped from Slocan mines since the suspension of work at the Trail smelting works, other than zinc concentrate from the Standard Silver-Lead Mining Co.'s concentrator at Silverton under its contract with a zinc smeltery at Bartlesville, Oklahoma, U. S. A., few mines have yet completely stopped work as a result of the labor difficulties at Trail.

Near Sandon, the Slocan Star is hampered by lack of money to pay for necessary development work, comparatively heavy liabilities having been incurred to provide additional milling facilities, better water supply for the concentrating mill, aerial tramway, etc., without first having developed sufficient ore to keep things going in such a way as to meet payments when due. The shareholders in the company are now asked to pay an assessment on their shares to tide over the present financial difficulty; meanwhile operations have been stopped.

In connection with the Lucky Jim Zinc Mines, Ltd., it is stated that the former manager, Mr. G. Weaver Loper, has surrendered possession of \$150,000 in bonds he held as security for alleged advances to the company, but no definite action, so far as has been made public, has been taken in regard to the stated large over-issue of shares in the company. The closing of district concentrating plants at which Lucky Jim ore was made marketable and of the Trail smeltery to which shipments were being made, have for the time interfered with the progress the receiver was making toward clearing off liabilities to various creditors of the company.

A different condition of affairs is claimed for the Rambler-Cariboo Mines, Ltd., operating on the other side of the mountain from the Lucky Jim mine. A report published in Spokane, where is situated the head office of the company, follows: Promising conditions have been developed on the fifth and ninth levels of the Rambler-Cariboo mine, according to a report received from the mine, in Slocan district of British Columbia. It is believed important ore resources will be developed on those levels. The concentrating mill has been operated, working only one shift a day since the interruption, of ore shipments following the suspension of smelting at Trail. A fairly large quantity of crude and concentrated ore has been accumulated at the Rambler-Cariboo mill. It is probable, though, that it will be found desirable to stop production at the mine for a while. It is estimated that the company's surplus at the end of November was \$32,000.

Other Slocan notes are that work has been stopped at the Ivanhoe, a small property, near Sandon. Development of the Noble Five group is being continued. Mr. Bruce White, manager of the Noonday Mines, Ltd., reports the outlook for the Noonday mine as satisfactory except that shipment of ore is not at present practicable. The Surprise Mining Co., operating successfully the Surprise mine above Cody and the concentrator just below Sandon, has some forty men at work on the old Bosun property, between New Denver and Silverton, Slocan lake, which mine was a comparatively important producer some years ago until much zinc ore was encountered and a market for it could not then be found. The several properties including the Queen

Bess and Van-Roi, that for some months have been operated by Mr. Clarence Cunningham for himself and associates, are in good shape for maintaining production as soon as buyers can be obtained for their silver-lead ores, and the Hewitt group, in Silverton camp, the last property to be taken over by that syndicate, is stated to have much silver ore of a good grade available for extraction whenever conditions shall be favorable for its being shipped profitably. Other mines in the district are also being operated.

Nelson.—There is little mining news of importance from this division at present. The Daily News, Nelson, has of late given scarcely any information relative to mining in the division, so it seems fair to assume that for the time not much is being done. The chief shipper in recent months up to the time of the closing of the smelting works at Trail in the middle of October was the Emerald lead-ore mine, in the neighborhood of Salmo, where the outlook has been increasingly favorable for maintaining a considerable output of ore. It was stated several months ago that shipment of gold-silver ore was to be resumed from the Yankee Girl mine, near Ymir, with a Boundary district smelting works as its destination, but no information in this connection has been made public in quite recent weeks.

Rossland.—Similarly, no news of Rossland mines is being made public. Only four mines were being worked in the camp when the Trail trouble arose, namely, the Centre Star group, Le Roi, and White Bear, by the Consolidated Mining and Smelting Co., and the Josie group, by the Le Roi No. 2 Ltd. A report from Grand Forks is to the effect that there is a possibility of the Le Roi No. 2 company shipping ore from its Josie group to the Granby Consolidated Co.'s smeltery at Grand Forks, but no definite information as to this has yet been made public.

Boundary.

Early in November The Ledge, published at Greenwood, stated that the Canada Copper Corporation had that week shipped three carloads of copper to New Jersey and had two other carloads awaiting shipment; also, that a second blast furnace at the local smeltery was to be blown in and would be run a short time. For some time past the company had been shipping its blister copper to Trail to be refined at the Consolidated Company's electrolytic refinery, but on the closing of the latter company's works other arrangements had to be made for refining it.

Shipment of ore from the Union mine, in Franklin camp, some fifty miles north of Grand Forks, has been stopped for the winter. Ore from this small mine has been sent to the Granby Company's smeltery during the months when hauling could be done from the mine to the rail-head at Lynch creek, but now that snow has fallen the running of motor trucks can not be continued except under difficulty. A short time ago it was stated that the owners of the Union property were endeavoring to arrange to put in concentrating plant so as to be able also to use some of the lower grade ore occurring in their mine.

Similkameen.

News from Camp Hedley is to the effect that recently there was quite an influx of miners and shovellers, so that the Hedley Gold Mining Company now has an adequate supply of labor at its Nickel Plate group of gold mines.

According to the Similkameen Star, of Princeton, about 150 miners are now employed at the Canada Copper Corporation's mines on Copper Mountain, twelve miles from Princeton. It is stated, further, that the miners there are paid on the bonus system, and that they earn about \$5.20 a day.

From twelve to fifteen men have lately been employed at the coal mine near Coalmont, taking out coal and getting the mine into shape for being operated again. Some coal is being shipped to Vancouver. The property is now controlled by a syndicate of Vancouver men, including Mr. R. S. Lennie, Mr. Blake Wilson, and others.

PERSONAL AND GENERAL

Mr. J. A. Dresser, of Montreal, and Mr. H. E. T. Haultain of Toronto have been nominated as vice-presidents of the Canadian Mining Institute to succeed Mr. Chas. Fergie and Mr. T. W. Gibson.

A meeting of the Toronto Branch of the Canadian Mining Institute was held on Saturday, Dec. 8, at the Engineers Club. The speakers were President A. A. Cole, of Cobalt, Mr. D. B. Dowling of the Geological Survey, Ottawa, and Mr. John Stirling, Inspector of Mines of Alberta.

Mr. W. R. Wilson, of Fernie, B. C., general manager for the Crow's Nest Pass Coal Company, recently paid a business visit to the Coast districts of Washington and British Columbia.

Mr. George L. Fraser, for the last two years in charge of surface operations at the big copper mine of the Granby Consolidated Company at Hidden Creek, near Observatory Inlet, B.C., is now in charge of development work on the coal lands on Vancouver Island the company has acquired. It is stated that Mr. J. W. Powell, who several years ago was mine manager under Mr. Fraser at the International Coal and Coke Company's mines near Coleman, Alberta, has resigned as superintendent for a coal mining company operating in Kentucky, to take a similar position with the Granby Company on Vancouver Island.

The Victoria, B. C., office of the Ladysmith Smelting Corporation, has been closed, and an office opened by that company in Seattle. Mr. W. J. Watson, resident representative of the Tyee Copper Company, is again manager of the smelting works at Ladysmith, and Mr. Geoffrey B. Kitto has resumed his former position of superintendent.

Mr. E. G. Montgomery, of Rossland, B. C., superintendent of the Consolidated Mining and Smelting Company's Centre Star group of mines, has been examining mining property in Camp Hedley, Similkameen district.

Mining and Scientific Press states that Mr. James G. Parmalee, research metallurgist for the Granby Consolidated M. S. and P. Co. at Anyox, B.C., has accepted a fellowship in metallurgy at the University of Idaho, Moscow, Idaho, in connection with the United States Bureau of Mines.

A report from Telkwa, in Omineca mining division, British Columbia, states that men working on the Cassiar Crown Copper Company's property on Grouse Mountain, in that neighborhood, have sent in to Telkwa word that they have run into five feet of clean ore. The company has its headquarters at Spokane, Washington.

MINERALS SEPARATION PATENTS

In the matter of the Minerals Separation controversy which began in Cobalt, Sept. 10, and which has since spread to all parts of the continent, there is at present a lull. The matter is now receiving the attention of the patent office of the Department of Agriculture. The mine operators have submitted evidence which they believe sufficient to convict the M.S.N.A. Corporation of being under German influence, while the M.S.N.A. Corporation officials have furnished the department with evidence which they claim will clear them of the charges made.

In a free country such as Canada, an individual who makes a discovery which is patentable, is entitled to protection. If the idea is of commercial value, the revenue rightly belongs to the inventor. This is what encourages inventive genius. Yet, that is precisely what the M.S.N.A. Corporation is endeavoring to rob the world of. The proof is this: Any one who subscribes to the license of the M.S.N.A. Corporation thereby enters into a binding contract to not only pay the prescribed terms of royalty, but also to hand over to the licensors all improvements, additions and modifications which may be patentable, and such to automatically become the property of the M.S.N.A. Corporation.

The M. S. N. A. Corporation owns certain patents pertaining to the recovery of mineral from ore by use of the flotation process. Other concerns such as Elmore, and Callow own somewhat similar patents. However, the M.S.N.A. Corporation appears to think all others than their own are infringements. Granting, for the moment and only for simplifying discussion, that this last named corporation does own the rights to the process and that all others are infringers, then the Corporation is entitled to royalty from anyone who wishes to use the process. If the terms of royalty are excessive and tend to burden the mining industry it is for the Government to step in and protect the industry. In arriving at this conclusion however, we also arrive at another. The Corporation can license what it controls but cannot by any stretch of imagination lay claim to any discovery, addition, modification, or improvement made by other individuals while using the process. Because Tom invented a pump he cannot accuse Dick and Harry of infringing when they invent a wind-mill.

In support of their scheming paragraph 3, the M.S.N.A. Corporation has drawn up paragraphs 5 and 6 wherein it is pointed out that anyone who once becomes their licensee must not while using the process nor any time after a discontinuance of the contract dispute or even object to the validity of the M.S. patents. It is doubtful if this latter attempt to silence mining men and metallurgists could be legally enforced, but any one who should be compelled to subscribe to the present form of license would feel more or less bound in honor to live up to the conditions outlined.

Thus, it is plainly up to the Government to first investigate the charges of German control; secondly, to find out what would be reasonable terms of royalty; thirdly, to confine the M.S.N.A. Corporation to the licensing of the patents owned by that corporation.

The writer has been informed by a gentleman who has for several years been in the service of the M.S.N.A. Corporation, that of all the ideas reported to that corporation by their licensees, in no case has the licensee received any material sum for the discovery, or discoveries.

Another matter which stands out as a possible menace to the progress of metallurgy, and which would tend to indicate that possibly an attempt is being made to evade the patent laws of the country in which they operate, is this: By taking out patents for improvements, additions and modifications, a portion or perhaps all of which are the results of the intellect of their (M. S. N. A. Corporation) licensees, that corporation is constantly coming into possession of a veritable sheaf of legal documents which will possibly be held as a weapon, for many years to come, over the science of flotation. Under cover of meaningless, but confusing legal wrangle the patents of 1916 might well be employed as a means of carrying the monopoly on for another dozen years or more. By the end of that time, if such practice were not squelched, there is no telling but that new and later patents would be taken out which would again carry the monopoly forward for another term of years.

A sense of common justice will bid the Government to free the mining industry from the shackles of the existing monopoly. Accredited representatives of the Government deliberately fix the price of wheat, of potatoes, of coal, and of copper, and now contemplate the fixing of the price of silver. They should not hesitate to fix reasonable terms of royalty for use of a process which is of great benefit to the mining industry and which is being held at exorbitant ransom to any one who wishes to use it.

As stated not long ago, the fruits of the intellectual energy directed along this one particular highway of science should be the reward of the discoverer. Screened behind the shield of science which has ever shrouded the inner workings of the M. S. N. A. Corporation, may be considerable intellect or may be profound ignorance in wily retreat feasting upon the brains of the world. The M. S. N. A. Corporation, whether bursting with energy or wallowing in a slough of inertia, by the enforcing of its license in its present form would have an endless chain of useful ideas flowing to its bosom, and to be held at exorbitant ransom to the very men through whose combined energy the complete idea was evolved.

It is from that menace the mining men and metallurgists of Canada demand protection. The writer is not speaking without authority in stating the mine managers, as a body, of the largest precious metal mining camp in the Dominion will refuse to subscribe to any such contract as that embodied in the license of the patent exploiting firm of Minerals Separation North American Corporation. Truly, the situation warrants immediate action by the Canadian Government, not only in the matter of nationality, but also in the matter of terms of royalty and conditions imposed upon the licensees.

The belief is growing, especially in the Cobalt camp, that the terms of royalty will shortly be fixed and the royalty be paid to the Canadian Government to remain in escrow until such time as the stability of the Minerals Separation master patents is proven, and also until such time as that concern is proven free of German influence.