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BRITISH AND GERMAN IRON AND STEEL TRADE.

British economists are persistently calling attention to the rapid growth of Germany's iron and steel trade. Since the year 1897, when the export bounty policy was put in operation, Germany has steadily overtaken her commercial rival. British exports of iron and steel amounted to 3,318,000 tons in 1897. In the same year Germany exported 1,069,000 tons. But during 1908 Germany's trade had grown to such an extent that exports totalled 3,732,000 tons, while Great Britain's exports aggregated only 4,233,000.

This comparison is more strongly in Germany's favour when we consider that fully one-third of Great Britain's iron exports may be classed as pig-iron. German exports of pig-iron, on the other hand, constitute hardly a twelfth of her total, and the proportion is constantly decreasing. The commercial gain to Germany, in thus selling finished products abroad, instead of raw material, is enormous.

A review of natural conditions affords no key to the situation. Raw materials can be assembled in Great Britain more cheaply than in Germany. British coal is cheaper and better. There is no great disparity in cost of labour; although the cost of living is cheaper in Germany. Transportation facilities are better in England than in Germany. What, then, has enabled Germany, with her lean ores and her poor fuel, to gain so remarkably upon her wealthier and more favoured neighbour?

In the face of natural disadvantages, Germany has sprung into second place as a producer of iron and steel. At the same rate of expansion Germany's export trade will soon eclipse that of Great Britain.

As we have seen, neither to geographic nor to other natural advantages can German progress be attributed. One outstanding feature, however, explains the strength of her position. The German iron and steel trade is perfectly organized. By a system of differentiated syndicates, not only is the trade, foreign and domestic, regulated, but a schedule of co-operative bounties was most successfully applied for a period of some years. Simultaneously with a slackening in domestic demand, the bounties rose so as to enable German manufacturers to dump their products on the British market. Similarly, when the domestic demand was strong, the bounties were lessened. Thus production was maintained, and the entire iron and steel industry kept continuously active.

The bounty regulations were in force through the period, 1897-1905. During that space of time German iron and steel exports increased 200 per cent.

That the stimulus thus administered induced a wholesome growth is not to be denied. But it was successful solely because of the complete and effectual syndication of the iron and steel interests. Each of the numerous

syndicates controls distinct kinds of products. The whole country is divided into zones, and, in the allocation of orders, the general welfare of all constituents is considered. Thus it is usual for a British order to be allotted to one particular district, Russian orders are usually placed in another, and so on. That is, foreign orders are allocated where they can be filled most advantageously. Geographical position, equipment, cost of production, are all considered.

In the development of Great Britain's iron and steel trade no such control has been present. Combinations, large and small, have been organized, but competition between individual interests has prevented any approaching the convention that exists in Germany. No tariff protects the British manufacturer. The national temperament does not take kindly to the rigid organization that appears to be the central idea of German civilization.

But, be these reasons sufficient or insufficient, the fact remains that Great Britain is falling behind, and that Germany, to a marked extent, is profiting by Great Britain's recession.

The hopeful aspects of the situation are that Great Britain is slowly becoming aware of the truth, and that she has natural advantages far greater than those with which Germany is endowed.

LA ROSE AFFAIRS.

The first Report of La Rose Consolidated Mines Company was dated June 20th, 1908. Appended to this are three reports on the physical condition of the properties of La Rose Mines, Limited. The specialists engaged to report were, respectively, Messrs. Watson & Watson, Mr. T. R. Drummond, and Prof. Willet G. Miller.

Dr. W. G. Miller, whose report is dated August 9th, 1907, figured the silver content of ore blocked out on two sides in La Rose, 6,518 tons, at 8,020,870 ounces. Ten months later Messrs. Watson & Watson arrived at an estimate of 4,894,065 ounces as the silver contained in 10,358.17 tons of ore "practically developed" and ore "indicated." About the same time, Mr. T. R. Drummond estimated 5,303,000 ounces of silver as the probable yield of 5,484 tons of "ore available." While the basis of comparison is uncertain, owing to the divergent terminology and methods employed in the three reports, they may be used to indicate the general conditions of the mine. Mr. Drummond's estimate covers less territory than does the report of the Messrs. Watson. His figures are considerably higher for the main vein, No. 3 vein, and McDonald No. 5. Hence it is most suitable to take, for purposes of discussion, the Watson estimate of 4,894,065 ounces as the amount of silver indicated at the end of the fiscal year 1907-1908.

The output of La Rose as between August, 1907, and June, 1908, was approximately 900,000 ounces.

Taking Dr. Miller's figures, and disregarding any reserves added during that period, this would leave 7,120,870 ounces of silver in ore blocked out on two sides. As noted above, the total "practically developed" silver in almost twice the tonnage of ore, ten months later, is given by Messrs. Watson & Watson as 4,894,065 ounces, a discrepancy of more than two million ounces.

During the fiscal year ending June 1st, 1909, silver was shipped from La Rose to the amount of 2,979,953.97 ounces. Partly developed ore at that date is reported by Mr. R. B. Watson to contain 4,307,705 ounces. To this total may be added 454,013 ounces contained in "McDonald" country rock, and 206,700 ounces "indicated" in No. 3 vein, making a grand total of 4,968,418 ounces contained in ore reserves.

As plans and sections of the mine do not accompany either the annual or the special reports, and as Mr. Watson makes only vague reference to progress and does not specify the footage made on any vein, it is impossible to analyze the figures referred to above. We may remark here that this omission is inexcusable. Shareholders should insist upon detailed information as to progress and development. That this is necessary is amply proved by the history of La Rose itself. The general manager's report should be an actual history of work done in each section of the mine. If this has been prevented heretofore by speculative interests, there is all the more reason that the objectionable policy of repression be discontinued at once. In this we are confident that General Manager R. B. Watson will concur. He is looked upon as a competent engineer. Until now he has had no opportunity to prove himself anything but an important cog in an elaborate stock-market device.

Roughly, the position of La Rose to-day may be summed up thus:—

The total capitalization is about \$7,500,000. Since organization of La Rose Consolidated, the net value of silver shipped aggregates now about \$1,750,000. Net profits to be expected from ore reserves, on Mr. Watson's estimate, will hardly equal this sum. No substantial development work has been performed on the other properties. Lawson, according to general belief, has not by any means lived up to its promise. The attention of the executive has been devoted, not to putting La Rose and the subsidiary mines in good condition, but to unloading their stock at the top of the market. Having accomplished this, most especially and most regrettably in London, the chief manipulators resigned and new directors were appointed.

We may interject here one or two questions that are decidedly pertinent. As pointed out above, there is no possibility of comparing the three estimates mentioned in our first paragraph. But we may ask Mr. Watson if, in estimating his reserves, he is revaluing part of his old reserves, or touching new ground entirely? What and where are his reserves, anyway? How do they check

with Dr. Miller's estimate of "tonnage and possible tonnage" published in the First Annual Report, which places the total productive capacity of veins then known at 12,871,750 ounces? Indeed, the more we examine the published statements of La Rose Consolidated, the less we find to enlighten us. But it is surely unfair to expect us to accept bald statements of reserves with absolutely no physical data.

It is not our belief that La Rose is to be a fiasco. A competent general manager, strong enough to resist market influences, and backed by the majority of his directors, will undoubtedly pull the fat out of the fire. We hope that La Rose possesses both the proper manager and the proper directorate. We do not *know* that this is the case. Knowledge will come soon enough.

LIBRARY MEMORIAL TO HUGH FLETCHER.

The Mining Society of Nova Scotia has decided to raise four thousand five hundred dollars for the purpose of establishing a Memorial Library in honour of the late Hugh Fletcher. The library will consist entirely of books on geological and mining subjects. The Provincial Government is to be asked for permission to place the library in the new Technical College building.

British business enterprise is in nothing more evident than in the shipments of coal to Europe. Austria, for instance, is largely supplied by Great Britain. Trieste, on the Adriatic coast, is an important industrial centre and distributing point. To this city Great Britain shipped 804,000 tons of sea-borne coal during 1908. More than half of this quantity came from Northumberland, the remainder from South Wales and Scotland. Entries of Austro-Hungarian coal amounted only to 73,000 tons.

RADIUM.

A significant event was the laying of the foundation stone of a large radium reduction works at Limehouse, England. The ceremony took place on October 16. Lady Ramsay, the wife of the renowned scientist, Sir William Ramsay, laid the stone.

This new enterprise, launched under the name of the British Radium Corporation, is the outcome of a combination of interesting and peculiar circumstances.

Associated with the British Radium Corporation is the St. Ives Consolidated Mines, Ltd., which controls an important group of tin mines in Cornwall. Among these tin mines is the Trenwith, which, in former years, was a copper producer. Early in the last century, so run the records, pitchblende was found in quantity. This mineral the miners mistook for black copper. On account of this delusion there was serious friction with the smelters. But the difficulty was cleared in 1843, when Professor Henwood identified the mineral rightly as pitchblende. After that this valuable ore of radium and uranium was considered a waste product.

The British Radium Corporation was organized to treat this neglected ore. The process to be used was devised by Sir William Ramsay. The method now in use on the Continent occupies at least twelve months. By Sir William's process a great saving of time will be effected. The whole treatment of the pitchblende will not occupy more than seven weeks.

The efficacy of radium as a cure for certain diseases, including cancer, is one of the beneficent discoveries of modern science. Sir William in his speech on this occasion alludes to the desirability of supplying the British Empire before allowing any of the precious element to be purchased abroad. Neither Austria nor Germany permits radium to be exported. Their example, according to Sir William, should be followed.

CANADA'S ARCTIC DOMAIN.

History, written and unwritten, accentuates one fact. The nation that lays claim to territory must occupy that territory. The incidents of the Alaskan award, and of the adjustment of the International Boundary between Canada and the United States lend force to this. Skagway should never have been turned over to our neighbours; nor need it have been had Canada been early alive to her own interests.

In a recent newspaper interview, Mr. J. B. Tyrrell, who may be justly termed our leading authority on the Arctic and sub-Arctic regions of the Dominion, expressed his belief that the northern shore of the Dominion and the Arctic islands lying between the mouth of the Mackenzie River and the north-west extremity of Hudson Bay should be thoroughly explored. At present Canada has no substantial title to these lands. A vague suzerainty, based upon geographical considerations, constitutes our only hold upon territory that may be of immense value.

Mr. Tyrrell urges that the Dominion Government regularly appropriate a few thousands of dollars to equip an expedition to investigate the natural resources of these northern lands. This form of occupation has international value. It also may bring to light mineral deposits of great commercial importance.

Alaska, once looked upon as a white elephant, has returned a hundred times over the few millions paid for it by the United States, and its development has scarcely begun.

Disregarding altogether the sentimental aspects of the case, the exploitation of the Dominion's northern fringe is a practical duty that our Government must no longer neglect.

CONCRETE IN METAL MINING.

Not only is concrete growing in favour as a substitute for timber in metal-mining, but the advantages of using it in sinking shafts in wet ground and in keeping water out of underground workings are rapidly being

recognized. Mr. Henry W. Edwards, in an article reproduced in this issue by special permission of The Engineering Magazine, outlines very usefully the uses of concrete underground.

We consider this article well worthy of reprinting. It brings before our readers a subject that will sooner or later obtrude itself in established mining camps. The utilization of concrete must command attention for several reasons. The supply of mine-timber gradually grows less. It is extremely difficult to conserve this supply. On the other hand, experience is proving that concrete may sometimes effectively replace timber, even where supplies of the latter are abundant. Concrete, moreover, can be utilized where timber cannot. Concrete is infinitely plastic and can be made to assume any desired shape. Its component materials can be assembled and mixed without excessive cost in almost any locality.

The whole question resolves itself into a problem of economics and of engineering skill. Only the fringe of the subject has been touched.

THE ANNUAL REPORT OF THE ONTARIO BUREAU OF MINES.

Part I., Vol. XVIII., of the Annual Report of the Ontario Bureau of Mines appears just as we are going to press. In a later issue we shall discuss it adequately. At present we wish to express our appreciation of the careful and masterly Statistical Review that takes up the first seventy pages of this volume. The Deputy Minister of Mines, Mr. T. W. Gibson, is personally responsible for this section, and it is notably workmanlike, comprehensive, and clear.

EDITORIAL NOTES.

The public will give thanks for the latest volume issued by the Geological Survey. "A Descriptive Sketch of the Geology and Economic Minerals of Canada," compiled by Dr. G. A. Young under the direction of the Survey. The book is a model of clean editing and intelligent selection. In both respects it is superior to any official Canadian publication. It gives a bird's-eye view of the economic geology of the Dominion. Extended notice is given on another page.

Western railroads have granted valuable concessions to the Los Angeles Chamber of Mines. The Chamber is endeavouring to assemble in Los Angeles a mining and oil exhibit. To aid this good work the railroad has consented to carry free of charge all ore and oil exhibits.

Shipments of 50,000 tons of Chinese pig iron are to be made to New York at prices that compare favourably with Pittsburg quotations for delivery on the

Atlantic seaboard. The chief iron works of the Chinese Empire are situated 750 miles inland on the Yangtze River, near Han Kow. Cheap labour, excellent ore and good coal all contribute to the low production costs. The possibility of such shipments being made re-adjusts our ideas of international commerce.

MEXICAN MINING COSTS.

Mexico Mines of El Oro, Limited, is a corporation subsidiary to the El Oro Mining and Railway Company, Limited. It operates the Mexico mine, near the town of El Oro, Mexico. The company's record is worth noting.

Organized in 1904, the company had its plant completed and running in October, 1907. The positive ore reserves in June of that year amounted to 178,240 tons, carrying \$11.53 gold and 6.9 ounces silver per ton. The equipment as completed in October, 1907, consisted of a 40-stamp mill, six-tube mill, and a cyanide plant.

It was expected at first that the stamp-mill would crush 200 tons per day. In two years that expectation has been nearly doubled. At present the 40 stamps crush 378 tons per day, a duty of 9.45 tons per day per stamp.

Last year, ending June 30, 1909, the ore averaged \$13.47 in gold per ton. The mill treated 110,105 tons, getting an average extraction of \$12.44 per ton, a recovery of 92.35 per cent.—94.46 of the gold and 87.35 of the silver. During the previous year the recovery was 89.6 per cent.

The total working cost was \$5.67 per ton, as compared with \$6.33 for the preceding year. Development and State and Federal taxes amounted to \$1.64 per ton in the past year, while in the previous year they averaged only \$1.27. Thus the reduction in working costs is 40 cents greater than would appear.

By increasing the duty of the tube-mills it is hoped to bring the costs down still further.

The present ore reserves amount to 191,655 tons, almost two years' supply at capacity of mill.

VOLCANIC GAS.

Through long years Mr. Eugene Coste has contended for the inorganic origin of natural gas and petroleum as opposed to the organic origin. Mr. Coste's papers on the subject in the publication of the Canadian Mining Institute have attracted much attention but his converts have been few. Of course most of us who have attended the annual meetings had to accept the theory (outwardly at least) and now it is receiving support from no less an authority than Dr. Becker, of the U. S. Geological Survey, "an unexpected source."

To Mr. Coste's long-continued, "vigorous, almost polemic, writing is mainly due the renewed interest in the long dormant theory of the inorganic origin of petroleum." Can we say to Mr. Coste "patience and perseverance made a bishop of his reverence"? Or is the conundrum sprung by that punster, Mr. Mickle, during one of the hot debates at a meeting of the Institute in Montreal some years ago appropriate: "What is the difference between a vegetarian and a man who believes in the organic origin of gas?" Give it up! "The one draws the line at meat while the other will swallow anything."

HUGH FLETCHER.

Written for The Canadian Mining Journal by Mr. R. W. Brock,
Director of the Geological Survey of Canada.

Through the death of Hugh Fletcher the Geological Survey lost one of its oldest and most respected officers. He was born in London, England, of Scotch parents in the year 1848. At the age of 12 he came to this country with his father, a well-known mining engineer.

His education was received in Ontario. At Toronto University he took a brilliant course, securing the gold medal in modern languages, the silver medal in natural science, and the Prince of Wales prize in general proficiency. His first practical experience was obtained in the gold mines at Tangier, N.S., where his father was manager. In 1872 he was appointed to the Geological Survey of Canada as assistant to Mr. Charles Robb, then engaged in a study of the coal fields of Cape Breton. Of Mr. Robb's work and the training he received while under him Mr. Fletcher always spoke in the highest terms. Upon Mr. Robb's retirement in 1875, Mr. Fletcher was given charge of the work in Cape Breton, and from that time until his death in the field, his life has been unsparingly devoted to the study of the geology of Nova Scotia. His work included the survey of Cape Breton and the counties of Cumberland, Colchester, Pictou, Antigonish, Guysborough, Kings, Hants, and a portion of Halifax.

For more than thirty years he has been an accepted authority on the geology and mineral resources of Nova Scotia, more particularly as regards coal and iron. The published results of his work are largely confined to Geological Survey publications as given in the appended list. Like that of many other strong men, the value of his work is in the inverse ratio to the number of printed pages describing it. The greater part is represented graphically on the maps which he made, Mr. Fletcher being a strong believer in this method of recording information and presenting it to the public. The long list of maps prepared under his hand on a scale of one mile to an inch, with every feature shown, accurately located, and in greater part from original surveys by Mr. Fletcher, evidences the patient, painstaking, untiring work of this geological explorer. These maps are accepted as standard for geographical features, as well as for geological. During his long life

of active research in Nova Scotia he steadily acquired a mass of detailed information concerning this province, so that his knowledge of it became encyclopedic. He was ever ready to give the benefit of his knowledge and experience to any enquirer. Probably the most valuable of all the assistance the Survey can render is not that given through the printed report, but that furnished by officers in the field to individuals on the ground. In Mr. Fletcher's case his assistance was cheerfully accorded, and to an unusual extent.

As his active field life was spent wholly in Nova Scotia it is there that he and his work (they are always associated) were best known. The high estimation in which both were there held would amply repay the most self-sacrificing public servant. It is to the credit of Nova Scotia that this appreciation was not withheld until too late to reward, cheer and inspire this devoted worker.

As might be surmised from his wide circle of friends and admirers, Mr. Fletcher possessed a striking and winning personality. He was intensely loyal to his ideals, devoted to what he conceived to be duty, and persistent in his endeavours. His work was characterized by care, accuracy and system. It is as yet too soon to estimate the place he will occupy among the unravellers of Canadian geology, but no matter what advances be made in the science, his work will remain as fundamental. New terms may be introduced and formations differently grouped and subdivided as further light is thrown on the geological problems, but when work has been done with the precision and care that characterizes Mr. Fletcher's, such changes are merely readjustments.

It was his ambition to finish the mapping of his portion of Nova Scotia, and to embody in one report the results of his years of labour. His first wish was practically realized. The last, unfortunately, was unattained, and must be undertaken by other hands. He died, as he would have chosen, in harness, and amid the hills of his well-loved Nova Scotia.

Mr. E. R. Faribault, his colleague in Nova Scotian geology, is an old assistant of Mr. Fletcher, and the training he received at his hands is reflected in the detailed accuracy of his work.

Bibliography of Hugh Fletcher.

A. Geological Survey Publications, Reports.

G. S. No. 108. Report of Explorations and Surveys in Cape Breton. (Pt. No. 108, 1875-6.) H. Fletcher.

114. Report on the Geology of portions of the Counties of Victoria, Cape Breton and Richmond. (Pt. No. 114, 1876-7.) H. Fletcher.

125. Report of Explorations and Surveys in Cape Breton. (Pt. No. 125, 1877-8.) H. Fletcher.

147. Report of Surveys of portions of the Counties of Richmond, Inverness, Guysboro', and Antigonish, from Chedabucto and St. Peters Bays to Judique and Denys Basin. (Pt. No. 147, 1879-80.) H. Fletcher.

167. Report on the Geology of the portion of Cape Breton north of Judique and Denys Basin. (Pt. No. 167, 1882-3-4.) H. Fletcher.

243. On Geological Surveys and Explorations in the Counties of Guysboro', Antigonish, Pictou, Colchester and Halifax. H. Fletcher and E. R. Faribault.

331. Report on Geological Surveys and Explorations in the Counties of Pictou and Colchester. H. Fletcher.

1021. Explorations in Nova Scotia. (Summary Report, 1907.)

Geology of Southwestern Nova Scotia. (Summary Report, 1894, p. 89.)

- Sydney Coalfield, N. S. (Summary Report, 1895, p. 105.)
 Coal Deposits of Cape Breton. (Summary Report, 1896, p. 94.)
 Surveys in Western Nova Scotia. (Summary Report, 1897, p. 98.)
 Springhill Coalfield, N. S. (Summary Reports, 1898, p. 139; 1899, p. 162.)
 Springhill and Inverness Coalfields, N.S. (Summary Report, 1900, p. 162.)
 Kings and Hants Counties, N.S. (Summary Report, 1901, p. 210.)
 Surveys and Explorations in Richmond, Cape Breton, Kings, Cumberland and other counties. (Summary Report, 1902, p. 390.)
 Northern part of Nova Scotia. (Summary Report, 1903, p. 160.)
 The Counties of Cumberland, Hants, Kings and Annapolis, N.S. (Summary Report, 1904, p. 293.)
 Geological Work in Northwestern Nova Scotia. (Summary Report, 1905, p. 118.)
 Surveys in Western part of Nova Scotia. (Summary Report, 1906, p. 140.)
 Explorations in Nova Scotia. (Summary Report, 1907. See at end.)
 On a portion of Cumberland County, N.S. (Summary Report, 1908, p. 143.)

B. Papers Read Before Scientific Societies.

- The Sydney Coalfield. From Trans. of the Mining Society of Nova Scotia. Vol. 3, pp. 112-124. (With map.) 1894-95.
 Geological Nomenclature in Nova Scotia. From Trans. Nova Scotia Inst. Science. Vol. 10, pp. 10. 1899-1900.
 Limits of the Workable Coals of the Cumberland Coalfields in Nova Scotia. From Trans. of the Mining Society of Nova Scotia. Vol. 8, pp. 123-126. 1903-4.
 A Section of Carboniferous Rocks in Cumberland County, N.S. From Shulie to Spicer Cove. From Proceedings and Transactions of the Nova Scotia Institute of Science. Vol. 11, Part 3, pp. 500-548. 1904-05.

C. Publications of the Geological Survey—Maps.

Note.—A few of these maps were made with the assistance of Mr. Faribault, Dr. Ells or others.

General Maps. Nova Scotia.

- G. S. No. 105. Cape Dauphin District. Report, 1874-75. Scale 20 chains to 1 inch.
 106. Eastern Part of Sydney Coalfield. Report, 1874-75. Scale 1 mile to 1 inch.
 113. Western Part of the Sydney Coal-field. Report, 1875-76. Scale 1 mile to 1 inch.
 124. Grand Narrows Sheet. Report, 1876-77. Scale 1 mile to the inch.
 131. Louisbourg Sheet. Part F., 1877-78. Scale 1 mile to 1 inch.
 764. Geological Sketch Map of parts of Kings and Hants Counties, N.S. Part A., Vol. XIV. Scale 2 miles to 1 inch.
 812. Preliminary Geological Map of Springhill Coalfield. Part A., Vol. XV. Scale 50 chains to 1 inch.
 833. Map of Pictou Coal-field. Part M., Vol. XIV. Scale 25 chains to 1 inch.

897. Preliminary Geological Plan of Nictaux and Torbrook Iron District, N.S. Part A., Vol. XVI. Scale 25 chains to 1 inch.

Serial Geological Sheets—Scale 1 mile to 1 inch.

184. Sheet 1. Cape North Sheet. Part H., 1882-83-84.
 185. Sheet 2. Aspy Bay Sheet. Part H., 1882-83-84.
 186. Sheet 3. Pleasant Bay Sheet. Part H., 1882-83-84.
 187. Sheet 4. Ingonish Sheet. Part H., 1882-83-84.
 188. Sheet 5. Headwaters of Cheticamp River Sheet. Part H., 1882-83-84.
 189. Sheet 6. North Cheticamp Sheet. Part H., 1882-83-84.
 190. Sheet 7. North Shore Sheet. Part H., 1882-83-84.
 191. Sheet 8. Headwaters Margaree River Sheet. Part H., 1882-83-84.
 192. Sheet 9. South Cheticamp Sheet. Part H., 1882-83-84.
 193. Sheet 10. Englishtown Sheet. Part H., 1882-83-84.
 194. Sheet 11. Margaree Sheet. Part H., 1882-83-84.
 195. Sheet 12. Baddeck Sheet. Part H., 1882-83-84.
 196. Sheet 13. Middle River Sheet. Part H., 1882-83-84.
 197. Sheet 14. Broad Cove Sheet. Part H., 1882-83-84.
 198. Sheet 15. Whyecomagh Sheet. Part H., 1882-83-84.
 199. Sheet 16. Port Hood Sheet. Part H., 1882-83-84.
 200. Sheet 17. Loch Lomond Sheet. Part F., 1879-80.
 201. Sheet 18. River Denys Sheet. Part F., 1879-80.
 202. Sheet 19. Judique Sheet. Part F., 1879-80.
 203. Sheet 20. L'Ardoise Sheet. Part F., 1879-80.
 204. Sheet 21. Saint Peter Sheet. Part F., 1879-80.
 205. Sheet 22. Strait of Canso Sheet. Part F., 1879-80.
 206. Sheet 23. Arichat Sheet. Part F., 1879-80.
 207. Sheet 24. Guysborough Harbour Sheet. Part F., 1879-80.
 385. Sheet 31. Roman Valley Sheet. Part P., Vol. II.
 386. Sheet 32. Pomquet Harbour Sheet. Part P., Vol. II.
 387. Sheet 33. Cape George Sheet. Part P., Vol. II.
 388. Sheet 34. Antigonish Sheet. Part P., Vol. II.
 389. Sheet 35. Lochaber Sheet. Part P., Vol. II.
 390. Sheet 36. West River St. Marys Sheet. Part P., Vol. II.
 593. Sheet 42. Trafalgar Sheet.
 598. Sheet 43. Stellarton Sheet.
 600. Sheet 44. New Glasgow Sheet.
 608. Sheet 45. Toney River Sheet.
 609. Sheet 46. Pictou Sheet.
 610. Sheet 47. Westville Sheet.
 633. Sheet 48. Eastville Sheet.
 635. Sheet 56. Shubenacadie Sheet.
 636. Sheet 57. Truro Sheet.
 637. Sheet 58. Earltown Sheet.
 793. Sheet 59. Tatamagouche Sheet.
 794. Sheet 60. Malagash Sheet.
 795. Sheet 61. Pugwash Sheet.
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 879. Sheet 74. Walton Sheet.
 838. Sheet 75. Five Island Sheet.
 839. Sheet 76. Pleasant Hills Sheet.
 840. Sheet 82. Southampton Sheet.
 841. Sheet 83. Parrsborough Sheet.
 826. Sheet 100 (and 101). Apple River Sheet.
 652. Sheet 133. Cape Dauphin Sheet. Report No. 685.
 653. Sheet 134. Sydney Sheet. Report No. 685.
 654. Sheet 135. Little Glace Bay Sheet. Report No. 685.

APPLICATIONS OF CONCRETE IN THE METAL MINING INDUSTRY.

By Henry W. Edwards.

(Abstract of article from The Engineering Magazine reproduced here by special permission.)

Concrete, used for the mere purpose of supporting unsafe ground is gaining but slowly in favour, being confined for the present to an occasional tunnel portal, to lining shafts through surface soil down to solid rock, and to a very limited use of "stulls." In the coal-mining industry much greater use is made of concrete for all purposes; but it is not the intention in this article to touch upon that branch.

The chief advantage of concrete for lining shafts through the surface soil and down to bed-rock, outside of its durability, is its efficiency in keeping out water. The upper part of the lining is usually so shaped and extended as to form the foundations for the hoisting machinery. The rounding shape, or arched effect, shown in recent illustrations published, is of no particular advantage for vertical shafts, although it is quite necessary if the lining be made of brick or stone. Even in small mining operations, if the surface soil be wet no time should be lost in protecting the shaft with a watertight lining, which should be extended upward above the floor line sufficiently to form a kerb around the mouth of the shaft to prevent the rain water or rubbish from falling in. Arrangements for supporting the ordinary shaft equipment of cage-guides, ladders, pipes, etc., must be well thought out beforehand in order to avoid having to cut into the concrete after it has set. Shaft linings are comparatively simple in vertical shafts, but inclined shafts do not lend themselves quite so easily to placing the forms and ramming the concrete but not even these require any very high order of ingenuity. In this latter case the upper part had perhaps better be made arching and, if possible, reinforced either with specially purchased iron or with whatever old material may be available on the spot, such as old rail or pipe. A neat method for shaft lining is to make slabs of concrete three or four inches thick by two or three feet square, which when properly hard are placed and supported against the sides of the shaft, the space between them and the soil or rock being filled with concrete well rammed in; these slabs are left permanently in position.

It is as a means of controlling water underground that concrete is growing in favour rapidly. It is a much better stroke of business to keep water out of a mine than to pump it out. As an instance, at the Candelaria mine, in Mexico, the great influx of water was found to be at a point midway between the first and second levels, about 160 feet from the surface. A portion of this water was very ineffectually trapped on the second level by means of wooden troughs and pumped thence to the surface, but the great bulk of the water found its way to the bottom of the shaft at 700 feet. Raising the water from this depth to the surface necessitated a continuous effort at the pump to overcome some 630,000 foot-pounds. What with condensation in such a long steam line, pipe friction, etc., this amounted to something over 30 horse-power at the boiler. It was therefore decided to arch over the second level from the shaft completely to the end. This being done, the water, thus completely confined above the arch, was pumped only 200 feet to the surface. The pump at the bottom

of the mine was then able in a few hours' work per day to take care of all the water seeping into the mine below this level. The saving in reality was found to be more in money than was represented by the steam saved, the men being much more efficient in the more agreeable circumstances, besides the heavy bills for repairs to the pump being much diminished. The forms used in this work consisted of two segments from an old steam boiler, lapped over one another to a greater or less degree to accommodate the variable width of the level, the smaller irregularities being closed by scraps of boards or sheet iron or anything else that came handy. As elegance and finish are not considered necessary underground the marks left by these were not smoothed off. The preliminary work, having for its object the preventing of the water from washing over the wet concrete, was much more difficult and engaged much more attention than the mere construction of the arch.

At the San Blas mine, also in Mexico, in sinking a shaft 8 feet by 12 feet in area, a heavy flow of water was encountered at 90 feet from the surface, through a fissure which crossed the shaft at about a 25-degree angle. The flow of water was such that in spite of the most energetic efforts only eight feet of progress was made in a month. We therefore enlarged the shaft, in an irregular outline, for two or three feet on each of its four sides for a belt of about three or four feet above the fissure and about the same distance below. After the water had risen to its natural level in the shaft, some 250 tons of concrete were dumped in and allowed several weeks to set. The water was then pumped out and the shaft re-excavated through the concrete and carried down to 400 feet without further trouble. Had a central hollow core been left in the concrete the work of sinking through it would have been very much diminished. The total cost of this work did not exceed \$2,200, including the re-excavation of the shaft, the cement costing, delivered at the spot, \$4.50 per barrel.

It may be as well to indicate the precautions necessary to secure a successful issue to a piece of work of the above sort. First, the water should be without movement, or the flow be at least imperceptible. For this reason the shaft was allowed to fill up to its natural water level. Second, the concrete should not be dumped in and allowed to fall to the bottom, causing a separation of the heavier from the lighter ingredients. In the case cited the concrete was lowered in a wedge-shaped bucket, one side of which was hinged at the top and fastened at the bottom by a latch to which was attached a wire leading to the surface. When the bucket was lowered and placed as nearly as possible in position the wire was pulled, releasing the concrete without giving the cement much opportunity to separate from the other ingredients. Third, the re-excavation must be made without the aid of explosives. Fourth, ample time must be allowed for the concrete to solidify.

For "timbering" underground, concrete "timbers" are attracting a certain amount of attention. The average life of a pine timber or stull in a mine may not be counted on to exceed four years, while the life of a concrete "timber" is indefinite; it costs more in the

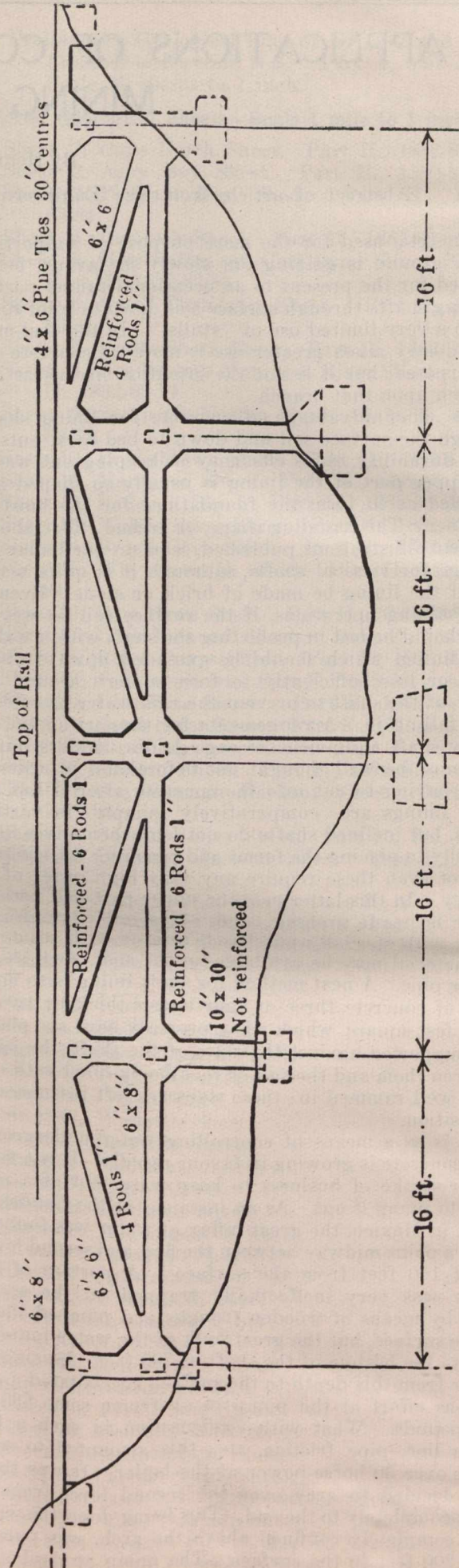
first instance and, owing to its weight, it is more costly to place in position. Concrete timbers are easily made in long wooden troughs, or in split tubes of sheet iron, with the ends adjusted so that they can be changed to suit the desired length and angle of cut. If it is possible to do so, the form should be set close to where the stull is to be finally placed. The conspicuous disadvantage of the concrete stulls is the difficulty in placing them at the proper angle with regard to the line of thrust of the ground to be supported. Frequently when the ground being supported settles to a small extent the angle of thrust is greatly changed; in such a case a pine timber is easily wedged up, or the ends cuts to a new angle, or the position of the whole thing changed to suit the new conditions; once a concrete timber is in place any changes are very difficult. Up to the moment of writing, the greater use of concrete stulls and timbers is in replacing rotted ones. In this case the ground having already settled and the wooden stulls having been subjected to observation for a considerable period of time, the concrete props can be placed with more intelligence, not only as to the direction of the lines of force, but also as to the amount of strain they are to be called upon to resist. Both of these factors are usually only partially known in the first instance.

As a general proposition, the use of reinforcement, either of scrap material or of some one of the many special shapes of iron, is not very usual for underground work in the metal-mining industry. For surface structures, however, we follow all the usual rules of such constructions. Portions of the various structures in which the stresses are exclusively in compression do not require reinforcement.

These statements suppose the use of cement of good quality, which, in out-of-the-way places, is not always obtainable. It is of very little use to attempt to test the cement for the purpose of comparing the results obtained with the figures obtained by the manufacturers. So many factors are not uniform with the conditions under which the experiments are made at the factory that the final results are quite different. The age of the cement, difference of temperature and humidity of the air, of the water or of the cement itself, and even the nature and amount of the various mineral substances dissolved in the water, all together introduce such differences as to make it a waste of time to make any other tests than the actual mixing and laying of a small preliminary batch of concrete. About the only exterior indication of defective quality is the swelling of the barrels when they have been too long in stock in a humid climate or have accidentally been wetted. It seemed a pity that no way could be found to stamp each barrel reliably with the date it left the factory like the photographic supplies. If it be possible, the engineer will do well to purchase his cement direct from some manufacturer of a standard brand and not to depend on purchasing from local merchants.

As a general rule there is nothing at any mine in the way of surface structures that cannot be made, and better made, of concrete than of any other material—head frames, ore bins, floors, buildings, electric-wire poles, trestles, water pipes for low pressure, boiler settings, chimney stacks, tanks of all kinds, and even boats and lighters if the mine have use for these latter.

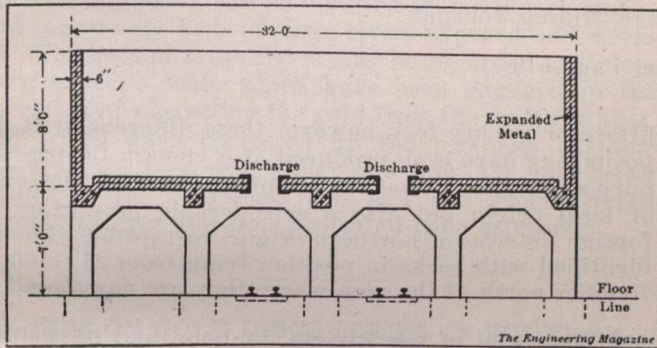
As to head frames, the strains of hoisting are converted entirely into compression in these structures, and concrete is, therefore, exceedingly appropriate. One of the most satisfactory head frames I have put in had for its principal members two old sheet-iron smoke stacks, each 28 inches in diameter by 50 feet high. These were



REINFORCED-CONCRETE BRIDGE FOR 20-INCH GAUGE MINE TRACK.
For mule hauling three cars, each 1,500 pounds net load.

filled with concrete, section by section. As just remarked, all the strains in these structures being resolved into compression in the direction of the resultant of the engine pull and the ascending load, it would appear that a head frame need consist of a single strut only, placed in the plane of this resultant, and that any other members would be superfluous except such feeble ones as might be necessary to support the main strut in the proper attitude while not in use. Concrete head frames are cheaper than steel, and, moreover, are not subject to the violent and unpleasant vibration of the steel construction. This vibration may be done away with entirely by casing the steel structure with concrete.

In the making of tanks for water or for the cyanide process or for slime settlers, reinforced concrete is most adaptable. Recent changes in the manipulation of the cyanide process have involved the use of tanks which rather puzzle the wooden tank manufacturer, particularly those tanks with conical bottoms. The maker's difficulty in these tanks comes in keeping the hoops from slipping down the conical part, or in finding any really satisfactory substitute for hoops. For the concrete man these difficulties do not arise; he has no bounds of shape nor size nor position, nor is he called upon to handle material of unusual dimensions, nor, like the iron tank man, is he obliged to send a gang of riveters, say from Pittsburg to Nicaragua, to rivet up a set of tanks shipped in sections.



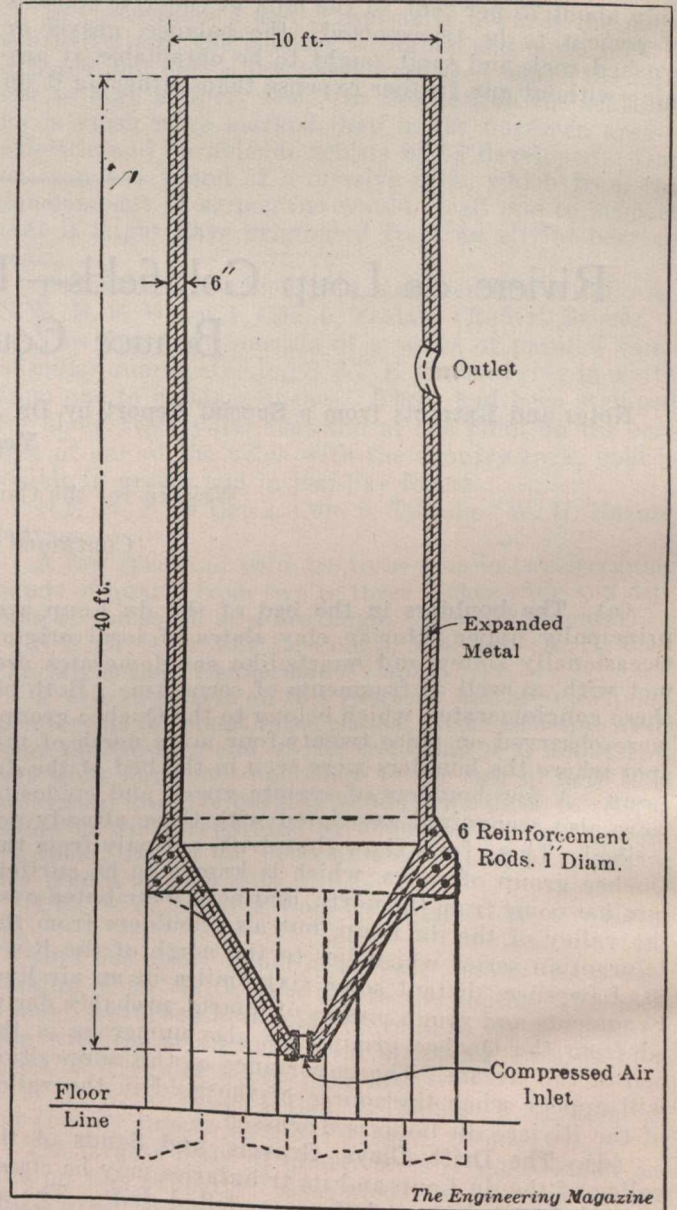
CYANIDE VAT OF REINFORCED CONCRETE.

Another essential part of the cyanide plant is the system of launders or troughs for conveying the solutions from tank to tank. When made of wood these launders are not difficult, so long as they are straight; but when curves or junctions become necessary, then the difficulties of making them absolutely watertight begin. Concrete launders can be made as complicatedly crooked as may be convenient, with perfect freedom from leakage, and, moreover, if allowed to dry, they do not shrink, like wood, opening up cracks where none previously existed.

The former method of building cyanide tanks was by lining, with heavy concrete excavations partly or wholly below ground level. The modern reinforced concrete cyanide tank is an elevated structure upon concrete pillars, with its bottom and all its other parts as accessible to inspection and repairs as an iron or wooden tank. In the modern construction of cyanide tanks "expanded metal" or a system of iron rods and wires forms the reinforcement; the concrete, some 6 inches in thickness, is thoroughly trowelled over with neat cement on the inside in order to close up the pores of the concrete. Any offsets or fastenings for filters or outlets or inlets are all provided for in the wet concrete. Should small cracks develop so as to expose the iron reinforcement to contact with the cyanide solution, no

harm will result, as the solution is entirely without action on iron. A good preliminary paint coating may be made by emulsifying soap and water and kerosene oil (in about equal weights of the three ingredients), after which the tanks may receive two coats of the usual paint sold for cyanide work.

The "pointed boxes" and other similar appliances used in the concentration mill are made in a similar manner with expanded metal, or rods and wire, and may be relied upon to give better service than either



REINFORCED-CONCRETE CYANIDE VAT, PACHUCA PATTERN.

wooden or iron apparatus. For dressing ores, concrete made with a smooth finish of neat cement offers an excellent surface to which some minerals appear to cling more than others. I had in use in Arizona two revolving "buddles" of 12 feet diameter made in this manner. The ore there consisted of several minerals, among them a copper-gold-silver mineral, valuable, and a zinc-sulphide, valueless. In passing the crushed ore over the buddles for washing off the rock matter, it was noted that the proportion of zinc sulphide gotten rid of

on these machines was greater than in any of the other appliances in the mill.

Trestles for the ordinary mine tramway are very striking instances of the advantage of reinforced concrete, especially in districts where timber has to be transported great distances. The difficulty and expense of carrying long timbers for the chords is enormous as compared with the carrying of cement, and the differences become more and more evident as the distance increases, and finally the timber becomes prohibitive when mule-back is the only means of transportation. Only about 15 per cent. of the bulk of concrete consists of cement to be transported; the balance, gravel or crushed rock and sand, ought to be obtainable at any mine without any further expense than gathering it up

on the spot. Attention is called to the advantage of designing these light bridges or trestles so that the whole structure forms a jointless, continuous, trussed girder, and with a view to making them self-supporting in the event of one or more of the legs being washed out from under by floods. It is only necessary to reinforce those parts subject to stresses of tension and shearing, the thin material usually employed for reinforcement being of little or no help against compression. To sustain the ordinary mine track using a car moved by man power, supports 16 feet apart, and chords 6 inches by 8 inches, are ample. Forms for this class of small repetition work are most conveniently made of No. 16 sheet iron nailed to a framework of 2 by 4 scantlings.

Riviere de Loup Goldfields—Townships of Jersey and Liniere, Beauce County, Quebec.

Notes and Extracts from a Special Report by Dr. Henry Youle Hind, M.A., F.R.G.S., Published in the Year 1864.

Written for the Canadian Mining Journal.

(Continued from Page 619.)

(c) **The boulders in the bed** of the du Loup are principally upper Silurian clay slates of local origin. Occasionally slaty and quartz-like conglomerates are met with, as well as fragments of serpentine. Both of these conglomerates, which belong to the Quebec group, were observed on place twenty-four miles north of the spot where the boulders were seen in the bed of the du Loup. A few boulders of syenite gneiss and epidosite were also recognized associated with those already described. These facts show that drift, not only from the Quebec group of rocks, which is known to be auriferous, has come from the north, and been distributed over the valley of the du Loup, but also boulders from the Laurentian series which lies to the north of the River St. Lawrence, distant some sixty miles in an air line. Fragments and rough masses of quartz, probably derived from the Quebec groups are also numerous in the bed of the stream. The importance of this supposition will appear when the source of the gold in the valley of the Riviere du Loup is discussed.

(d) **The Drift, Clays, Gravels, and Sands** of the valley of the du Loup and its tributaries may be classified as glacial drift and the remodelled drift. The alluvial flats in the river banks are derived from these older deposits and the wearing away of the rocks in the beds of the streams.

The glacial drift is represented by the unstratified blue clay with its associated boulders of northern origin. This drift must not be confounded with the stratified blue clay occasionally found in the bed on the alluvial banks of the Riviere du Loup. The glacial drift is capped by beds of gravel, gravelly clay, and stratified sand, which constitute the remodelled drift. Fine and coarse sand beautifully stratified was found forming mounds on the east side of the Riviere du Loup one hundred and fifty feet above its present level. The average thickness of the drift probably does not exceed

fifteen or twenty feet, however these different drift deposits may have been produced, it is enough for present purposes to know that both contain materials not only of local origin but also a considerable proportion of foreign detritus of northern origin; susceptible of being identified with rocks in position lying from 24 to 60 or 70 miles north of the area where they are now found.

111. The Gold of the Riviere du Loup and its Tributaries.

In this section Dr. Hind gives the results of numerous panning and cradling experiments conducted to determine "the auriferous, or non-auriferous, character of the rocks in position, as well as of the overlying drift." Good colours, occasional nuggets, and flakes resulted from many of the pannings, especially on the du Loup.

In Section IV., Dr. Hind attempts a rough estimate of the value of the drift and concludes that the plateau of the du Loup, containing about 3 grains of gold to each bushel of earth, could be worked hydraulically with profit. Dr. Hind's basis of calculation is a citation from the 1863 geology of Canada. He quotes Mr. W. P. Blake who, in a report on the gold fields of Georgia, states that earth containing one twenty-fifth of a grain of gold to the bushel can be worked profitably by the hydraulic method. As the du Loup ground was estimated to contain 3 grains to the bushel, there appeared to be an ample margin of profit. Dr. Hind's estimate thus works out at about \$2.50 per cubic yard.

In Section V., "Origin of the Gold," Dr. Hind discusses further the source of the metal. He concludes that the auriferous drift clays and gravels of the Riviere du Loup really enclose the products of two distinct series of gold-bearing rocks, the upper Silurian slates and the lower Silurian schists, represented on the

Chaudiere, north of a few miles above the Guillaume River, in the parish of St. Francis, by the Quebec group.

The Black Sand, Section VI., exists in considerable quantity in the gravels, clays, and alluvial deposits. According to Dr. Sterry Hunt, who examined this material at different times, it is made up of magnetite, hematite, chromic iron and ilmenite, with occasional grains of garnet nitile and, more rarely, zircon and corundum. Portions of native platinum and iridosmine were also obtained. Dr. Hunt recommends that the black should be saved for further treatment for gold not recoverable by washing.

Five specific advantages in working the gold-yielding Riviere du Loup tract are enumerated in Dr. Hind's Conclusion, Section VII.:

1. Uniform distribution of the gold in the drift clays and gravels in the valleys and in the uplands.

2. The occurrence of rapid streams with abundance of water for sluicing, fluming, or power, throughout the entire area under review.

3. The existence of numerous gold-bearing quartz veins, which can be worked during the entire year.

4. The comparative shallowness of the drift on the uplands which will admit of the clay slates being easily reached, where the course of heavy gold will most probably be found in the fissures of the slates exposed.

5. The facility with which the Metgermette, the small streams flowing into the Riviere du Loup, and the du Loup itself, can be diverted from their channels, and the present beds of these rivers exposed and worked. The beds of these rivers may be regarded as sluices on a gigantic scale which have been engaged in the operation of separating the gold from the drift for ages, and which have treasured up the products of their labour in the beds where they now flow, the gold being caught by the numerous reefs of slates which stretch across the river and thus protected from attrition.

NOTES ON GOLD DISCOVERIES IN WHITNEY AND TISDALE TOWNSHIPS.

Report by Inspector James M. Bartlett, 15th October, 1909.

Whitney and Tisdale townships are reached from the T. & N. O. Ry., by leaving the train at mileage 228 1-2 which point has been made a flag-station, and named "Red Pine Lakes." The canoe-route from here to Porcupine Lake, which is situated conveniently to the gold-bearing area, is estimated to be in the neighbourhood of sixty miles in length, and is for the most part easy travelling. A fifty chain portage leads from the railway to a small lake from the south end of which a crooked creek drains into the Frederick House River. The latter stream is ascended through the lake of the same name to Night-Hawk Lake, and the remainder of the journey is via Porcupine River to Porcupine Lake. Two portages—one of three chains and one of eight chains—occur on the Porcupine.

Eight days were spent in this vicinity and the twenty-four square miles bounded by the line shown on the map were travelled over and all the reported discoveries of gold visited. The location of these is shown on the map by the letter "G."

The area to the north and west of Porcupine Lake is a low-lying one consisting of a level plain, largely swamp-covered, with occasional outcrops of rock. The latter seldom rise to a height of more than ten or twen-

ty feet—as a rule being only four or five feet above the surrounding plain. The rocks of this area strike in a north-easterly direction and commonly weather with what might be described as a saw-tooth effect caused by the development of two planes of weakness, the one dipping at a high angle to the northwest and the other at a much lower angle to the southwest. The rocks of this section are much altered and some of the veins occur in a rock which approaches a quartz-schist. Besides this type rocks of a basic and others of a calcareous type occur.

In Concessions 1 and 2, especially towards the more southerly part, the country is higher and more rock is exposed, but only a few cases were seen where the hills rise as high as forty feet. In this section the schistosity is much more marked than in the northern area—chloritic and hornblende schists being developed. One outcrop was found of a massive rock, which from the development of serpentine would lead one to suspect that it might have originated from an olivine-bearing rock.

The claims on which gold was seen are as follows: N.W. $\frac{1}{4}$, S. $\frac{1}{2}$ Lot 1, Con. 5, Tisdale—Robert Bruce.

This discovery consists of a series of parallel veins of milky quartz, striking S. 83° E., and varying in width from one to eighteen inches. These had been stripped for about twenty-five feet and at one point on the contact of one of the veins with the country rock, gold is visible in grains and in leaf-like forms.

N.E. $\frac{1}{4}$, S. $\frac{1}{2}$ Lot 2, Con. 5, Tisdale—W. H. Reamsbottom.

A few specks of gold are to be seen in two irregular bands of quartz from two to three inches wide and dipping to the south at a low angle (almost horizontal).

S.W. $\frac{1}{4}$, S. $\frac{1}{2}$, Lot 11, Con. 5, Whitney—A. E. Way (known as the "Bannerman" claim).

A vein of quartz on this property has been stripped at intervals for about three chains; strike east and west. Near the western end of the trenching it is about two feet wide, but about one chain to the east of here it is broken up into five parallel bands from three to twelve inches in width separated by about six inches of country rock. Dip is not determinable. Gold is visible in two places on this vein.

S.W. $\frac{1}{4}$, S. $\frac{1}{2}$ Lot 2, Con. 5, Tisdale—W. H. Davidson.

Gold has been found at several points on a vein striking S. 85° E., with a dip to the south. The rock is much disturbed here and the vein, so far as could be seen with the small amount of stripping, consists of a series of irregular lenses of quartz.

N.W. $\frac{1}{4}$, N. $\frac{1}{2}$ Lot 4, Con. 1, Tisdale—F. C. Remington (locally known as the "Wilson" property).

The largest body of quartz seen in the district occurs on this property associated with a much decomposed green schist. This vein had been found only a few days before, so that no work had been done on it, but it could be traced for at least six chains in a south-westerly direction, and at one point it appeared to be two chains in width.

Gold could be seen at five or six different spots near the northern end of this outcrop and one of these showings was the most attractive in the district. Enough gold not in the leaf form but rather resembling nuggets, was scattered through the quartz in a space of about an inch and a half square to cover a twenty-five cent piece.

The quartz in this vein, as in all the others mentioned above, is of the milky variety and is practically free from sulphides. No sinking has been done on any of

these properties and very little trenching. In view of this any estimates of "ore-in-sight" at the present time are unwarranted.

Since returning from this field another discovery has been reported occurring in the southwestern part of Tisdale Township.

(Signed)

JAMES BARTLETT.

GOLD AND SILVER PRODUCTION IN CALIFORNIA

The mining interests of the State are wondering why the annual statistics of gold and silver production of California for 1908 have not been made public. Some time since the State Mining Bureau issued figures of production for all other mineral substances, and many requests have since been made to State Mineralogist Aubury to supply those of the precious metals, but that official, in an interview, stated that the State Mining Bureau never did collect the figures of precious metal production, principally for the reason that the Government, through the United States Mint, was in a better position to obtain the figures than a State institution.

Besides, as the Government annually collected the statistics, it would place an unnecessary expense upon the State. When the statistics were collected by the Mint, they were issued to the public, about the first of July of each year for the preceding year.

About three years ago, the Mint turned the work over to the United States Geological Survey, and since that time the Survey has supplied the statistics. It appears, however, that instead of the Survey improving on the system of the U.S. Mint, each year the statistics are longer delayed. Whether this should be charged to incompetency or carelessness is not known.

California is probably more vitally interested in the figures of gold production than any other State excepting Colorado, and the withholding of the statistics from the press of this State is inexplicable. At the same time the delay in furnishing the figures will make them of practically little value when they are given out.

The State Mining Bureau completed its statistics for 1908 in July, for over forty-five different mineral substances; yet it has taken the U.S. Geological Survey over ten months to collect figures on two mineral substances, and they are not yet ready for the press, and California suffers from the delay in not being able to show to the world the large output of precious metals of our mines, and thus invite the co-operation of capital.

A Descriptive Sketch of the Geology and Economic Minerals of Canada.

By Dr. G. A. Young.

Published by the Geological Survey Branch, Department of Mines, Ottawa.

This latest publication of the Geological Survey is designed to furnish a readable, and reasonably complete, description of the geology and economic minerals of Canada. So vast a field needs careful approach. It is by no means easy even to draft a workable plan for an undertaking of this kind. But the need is more than apparent. To the great mass of people interested in some phase of mining, the special reports of geologists are either too vague or too abstruse, or both. In any case, the effort to consolidate in one volume the cream of the geologic, mineralogic and physiographic data gathered by the Survey is commendable. It supplies the public with what is wanted in concise form.

Dr. J. A. Young, the compiler of the volume, has adapted broadly the plan followed by the late Dr. J. M. Dawson in his admirable outline of the physical geography and geology of Canada, prepared in 1897, for the Toronto meeting of the British Association for the Advancement of Science. Since that time our knowledge of the geology of Canada has been added to largely. Consequently Dr. Young's basis is wider and better-defined than was Dr. Dawson's.

Director Brock's lucid introduction is followed by a few prefatory and explanatory pages by Dr. Young. Then each of the geologic provinces, enumerated herewith, is dealt with. Political divisions are disregarded, except for reference.

Dr. Young's provinces are as follows:—

1. **The Appalachian Region**, including the portion of Canada east of a line running from Lake Champlain

to the neighbourhood of the city of Quebec and thence down the channel of the St. Lawrence.

2. **The St. Lawrence Lowlands**, including the plains, bordering the St. Lawrence River above the city of Quebec and extending through southern Ontario to Lake Huron.

3. **The Laurentian Plateau Region**, including the great U-shaped upland surrounding Hudson Bay.

4. **The Arctic Archipelago**, including the islands of the Arctic Ocean north of Hudson Bay.

5. **The Interior Continental Plain**, including the central belt of plains lying between the western margin of the Laurentian plateau and the Rocky Mountains.

6. **The Cordilleran Region**, including the mountainous region of the western portion of the continent.

To each of these divisions one chapter is assigned. The geology of each is outlined, and the economic mineral occurrences of each are described at more or less length.

A concluding chapter touches on the phenomena of the glacial period. Two maps are appended, a second of the excellent "Minerals" map, and a general geological map of the Dominion.

Abstract of Director Brock's Introduction.

Mr. R. W. Brock, Director of the Geological Survey, in his introduction disarms critics. "In a brief and general statement," he explains, "concerning so wide a subject, and covering so vast a territory, much that is interesting and important must of necessity be

passed without notice; and the broad generalizations cannot be expected to present with absolute fidelity the actual facts. What has been attempted is to give merely a general idea of the conditions obtaining in the various geological provinces into which the Dominion of Canada is naturally subdivided, together with the more important minerals which are characteristic of, or which have been exploited in, each."

The geological investigation of Canada may be said to have been commenced in 1843, with the organization of the Geological Survey of Canada, under Sir William Logan. The work of Logan and of his assistants, Murray, Hunt, Billings, and others, was summarized in a volume published in 1863, "The Geology of Canada." This deals only with the southern portions of the Provinces of Ontario and Quebec. The work of the Geological Survey embraces now the northern half of the continent of North America. In spite of enormous difficulties, sufficient work has been done to make known Canada's main geological features; to indicate roughly the territories that will be found to be mineral-bearing; to forecast the character of its mineral resources in the different mineral provinces; and to demonstrate that Canada is destined to become one of the great mining countries of the world. Nevertheless, a large part of Canada is yet unexplored.

The amount of mineral-bearing territory still awaiting the prospector is prodigious, the greatest, in fact, that now remains anywhere on the globe.

The tardiness in developing the mineral resources is due probably to Canada's wealth in farming lands. The first settlers, in order to provide food were forced to become farmers. Farming lands were sought after, and were developed by lines of transportation. The lack of transportation facilities in the mineral-bearing areas, and the extent of country in proportion to its population were contributory factors.

In 1886, the mineral production of Canada did not reach \$10,250,000 in value, and was only \$2.23 per capita. In 1908, the production was \$87,000,000, or \$12.57 per capita. The output of the mine is now greater than the combined output of forest and sea, and ranks next to agriculture.

The total production of minerals for the last twenty-three years amounts to \$926,516,579, of which gold represents \$267,700,000.

In the review of the world's production in 1907, Canada ranked first in asbestos and nickel; third in chromite; fourth in silver; seventh in copper; eighth in gold; and tenth in coal.

Mr. Brock notes the geographical distribution of the chief commercially important minerals, and notes the mineral possibilities of the geological provinces.

The Appalachian Region is characterized by rock formations that are typically disturbed and thrown into a succession of folds. In Canada, the Appalachian extension is found to possess many of the minerals that have placed some of the eastern States in the foremost rank of mineral and industrial districts of the world.

Comparing Pennsylvania, which is probably the best developed Appalachian State, with Nova Scotia, Mr. Brock points out that whereas Pennsylvania has an annual production of domestic minerals approximately equal to \$9,340 per square mile of territory, or to \$67 per capita, Nova Scotia has an annual production of about \$1,000 per square mile, or \$46.00 per capita. Taking into consideration the more intensive production that follows increase of population, a geological comparison would appear to be fair, and Nova

Scotia would seem to possess proportionately equal mineral resources with the most favoured Appalachian States. The mineral development of New Brunswick is backward. This is partly due to the heavy covering of soil, and to the forested areas. Many important mineral deposits have been found, and a few are being worked to advantage. The south-eastern portion of Quebec—also belonging to the Appalachian area—is a high producer of economic minerals. The main asbestos mines of the world are situated in this area; and important industries are carried on in chrome iron ore, copper and pyrites.

The Lowlands of the St. Lawrence Valley, including the southern portion of Ontario, consist mainly of flat-lying Palaeozoic rocks. The mineral products are typically clay, cement, petroleum, natural gas, gypsum, and other non-metallic products.

The Laurentian Plateau is described by Mr. Brock as an area of pre-Cambrian rocks, estimated to cover 2,000,000 square miles, or over one-half of Canada, lying north of the Valley of the St. Lawrence, from Newfoundland to beyond Lake of the Woods, and enclosing Hudson Bay like a huge V. Only the southern fringe of this area is known, and of this fringe only a portion prospected. These rocks are remarkable for the variety of useful and valuable minerals they contain. The Michigan copper mines, the Lake Superior iron ranges, the Thunder Bay silver region; the Sudbury copper-nickel deposits; the Cobalt silver areas; the magnetite and mica deposits of eastern Ontario and Quebec fall within this geological province. Mr. Brock refers to the fortuitous manner in which most of the richest mineral districts were discovered, and to the unsuspected possibilities of this great stretch of 2,000,000 square miles.

The Interior Plain embraces the greater portions of Manitoba and Saskatchewan which lie outside the pre-Cambrian, and the Province of Alberta. This area is pre-eminently agricultural, but in addition to furnishing a market for the product of the mines, it will have a large output of non-metallic minerals. It is underlain mostly by sedimentary rocks, chiefly of Cretaceous age, containing coal, building stones, clays, and cement materials. Natural gas has been tapped over wide areas and under great pressure, and there is every indication of a large oil field in the northern portion, at least, of Alberta, and some oil has been encountered in the south-west. The tar sands of the Cretaceous, along the Athabaska River will be important sources of asphaltum. The lignites of the eastern plains and the bituminous coals to the west occupy known areas comprising at least an extent of 27,330 square miles. Alluvial gold, clay-ironstone, salt, and gypsum also occur.

The Cordilleran Belt, in South America, in Mexico, and in the Western States, is recognized as one of the greatest mining regions in the world. It is noted principally for its wealth of gold, silver, copper, and lead. The Cordilleras stand unparalleled for the continuity, extent, and variety of their mineral resources. In Canada, and in Alaska, this belt maintains its reputation; although in both it is for the greater part unprospected. In Canada its length is 1,300 miles, and its width 400 miles. Pre-eminently a great mining region, its rocks range from the oldest formation to the youngest. Vulcanism and mountain building have repeatedly been active. Although developed along the international boundary line, probably not one-fifth is prospected at all; not one twentieth prospected in detail; and not one area, however small, completely tested.

Fifteen years ago lode mining commenced in British Columbia, the production before this being largely in placer gold and coal. In 1893, the annual production of minerals in British Columbia had a value of about \$3,500,000. It now runs about \$25,000,000. The total production, up to the end of 1907, was about \$300,000,000. The Yukon is credited with over \$125,000,000 in placer gold.

The Cordilleran belt in Canada is rich also in coal of excellent quality, ranging from lignites to anthracite, and conveniently distributed. Only the coal areas in the southern portion of the Province, and a few small areas on the Telkwa and Nass Rivers, and on the Yukon, are known at present. But the estimated quantity of coal in these known fields is enormous. British Columbia's known coal fields, according to Mr. D. B. Dowling's estimate, comprise 1,123 square miles, containing 20 million tons anthracite, 38 billion tons

bituminous, and 314 million tons lignite. The corresponding figures for the Yukon are: 400 square miles, estimated to contain 32 million tons anthracite, 32 million tons bituminous, and 850 million tons lignite.

The prospective resources of the Cordilleran belt in Canada are enormous. Though mostly unprospected, it has already been proved to possess the greatest copper mines; one of the greatest silver-lead mines; and two of the greatest placer camps in Western America—a region noted for its extraordinary mineral wealth.

Perhaps half the rock history of the world is written in the pre-Cambrian, and it is of this portion that most remains to be deciphered. Since the greatest spread of these old rocks occurs in Canada, much of this work will fall to Canadian geologists, and the careful solution of the problems presented will be as valuable to science as to the mining industry.

CANADIAN AND ENGLISH COMPANY LAW.

On September 1st, the *Financial Times*, of London, published a letter, in which comparison was made between Canadian and English company law. The comparison did not result favourably to Canada.

Mr. J. J. Harpell, who is at present in England, sent the following communication to the *Financial Times* early in October. A copy was also mailed to the *Canadian Mining Journal* for simultaneous publication.

For clearness' sake we append the original letter that appeared in the *Financial Times*.

We may remark that if our English contemporaries took ordinary pains to ascertain facts concerning Canada, they would have much less to complain of:—

(From the *Financial Times*, Oct. 23, 1909.)

Canadian Company Law—How It Differs From English Legislation—Some Objectionable Features.

It seems desirable to sound a note of warning to investors in regard to some of these companies, which the lax state of the Canadian company laws permits to be greatly over-capitalized. The Canadian company laws follow the American rather than the English model, being in this respect unlike the Australian and New Zealand Companies Acts, which are framed upon the English Acts from 1862 to the present date.

A Canadian company may be incorporated under a Dominion charter, or by a charter granted by any one of the nine Provinces. Except in certain special circumstances, as in the case of railways, a Provincial charter seems to be just as good as a Dominion one. Charters for new companies are obtained at a ridiculously low cost, from an English standpoint, the scale of fees being similar to that charged by some of the American States, that have the unenviable reputation of being the "domiciles" of many of the questionable undertakings with which the United States is flooded. In the promotion of a Canadian company the laws make no provision for proper disclosure of agreements by which hidden profits may be secured, and in a majority of incorporated companies there seems to be little doubt that the vendors or promoters make enormous undisclosed profits. There is not in Canada such a place as Somerset House, where a shareholder

can satisfy himself about the main features of the company in which he happens to be interested, or a creditor can see a list of shareholders. The shareholder in a Canadian company knows just as much about its affairs as he can gather on the outside, or as the Directors, collectively or individually, choose to tell him.

Directors' Idea of Duty.

Canadians have not yet come to realize that a company, when it is incorporated, becomes an entity recognized by law as such, just as much as any individual human being. Canadian, like American, directors do not as a rule recognize that they are trustees for the shareholders—not only for the owners of a majority of the share capital, but for every individual shareholder. Hence it follows that a Canadian director usually finds it his duty and to his advantage to administer the company solely in the interest of the person or persons holding the "controlling interest." It is customary for promoters to make presents of shares for a qualification to directors, who are thus in the pay of persons whose interests are frequently antagonistic to a minority of the proprietors after the company has come into operation. A respectable and responsible Englishman to-day will not lightly, or until after due consideration, allow his name to appear on the prospectus of a new company. It is far otherwise in Canada, and it would be easy to mention names of a number of men well known not only in Canada, but also in this country, who figure on the directorates of all sorts of companies, as to the proceedings of which they know little or nothing—and probably care less.

Share Capital Regarded as "Boodle."

The method adopted in the formation of a Canadian company is simple. The stock or share capital is from the start regarded as so much "water," or "boodle." Take the case of a company incorporated for, say, \$30,000,000, of which \$15,000,000 is in five per cent. gold bonds, "payable principal and interest, in London, Montreal or New York," and the remaining \$15,000,000 in fully-paid shares, the whole amount of capital required to carry out the purposes of the undertaking being not more than \$10,000,000. The first thing to do is

to advertise the company and start selling some of the bonds. Blocks of bonds are hawked round for, perhaps, 60 cents on the dollar of their face value, but the purchaser, or the selling agent, for his services receives a large number of shares by way of a bonus on the sale of the bonds. It is customary, as a Toronto man puts it, in the formation of a company, "to give a good swag of shares to the boys and let them go around gassing it up." There is no doubt that this frequently occurs. It would be very interesting if a return could be prepared showing what actual cash was received in exchange for the issue of their shares by a selected list of, say, two hundred companies of Canadian incorporation. There is no law prohibiting the issue of shares at a discount, and, in fact, nearly all the safeguards that the English laws provide for the safety and security of the investing shareholder are conspicuous by their absence from the Dominion and Provincial legal codes.

Loose Administration.

Time and again there has been talk of a revision of the Canadian company laws, with a view to bringing them into closer correspondence with the laws in force in England. Vested interests have probably proved too strong, for the proposed amendment has been shelved every time it has been suggested. Nearly every member of the Dominion Parliament and of the Provincial Legislative Assemblies is a director of one or more companies, which, to some extent, may account for the company laws being allowed to remain in their present lax condition. It is far from being my wish or intention to in any way reflect upon or disparage Canadian business men, but, with some experience of the subject, I have no hesitation in saying that the business methods and commercial morality of Canadians are patterned upon the standard of the United States rather than upon the customs of Great Britain—and in no branch of commercial life is this dissimilarity to the Mother Country so apparent as in the loose administration permitted to, and practised by, directors of companies of Canadian incorporation. From the foregoing criticism, the Canadian banks are exempted, as the banking laws are quite distinct from the company laws and are rigidly enforced by the Dominion Government.

In Canadian mining companies, often formed to work mere prospect holes, and sometimes absolutely unexplored mining leases, the over-capitalization is ludicrous and pitiful. Pitiful, because many ignorant and innocent people are smitten with "mining fever," and rush in, to their undoing. But in the matter of over-capitalization some of the principal industrial undertakings are about as bad as the mining propositions. In particular, some of the numerous electric power companies might be instanced. Their over-capitalization is nothing short of a public calamity. They carry a huge deadweight of watered stock, upon which the consumer has, for all time, to pay enough for his power to earn dividends. Where the shares of such concerns have passed by transfer into the hands of second and third parties, it would be hard on these innocent holders if laws are passed compelling companies to furnish power at a rate that will pay liberal interest only on the actual capital expended, or, if the State should expropriate some of these power concerns on a valuation arrived at in the same way. This aspect of the case is not imaginary, as there is a strong and growing feeling in many parts of Canada that electricity is now so much of a necessity in everyday life that its generation should be controlled by the State, and that its cost should not be enhanced to the consumer by having to pay dividends

on large amounts of watered capital, for which no cash ever found its way into the treasury of the power companies.

Canadian Directors and English Companies.

There has been some newspaper talk of late of the advisability of securing Canadian directors for English companies doing business in the Dominion. It looks well on paper, but it would not, in all probability, turn out well in practice. To begin with, a Canadian of any standing would be unlikely to buy into any English company at current prices to secure a qualification and sufficient interest in a company to become a director. He comes to England to sell, and not to buy, shares, as a rule. A carefully selected, and numerically small, Canadian Board of Advice to co-operate with an English Board of Directors is quite another matter and in many cases might be distinctly advantageous, so long as the control of the purse strings is retained in the hands of those who have to find the money in England. As a rule, however, one strong man of the right sort, with a competent knowledge of his work and on the ground, is worth half-a-dozen Canadian Boards of Advice, if he enjoys the entire confidence of his directors and they give him a free hand in everything except the financial policy of the company.

An Instructive Story.

As to the names that figure on the directorates of Canadian companies, the following little story is instructive. A heavily capitalized Canadian company has for some years been unloading its shares in the United Kingdom—or rather it should be said that the promoters and their associates have been unloading their shares on British investors. On the Canadian directorate are some of the best-known names in the business and financial world of the Dominion. English newspapers from time to time have made favourable comment on the strength of the Canadian Board. One of the gentlemen mentioned as a director—a very well-known man—a short time ago visited England, and to him went a seeker for information about the Canadian company. "Why do you come to me?" asked the Canadian magnate. "Because you are one of the directors," was the reply. "Am I?" said the Canadian, "well, I suppose the company is all right, but, to tell you the truth, I didn't know I was connected with it. 'They' put me down on it when the concern first came out, but I've never taken any active interest in it. I suppose I've got some stock in it—must see about it when I get back to the other side." It will be noticed that the Canadian magnate said "they" put him on the directorate. By "they" he presumably meant the promoters. "They" did not put him there for nothing, for many English investors regard his name as a tower of strength as a typically successful Canadian. The moral of the whole of the foregoing is that intending British investors in companies of Canadian incorporation—especially of recent incorporation—should make strict inquiry into the original issue of the capital stock of the company—who got it, and what money was paid to the company, not the promoters, for it.

Mr. Harpell's Letter.

To the Editor of the Financial Times:

Sir,—In your issue of September 1st, there appeared an article by one of your correspondents entitled "Canadian Company Law," in which much injustice is done

to Canadian people and to many of their laws and institutions. It would be a great mistake to leave your readers under the impression that Canadian Company Law has not been modelled after similar English legislation, because nothing could be further from the truth. The Dominion Companies Act and that of every Canadian Province, with the exception of Ontario, is similar to the company law of England as it was previous to 1901, while the Act of Ontario is almost an exact replica of the English Act of 1901, with one or two very important amendments, the principal one being that the Ontario Act requires that all foreign companies attempting to market their securities in the Province must file information equally complete and exhaustive as is required of companies chartered by the Province. In this respect the Ontario Act does much more to protect its people from fraudulent flotations chartered by foreign countries than does the English Act.

Within the last few days my attention has been drawn to literature that is being circulated in the United Kingdom by a company chartered in United States to float mining claims of the Cobalt district of Canada. This flotation has made no registration at Somerset House, and its promoters seem to be going about their business of unloading their scrip upon the English people without any interference. This is in marked contrast to the manner in which this same company was treated when an attempt was made to dispose of its securities in the Province of Ontario. As soon as its promoters started to circulate their literature in that Province, they were proceeded against, under instructions from the Government, fined the maximum penalty imposed by the Companies Act, and compelled to withdraw their literature.

When your correspondent says that "there is not in Canada such a place as Somerset House, where a shareholder can satisfy himself about the main features of the company in which he happens to be interested," he certainly shows himself to be not very familiar with his subject. In the Provincial Secretary's Department at Toronto he will get as much information concerning any company chartered either by the Province of Ontario, or which, chartered elsewhere, attempts to sell its stock or bonds in Ontario, as he will get at Somerset House concerning any company registered there. Furthermore, neglect on the part of any company to register the required information is a much more serious oversight in Ontario than it seems to be in England. During the last few years very many promotions of a questionable character have been brought to grief for neglecting to register in the Provincial Secretary's Department the information required by the Ontario Companies Act.

The observation of your correspondent that the over-capitalization of the numerous Canadian electrical power companies is "nothing short of a public calamity" is well made. "The huge dead weight of watered stock" upon which dividends are to be earned is a heavy burden on the industries that are compelled to use their power. But this is not true only of electrical power. Almost every conceivable commodity in Canada is being syndicated and capitalized to an extent that is forcing up the cost of living and production to a point where the prosperity and development of the country are being threatened. The people are already aroused by this fact, and are taking steps to protect themselves which would never have been contemplated under ordinary conditions.

The recently-adopted policy of the Ontario Government to assist a number of municipalities to procure electrical power at reasonable rates is the direct result of an attempt on the part of a few reckless promoters

to compel the people to use their power at prices that would enable them to pay handsome dividends on an enormous amount of watered stock. It is very much to be regretted that so many English papers should have seen fit to denounce this move and to attempt to make it difficult for the Province to raise money for this purpose. These papers should have realized that a policy which had the support of a whole people, so nearly approaching unanimity, must have been actuated by an intolerable condition of affairs. The money which the English people, by subscribing to the recent Ontario bond issue, have provided for the carrying out of the power policy of Ontario means much for Canada, and will do more to build up a healthy sentiment than many times the same amount that has been given for the securities of Canadian syndicates and other private corporations has done.

It will be really too bad if English investors, who have taken up the securities of private Canadian corporations, suffer any loss by the policy of municipalization and nationalization of necessities, which the people of Canada are being forced to adopt. But surely if such should be the case, less blame attaches to the people of Canada than to the judgment of the investors or to English laws, which should have compelled promoters to file particulars of these private corporations at Somerset House, where it would have been seen that the actual investment of these companies represented but a very small fraction of the capitalization, and that the methods of the promoters were, to use your correspondent's words, "to give a good swag of shares to the boys and let them go around gassing it up."

It is very interesting to review some of the tactics by which promoters of these private corporations endeavour to unload their securities in this country and in Canada. In England the people are urged to take up the securities because they represent a Canadian enterprise and by so doing they will be building up the Empire. In Canada the Englishman's subscription is held up as an example and pointed to as a guarantee that the flotation is "a good thing."

I am, etc.,

J. J. HARPELL.

ROUMANIAN PETROLEUM.

The growth of the petroleum industry of Roumania has been phenomenal. Twelve years ago, 1897, the annual output of crude oil was 110,000 tons. Last year, 1908, the output was 1,147,000 tons. Nearly all of this production has come from old fields, and much good territory remains to be exploited.

Ninety-five per cent. of the present production comes from three districts—Campina-Bustenari, Baicoi-Tzin-tea, and Gura-Oenitza-Moreni. The two former fields were worked for years by means of the old hand-dug wells.

From the Campina-Bustenari zone comes over 60 per cent. of the total output. It is, therefore, the centre of the industry. More than 50 per cent. of the wells drilled in this region were gushers, often producing hundreds of tons per day when first drilled. Much of the district is held by speculators and development thus retarded.

In the Gura-Oenitza-Moreni field there was only one productive borehole in 1904. There are now sixty.

The English Companies Act forbids the distribution as dividends of money earned prior to the actual flotation of a company.

LIST OF PERMISSIBLE EXPLOSIVES.

Tested Prior to October 1, 1909.

The following list of permissible explosives tested by the United States Geological Survey at Pittsburg, Pa., is hereby published for the benefit of operators, mine owners, mine inspectors, miners, and others interested.

The conditions and test requirements described in Explosives Circular No. 1, issued under date of May 15, 1909, have been followed in all subsequent tests.

Subject to the provisions named below, a permissible explosive is defined as an explosive which is in such condition that the chemical and physical tests do not show any unfavourable results; which has passed gas and dust gallery tests Nos. 1 and 3, as described in circular No. 1; and of which, in test No. 4, 1½ pounds (680 grams) has been fired into the mixture there described without causing ignition. (Those reported in Explosives Circular No. 1 are marked *.)

Brand.	Manufacturer.
*Ætna coal powder A.....	Ætna Powder Co., Chicago, Ill.
Ætna coal powder AA.....	Do.
*Ætna coal powder B.....	Do.
Ætna coal powder C.....	Do.
Bituminite No. 1.....	Jefferson Pdr. Co., Birmingham, Ala.
Black Diamond No. 3.....	Illinois Pdr. Mfg. Co., St. Louis, Mo.
Black Diamond No. 4.....	Do.
*Carbonite No. 1.....	E. I. Du Pont de Nemours Powder Co., Wilmington, Del.
*Carbonite No. 2.....	Do.
*Carbonite No. 3.....	Do.
*Carbonite No. 1-L. F.....	Do.
*Carbonite No. 2-L. F.....	Do.
Coalite No. 1.....	Potts Powder Co., New York City.
*Coalite No. 2-D.....	Do.
*Coal special No. 1.....	Keystone Pdr. Co., Emporium, Pa.
*Coal special No. 2.....	Do.
*Collier dynamite No. 2.....	Sinnamahoning Powder Mfg. Co., Emporium, Pa.
*Collier dynamite No. 4.....	Do.
*Collier dynamite No. 5.....	Do.
Giant A low-flame dynamite	Giant Pdr. Co. (Con.), Giant, Cal.
Giant B low-flamedynamite	Do.
Giant C low-flame dynamite	Do.
*Masurite M. L. F.....	Masurite Explosives Co., Sharon, Pa.
*Meteor dynamite.....	E. I. Du Pont de Nemours Powder Co., Wilmington, Del.
*Mine-ite A.....	Burton Powder Co., Pittsburg, Pa.
Mine-ite B.....	Do.
*Monobel.....	E. I. Du Pont de Nemours Powder Co., Wilmington, Del.
Tunnelite No. 5.....	G. R. McAbee Powder and Oil Co., Pittsburg, Pa.
Tunnelite No. 6.....	Do.
Tunnelite No. 7.....	Do.
Tunnelite No. 8.....	Do.

by other explosives will be made public immediately after the completion of the tests.

With a view to the wise use of these explosives it may be well in this connection to point out again certain differences between the permissible explosives as a class and the black powders now so generally used in coal mining, as follows:—

(a) With equal quantities of each, the flame of the black powder is more than three times as long and has a duration three thousand to more than four thousand times that of one of the permissible explosives; the rate of explosion also is slower.

(b) The permissible explosives are one and one-fourth to one and three-fourths times as strong, and are said, if properly used, to do twice the work of black powder in bringing down coal; hence only half the quantity need be used.

(c) With 1 pound of a permissible explosive or 2 pounds of black powder, the quantity of noxious gases given off from a shot averages approximately the same,

Provided:

1. That the explosive is in all respects similar to sample submitted by the manufacturer for test.

2. That No. 6 detonators, preferably No. 6 electric detonators (double strength), are used of not less strength than 1 gram charge, consisting by weight of 90 parts of mercury fulminate and 10 parts of potassium chlorate (or its equivalent), except for the explosive "Masurite M. L. F.," for which the detonator shall be of not less strength than 1½ grams charge.

3. That the explosive, if frozen, shall be thoroughly thawed in a safe and suitable manner before use.

4. That the amount used in practice does not exceed 1½ pounds (680 grams), properly tamped.

The above partial list includes all the permissible explosives that have passed these tests prior to October 1, 1909. The announcement of the passing of like tests

the quantity from the black powder being less than from some of the permissible explosives and slightly greater than from others. The time elapsing after firing before the miner returns to the working face or fires another shot should not be less for permissible explosives than for black powder.

The use of permissible explosives should be considered as supplemental to and not as a substitute for other safety precautions in mines where gas or inflammable coal dust is present under conditions indicating danger. As stated above, they should be used with strong detonators, and the charge used in practice should not exceed 1½ pounds and in many cases need not exceed 1 pound.

JOSEPH A. HOLMES,

Expert in Charge Technologic Branch.

Approved, October 11, 1909.

WINNIPEG MEETING OF BRITISH ASSOCIATION.

[EDITOR'S NOTE.—The following paragraphs were omitted from Mr. C. W. Knight's article in our last issue.]

The excursion and side trips taken by the party were many and varied. They visited the silver and nickel camps of Ontario, the Keewatin iron ranges at Temagami and Moose Mountain, and Silver Islet, that lone dot of land on the north shore of Lake Superior. While at Winnipeg trips were arranged to the quarries at Stoney Mountain, to modern flour mills and great railway yards, to prairie lands nearby where thrashing operations could be seen on a large scale, and, finally, a trip to the Pacific Coast, which was participated in by the officers and guests of the association.

The excursion to Cobalt and Sudbury was taken before the meeting at Winnipeg by about a score of members. The trip was arranged by Dr. W. G. Miller, and the party was conducted about Cobalt by Dr. Miller and Mr. Arthur A. Cole; while at Sudbury Mr. Turner, the president of the Canadian Copper Company, took charge of the visitors. The geology of Cobalt was explained by Dr. Miller in such a way that it seemed simplicity itself, and the wonder was that the Cobalt area should have remained so long a geological terra incognita. We were told that the oldest rocks in the camp were greenstones known as the Keewatin series; that these were penetrated by granites, now defined as Laurentian. For an enormous length of time these greenstones and granites were cut down and eroded by atmospheric agencies, and during this period the conglomerates, slates, and quartzites were deposited. After another long interval of time all the rocks previously mentioned were cut by great sheets or sills of diabase. As a remnant of one of these sills we were shown Diabase Mountain, to which, surely, every Cobalt mining promoter should daily take off his hat and make his very deepest bow, for has not this same diabase brought up from the depths of mother earth the silver and cobalt and nickel and given to the world a mining camp which is unique on a whole continent?

The widely advertised Lawson vein was studied with interest by the party because there has been little or no work done on the surface and a good idea was therefore obtained of the cracks in which the veins occur. By the genial Sam Cohen the party was shown through the underground workings of the Crown Reserve mine. Some of the methods of concentrating the ores were seen in operation at the Coniagas and other mills. One day was spent in a gasoline launch on Lake Temiskaming and different points of geological note were visited.

Much admired was the model by Arthur A. Cole, of Cobalt, constructed from the geological maps and reports of the area by Willet G. Miller, Provincial Geologist.

Cobalt was left behind early in the afternoon of August 19th, but a few hours were spent at Temagami to see the banded jasper iron ores there. If it is true that the world's known supply of high-grade iron ore may be exhausted in sixty years, these low-grade ores are destined to play an important part in the future of the iron industry.

While in the Sudbury district Mr. Turner personally conducted the members through the large metallurgical plant at Copper Cliff, and although during this process they were more or less choked by sulphur fumes this was soon forgotten over the delightful little luncheon given through his kindness. The same day the Creigh-

ton mine was visited, from which much of the nickel ore is obtained.

The geology of the district was explained by Prof. Coleman. He stated that, unlike Cobalt, no basement had as yet been found for the great series of sediments occurring there. At all places where they are in contact with igneous rocks the contact is an intrusive one. It has not been possible either, to prove the presence of the Keewatin series, though certain greenstones may represent this group.

A day was spent at the Moose Mountain iron mine, which lies to the north of the Sudbury district. Mr. Jordan, the manager, showed the party the various workings, and incidentally pointed out a pine tree which was climbed by a noted iron man from the United States. He was driven to this stern though rather ludicrous extremity—so the story goes—by a bull moose; and to prove the truth of this yarn a photograph of the tree was shown.

GAS-PRODUCER PROBLEMS.

The United States Geological Survey, through its Technologic branch, has just issued a bulletin entitled "Incidental Problems in Gas-Producer Tests," by R. H. Fernald, C. D. Smith, J. K. Clement and R. A. Grine. The Survey is studying the general problems involved in the economic use of fuels in gas-producers as part of its investigation of methods of increasing the efficiency of the fuel resources of the country. The bulletin declares that one of the important problems is the determination, under practically constant conditions, of the duration of gas-producer tests necessary to reduce the possible error to a minimum. A greater part of the bulletin is therefore taken up with a discussion of the proper length of test period.

Mr. Fernald, the consulting engineer in charge of these tests, has the following to say on this subject: "Some of the test results reported by certain gas-producer manufacturers are so absurd that no careful purchaser will be deceived; but, unfortunately, the alluring guarantees and special inducements regarding the cost of the installation have caught enough unwary buyers to injure seriously the business of reputable concerns. It is not uncommon to pick up advertising material that states a fuel consumption per horsepower per hour based on tests of two or three hours' duration only, in which the total coal charged during that period was from 20 to 30 pounds. The producers in such tests are of course of small sizes, but the principle is the same for all.

"The initial fuel bed built up before the test is started amounts to several times the quantity of fuel charged during short interval tests, and the amount of gas that may be drawn from this foundation bed is an unknown quantity. It may be very small or may reach a large percentage of the total gas used during short tests, depending on the carelessness or cleverness of the superintendent of the test.

"Of course the claim is made that at the end of the test the fuel bed is always brought to the same condition that it was in the beginning, but experience in this direction need not be great to show that such conditions are practically impossible in tests of short duration. The error introduced by such an assumption may be sufficiently great to make the record results absurd. In fact, the percentage of possible error, may be so large that it is only necessary to predetermine the desired fuel consumption per horse-power per hour and trust to the

clever manipulation of the operator to secure that result.

"It is no wonder then that tests showing a consumption of only 0.6 pound of coal per horse power per hour are often reported; and apparently it is only necessary for some daring promoter to decide that a horse-power should be developed with a consumption of 0.25 pound per hour for tests to be reported that show this figure.

"For accurate tests of gas producers and for a true determination of the fuel consumption, either the condition of the fuel bed at the beginning and at the end of the test must be positively known, or the test must be of sufficient duration to practically eliminate the uncertainties that arise from varying conditions of the bed. Inasmuch as the first method is usually out of the question, it is necessary to resort to the second, at the same time securing as uniform conditions as possible in the fuel bed."

Mr. Fernald summarizes the tests as follows:

"That throughout a test the fuel bed should be maintained in uniform condition, with regard to both the character of the fire and the thickness of bed; but that failing in this, special care should be exercised to see that the fuel bed is in the same condition and of the same thickness at the close of a complete test, or at the end of a test period, as at the beginning; that a test should never be started when the producer has been standing idle for some time with 'banked fires,' as the fuel bed will not be in the average condition under which it will be required to work during the test; that, if, as the appointed hour for closing the test approaches, the fuel bed is not in proper condition, the time of closing the test should be postponed until the bed naturally assumes the proper thickness and character. No forcing of conditions should be allowed simply to bring the test to an end at a previously determined hour."

TUNGSTEN.

One of the most widely known of the rarer metals is tungsten. The production of this metal in the United States, however, is not large, as a little of it goes a long way for some of its most important uses. As by far the largest of the tungsten produced is used in making tool steel, the demand for tungsten decreased greatly during the recent depression in the steel industry. In 1908 the domestic production of tungsten ore, reduced to an equivalent of ore carrying 60 per cent. of tungstic trioxide (WO_3), the ordinary commercial basis is the United States, was 671 short tons, valued at \$229,955, as against 1,640 tons, valued at \$890,048, in 1907. The statistics at present available from foreign countries show a similar decline. These figures are taken from a report by F. L. Hess, of the United States Geological Survey, published in an advance chapter from "Mineral resources of the United States, calendar year 1908." Mr. Hess gives also details of the industry by States, notes on the occurrence and uses of tungsten, and a partial bibliography.

Occurrence of Tungsten.

Tungsten is of wide occurrence, but the individual deposits can hardly be said to be large. As a rule they are "pockety"—that is, they occur in lenticular masses or small shoots. Many of those at the surface are quickly and easily mined, but it may then take all the profits derived from the first ore body to locate another one.

The tungsten minerals used as ores are hubnerite, a tungstate of manganese; wolframite, a tungstate of manganese and iron; ferberite, a tungstate of iron; and scheelite, a tungstate of calcium. They generally occur in veins cutting igneous rocks that contain much silica, such as granite and granodiorite. Some simple tests for identifying these minerals are described by Mr. Hess.

Uses of Tungsten.

The most important use of tungsten is as an alloy for tool steel, to which it imparts the property of holding temper at a much higher temperature than high-carbon steels. When lathe tools are made of tungsten steel the lathe may be speeded up until the chips leaving the tool are so hot that they turn blue. It is said that about five times as much work can be done by a lathe built for such speeds and work and fitted with tungsten-steel tools as can be done by the same lathe with carbon-steel tools. From 16 to 20 per cent. of tungsten is ordinarily used in lathe tools.

There has been a widespread belief that most of the tungsten mined went into armor plate, but it is stated by the Ordnance Bureau of the Navy Department that tungsten is not now and, so far as known to that bureau, never has been used in the manufacture of armor plate in this country, and it is not known to have been so used in other countries, though it has probably been used in experimental armor plates. One of the most essential properties of armor plate is its ability to resist shock, and this property is not imparted to steel by tungsten.

As the melting point of tungsten is very high—about $3,080^{\circ} C.$ —the metal is valuable for use as a filament in incandescent electric lamps, and such lamps are rapidly coming into common use. The whiteness of the light given by the tungsten filament makes it much superior to that of carbon and the efficiency of the tungsten lamp is more than twice as great as that of the carbon lamp. Thousands of filaments can be made from a pound of tungsten.

Tungsten salts are used in fireproofing cloth for curtains, draperies, etc.; in weighting silks; in glass making; as a mordant in dyeing; and for other purposes.

A copy of Mr. Hess's report may be had by applying to the Director, U.S. Geological Survey, Washington, D. C.

CANADIAN PATENTS.

The following is a list of Canadian Patents, issued by the Canadian Patent Office on Oct. 26, 1909, relating to Mining and Metallurgy and furnished by Fetherstonhaugh & Co., 5 Elgin St., Ottawa, Can. Russel S. Smart, Resident:

- 121474. N. Langlet, Gothenburg, Sweden, Pros. for precipitating ulmic compounds from the black liquors of soda pulp mills.
- 121487. W. McCarty, Rocky Ridge, Md. Metallurgical furnaces.
- 121494. J. H. Reid, Newark, N.J. Pros. for hardening metallic surfaces.
- 121514. J. E. Teeple, Montclair, N.J. Retorts.
- 121554. V. Raisin, Paris, France. Pros. of recovering sulphurous acid assigned.
- 121564. G. L. Meaker, Chicago, Ill. App. for electroplating, Meaker Co.
- 121574. A. Messerschmitt, Frankfort, Ger. Pros. of producing hydrogen assigned.

WHAT IS AN ORE ?

By J. F. Kemp, D.Sc., Dept. of Geology, Columbia University, N.Y.

(Annual Meeting, Canadian Mining Institute,
Montreal, March, 1909.)

The definition of a perfectly familiar word sometimes involves unexpected difficulties when we are confronted with the necessity of its expression in unmistakable language. The more familiar the object noted by it, the greater is the surprise of one who finds himself obliged both to delimit from everything else and to put into other words the essential characters. Nothing is more familiar to the mining fraternity than the word "ore." So familiar is it that not every writer of a book on a mining subject has even thought of its definition, having obviously taken for granted the fact that everybody knows what ore is. There are nevertheless some striking differences to be found in the published works, and it may not be without interest to set the matter before the Canadian Institute and see what the impressions of its members are upon the subject.

The variation in conceptions of ore largely rests upon the double use of the word both in a purely scientific and in a technical sense. Sometimes this contrast is not fully appreciated. It will doubtless be admitted by all that there is a group of metalliferous minerals which have been the source of the metals in mining and which as a class may, therefore, be set aside as ores. Thus if I have in my hand an ounce fragment of specular hematite, I may properly say it is an ore of iron. It is a well-known and important member of the group of minerals which have furnished iron to commerce. But if I show you a supposed mining property with only an ounce of specular hematite in it, and in this connection refer to it as ore, you would laugh scornfully. We must, therefore, carefully discriminate in our minds the connection in which the word is used. To this technical use I will shortly pass, since it is the main point of interest, but I wish to clear away a few other preliminaries, relating to the use of the word ore in other senses.

In the microscopic study of rocks we have learned that minerals crystallize from a molten magma in a fairly definite succession and that the earliest group embraces magnetite, ilmenite, specular hematite, pyrrhotite, and one or two rarer metallic minerals, besides several non-metallies, such as apatite and titanite. We often call all these taken collectively as the group of the "ores," as contrasted with the ferromagnesian minerals; with the feldspars and feldspathoids; and with quartz. But we may set aside this use as not bearing in an important manner upon the question.

It is a time-honoured conception of an ore, that it should consist of a metal in composition with some non-metallic substance, such as oxygen or sulphur, which disguises its metallic qualities and which is called a "mineralizer." Native metals are not ores according to this view. The copper of Lake Superior is therefore obtained from "copper-rock," not from ore. Gold is yielded by "gold-quartz," not by gold ore. But I think we must all feel that this old-time usage is no longer sharply observed and that it may well enough drop out. Thus in Mr. T. A. Rickard's interesting little book on "The Copper Mines of Lake Superior,"

we certainly find the output of mines referred to as "ore."

Sometimes also in the mining of the non-metallic substance sulphur, the output of the mine is called "sulphur-ore," although no metal is involved at all. Yet while we may not especially controvert this usage, it cannot be said to seriously affect the general and large conception of ore as limited to the metalliferous minerals.

Finally, the word "ore" is used by Milton and other early English writers as meaning a metal itself, artificially produced, but of course this use is obsolete.

Let us now set in order the definitions which have been proposed and which treat of ore in its technical sense. We may then examine them somewhat critically and determine whether they satisfactorily formulate our present conceptions.

The most inclusive and sweeping of the definitions which the writer has found is one given by Dr. R. W. Raymond, on "A Glossary of Mining and Metallurgical Terms," in Vol. IX, p. 160, of the Transactions of the American Institute of Mining Engineers, 1881.

"Ore, 1. A natural mineral compound, of the elements of which one at least is a metal. The term is applied more loosely to all metalliferous rock, though it contains the metals in a free state, and occasionally to the compounds of non-metallic substances, as sulphur ore. 2. Corn. (Cornish) copper ore; tin ore being spoken of in Cornwall as tin."

Obviously the above definition is open to grave objection. Thus any mineral which contains a metal as one of its elements without regard to amount would be included. Hornblende with five per cent. iron would be an ore. Some other mineral with a half of one per cent. of iron or manganese would equally come within its provisions. To be at all satisfactory we must delimit far more sharply and upon some other basis. Yet from the associations in which the definition appears, one would anticipate a technical rather than a purely scientific expression.

Wm. Humble, an English writer in a "Dictionary of Geology and Mineralogy, etc.," 3d. ed., 1860, gives the following:—

"Ore (erz. Germ.) A metallic compound. Metals are found usually combined with other substances; the compounds they thus form are called ores when the metal exists in them in sufficient quantities to form a considerable portion of the mass."

This definition introduces the idea of quantity, but not as yet in an altogether satisfactory way, the adjective "considerable" not being very definite. At what point do percentages pass from considerable to inconsiderable? Is not 20 per cent. of iron considerable, yet it would not warrant mining. Is 1-1200 of one per cent. considerable, and yet it might justify mining for gold. The word "metallic" being sharply used in mineralogy for a variety of lustre, is also objectionable. We might question whether calamine, cerussite, siderite, and many other well-known ores would be included in the definition. Metalliferous is of course better.

Let us take now the two dictionaries which twenty years ago were chiefly cited in English-speaking North America. Worcester (1905 ed.) states: "Ore 1. A mineral body which is reduced to the metallic state by fire; a metal chemically combined with some mineralizing substance which completely disguises its usually recognized and useful properties."

The first sentence of the definition is very objectionable, since wet methods are no less serviceable than fire, in reducing the metals, and this delimitation for ore is obviously ill-chosen. The second sentence brings out the time-honored conception earlier discussed. It is flatly contradicted by Webster whose definition will next be given.

"Ore 1. The native form of a metal whether free or uncombined as gold, copper, etc.; or combined as iron, lead, etc. Usually the ores contain the metals combined with oxygen, sulphur, arsenic, etc. (called mineralizers). 2. (Mining). A native metal or its compound with the rock in which it occurs, after it has been picked over to throw out what is worthless."

The first portion of this definition is so condensed in statement as to be literally meaningless. Thus, as the word native is used in connection with metals, it distinctively means uncombined. How then could the native form of a metal be "combined as (presumably 'in the case of' to be supplied) iron, lead, etc.?" We may infer that native means natural as opposed to artificial; but unless a reader knows more about the meaning of ore than good Noah Webster himself did, this definition will contribute little to clearness of thought. Curiously enough the second definition is scarcely better. Can a native metal be "compounded" with a rock? We usually employ in these senses compound to mean chemical union. Again, is the product of a mine never "ore," until it has been sorted over? Surely the majority of us would impose no such condition.

We come next to a series of definitions in which a distinction is made between the scientific use and the technical use and into which, for the latter, the condition of profit is introduced as a feature, although it is not always insisted on as essential. The late Professor J. D. Dana expresses his views as follows in his *Manual of Mineralogy*, 3d Ed. 1884, pp. 92-93:—

"An ore in the mineralogical sense of the word is a mineral compound in which a metal is a prominent constituent. In the miners' use of the term, it is a mineral substance that yields by metallurgical treatment, a valuable metal, and especially when it profitably yields such a metal. In the former sense, galena, the common ore of lead, is, if it contains a little silver, an argentiferous lead ore; while in the latter, if there is silver enough to make its extraction profitable, it is a silver ore. Further than this, where a native metal, or other valuable metallic mineral, is distributed intimately through the gangue, the mineral and gangue together are often called the ore of the metal it produces. We have beyond to do with ores only in the mineralogical sense.

The *Century Dictionary* contains a definition, presumably by Professor J. D. Whitney, which is essentially the same:—

"Ore. 1. A metalliferous mineral or rock, especially one which is of sufficient value to be mined. A mixture of a native metal with rock or veinstone is not usually called ore, however, it being understood that

in an ore proper the metal is in a mineralized condition—that is, exists in combination with some mineralizer, as sulphur or oxygen. The ore and veinstone together constitute the mass of the metalliferous deposit, vein or lode. The ore as mined is usually more or less mixed with veinstone and from this it is separated, as completely as may be convenient or possible, by dressing. It then usually goes to the smelter, who, by means of a more or less complicated series of operations, frees it from the worthless material, which still remains mechanically mixed with it, and also sets it free from its chemical combination with the substances by which it is mineralized."

The *Standard Dictionary*, whose definition presumably passed under the eye of either Professor W. H. Pettee or Professor N. S. Shaler, is shaped along the same lines, as follows:—

"Ore. A natural substance, sometimes forming part of a rock, containing one or more metals. The term is applied usually to a mineral from which the metal can be profitably extracted; but is sometimes extended also to non-metallic minerals, as sulphur ore."

In these three it is a little uncertain whether, when Dana and Whitney say with regard to profit, "especially," and when the *Standard* says, "usually," they mean in the technical as contrasted with the scientific use or not. No one of them absolutely prescribes this condition and a reader is somewhat uncertain whether it is essential or not. In definitions it is doubtless better to leave no ground for uncertainty or confusion of thought.

In Prime's translation of von Cotta's "Treatise on Ore Deposits," New York, 1870, p. 1, we find the following: "Under the general term ores are comprehended all minerals and mineral aggregates which from their metallic contents attract the attention of the miner. Metalliferous deposits are therefore for us all local accumulations of minerals or mineral aggregates which correspond to this demand:—

"The idea of the terms ores and metalliferous deposits, in mining parlance, cannot be well expressed in a more precise and scientific manner. There is not any particular class of minerals or of rocks corresponding to these terms. To them belong native metals, metallic oxides, metallic sulphides, and even metallic salts, and their combinations; but on the other hand not all metalliferous species of the Mineral Kingdom, because many of these cannot, either from their nature or the too small percentage of the metal they contain, proportionately to its worth, be worked with profit. No rock, for example, containing 5 per cent. of oxide of iron can be considered an ore; while on the other hand, a vein of quartz, with but 1 per cent. of gold would be regarded as a very rich and valuable metallic deposit, so relative is the idea.

"It is even possible, and has already occurred, that a mineral which for a long time was useless to the miner, and on this account was not considered an ore, has, by means of new discoveries, been included in the category of ores. Blende, for example, when it did not contain valuable metals, could hardly have been considered formerly as an ore, though commonly defined as such; but since a method has been discovered of extracting zinc from it with profit, it may be ranked without doubt among the ores."

(To be continued.)

Correspondence.

ELECTROCHEMICAL PLATE AMALGAMATION AND IONIZED GOLD.

To the Editor:—

Sir,—I read with much interest Mr. Carey's learned remarks on the truly wonderful action of electricity when applied to the old and simple process of plate amalgamation. The new adaptation is so simple that one wonders that it has not been thought of before, but so is it with all great inventions.

Mr. Carey himself seems to have overlooked a very simple matter despite his deep scientific study. A very simple matter but one fraught with momentous importance to the whole world and to Ontario in particular. I had not intended publishing this until my financial arrangements were complete, but Mr. Carey's timely article urges me to it. He came very close to it when he spoke of the dynamic quality in the electric flow and of the material ions of Madam Curie. He spoke, too, of the nascent mercury and its wonderful affinity for gold, but he saw only a small part of the glorious truth. He has missed entirely the nascent gold. It is true that the gold he saves is virgin gold and of this, as he truly says, he can save 100 per cent., but there is other gold there—nascent gold! It exists as truly as does the virgin gold, but in its present or nascent form it does not appear as gold. The harsh action of the fire-assay kills it before it is truly born and no sign of it as gold can be found. But by the gentle, kindly but powerful process of ionization, that is by the newly discovered means of controlling the ions of Madam Curie this nascent, this about-to-be-born gold is brought forth in all its beauty as material gold. If Mr. Carey can find me in my laboratory I shall be delighted to show him these ions performing their gynecological functions upon the nascent gold which my delicate and subtle apparatus has proven to exist in large quantities in the Ontario quartz.

It is needless for me to point out to you the greatness of this discovery. I am overwhelmed when I think of it. Think of what it means to Hammond Reef, to Highland Mary, and to all Ontario.

Yours truly,

N. A. Scent.

P.S.—Please do not consider that anything I have said in regard to the nascent gold in Ontario quartz casts any aspersions on the virginal character of Mr. Carey's gold, and please tell me Mr. Carey's address; he writes so beautifully, I want him to write the prospectuses for my forthcoming companies.

Nov. 9, 1909.

Editor Canadian Mining Journal:

Sir,—Mr. Cyril Knight's interesting account of the Winnipeg meeting of the British Association in your last number devotes some space to the Lower Huronian Ice Age, which was briefly described by me in a paper on the Canadian Archaean. The report leaves the impression that the evidence in its favour is by no means convincing. As the Lower Huronian conglomerate is the country rock of nine-tenths of the rich silver veins of Cobalt, it may interest mining men to know something of the evidence for its glacial origin.

Mr. Knight quotes three geologists as throwing doubt on the Lower Huronian Ice Age. All of them are emi-

nent men in their special department, but none of them can be called a glacial geologist, so that their opinions on the subject must be looked on as off-hand rather than carefully studied. President Van Hise's suggestion that somewhere a glaciated basement ought to be found beneath the conglomerate ignores the fact, well known to glacialists, that near the edge of a glaciated area where the thickness of ice is not great the ice sheet often moves for many miles over loose materials without ever reaching the rock surface beneath. This is true of thousands of square miles of glaciated country in certain States to the south of us, and is true also of most of the area covered by carboniferous boulder clay in India. The carefully studied conglomerate area at Cobalt makes up in all only a few square miles. There is a much larger area of Pleistocene boulder clay showing no striated surfaces in the neighbourhood of Toronto. Probably as our knowledge extends a striated floor will somehow be found beneath the Lower Huronian tillite; but its absence in the small area known has no force as an argument against its glacial origin.

The real test of glacial action is to be found in boulder clay and the glaciated stones contained in it. This is the final proof of ice action at any age. To the geologist unfamiliar with ancient tills the Cobalt conglomerate may look very unlike the boulder clay softening under the rain about him, merely because it is a very firm, hard rock; but anyone who has seen an ancient boulder clay, such as the South African Dwyka, is impressed by the striking resemblance between the two. If only a small patch or two of the boulder conglomerate was known, Dr. Miller's suggestion of freshet action would be reasonable, but surely no one will claim that freshets have formed the thousands of square miles of boulder conglomerates in northern Canada reaching from Lake Chibougamou to Lake Winnipeg, and often enclosing boulders tons in weight miles away from any known source. Likewise no one will imagine that freshets can produce the beautifully striated stones found in the Lower Huronian boulder clay.

Prof. Hobson's suggestion that the striations might result from other causes glacialists are not likely to accept. No cause, such as faulting or mud flows, has ever been shown to form anything approaching a typically glaciated stone, and the dozen specimens shown at Winnipeg are typical striated stones with markings on several sides, and even with minute "chatter cracks," as Mr. Taylor pointed out to me after examining the collection with a lens.

The impression produced by the specimens and lantern slides on the glacial geologists present in Winnipeg may be shown by the following quotation from *Nature* (Oct. 7, 1900, p. 446):—

"In the subsequent discussion Drs. Fairchild, Strahan, Warren, Upham and Dwerryhouse expressed the opinion that Prof. Coleman had established his contention." It should be added that Messrs. Leverett and Taylor, who did not speak, are in accord with the others, and that Mr. Tyrrell, after a thorough study of the stones, can explain them only as glacial.

Everyone familiar with Pleistocene geology will agree that the names just given include several of the most competent and experienced glacial geologists in the world.

The evidence for the glacial origin of the Lower Huronian conglomerate presented in three papers published during the last two years has been widely accepted in the Old World as well as in America. For instance, Prof. Haug, of Paris, founds upon my results his discus-

sion of ancient climates in his recent book on geology, one of the most important works on the subject produced of late years.

When every glacialist who has examined the specimens obtained at Cobalt accepts them as glacial, and when doubts as to the value of the evidence are confined to non-glacialists, it looks as though the proofs of a Lower Huronian Ice Age must be fairly satisfactory.

A. P. COLEMAN.

PERSONAL AND GENERAL.

Major Boyd McGee, General Manager of the Keeley mine, South Lorraine, is not the McGee referred to in press notices of the Russell extradition proceedings.

The Hon. Robert Rogers, Provincial Treasurer of Manitoba, was in Montreal recently. Mr. Rogers is one of the directors of Black Lake Consolidated Asbestos.

The Montreal office of the Robb Engineering Co., Limited, Amherst, N.S., has been moved to 607

Canadian Express Building, Montreal. Mr. R. W. Robb is manager.

Messrs. Pellew-Harvey and Fell, mining engineers and metallurgists, of 62 London-wall, E.C., state that the partnership hitherto existing between Mr. E. Nelson Fell and Mr. W. Pellew-Harvey has been dissolved by mutual consent as from the 1st inst. Mr. Fell retires from the firm and the business will be carried on as heretofore by Mr. W. Pellew-Harvey in the name of Pellew-Harvey & Co.

The efficiency of furnaces of various kinds has been investigated by J. W. Hull, a British metallurgist. The greatest efficiency in ordinary work was found in the use of an English blast-furnace making pig-iron, not less than 81.7 per cent. of the heat given by the fuel being utilized, but 65.3 per cent. escaped from the furnace and was recovered outside. A puddling furnace not fitted to a boiler wasted 91 per cent. of the heat. The most wasteful furnace of all, however, was proven to be the common coke crucible furnace employed in making steel, as this uses only 1.43 per cent. of the heat, 98.57 per cent. being lost.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay, Nov. 4.—The U. M. W. A. Strike.—Repeating the figures given in the last two letters, the output figures of the Dominion Coal Company for the month of October compare as follows with the preceding months of the strike period:—

	Total Output.	Average Daily Output.
July	136,000	4,200
August	154,000	5,900
September	180,000	7,200
October	205,000	8,200

For the last week in the month the output averaged around 8,800, and on one occasion it went over the 9,000 ton mark. How very ineffectual the so-called strike is at the older mines of the company is shown by a comparison of the outputs for the month with those of October last year:—

	Oct., 1908.	Oct. 1909.
Dominion No. 1.	44,063	51,076
Dominion No. 2.	49,769	44,522
Dominion No. 3.	19,443	18,726
Caledonia No. 4.	31,156	23,874
Reserve No. 5.	28,531	29,896

The total output for the month was 205,000 tons, comparing with a total of 265,000 tons last October. Two of the company's mines, namely, Nos. 6 and 7, have not worked since the strike commenced, and if their output is taken into account, the production for the past month was only 29,000 tons below that of last October. It hardly looks as if the U. M. W. A. were correct in their pre-strike statement that they controlled 95 per cent. of the output, or that four thousand miners were on strike. In the face of the foregoing figures the reader may form his own estimate of U. M. W. A. arithmetic. This increase in outputs has not been obtained by any large importation of foreign strike-breakers, for the number of actual foreigners which have

come to Glace Bay since the strike commenced does not exceed one hundred men. At least 80 per cent. of the men who have filled the places of the strikers are residents of Eastern Canada, and probably seventy-five per cent. of these are natives of the Island of Cape Breton. The entirely foreign nature of this strike is now more clearly apparent than ever. It was called to obtain recognition of a foreign union, has been financed entirely by foreign funds; the majority of the strikers are persons born out of Canada, and the two outstanding results of the strike are at present the impoverishment of a Canadian industry, side by side with the enlargement of the United States coal sales in our own country. There are all kinds of side issues connected with this strike, such as loss in wages and hardships which must be borne by the strikers and their families, the breaking up of pleasant relations between the Coal Company and their employees, and many other things all more or less unpleasant, but the two main results are as stated, loss to Canada and gain to the United States. This cannot be gainsaid, and its moral is too obvious to need elaboration.

Renewal of the "Shortt" Agreement.—During the latter half of October negotiations were carried on between representatives of the Provincial Workmen's Association and the management of the Dominion Coal Company for a renewal of the award of the Conciliation Board in 1908, and under which the P. W. A. has worked through the trouble caused by the U. M. W. A. agitation. The company offered to renew the agreement in its entirety. This proposal was considered by the lodges, who reported in favour of acceptance, and a meeting of the Grand Council authorized this step. A very large committee of the P. W. A. representing all the lodges met the management of the Coal Company on the 4th of November, and it was finally arranged to sign an agreement continuing the present contract in force until December 31st, 1911. One of the demands of the P. W. A. before the Board of Conciliation in 1908 was a 15 per cent. increase to the able-bodied unskilled labourer, who at that time was rated at \$1.38 per day. The Board awarded an

increase of 10 per cent., making the maximum wage \$1.52 per day, which was the rate offered by the company in Schedule No. 1. This rate has now been raised by the company to \$1.60, being a 5 per cent. increase on the award of the 1908 Board. The terms now accepted by the P. W. A. for a further two years are a very substantial increase on the rates which were paid under the three years' contract signed in 1904.

No better proof of the vitality of the P. W. A. could be asked than the signing of this contract, and it is an open secret that their desire to continue the present arrangement has been crystallized by the extraordinary action of the U. M. W. A. executive in proceeding against the coal operators on a charge of criminal conspiracy to raise the price of coal. The U. M. W. A. campaign has been from the first conducted in a very unintelligent and foolish manner, but nothing it has yet done has been so calculated to lower its prestige and alienate its dupes as this particular ineptitude. One could almost question the sanity of a body of men who first of all ask for a preposterous advance in wages from the management of a coal company which for three years had been losing money, then stop the production of coal by striking, and finish up by prosecuting this company on suspicion of endeavouring to get a reasonable profit on its product. This is exactly what has happened at Springhill. The ultimate object of the lavish expenditure of American money in Nova Scotia is too palpable to deceive any but those who deliberately close their eyes to it, and it is certain that nothing has so thoroughly alarmed the miners of Nova Scotia who think about these things as the action of the U. M. W. A. against Messrs. Dick and Cowans. In the matter of markets and price the interests of the miner and of his employer are identical, and the willingness of the two parties to the two years' contract to renew arises from a realization of the imminent danger in which our coal markets stand from the United States operator and the U. M. W. A., and a grave sense of the common danger which loss of trade most certainly spells to both employees and employers in Nova Scotia.

Birds of a Feather.—A little while before the U. M. W. A. strike Glace Bay was favoured by the presence of Kier Hardie, a gentleman whose recent remarks about the melting pot and His Majesty's crown have caused a wholesome revulsion against him and his ilk. For a brief space we had the pleasure of the company of Mr. E. McCullough, an American citizen, who told a Sydney audience that Canada's national ambitions were "tommyrot," and who referred to our soldiers as "pimps." Then we suffered the lucubrations of an aspiring member of the Trades and Labour Congress from Toronto, whose reportorial feats induced the Grand Council of the P. W. A. to refer to him as "a shameless prevaricator." We are to have Hr. Haywood, a person who became notorious in Colorado in connection with the Western Federation of Miners. The last state of this town appears to be worse than at first.

One of the things "which no fellow can understand" is the attitude of the politicians of Canada towards our rapid industrial development. The Government, which happens to be in power at any well-marked stage of our natural expansion, takes credit for that particular evidence of growth, and proudly refers to it as being associated with itself. One often sees in the newspapers and in campaign literature tables showing the expansion of the country's finances, its transport facilities, or exports under such and such a period of Liberal or Conservative rule, and the last-named accident is claimed as the cause of the expansion. This seems to us so much moonshine. Governments come and governments go, as they reflect the mood of the voters, the wealth of the campaigners, or as one party selects a more attractive election issue than the other. There is no essential difference in the aims or the principles of our two leading political parties, and their existence is merely a necessary condition of that form of government by opposition which is a tradition with the Anglo-Saxon. In Nova Scotia, however, we are so unfortunate that one devoted industry has

become the shuttlecock which has to withstand the buffeting of the party battledores.

The Dominion Coal Company was conceived by a Liberal, and was carried through under a Liberal administration. The incorporation of this company was objected to by the other political party only because it was advocated by the party in power. The incorporation of the Dominion Coal Company simply came about because the times were ripe for it, because the genius of one man saw its necessity and its possibilities, and because the coal industry of this island needed some such consolidation of interests to prevent useless expense and waste, and to make progress a certainty. The expectations of those who incorporated the Coal Company have been more than justified, and, as we remarked in a previous letter, the formation of the Dominion Coal Company was the inception of the greatest single impulse ever given to the commercial prosperity of Nova Scotia. But no political party can with fairness take all the credit for this. It would have come, no matter which side held the reins for the nonce.

Nevertheless, the opposition towards the Coal Company has never ceased, and for purely party reasons it has been fostered and kept from dying of sheer inanition. By a peculiar mental process the enmity has spread to the whole coal trade of the province, and certain newspapers never lose an opportunity to villify the coal industry and damage as much as possible all connected with it. It is not necessary to name these papers, for their daily perversions and libels are the bane of every coal man in the province. Plain every-day men might think that matters of common interest could be lifted out of the maelstrom of politics, and surely it is not for the benefit of any business conducted in our midst that it should be unremittingly assailed for mere party gain. We have in this province some of the most magnificent collieries in operation. Our mining methods will bear comparison with anything on this continent. Yet one never sees a word of commendation on this score, and the visiting engineer who takes our provincial press seriously must be sorely puzzled at times to reconcile what he reads therein with the actual conditions as they present themselves to him. Surely there is no other place where the newspapers open their columns to anonymous letters criticizing not only the policy of the coal companies, but also the most intimate details of their technical management and the pitmanship of the officials. These are matters for the Mines Inspector and those whose duties fit them to pass upon them. When a newspaper takes upon itself to criticize the management of a colliery it usually falls into laughable and egregious error, which is some consolation, but it seems to us a regrettable thing that it should have become a tradition with a certain section of our provincial press to everlastingly "knock" the coal industry. The outsider who is not acquainted with Nova Scotia's family squabbles may be excused if he acquires a poor opinion of our coal trade generally. Very recently Glace Bay was visited by a gentleman from the High Commissioner's office in London, who expressed surprise at finding such up-to-date machinery and methods, as he phrased it, "tucked away in a little corner of Canada like this." He was unable to understand why the newspapers should refer so slightly to the mines and their management, and we were unable to enlighten him. As the Montreal Gazette recently remarked, "politics have entered into the strike situation in Nova Scotia in a manner that no person outside of Nova Scotia can understand." To understand the attitude of the Nova Scotian party press towards the coal industry is difficult, but to justify it is impossible.

ONTARIO.

Cobalt, Nov. 4.—During the past summer some of the best finds in the history of the Nipissing Mining Company were made. One of these, which is known as vein No. 114, was found near shaft 26, but when first discovered little work was done,

as it was decided to cover as much territory as possible during the season. A few days ago, however, a force of men started to work stripping the vein, and toward the east the vein widened from one inch to three inches of high-grade ore. About 250 feet of stripping has been done, and shows a rich ore shoot for a distance of 50 feet. During the winter a cross-cut will be started from the 85-ft. level of shaft 26 to cut the vein.

The returns from the last sale of the Gillies Limit lots were so satisfactory to the government, they have now announced a third sale, which will take in about 1,200 acres directly south of the land already sold. It is understood that this new area embraces some very promising territory, and it is probable that considering the discoveries that have lately been made in this section, that the prices will be fairly high. The total area of the Gillies Limit amounts to about 64,000 acres, and of this about 2,100 acres have been offered or sold. The tenders will close on the 15th Nov. Hundreds of prospectors are looking over the territory, and a number of valuable finds have been reported, which will no doubt make prices much higher on this sale than the previous ones. Many of the mining companies have sent out their own men to look over this territory.

The new government road which is being built into Gowganda will undoubtedly have a very important effect on the future of that camp. It is estimated that there is at present in the ore houses of the different mines about ten earloads, which will be shipped as soon as the winter roads are in condition. It is interesting to note that the Reeves-Dobie company has made a contract to ship out their ore at \$15 per ton to Sellwood. The shippers will be the Boyd-Gordon, Reeves-Dobie, Blackburn and the Mann, and it is probable that the Bartlett will send out some.

In sinking the winze for the 150-ft. level of the Coniagas a new vein was encountered just below the contact between the keewatin and the conglomerate, and in the keewatin formation, running at right angles to the vein on which the winze was started. The winze has been continued some distance below the point at which the vein was struck, and the ore in wall rock still carries small values in silver. The winze will be continued to a depth of 75 feet, and from the bottom a crosscut will be run to a point below the shaft, and then a raise will be started to connect up the two workings. All the machinery for the new addition to the mill is now on the ground, and the work of installation will be pushed as rapidly as possible. This company has ore reserves which probably are second to none in the camp, and as their veins are narrow and the wall rock heavily impregnated with silver, the supply of mining ore is very large. The capacity of the mill when completed will be 160 tons a day. The announcement that this company would declare their regular quarterly dividend on Nov. 1st was rather a surprise. In July the directors issued a circular stating that the quarterly dividend due Aug. 1st would not be paid, as the company needed the funds to complete the addition to the mill at Cobalt and the smelter at Thorold, and although it was known that the suspension was only temporary, it was believed that the dividend due Nov. 1st would also be passed.

The work that is being done at the Cobalt Lake has lately been productive of very favourable results, and considerable quantities of high grade ore are being mined. A new ore shoot has been discovered in the vein that was traced along the McKinley-Darragh boundary, and ore carrying up to four thousand ounces of silver is being taken out. The vein that was struck some time ago is still carrying good silver values.

A case that has aroused much interest lately is the claim of Mr. Douglas Balfour in relation to a property in the Miller Lake district, known as M.R. 1098, the defendants being James Hylands, Gardner and Johnson. The claimant Balfour asked to have the mining claim declared invalid, for several

causes, among these being non-performance of the necessary work, it being stated that the thirty days' work to be performed directly after the claim had been staked was not done. In regard to the contention the Mining Recorder stated that the holders of the claim did commit a technical violation of the Forest Reserve regulations, but he considered it unwarrantable to declare the claim invalid. To do so would, he believed, disturb nearly half the mining titles in the forest reserve, as a practice had grown up in the district of doing the necessary work without waiting for the receipt of the formal permission. There has been considerable agitation lately in the outside districts on account of the efforts of various claim-jumpers to acquire properties that they thought would make good, as on account of the peculiar nature of the mining laws it is very difficult for the original stakers to hold their claim without some technical violation of the Mining Act.

Another promising lead has been found on the 100-ft. level of the Silver Leaf. It has been drifted on for some distance and shows about five inches of calcite and smaltite with some values of native silver. Another very good vein was struck at a point about fifty feet from the Crown Reserve line on the 100-ft. level, and it is thought to be an extension of one of the Crown Reserve veins. Where it was encountered it showed a width of about 12 inches of high grade ore. Since mining was started on the Silver Leaf, the ore where found has always been very pockety, but the veins met lately under the Crown Reserve management seem to give promise of greater extent. Under the lease by which the Crown Reserve holds the Silver Leaf, the latter company receives 25 per cent. of the gross value of the ore, on condition that \$20,000 is spent on the property the first year, and \$10,000 annually for the four remaining years.

At the annual meeting of the Little Nipissing Mining Co. held on Oct. 20th, the decision to increase the capitalization of the company from one million to one million and a half dollars was confirmed. The directors also authorized the sale of 250,000 shares of the new stock at twenty cents a share, to be first offered pro rata among the shareholders. The meeting was very stormy and Mr. S. D. Madden and Mr. A. Ferland retired from the directorate.

The Coleman Development Company has decided to start diamond drilling on its properties in Coleman and Lorraine Townships. Considerable prospecting is also being done at the present time. It is estimated that there are now nine diamond drills at work in the Cobalt camp, in addition to these two are operating in South Lorraine, one at Silver Lake and one at Miller Lake. Practically all the companies in camp have at one time or the other resorted to that method of prospecting. Considering the narrow veins that are found in this district it is not to be expected that the same results can be obtained as in any other district, where the ore bodies are much larger, but nevertheless they have been the means of finding many new veins. The most important feature, however, has been the knowledge they have given regarding the different formations, that has encouraged several of the companies to continue their workings at greater depth, when they had thought that they had practically reached the limits of their ore bodies.

The Wyandoh, under the management of Mr. Nesly, will commence active development work at once. The company has decided to install a steam driven compressor and the other necessary equipment, bunk houses and other buildings will be erected as soon as possible.

An interesting report has recently been issued by Col. Carson on behalf of the directors of the Crown Reserve, covering the first nine months of 1909. It shows that during this period a total of 84 cars of ore were shipped, and 22 of these were high grade. The total net value of the ore amounted to \$1,368,951, the net profit on operation amounted to \$1,078,806. Of this

amount \$795,966 was paid out in dividends. The surplus on September 30th was \$629,957. On November 1st winzes were started to the 300-ft. level. These will be connected up, and the main shaft also connected at that depth. During this period a total of 3,336 feet of development work was done.

The development of the Wetlaufer mine in South Lorraine has shown that the high grade ore which was found at the 50-ft. level has continued to the 100-ft. level, and at that depth it is fully as rich, and the veins are wider than on the upper level.

tion was met with from the Railway Commission, as at first they refused to permit this work to be carried on on the right of way. The opposition was overcome, however, and work will be started in a short time. It is understood that good indications have been encountered in the diamond drill hole which was bored at this point.

The Right of Way Mines, Ltd. has issued a circular to its shareholders requesting them to forward their certificates to the secretary in order to receive an exchange for the certificates of



The second shipment of high grade ore will be made from the mine this week, and the development of the property is progressing to such an extent that it is believed that regular shipments can now be maintained. This district is commanding much attention on account of the number of important discoveries that have been made there during the past summer, and it is believed that it will develop into one of the best sections outside of Cobalt.

The Station Grounds Mining Co. has decided to sink a shaft on their property near the railway track. Considerable opposi-

tion was met with from the Railway Commission, as at first they refused to permit this work to be carried on on the right of way. The opposition was overcome, however, and work will be started in a short time. It is understood that good indications have been encountered in the diamond drill hole which was bored at this point.

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carrying small values in silver has been encountered. A diamond drill has started to work, and holes will be bored underneath the lake, to crosscut veins which have been traced to the lake shore.

An important discovery has been made on the Newman property, which adjoins the Great Northern in South Lorraine. The vein varies in width up to six inches, and carries high values in silver.

The American Smelting and Refining Co. has been served with a writ by the lawyers acting for Messrs. D. M. Steindler and A. M. Jacobs, which prevents them paying \$7,000, the proceeds of a shipment of ore from the Peterson Lake Co. This money has been attached in connection with a suit brought by these gentlemen against the mining company for some \$28,000, which they claim is due them for money advances.

It is understood that an English syndicate, after careful examination of the Trethewey mine, has taken over the balance of the treasury stock, amounting to 54,450 shares, at \$1.50 a share. In conjunction with this announcement it is stated that the next interim dividend will be 15 per cent. This will bring the total dividends for the year up to 25 per cent.

Great interest has lately been displayed in the gold discoveries at Poreupine Lake, which is west of Night Hawk Lake. Many prospectors have already gone into the district, but as the majority of the smaller lakes are now frozen over, many who would otherwise go in, will not be able to do so for some time. Engineers of the Ontario Government have visited this new gold field, and are convinced that at least some of the discoveries made give promise of good results. The discoveries are all of gold in quartz, and in places veins have been traced for several hundred feet. Some of the samples showing free gold are very spectacular, and it is stated that average assays from different veins have run nearly \$200 to the ton. It is probable that this section and the Larder Lake district will be the centres for the prospectors for the coming winter. Several hundred men have already made their way into the Larder Lake district, and this number will probably be largely augmented in the near future.

Kenora Mining Division.—A general meeting of the prospectors' and Mine Owners' Association of the Kenora Mining Division, was held in the Town Hall, Kenora, on Tuesday, November 2nd.

A letter was received from J. Edwards Leckie, of Cobalt in answer to a request from the Association for an expression of opinion as to the fairness to the prospector of the time given him in which to do his first 30 days' work (Mining Act, Ontario, Sec. 78, Sub-Sec. 1, Clause (a)). The opinion voiced by Mr. Leckie was that during the months of June and July it should not be obligatory to do assessment work on account of the very real hardship of trying to work in these months because of the flies and mosquitoes. In his opinion, while a prospector should be permitted to work during these months, if he so desired, it should not be compulsory for him to do so.

The meeting then discussed some needed changes in its own constitution, and finally elected a By-Law Committee to carry on this work.

The subject of applying to the Government to have a geologist come into this district and make a geological survey was then discussed; some members pointing out that the last visit paid to this district by a geologist was a very short one of a few days some 12 years ago, and that the present geological map of the district was incorrect in several particulars.

It was finally agreed to draw up a resolution re Government Geologist and submit it to the next general meeting to be held December 7th.

In order to be of greater use to the prospector coming into this district it has been decided to give an account of the various trails and routes and methods of transportation best

for this district, together with a list giving approximate cost of outfit for prospecting and the places where necessary stores and outfits can be purchased together with such information and advice as may be of use to prospectors new to this neighbourhood and commencing operations here.

BRITISH COLUMBIA.

Rossland.—The Consolidated Mining & Smelting Co. of Canada, Ltd., at its annual meeting increased the capitalization of the company by two millions of dollars to \$7,500,000. In view of the fact that the company has during the last fiscal year acquired several claims adjoining the St. Eugene mine at Moyie, and has secured control of the Monita, Mugwump and City of Spokane properties at Rossland, adjoining the War Eagle, and as \$24,444,33 has been spent in putting the Richmond-Eureka in working condition, a large sum of money has been expended on the Snowshoe and Phoenix Amalgamated mines in Phoenix; as we say, in view of this heavy expense in work to advance the future interests of the company, this increase of capitalization is looked upon rather favourably here in British Columbia. It is generally known, too, that it will take considerable money to get the Phoenix Amalgamated group in producing form. The amount of money spent in acquiring new mines and real estate was \$77,836 for the year ending June 30th, 1909.

The company earned a net profit during the year under review of \$329,004,08. This figure was arrived at after writing off the usual accounts including \$153,218. depreciation and \$563,413 expended on development work. There was spent in augmenting the working plants at the different mines of the company \$164,951. The figures indicate good progress and if the profits were not exceptionally large the metal market can be blamed to some extent, as the company had to absorb about \$56,000, shrinkage in metal quotations. During the year steady shipments were maintained from the St. Eugene, Centre Star group and the Snowshoe mines, while occasional shipments were made from the Richmond-Eureka and Phoenix-Amalgamated properties. The amount expended for development work, however, speaks for itself; a good supply of ore was kept in sight all the year and no attempt made to force shipments. The shipment from the five groups for the year ending June 30, 1909, amounted to 480,533 tons, valued at \$4,012,587, or an average of about \$8.35 per ton. Rossland ore averaged approximately \$10.55 per ton; St. Eugene ore \$9.08; Snowshoe, \$4.76, Richmond-Eureka, \$40.84.

It is with gratification that shareholders here of the stock of the Le Roi 2, Ltd., hear that they are now to receive a third dividend of two shillings per share this year, which will possibly be followed by another such dividend at the end of the year from the earnings of the current period. It is certainly pleasing to note that this concern continues to pay dividends in the face of the somewhat heavy expense it is under in deepening the main Josie shaft. The output of the mine is being maintained at about 1800 tons of ore per month that should average \$23.00 per ton and which under existing conditions would mean a clear profit of \$10.50 to \$11.50 per ton.

The lessees of the Velvet-Portland group have a small crew of men working about the mine and on the road and bridges to the railway siding, a distance of seven or eight miles. The contract has been given for the haulage of ore and concentrates. Two 4-horse teams will be able to handle the output for the time being.

The bond which Chas. Dempster of Rossland and New York, has been working under on the Hattie Brown property in the debatable South Belt district of Rossland, has been permitted to lapse. It seems that one of the principal payments fell due a

few days ago and while the bondholders were willing to go ahead with the development work, on the showing that they then had, they did not consider it good business to make any large payments on principal. As the owners held out for the payment the bond was allowed to lapse and development work has been discontinued by the Dempster Syndicate.

The Fife Mines, Ltd., has ordered a 100 h.p. boiler plant and five drill compressor plant, drills, hoist, etc. for the property at Fife. It will be installed in about 45 days.

Phoenix.—The Boundary mines surpassed all past records for the week ending October 23rd, the total shipments for the district going up to 43,569 tons. With seven big furnaces working full blast at the Grand Forks smelter, the Granby sent down 27,573 tons of ore, exceeding the high record mark of February 13th by 2,000 tons. It is expected that the eighth furnace will be put to work next week, when the shipments will be even larger.

The British Columbia Copper Co. shipped 11,396 tons from the Mother Lode mine, which is the high shipment mark for the year. From the Oro Denoro property this company sent 950 tons, only exceeded previously this year by the shipments of the previous week, of 1,200 tons. This is considerably over the average of 300 tons per week that was maintained in the early part of the year. Regular shipments were made by the Snowshoe of about 3,800 tons.

The annual report of the Granby Con. M. S. & P. Co. for the year ending June 30th, 1909, which has just been made public, subsequent to the company's annual meeting, is a favourable one when the many drawbacks that occurred during the year are considered. The gross earnings of the company for the year amounted to \$3,983,536, while the net profits were \$681,134, or about 17 per cent. on the total earnings. From this amount \$270,000 was paid in dividends, the balance going to surplus. The total mining, smelting, converting and marketing charges per ton were \$3.20, which, after the deduction of gold and silver, made the cost price of copper to the company 10c per lb., which was .0024c lower than for the preceding year. Owing to the large quantities of ore that were caved during the year, the grade averaged low, the extraction being 21.81 lb. copper, .2724 oz. silver and .0434 oz. gold per ton. There was a saving, however, in mining costs, that more than equalized the cost of running the low-grade material through the smelter. The average price obtained for copper during the year was .1322c; silver, .5125c, which was somewhat lower than for the prior year.

A small crew of miners has been put to work in the Elkhorn mine at Greenwood by the Boundary Development & Exploration Syndicate.

The good work that has been going on in the Tulameen platinum district in the way of geological survey has been finished for the season, and Chas. Camsell, geologist in charge, has returned to Ottawa.

The Vermillion Forks Mining & Development Co., a London concern, has begun work on its property near Princeton. There is a quantity of coal now ready for shipment, and a couple of cars will be tried by the Hedley Mining Co. shortly. It is thought this coal can be laid down in Hedley for about \$5 to \$6 per ton, whereas, at present consumers there are paying in the neighbourhood of \$13 per ton for coal from the Crow's Nest and elsewhere. When the Princeton mines are producing a heavy tonnage, a market for part of the output may be found in Spokane, Wash., and vicinity, where this coal should be laid down at a reduction of a dollar or two below what consumers there are now paying.

While none of the New Dominion mines are at work yet, the trend of affairs is toward an early resumption of work. The unpaid wage cloud has now been cleared up. The old company owed its miners about \$22,000 when it closed down. The new concern did not feel obliged to liquidate this debt, but considered that it should be attended to, so that in future they would be on good terms with the miners, and thereby avoid any possible friction; so they proposed to pay the wages due on a basis of 75 per cent; the local merchants, anxious to see things squared up in this matter, granted a reduction of 12½ per cent. on accounts that were related to the matter, and after some deliberation the miners accepted. One of the crushers at Boundary Falls is being placed on the Rawhide ground, preparatory to resumption of work.

Nelson.—It is expected that the C. P. R. will equip its Rossland and Phoenix branches, on which ore is hauled, with electricity next summer, as its engineers find that economy of operation can be gained by using power from Bonnington Falls.

The output of the Crow's Nest Pass Coal Co. is being materially increased since the new compressor was installed.

Steady shipments are being maintained by the Blue Bell, Cork, Highland-Buckeye, Rambler-Cariboo, St. Eugene, White-water, Van Roi and Yankee Girl mines to Trail smelter.

The Searchlight group in Sheep Creek district has been acquired by a local syndicate, one payment being made. The second payment has been made on the Golden Fawn, adjoining the Mother Lode. A contract has been let for tunnel work on this property. The usual milling operations are going ahead in Sheep Creek district at the Nugget, Kootenay Bell, Queen mine, etc.

GENERAL MINING NEWS.

NOVA SCOTIA.

Inverness.—A foolish attempt was made on Oct. 23 to wreck the works of the Inverness Railway and Coal Company. The offenders were U.M.W.A. strikers. The attack was to take place before daylight. Warning had been given the company. The attempt failed signally. Five men were arrested and summarily dealt with.

Halifax.—The search for Captain Kidd's treasure at Oak Island has been abandoned. The Old Gold Salvage and Wrecking Association of New York has stopped work. Captain Kidd has much to answer for. It is probable that this treasure was

buried in one of the unexplored gold districts. This is a reasonable enough assumption to justify ardent prospecting.

Sydney, N.S., November 2.—Although the Dominion Steel Co. is not giving out any monthly figures just now, it is understood that the output for October was more than satisfactory.

The rod mill output, especially, was very large, beating the world's record for one mill by several hundred tons.

ONTARIO.

Ottawa.—The Public Accounts Blue Book gives figures of expenditure for the past fiscal year. In iron and steel bounties the

sum of \$1,864,614 was spent; in lead bounties, \$807,433; and in bounties on crude petroleum, \$260,698.

Ottawa.—Mr. Wilson Foster, of Dawson City, has presented to the National Museum a collection of ten thousand specimens of minerals, ores, and precious stones.

Bancroft.—The Bancroft marble quarries which contain notable quantities and several varieties of excellent marble, are being opened and equipped vigorously under the superintendence of Mr. T. Morrison.

Madoc.—Square-set timbering is being used at the Henderson talc mine at Madoc. Timbering costs about 15 cents per ton of output.

Hamilton.—The Hamilton Steel and Iron Company has announced that it will spend approximately \$1,000,000 on enlarging its plant to meet increased trade conditions. The majority of the stock is owned in Hamilton.

Port Arthur.—The Thunder Bay Harbor and Improvement Co. has almost completed building the dock for the Bessemer Iron Co. at Camp Beulah. There are 13,000 tons of ore on the dumps ready to be taken to the docks and loaded.

Elk Lake.—It is estimated that about ten cars of ore will be ready to ship from the Montreal River district this winter. At 25 tons per car and 1,000 ounces per ton—a pure guess—the possible shipments will aggregate 250,000 tons, roughly \$150,000 gross—not a negligible quantity of money.

BRITISH COLUMBIA.

Phoenix.—It is announced that the C.P.R. will immediately commence the construction of a branch line from Phoenix to Wellington camp. The first section to be built will be the first three miles of the twelve miles to Central Camp. The route is rough, grades are heavy, and considerable cutting and filling must be done.

The New Dominion Copper Company has issued checks to all unpaid miners of the former Dominion company. The total was \$20,000.

Nelson.—Marble quarrying has been actively begun at Marblehead. 75 men are employed. Three Sullivan channelers are installed. The output is about 12 cars per week.

Vancouver.—It is reported that the Guggenheims have gained control of the Western Fuel Company's properties on Vancouver Island.

Rossland.—The Hedley Mining Company is testing two carloads of coal from the Vermilion Forks Mining Company. If satisfactory, the fuel will be purchased regularly.

Rossland.—In the week ended October 30, Le Roi recommenced shipments of ore to Trail. 21 carloads were shipped, mostly from the 1650-foot level. The ore was of fairly high grade. This is the first shipment made since March. Diamond drilling has been successful in locating new ore bodies.

Yukon.—Discoveries have been filed with the mining recorder at Dawson on two streams tributary to the Forty-Mile River. One stream is Mickey Creek and the other Maiden Creek. The streams enter the Forty-Mile on the right limit between four and six miles from the mouth.

Stephen Macfie staked discovery on Mickey and William Hayhurst discovery on Malden. Both these streams had been prospected in early days.

Donahue Gulch, a tributary of the Yukon, on the right limit, five miles below Thistle, is the scene of a new discovery by Alex. Middleton and William Middleton. They also have staked two adjoining bench claims.

The renewals of placer claims the last ten days have aggregated 100, bringing the Government \$1,000 in fees. Thus far in October \$5,000 has been taken in for renewals, representing 500 claims. The properties are in all parts of the camp.

The quartz department is more than crowded. The quartz recorder is almost buried under the increased business in that department. He works under pressure all the time, and then, in order to keep up with the pace of stakers and applicants for certificates of all kinds, often is in the office after hours. The entire force of the gold office has none too much time.

MINING NEWS OF THE WORLD.

EUROPE.

SPAIN.

Lisbon, Oct. 22.—It is announced that the Portuguese Government has granted a concession for mineral research over an area of 25,000 square miles in Portuguese East Africa, situated between latitudes 13 deg. 30 min. and 15 deg. 10 min., and not far from Blantyre, in British Central Africa, to a group of influential London and South African capitalists.

FRANCE.

Paris, Oct. 22.—On the 3rd November the technical delegates appointed by the British, French, German and Spanish Governments will meet at Paris to discuss officially from the technical point of view the draft Mining Law for Morocco provided for in the Algeiras Act and elaborated with Mulai Hafid's assent by M. Porche, a French engineer in the employ of the Maghzen. The results of this examination will be submitted to the diplomatic body at Tangier, in accordance with the Algeiras Act,

and, if approved by them, will be promulgated by the Sultan of Morocco. This procedure has been adopted with the object of simplifying the work of revision on the part of the diplomatic body at Tangier. M. Porche's draft law is framed with due regard to the peculiarities of foreign legislation on mining questions.

Paris.—M. Millerand, Minister of Public Works, announced on October 23 that in future mining concessions granted by his department will include a proviso that the miners shall share in profits. This was reaffirmed on October 26.

GERMANY.

Halle on the Saale, Oct. 22.—The newspapers state that in consequence of the riotous conduct of the strikers employed by the mining company which is working the Mansfeld copper deposits, the authorities last night despatched three companies of the 35th Regiment of Fusiliers and some companies of the 66th

Infantry Regiment to the scene of the trouble near Kupferhammerhuetten. Four machine guns have been placed in readiness for emergencies.

Berlin.—With reference to the approaching international conference in Paris to elaborate a mining law for Morocco, the German Mannesmann group has taken the opinion of thirteen authorities on international law in various countries, including Professor Westlake. These are unanimously agreed that the Mannesmann concessions do not come within the scope of the conference, which they consider can only deal with future eventualities. These concessions cover an area amounting to one-tenth of the whole of Morocco and are situated in the Melilla region, beginning 30 kilometres (18½ miles) from the coast. The Sultan, Mulai Hafid, is interested in them, and has already obtained advances from Mannesmanns on the security of his interest.

TURKEY.

...Constantinople.—Since the re-establishment of the Constitution, in July 1908, no fewer than thirty mining concessions have been granted to private persons, who, with two exceptions (British subjects at Smyrna) are all Ottomans. According to the terms of concession, two years are allowed in which the exploitation of the mine is to commence, failing which the concession is forfeited. The Government derives a benefit varying from 5 per cent. to 20 per cent. (according to the nature of the mineral) on the gross receipts, besides a tax of ten piastres per hectare of the extent of the mine. Work has not yet commenced on any of the new concessions, and a serious drawback to their proper working is the absence of roads. The mines for which concessions have been granted are situated in the vilayets of Aidin, Salonika, Brusa, Dardanelles, Trebizond, Uskub, Adana sandjat of Ismid, districts of Guebze and Kartal, near Constantinople, and comprise the following minerals—arsenic, manganese, argentiferous lead, antimony, copper, chrome, zinc, emery, lignite and iron.

RUSSIA.

Among the questions now engaging the attention of the Russo-British Chamber of Commerce is the importation into Russia of machinery and instruments for the gold and platinum mining industries. By a decision taken in 1898 such articles were admitted duty free for a period of ten years. In 1908 the Ministry of Commerce declined to renew the privilege, and the gold and platinum industries have now addressed themselves to the Chamber of Commerce in the hope that the exemption of mining machinery from duty may be restored.

AUSTRALIA.

During the past twelve months the export coal industry from Australia has been in a very depressed condition, and there are at present no signs of any improvement. The cause of the setback is attributable to the quiet state of trade all over the world and the lower prices at which coal has been selling in other countries, which have prevented the Australian collieries from competing in foreign markets. Tangible evidence of the unsatisfactory conditions which have prevailed recently is to be found in the dividend declared by the Scottish Australian Mining Company, which was at the rate of 7 1-2 per cent. per annum, as against 10 per cent. per annum in the first half of 1908. The distribution now declared is, of course, not altogether unsatisfactory, nevertheless, it does reflect the falling-off which has occurred in the company's business, which it is to be feared will make further progress before there is any revival.

Perth, Western Australia.—Press despatches dated November 10 bring the news that the surface structures of the Great Boulder gold mines have been destroyed by fire. The damage done is estimated at \$1,500,000.

Sydney.—Twelve thousand miners have gone on strike at the Newcastle and Maitland collieries. A general sympathetic strike is expected.

SOUTH AFRICA.

Pietermaritzburg, Oct. 25.—The Natal Mining Commission recommends the establishing of a permanent Board and the granting of increased facilities for prospecting and larger rewards for discoveries of gold.

Johannesburg.—The foundations for the mortar boxes of the Randfontein Central mill are completed. The ore-bins will have a 5,500 ton capacity. The excavations for the sands and slimes plant are progressing rapidly.

There has been large buying of Rhodesia, Ltd., on the strength of the reconstruction scheme undertaken by Mr. Abe Bailey.

The Umkondo Copper mine in the Victoria District of Mashonaland, the property of the Consolidated African Copper Trust, upon which active work is proceeding, is opening up well.

The Transvaal Gold Mining Estates (Lydenburg district) are opening up a new reef on Peach Tree Creek, going 26 dwts. over 21 ins. About 10,000 tons have been developed.

The October profits of the Rand mines will make a slightly lower showing, owing to the scarcity of labour and relatively higher costs. An improvement in the labour supply is perceptible.

The improvement in the ore of the central section of the Consolidated Main Reef mine, recently reported, is maintained, and the position and prospects of the company are being steadily enhanced.

De Beers are recommencing work on the Bultfontein and Du-toitspan mines. The public of Kimberley is elated at the immediate prospect of renewed activity and revival in local conditions.

SOUTH-WEST AFRICA.

A report issued by the German Colonial Economic Committee states that about 80 diamond winning companies have been formed in German South-West Africa, and the shares of about 25 of these undertakings are dealt in on the Bourse at Luderitz Bay. The strong resistance offered to the Regie Company at the beginning has been removed; the questions in dispute seem for the most part to have found a happy solution, although some difficult problems still await a settlement. The Diamond Leasing Company of Berlin has been formed to work the State diamond fields, and the German Diamond Company to work the "close district" of the Colonial Company for South-West Africa. About 50 per cent. of the value of the diamonds found has to be paid as taxes and the cost of production ranges from 2s to 10s per carat, according to local conditions. Since the beginning of activity of the Regie Company at the commencement of March down to the starting of October, 273,701 carats have been delivered, which have yielded \$399,060, of which the sum of \$193,500 has reverted to the State. The prices have gradually risen higher and higher and amounted in the case of the first nine deliveries on the average to 22s 5d per carat, 27s 3d, 27s 6d, 26s 11d, 28s 6d, 28s 1d, 28s 5d, 30s and 33s 8d respectively. At present the monthly output is about 45,000 carats, and it is expected that the monthly average for the current year will attain 45,000 carats.

Lagos.—The Government of Southern Nigeria has passed a new Ordinance regulating oil mining. New areas for mining may be notified, but they will be subject to restriction, and the Governor may declare that the holders of a lease are only entitled to drill for oil.

SOUTH AMERICA.

CHILI.

Santiago de Chile, Oct. 21.—As a result of borings made by the Government engineers in Southern Chili, in the district between Chilos and the south of the river Paullin, valuable petrol springs have been discovered.

Company Notes.

The Board of Directors of the operating company, La Rose Mines, Limited, will be constituted as follows: Messrs. Alex. Pringle, president; D. Lorne McGibbon, Shirley Ogilvie, Victor E. Mitchell, K.C., David Fasken, K.C., E. P. Earle, and R. B. Watson, general manager of La Rose Consolidated and Nipissing Mines, Ltd.

The Granby costs per pound of copper produced for the year ending last June, were 10 cents per pound.

The first general meeting of the shareholders of the Amalgamated Gold Mines of Sheep Creek, Limited, took place at Van-

cover on Oct. 30. at the company's offices, 506-508 Hastings Street West, at which organization was completed by the election of the following officers and directors:

President, Mr. F. C. Wade, K.C., Vancouver; Vice-Presidents, Mr. H. G. Neelands, Nelson, and Mr. F. L. Murdoff, Vancouver; Directors, Mr. H. A. Jones, Vancouver; Mr. Thomas Brown, Nelson, and Mr. J. L. Warner, Nelson. Secretary-Treasurer, Mr. D. G. Williams, Vancouver. This company has valuable holdings in the Sheep Creek gold camp.

At the meeting on Nov. 1st the Amalgamated Asbestos directors decided that the dividends on the preferred stock will date from January 1st. The first dividend for the quarter ending March 31st will be paid on April 1st.

Ore Concentration Company.—Advice has been received from the Sulitelma Company's mines in Norway that for the ten days ended 10th instant 341 tons of concentrates containing 6.73 per cent. copper, were produced by the Elmore process.

Dividend No. 17 Kerr Lake Mining Company.—The Board of Directors on Oct. 15 declared a regular quarterly dividend of four per cent. and an extra dividend of three per cent. upon the capital stock of the company, payable December 15th, 1909, to all stockholders of record at the close of business on December 1st, 1909.

Le Roi 2 has declared its regular quarterly dividend of two shillings per share, payable Nov. 6.

STATISTICS AND RETURNS.

The October outputs of the Nova Scotia Steel Co. were as follows: Steel, 7,148 tons; pig iron, 5,640 tons; coal, 77,130 tons.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt Camp for the week ending Oct. 30, and those from Jan. 1, 1909, to date:

	Oct. 30.	Since Jan. 1.
	Ore in lbs.	Ore in lbs.
Buffalo	945,978	
Carnegie	63,410	
Chambers-Ferland	961,010	
City of Cobalt	1,100,122	
Cobalt Central	46,131	731,327
Cobalt Lake		141,340
Coniagas		1,356,515
Crown Reserve	122,200	5,170,884
Drummond		992,100
Foster	187,800	187,800
Kerr Lake		1,886,341
King Edward		183,740
La Rose	278,085	11,189,668
McKinley-Darragh	96,000	1,739,424
Nipissing	248,927	10,758,345
Nova Scotia		480,810
Nancy Helen		124,700
Peterson Lake		324,040
O'Brien	127,358	2,471,107
Right-of-Way		2,533,226
Silver Queen		684,814
Silver Cliff		241,820
Stewart, H. J.		62,393
Temiskaming		1,626,060
Trethewey	64,625	1,743,323
T. & H. B.		1,106,260

Ore shipments to Oct. 30 from Jan. 1 are 48,806,586 pounds, or 24,403 tons.

Total shipments for week ending Oct. 30 are 1,171,123 lbs., or 585 tons.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt Camp for the week ending Nov. 6, and those from Jan. 1, 1909, to date:

	Nov. 6.	Since Jan. 1.
	Ore in lbs.	Ore in lbs.
Buffalo	945,978	
Carnegie	63,410	
Chambers-Ferland	961,010	
City of Cobalt	1,100,122	
Cobalt Central		731,327
Cobalt Lake		141,340
Coniagas		1,356,515
Crown Reserve		5,170,884
Drummond		992,100
Foster		187,800
Kerr Lake		1,886,341
King Edward		183,740
La Rose	340,287	11,529,955
McKinley Darragh	43,582	1,783,006
Nipissing	65,560	10,823,905
Nova Scotia		480,810
Nancy Helen		124,700
Peterson Lake		324,040
O'Brien	64,000	2,535,107
Right-of-Way	131,361	2,664,587
Silver Queen		684,844
Silver Cliff		241,820
Stewart, H. J.		62,392

Temiskaming	1,626,060
Trethewey	64,625 1,743,323
T. & H. B.	1,106,260

Ore shipments to Nov. 6 from Jan. 1 are 49,451,376 pounds, or 24,725 tons.

Total shipments for week ending Nov. 6, are 644,790 pounds, or 322 tons.

Nelson, October 23.—The total ore shipments for the week in Southeastern British Columbia amounted to 52,191 tons, and for the year to date 1,507,327 tons. The smelter receipts were 49,336 and 1,389,500 respectively.

This is by far the largest weekly output so far this year, and away over the average. The Granby's tonnage, and that sent to the British Columbia Copper Company's smelter accounts for the very gratifying increase.

SOUTH-EASTERN B. C.

The following are the ore shipments and smelter receipts in detail:

ORE SHIPMENTS.

Boundary—	Week.	Year.
Granby	27,573	808,850
Snowshoe	3,837	120,094
Mother Lode	11,396	233,074
Oro Denoro	950	4,333
Other mines		664
Total	43,756	1,165,015
Rossland—	Week.	Year.
Centre Star	4,093	142,855
Le Roi No. 2	463	25,200
Do. milled	260	10,706
Other mines		9,561
Total	4,816	188,376
Slocan-Kootenay—	Week.	Year.
Queen, milled	420	17,430
G. Poorman, milled	250	10,350
W. Deep, milled	700	29,200
K. Belle, milled	700	2,910
S. Relief, milled	145	6,020
Nugget, milled	110	4,570
B. Bell, milled	900	37,400
St. Eugene	377	17,340
Whitewater	151	1,169
Blue Bell	148	4,138
Van Roi	81	779
Rambler Cariboo	62	886
Yankee Girl	79	2,175
Highland Buckeye	26	160
Hall	25	25
Cork	21	384
Eastmount	20	112
Ruth	18	885
Bismarck	16	294
Other mines		17,140
Total	3,169	35,936
Grand total	52,191	1,507,327

SMELTER RECEIPTS.

Granby	27,573	807,300
Trail	9,417	332,032
B. C. Copper Co.	12,346	237,407
Le Roi		12,761
Total	49,336	1,389,500

TORONTO MARKETS.

Metals.

Nov. 9.—(Quotations from Canada Metal Co., Toronto.)
 Spelter, 6½ cents per lb. (strong).
 Lead, 3.75 cents per lb.
 Antimony, 8 1-2 to 9 1-2 cents per lb.
 Tin, 32 cents per lb.
 Copper, casting, 13.65 cents per lb.
 Electrolytic, 13.75 cents per lb.
 Ingot brass, 9 to 12 cents per lb. (metal market very steady).
 Nov. 9.—(Quotations from Drummond McCall Co.)
 Summerlee, No. 1, \$24.00 (f.o.b. Toronto).
 Summerlee, No. 2 \$23.50 (f.o.b. Toronto).
 Midland, No. 1, \$22.50 (f.o.b. Toronto).
 Coal, anthracite, \$5.50 to \$6.75.
 Bituminous, \$3.50 to \$4.50 for 1 1-4 inch lump.

Coke.

Nov. 5.—Connellsville coke (f.o.b. ovens).
 Furnace coke, prompt, \$2.75 to \$2.85 per ton.
 Foundry coke, prompt, \$2.75 to \$3.00 per ton.
 Nov. 5.—Tin (straits), 30.60 cents.
 Copper, prime Lake, 13 1-2 cents.
 Electrolytic copper, 12.85 to 13.00 cents.
 Copper wire, 14.50 cents.
 Lead, 4.40 to 4.42 1-2 cents.
 Spelter, 6.40 cents.
 Sheet zinc, 8.50 cents.
 Antimony, Cookson's, 8.37 1-2 cents.
 Aluminum, 23 to 24.00 cents.
 Nickel, 40.00 to 49.00 cents.
 Platinum, \$28.50 to \$32.25 per oz.
 Bismuth, \$1.75 per lb.
 Quicksilver, \$50.00 per 75-lb. flask.

SILVER PRICES.

October 23	50¾	23¾
“ 25	50¾	23¾
“ 26	50	23 1-16
“ 27	50¾	23 3-16
“ 28	50¾	23 5-16
“ 29	50¾	23½
“ 30	50	23½
November 1	50¾	23½
“ 2		23½
“ 3	50¾	23 3-16
“ 4	50½	23¼
“ 5	50¾	23¾
“ 6	50¾	23 5-16
“ 8	50¾	23¾

New York, November 2.—A large sale of copper, said to amount to 30,000,000 pounds, has been made by the United Metals Selling Company, the selling agents of the Amalgamated Copper Company, it was learned to-day and negotiations for still further sales of the metal are under way.

The price is believed to have been a fraction under 13 cents per pound, for electrolytic, or high grade metal.

The recent over-production of copper has caused no little concern among the trade, and to-day's news was regarded as an important advance toward the restoration of better conditions in that branch of the metal industry.