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The annual meeting of the Canadian Mining Institute will this year be held in Montreal on March 6th, 7th and 8th. Many important matters will be discussed and it is to be hoped that members will make every effort to be present. Canadians cannot afford to neglect such an opportunity to get together and talk things over. The mining men of the country have a duty to perform and they realize it more fully when they hear and take part in discussions on what is being done towards increasing production of minerals for war purposes and for maintaining Canada's credit now and after the war. If you attend this meeting and take an interest in the discussions you will doubtless make useful criticisms and suggestions. Don't be misled by the supposition that these meetings are unnecessary or undesirable in wartime, because they happen to be enjoyable functions. They are more useful now than they ever were, and you owe it to yourself and your country to attend.

During the past seven years Canada has had eight so-called Ministers of Mines. It is a pleasure therefore to record that there are signs that we now have a real one. We have, unfortunately, to be satisfied for the present with only half the attention of the new minister, for he also holds the portfolio of Secretary of State. Half the time of a capable minister will, however, be more than we have had for some years.

Hon. Martin Burrell, Minister of Mines and Secretary of State, has reason to be proud of his record as Minister of Agriculture. He has a good opportunity for showing again his ability as an organizer. His predecessors gave little attention to the business of the Mines Department and the Cabinet utterly failed in its duty to the mining industry. We expect that the new Cabinet and particularly the new Minister of Mines will make some effort to inform themselves as to the best means for speeding up the development of our mineral resources. Mr. Burrell will not have to do very much to surpass the efforts of those who preceded him. We do not believe that he will be content to be classed with them. He is not unfamiliar with the mining industry and as head of the Department of Agriculture he made a reputation that leads us to hope for much.

The fuel shortage has naturally directed much attention to fuels other than coal. Plans are being made to utilize peat, and an unusually large amount of wood is being burned. It would be well, however, for the public to realize that North America has plenty of good coal for immediate needs and that the real problem is one of transportation. There is, of course, a shortage of labor, but the great cause of shortage at points of consumption is inability of the railway companies to take the coal quickly from the mines to the consumers. We should cut out the long hauls where they are not necessary. Canadian coal in east and west should be more fully utilized in both Canada and the United States. Americans who think that central Canada gets too much coal from the United States, will do well to consider who is responsible for the failure to more largely use Canadian coal in northern Atlantic and Pacific States. In Nova Scotia we have great coal mines right on the sea, admirably situated to supply Boston and nearby ports. We have similar conditions on the Pacific coast. In Ontario we have no coal; but are close to great United States coal fields. By more complete utilization of our Niagara and St. Lawrence water powers Ontario should be able to get along without much coal for power purposes; but will be glad to have American coal for heating purposes.

We would suggest that the Fuel Controllers of the United States and Canada could help relieve the coal shortage by doing what they can towards increasing reciprocity in the use of coal and, if necessary, in the supply of labor and transportation facilities. They will do well to enquire into the conditions which have prevented the proper utilization of Canadian coal in Manitoba and North Western States. They will do well to consider whether Nova Scotia coal could not be more extensively used in New England and on the Atlantic.

Oil Prospecting in Southwestern Ontario*

By M. Y. Williams.

To-day it is self evident that Canada needs petroleum. America needs petroleum, the world needs petroleum, alike for war-time and the more peaceful endeavors. This need is manifest in the rising cost of all petroleum products, and the result has been a great impetus to oil prospecting. At the present time, America is drawing on its stored surplus of petroleum and petroleum products.

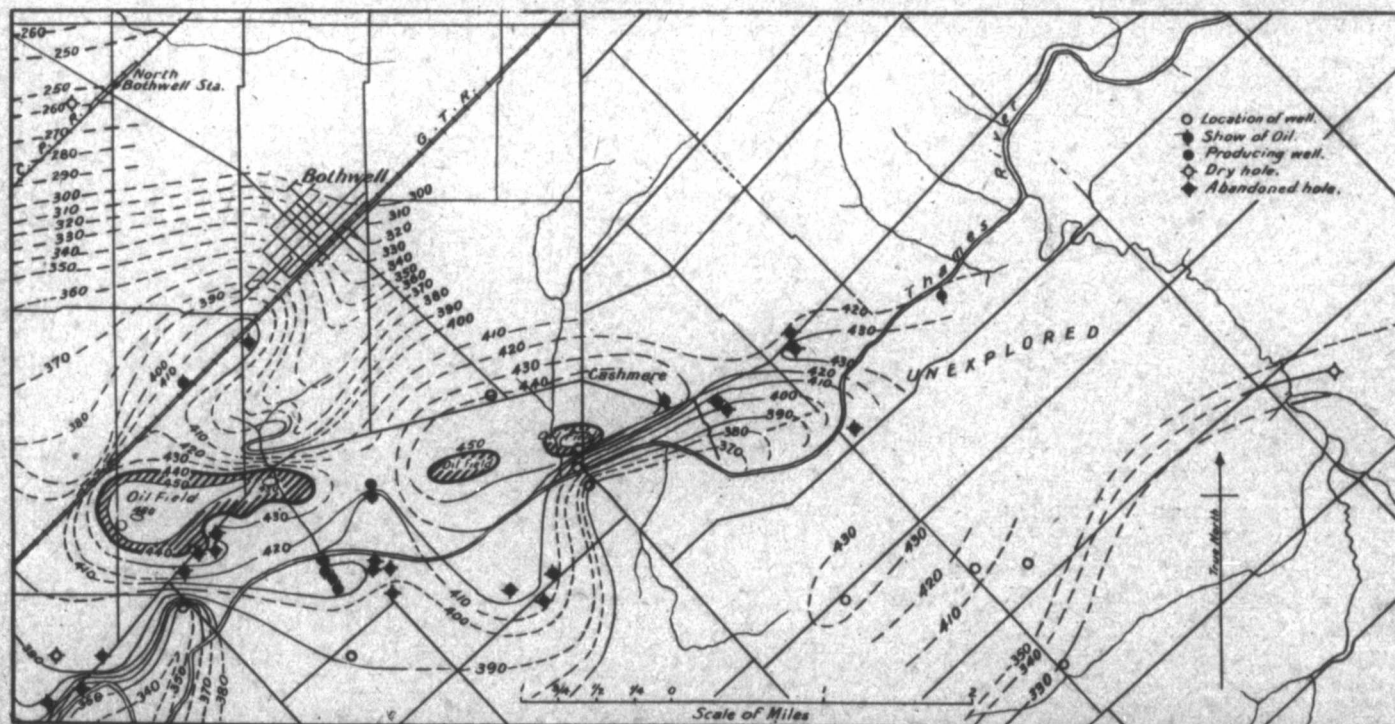
Let us examine the conditions of our Canadian supply. In 1916† Canada paid bounty on 198,123 barrels of crude petroleum valued at \$392,284 which may be taken as the total production exclusive of the small amount of light oil produced in Alberta, which is too low in specific gravity to draw Government bounty. Of the oil upon which bounty was paid, New Brunswick produced 1,345 barrels, and Ontario 196,778 barrels. The value of the total exports of petroleum and its products amounted in 1916 to \$73,771, and of the total imports to \$14,701,521. From the above the urgent need of an increase in our petroleum production is clear, and renewed prospecting is a reflection of the need.

What are the results in Ontario to date? Taken altogether, it is too soon to predict what the real results of the present efforts at increased oil production will be, as these will doubtless be cumulative and spread over several years to come. However, an abandoned prospect north of Glencoe, in Mosa township, Middlesex county, has been turned into a producing oil field by the Ontario Petroleum Company under the careful scientific management of F. J. Carman, of Bothwell. The oil produced here is from the Onondaga (Corniferous) limestone. In Dover West township, Kent county, a well drilled in to the Trenton limestone by the Union Natural Gas Company is changing from a gas well to an oil well, and is producing considerable

quantities of petroleum. Other areas are being tested by the drill and the results will be learned in due time.

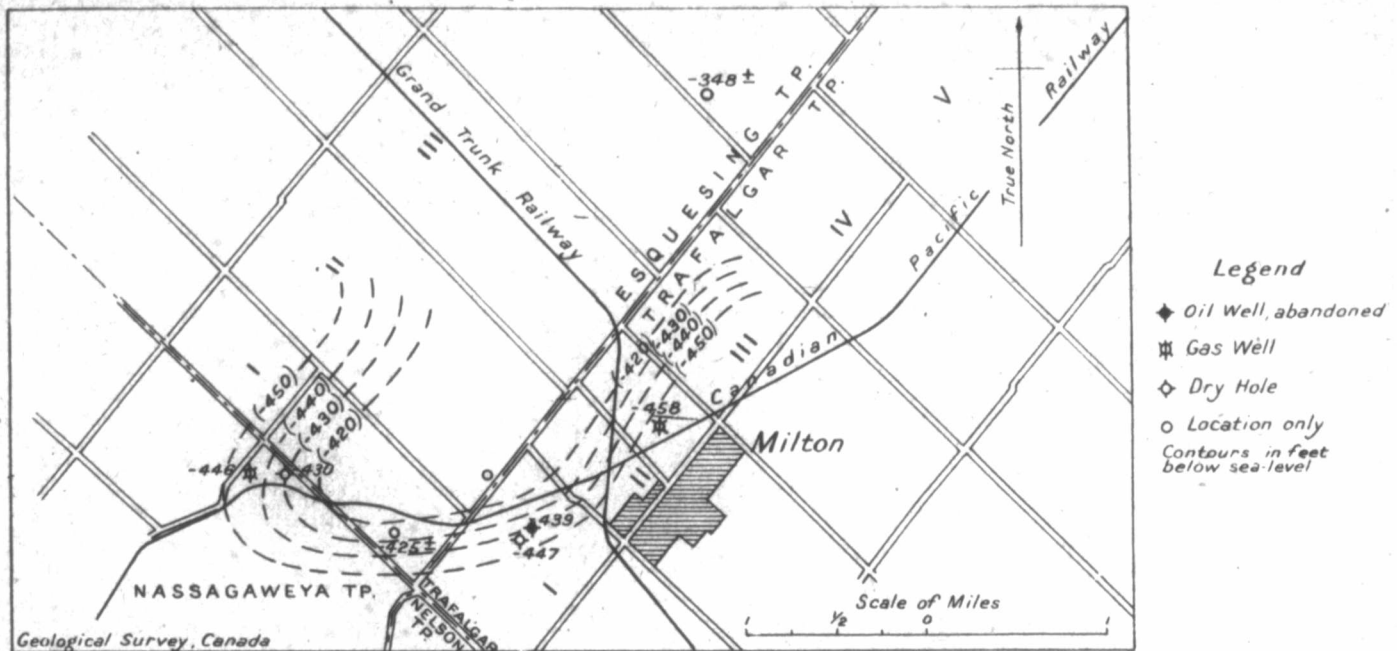
Besides the Onondaga (Corniferous) limestone which is the principal formation producing petroleum, the lower Salina and upper Guelph dolomites are producing oil in southwestern Kent, and the eastern part of Essex county. Near Brantford some oil is produced from the Queenston shale just below the Medina (Whirlpool) sandstone. The deepest petroliferous formation is the Trenton limestone which is known to contain some oil on Manitoulin Island, at Milton, and in West Dover township, Kent county. This formation, which is now being tested near Rockwood in Dover township, at Flesherton, at Rondeau and elsewhere, has produced great quantities of oil in Ohio, and is looked upon by Ontario prospectors as a possible source of supply.

Times have changed in the petroleum industry from the 'sixties, when stream beds were considered the most likely places to prospect for oil, (the natural excavation certainly saved much digging in the old fashioned clumsy way), and again from the 'nineties when plenty of water and good board were primary requisites for location with the explorers of the average company. To-day, thanks to pioneering work done by I. C. White in Pennsylvania which was followed later in the Canadian field by E. Coste, F. J. Carman and others, the localization of oil in "inverted" basins of rock, which take the form of domes, anticlines or monoclines, is well established in the average case, in which the strata bearing oil are also water-bearing and are of fairly uniform porosity. This is because oil floats on water and hence is forced to the top of the basin. In cases where the oil-bearing strata do not contain water, the oil tends to gravitate toward the synclines and basins, but as a strong driving force is lacking,



Structure Diagram of the Top of "Corniferous" Delaware limestone, showing the Bothwell Oil Domes. Structure contours are broken where information is insufficient. Contour intervals 10 feet, elevations are above sea level.

*By permission of the Geological Survey, Ottawa. Further information may be looked for in the 1917 Summary Report of the Geological Survey. †Preliminary Report, Mineral Production of Canada, Mines Branch, Department of Mines, pp.20-21.



Structure Diagram of the Top of the Trenton Formation near Milton, Ont. The broken lines are approximate contours of lines passing through points of equal elevation at the top of the Trenton Formation.
 † Contour intervals 10 feet; elevations are below sea level.

the accumulation is apt to be less pronounced than in the case of the normal accumulation in domes and anticlines.

Keeping these facts in mind, the well advised prospector collects all available data as to the elevation at different points of the formation to be prospected, and then chooses the highest point for his wells. Rarely does the first well prove or disprove the field. Well must follow well, the location in each case being made in the direction of higher structure suggested by previous wells, unless no water is found, in which case low structure is to be sought. The importance of keeping samples and accurate logs of wells in such work is evident. Except in very level country the elevations of the tops of wells should be determined, as only by knowing the surface elevations, can well logs be accurately compared and structure worked out.

In the light of recent oil discoveries in southwestern Ontario and in view of the fact that considerable areas of promising country have been lost sight of by being placed in the category of country already drilled, it seems probable that new oil pools will still be found in the Onondaga (Corniferous) limestone of southwestern Ontario. The Guelph formation is only partially explored, and it is possible that, by making use of the present knowledge of the structure of the Onondaga, new pools may be found in the Guelph beneath Onondaga (Corniferous) domes. Hopes are entertained that the Trenton formation, in spite of its apparent lack of water and varying porosity, may still be successfully developed.

Suggestions to Prospectors.

The attention of the prospector for oil is called to the following considerations. In the Milton area the highest structure probably lies about three-quarters of a mile north of the well in the Brandon brick yard which has produced some oil. The accompanying diagram showing the structure of the top of the Trenton formation as determined from the logs of some of the

wells already drilled, suggests that this is the case. The absence of salt water in the Trenton near Milton, however, would suggest drilling on lower structure, that is, away from the centre of the dome. Wells drilled to the south of the "oil well," however, struck no oil and although both producing gas wells are on lower structure the gas and oil of this region occur at different levels in the Trenton. It is probable that the rock porosity is variable, and hence the occurrence of oil is likely to be "pockety."

Other favorable locations for prospecting the Trenton formation are on the middle and southern parts of Manitoulin Island, away from Manitowaning bay and the north channel with its other tributary bays which wash the Trenton outcrops and have thus allowed natural egress for oil and gas, and ingress for water. Excepting one dry well drilled by H. F. Slater 100 ft. into the Trenton at Providence bay, no drilling has been done south of Lakes Manitou, Mindemoya and Kagawong, and Bayfield sound. At Providence bay, the Trenton was struck at 900 ft. in depth. It is well known that considerable quantities of oil were found in the Trenton in wells drilled near Wekwemikong, Manitowaning and Gore Bay. At Manitowaning the Top of the Trenton was penetrated at a depth of about 440 ft.

The Bruce peninsula, north of Wiarton, also offers virgin ground for prospecting the Trenton. Numerous undulations in the rock structure are visible along the 20-mile coast line between Cabot Head and Cape Hurd, and down the eastern coast. Much of this region, however, is difficult of access and prospecting here can well await the results obtained in the Trenton elsewhere.

As indicated on the accompanying diagram, the structure in the Bothwell field suggests a favorable area for prospecting from one and one half to four miles east of Cashmere. The wells drilled to the north, south and east are not on line with the Bothwell domes and there is room for another dome in this unexplored area.

Exploration of Nickel-Copper Properties in Falconbridge Township, Sudbury District, Ontario*

By Hugh M. Roberts and Robert Davis Longyear.

During 1916 and 1917, the E. J. Longyear Co. of Minneapolis, Minn., carried out a campaign of exploration for nickel-copper ore in the Sudbury District of Ontario. The work was initiated by W. E. Smith, a resident of Sudbury, who called the attention of W. J. Mead, Chief Geologist of the E. J. Longyear Co., to the fact that explorable lands in the Sudbury District were still available. Five diamond drills were employed, and holes were drilled in the townships of Levack, Trill, Denison, Blezard, Garson, Falconbridge and MacLennan.

As a result of this exploration, a large body of nickel and copper ore has been found in the western part of the Township of Falconbridge. This property lies in the eastern part of the Sudbury District, east of the Garson mine.

The geological direction of this work necessarily included a careful consideration of the nature and mode of occurrence of the Sudbury ore deposits and of the various existing ideas as to their manner of origin. Since exploratory work is very practical research in the theory of ore deposition, the writers propose in this paper to present the results of this investigation, and in particular to trace the influence of current theories of origin of the ores upon the conduct of the exploration.

The field geology is discussed by H. M. Roberts; the petrography and detailed study of the ore is the work of R. D. Longyear. We are indebted to C. K. Leith, W. J. Mead, W. H. Emmons and E. C. Harder for suggestions and criticisms.

The various places where drilling was to be undertaken were selected on the basis of A. P. Coleman's map and report. This was essentially the latest expression of the thought of Canadian geologists on the Sudbury District, embodying not only Coleman's own more recent work but the previous work of Barlow, Walker and others of the Canadian Geological Survey and the Ontario Bureau of Mines. Attention was given also to the work by Dickson, Knight and others, concerning the origin of the ore, whose views differed somewhat from those of earlier investigators.

It will not be necessary to enter upon a protracted description of the general geology of the district, as this has been discussed at length in recent geologic literature, but it may be well to outline a few important field relations.

Coleman's map shows a nickel-bearing intrusive, probably of Keweenawan age, which came in as a "laccolithic sheet" or sill. We wish to state our belief in the essential accuracy of this map. The laccolithic sheet is a body some 10,000 ft. thick and was intruded along an unconformable plane of contact between an older complex of Archean-Huronian rocks, and the younger flat-lying sediments mapped by Coleman as upper Huronian but described later by Collins as Animikie.

During the intrusion and cooling of this mass, the flat-lying sediments of the Animikie were displaced, and deformation of all the rocks in the area took place. The crust of rock covering the internal reservoirs, from which the intrusion came, ultimately settled, so that

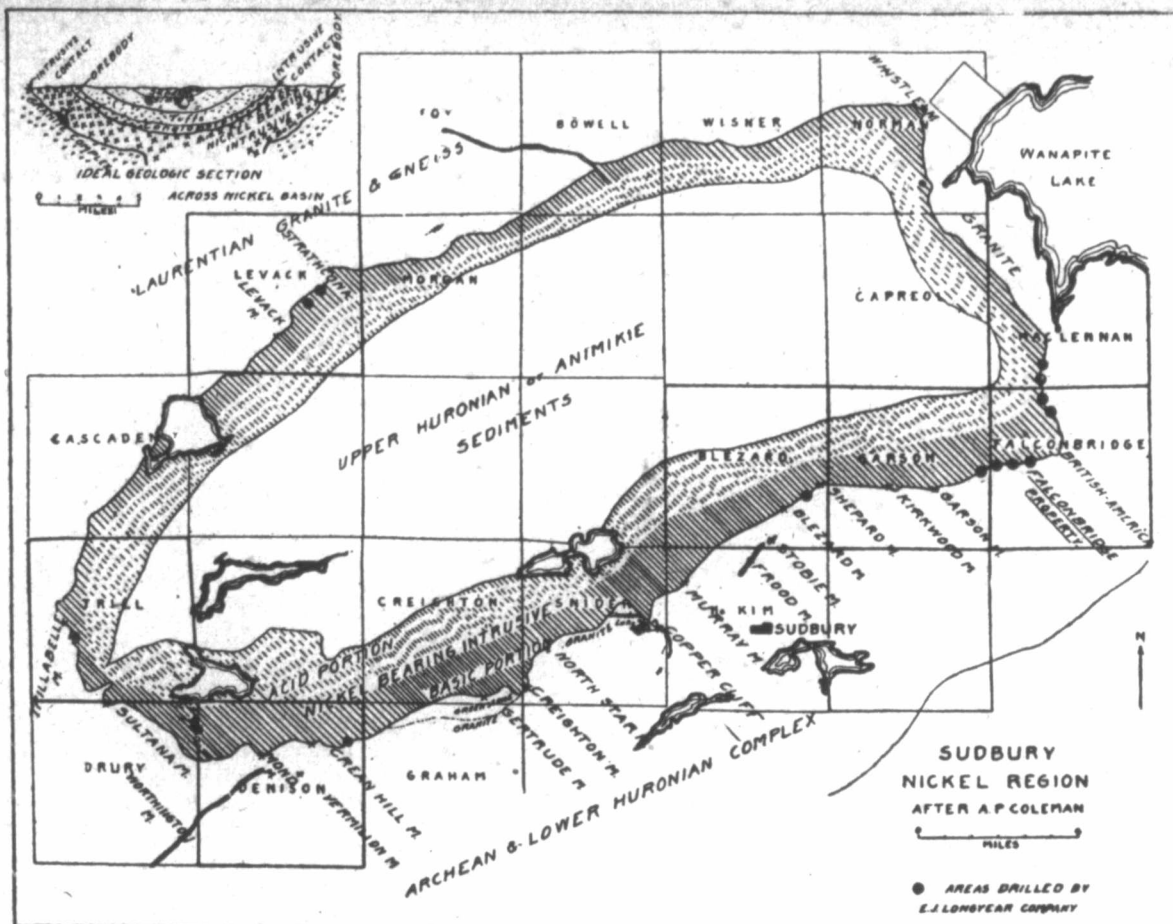
at present the central portion of the district is folded into a synclinal basin some 40 miles long and 15 miles wide. A great thickness of Animikie sediments has been removed, and also much of the nickel-bearing intrusive itself, bringing the lower portions to view at surface. The distribution of the intrusive is oval-shaped, and its outer edge constitutes the outer rim of the basin. The sediments in the interior of the basin have been faulted and continuations of these faulted zones, exterior to the basin, are represented by bodies of norite which were intruded into zones of weakness. These masses constitute forms described by Coleman as "offsets." Typical instances are found at Worthington and Copper Cliff.

Since the time when the magma was hardened into rock, many geologic periods have elapsed. During this interval, the region has been planed down by erosion. In much of the area, all of the rocks are stripped down to the older complex which is itself eroded. The region has since been glaciated.

The nickel-bearing intrusive is composed of two kinds of rock which grade into each other, micropegmatite, a phase of granite in the upper portion, and norite, a species of gabbro, toward the bottom. This gradation has been called in question—notably by Harker. At the very bottom of the intrusive, at its contact with the lower complex as now exposed by erosion, the norite and adjoining rocks contain the iron sulphide, pyrrhotite, with which is associated the nickel-bearing sulphide, pentlandite, and the copper-bearing sulphide, chalcopyrite. Commercial orebodies are found in places where the sulphides form a preponderant part of the rock. Orebodies of this type are described by Coleman as "marginal" deposits. The "offsets," previously mentioned, also carry important orebodies.

We believe, after examining many widely scattered cross-sections, that the intrusive sill is essentially one geologic body, differing in its mineral content from place to place. There are, however, later intrusions of diabase. An intrusion of granite also occurs within the norite near the Murray mine. Toward the interior of the basin, i.e., away from the lower contact of the intrusive, the norite changes its mineralogical characteristics and approaches granite in composition. This is true wherever the rock has been traced away from the contact in the Townships of Levack, Bowell and Wisner on the north, Trill on the west, and Garson and MacLennan on the east. The more acid rock which is found is similar in grain, and can always be recognized as a part of the same mass as the basic norite at the edge. In large outcrops of the intrusive, the effect of segregative tendencies in the molten mass may be witnessed; areas, 20 ft. square, or more, may be seen to be dominantly composed of pyroxenes. At a distance of 100 ft., segregations of rock comprised more largely of plagioclase and orthoclase feldspars may be seen. These occurrences are physically continuous and have a continuity of textures and grain. During the course of a single drill hole, for instance, one deep hole drilled in the Township of Levack on the north side of the basin, the gradation in the mineralogical composition from basic to acid may be clearly recognized. These facts lead to the conclusion that the intrusive body is essentially one mass, solidifying from a molten magma as a unit. The constant and widely distributed relation between the basic and acid portions of this body leads to the same conclusion.

*Extracts from a paper to be presented at the New York meeting of the A.I.M.E.



Sudbury nickel region, showing areas drilled by E. J. Longyear Company.

We agree with Coleman that this mass is a sill, or laccolithic sheet, rather than a dike-like intrusion, for the reason that an inward dip from the contact toward the center has been found at every place where we have drilled—in Levack 45 deg., in Trill 30 deg., in Denison 45 deg., in Falconbridge 70 deg. to 90 deg., coinciding in this respect with the evidence at most of the mines. The instances of steep and southward dips of the contact on the south limb in Falconbridge Township and at Garson and Crean Hill mines might be accounted for, on the basis that the structurally weak sediments and greenstones of those localities yielded under the weight of the intrusive and rolled up before the advancing mass, whereas the more resistant granite, as at Creighton mine, withstood the thrust; hence the relatively flat dips wherever the footwall is composed of massive granite.

The Orebody in Western Falconbridge Township.

The orebody, here described, is located in Lots 10, 11 and 12 of the Fourth Concession of the Township of Falconbridge. It lies at the eastern end of the southern limb of the synclinal basin, occurring at the outer margin of the norite. The Garson mine of the Mond Nickel Co., $2\frac{1}{2}$ miles to the southwest, is the nearest productive orebody. East of the property, in Lot 8, Con. IV, is a prospect owned by the British-America Nickel Co., where a small tonnage of medium-grade ore has been developed.

The main orebody has a length of 7,500 ft. The exploration was done mainly by diamond drilling. A small exploration shaft was sunk in ore for the purpose of checking the results of the drilling.

A mantle of glacial drift, from 50 to 250 ft. thick covers most of the rock formation. Few rock outcrops occur near the norite contact. In the main, the drift has formed extensive sand plains broken in places

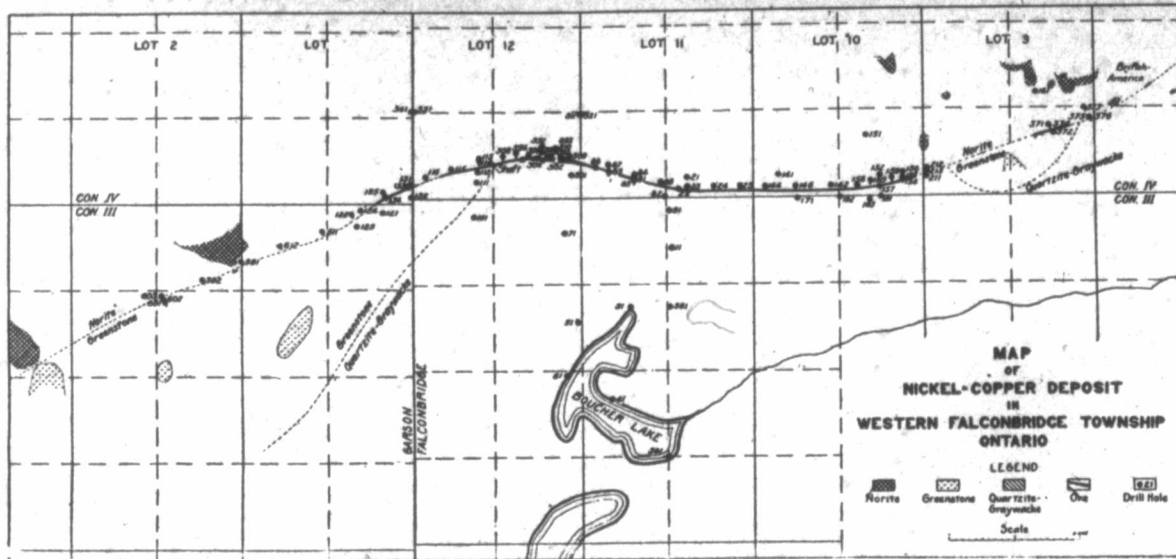
by kettles, locally known as pot holes. Cutting diagonally across the western part of the property in a northeasterly and southwesterly direction is a peculiar series of kettles, hills and ridges, which extend north-eastward to Wanapitei Lake.

The general inclination of the bed-rock surface is southeastward toward an old pre-glacial valley now indicated by swamp land, and small lakes. As shown by drilling, there is a rock escarpment along the northwest shore of Boucher Lake over which the glacial material has spilled, forming a steep bank.

The orebody occurs at the contact of the norite and footwall in a continuous band extending from the southwest corner of Lot 12, Con. IV, to the southeast corner of Lot 10, Con. IV, in the Township of Falconbridge. This is a total length of 7,500 ft., which is longer than any other known orebody in the district. This length has not been completely explored throughout, but it is a reasonable assumption that the ore is continuous over

Beyond the ends of this orebody are smaller outlying deposits, making the total length of the mineralized zone some 11,200 ft. The thickness varies from a minimum of 10 ft. to a maximum of about 120 ft. The greatest depth at which the orebody has been cut by a drill hole is 1,020 ft. below the surface of the ground. It probably extends to a much greater depth.

This orebody is a typical example of the so-called marginal deposit of the Sudbury district. In general, the ore is at the contact of the norite hanging-wall and the underlying quartzite or greenstone. In some cases, however, the ore is several feet away from the contact, and within the quartzite or greenstone. The ore generally dips steeply to the north. In two places, overhanging dips to the south have been observed. In some places the walls have a very irregular shape.



Map of nickel-copper deposit in Falconbridge Township, Sudbury District, Ontario:

The ores can be classified in three types: (1) norite partly impregnated with sulphides, (2) footwall (usually quartzite on this property) partly impregnated with sulphides, and (3) massive sulphides containing small particles of rock. The last type grades into the other two.

The sulphides in the norite usually take the form of blebs scattered uniformly throughout the rock. The sulphides in the footwall rocks may be blebs, but are more often in the form of irregular veinlets. Often the rock associated with the ore is so schistose that its original nature is uncertain.

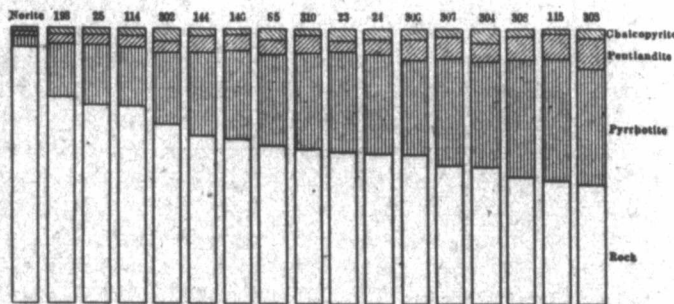
In the massive ore, it is rare to find less than 5 to 10 per cent. of rock particles present. These particles may consist of quartz, norite, quartzite, greenstone, or an indeterminate schist. They may be rounded, sub-angular, or angular, and generally suggest replacement by the sulphides.

The sulphide minerals comprising the ore are, in order of abundance, pyrrhotite ($Fe_{11}S_{12}$), pentlandite ($FeNiS_2$), and chalcopyrite ($CuFeS$).

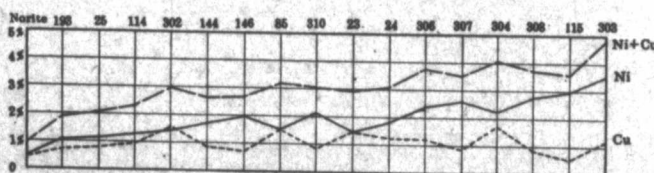
The proportions of minerals present are shown graphically in the accompanying figure. The first column represents the composition of a sample of typical mineralized or "spotted" norite. Each of the other

columns represents a composite sample of all ore in a drill hole between the foot and hanging walls. The relative amount of minerals present was calculated from analyses. It was assumed that all of the nickel occurs in the form of pentlandite. Cobalt, and arsenic were neglected as being too insignificant in amount to affect the results.

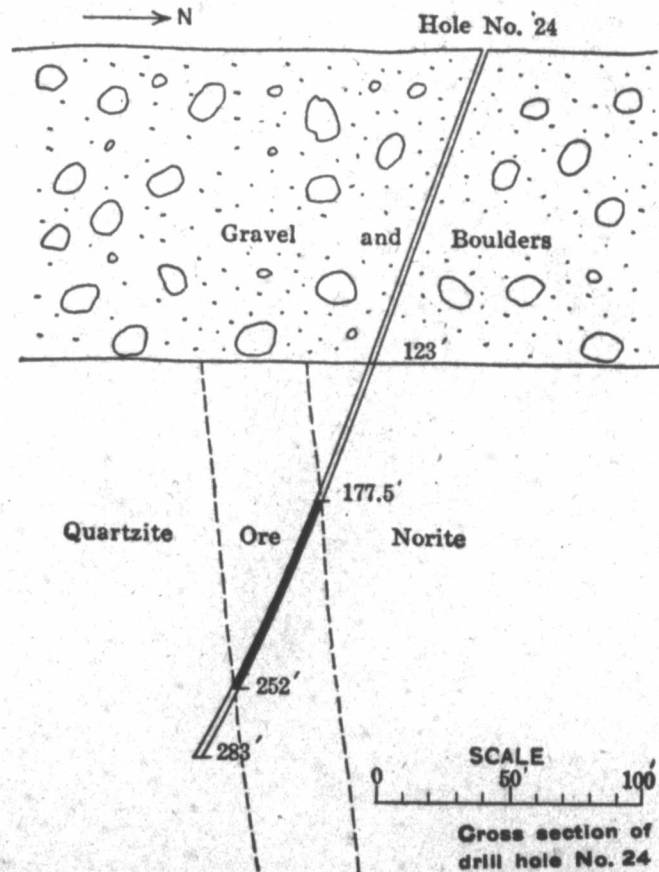
It will be seen that a very large proportion of the lode material is rock. It is customary in Sudbury mining practice to remove part of this rock by hand picking. The rest could be easily removed by flotation or some other mechanical process, but this is not desirable because a certain amount of siliceous gangue is necessary in order to act as a flux in the furnace for removing the iron. The rock gangue consists of quartz, or any of the country rocks or their altered equivalents. Calcite is rarely found.



Graphic representation of the relative amounts of sulphide rock gangue in several drill holes.



Curves showing percentage of nickel and copper in the ore from several drill holes.

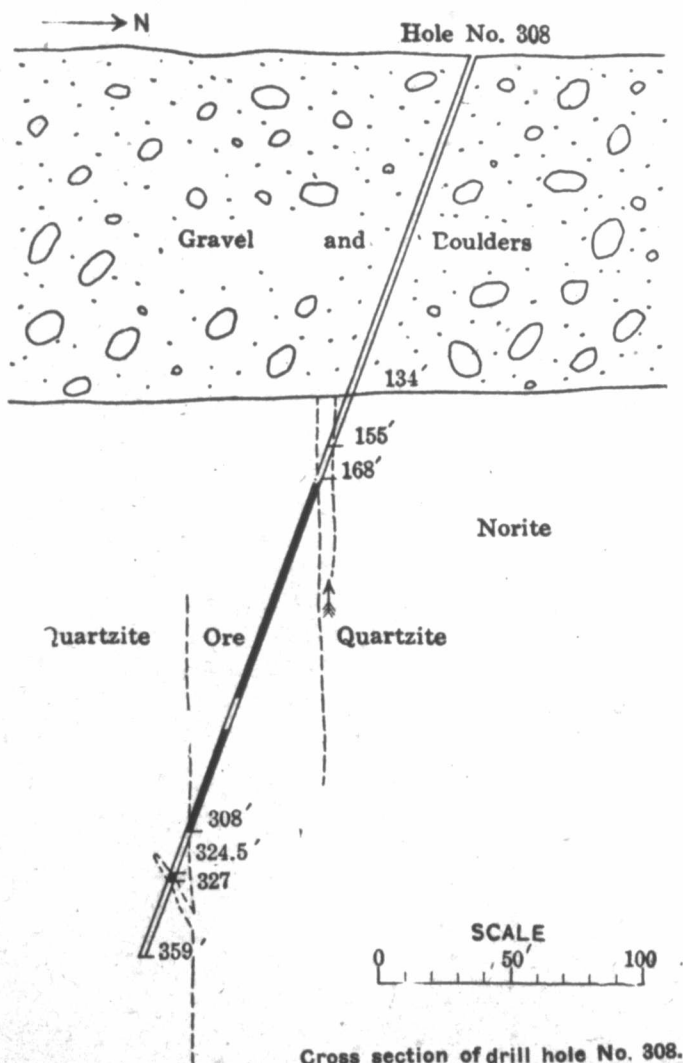


Cross section of drill hole No. 24

The amount of chalcopyrite present seems to bear little relationship to the amount of rock, being as abundant in the rocky ores as in the richer ores. Pentlandite, on the other hand, increases as the amount of rock decreases, and bears a fairly constant ratio to the amount of pyrrhotite present. Analysis curves for copper, nickel, and combined copper and nickel, illustrate the same features. The "copper curve" has practically no slope from left to right (rocky to less rocky ores), while the "nickel curve," rises toward the right. A striking feature of this diagram is the complementary nature of the copper and nickel curves, maximums on the one curve being opposite minimums on the other, showing that where the copper is more abundant the nickel is less abundant.

The remarkable uniformity in the composition of the ore is noteworthy. The chalcopyrite is the most variable member; the pentlandite is somewhat more constant, while the pyrrhotite, except at the hanging wall, is invariably around 75 and 80 per cent.

Magnetite is present in the ore in small amounts, but its period of formation has not been determined. Pyrite has been observed in some of the core but the amount is negligible. It appears to be later than the other sulphides. In one place, a narrow band of galena was found cutting the mineralized norite. It is clearly a later introduction and not directly connected in origin with the orebody. Aside from these, no other sulphides have been detected, although a detailed study would undoubtedly disclose the presence of some of the rare nickel minerals such as polydymite, gersdorffite, etc.



Cross section of drill hole No. 308.

PERSONAL

Mr. T. J. Harwood, who was for some years manager of the La Rose silver mine at Cobalt, has been appointed to succeed Mr. S. A. Wooky as manager of the Schumacher gold mine in the Porcupine district, Ontario.

Mr. E. P. Mathewson left Toronto last week on an extended trip through the Western States and British Columbia. He expects to return to Toronto in about two months.

Mr. J. B. Tyrrell, who has been for some weeks in England, has returned to Toronto.

The following have been nominated, and will be elected by acclamation, as councillors of the Canadian Mining Institute for 1918-1919: Alfred Stansfield, N. R. Fisher, E. P. Mathewson, R. E. Hore, S. B. Wright, Jules Charbonnier, W. P. Williams, R. H. Stewart, Geo. Wilkinson and W. R. Wilson.

Prof. H. E. T. Haultain has been elected a vice-president of the Engineering Institute of Canada (Canadian Society of Civil Engineers). Mr. H. H. Vaughan is president.

Mr. R. Randolph Bruce, of East Kootenay, B.C., has gone to Honolulu, Hawaiian Islands, on a vacation trip.

Mr. Geo. H. Aylard, general manager for the Standard Silver-Lead Mining Co., operating near Silverton, Sloean, B.C., recently left Victoria for Southern California, to spend some weeks in that country.

Mr. Gomer P. Jones, general superintendent for the Hedley Gold Mining Co., has returned to Hedley, Similkameen, convalescent after having been operated on in a hospital in Vancouver, B.C.

MR. HANNA GOES TO PERU.

Toronto, Feb. 4.—Hon. W. J. Hanna, who resigned the office of Food Controller recently, will leave for Peru this week for the purpose of adjusting some matters between the International Petroleum Corporation and the Peruvian Government. Mr. Hanna is a director of the International Petroleum Corporation, which produces a considerable amount of crude oil in Peru. A part of the output is conveyed in tank steamers to the new refinery of the Imperial Oil Company at Vancouver, and a considerable quantity is used in the nitrate plants in Chile. These industries provide the raw material for the great powder manufacturers of the United States. It was generally understood in official circles that when Mr. Hanna quit the post of Food Controller he undertook to stimulate the production of fuel oil for the Admiralty, and of gasoline for the air service of both the British and United States War Departments. Mr. Hanna will be absent about two months.

The decision of the Nipissing mining company to discard the flotation process is an indication that very good results can be obtained by other means. The episode will help to show that unreasonable demands of patent owners can be met in many ways.

Up to date the charge that the Minerals' Separation North American Corporation is controlled by Germans has not been proven. So far as we know the charge is false.

Coal Production in Nova Scotia

By F. W. Gray.

Underneath is shown a tabulated statement of the production of the individual coal companies in Nova Scotia during the calendar year 1917, giving, in addition, the output of the companies during the war period and during the year preceding the commencement of hostilities:

Coal Outputs in Nova Scotia: (Ton of 2,240 lbs.)		1913.	1914.	1915.	1916.	1917.
Dominion Coal Company—						
Cape Breton Collieries	4,739,139	4,287,717	4,608,979	4,091,790	3,551,800	
Springhill Collieries	381,434	417,406	400,791	351,315	364,700	
Nova Scotia Steel and Coal Co.	813,877	752,153	611,923	605,650	582,000	
Acadia Coal Company	539,121	394,397	340,975	392,065	390,000	
Intercolonial Coal Mining Company	189,550	213,289	177,977	143,748	180,000	
Inverness Coal and Railway Company	293,847	264,842	245,749	265,427	195,000	
Maritime Coal and Railway Company	155,051	141,830	175,482	197,101	203,000	
Minudie Coal Company	65,562	65,147	79,760	54,191	30,000	
Bras D'Or Coal Company	65,844	58,420	56,941	44,357	44,000	
Greenwood Coal Company				2,332	55,000	
Milford Mining Company				8,500	18,000	
Strathcona Coal Company				2,400	14,000	
Sterling Coal Company					8,500	
Fenwick Coal Company					3,500	
Barnes Mine				3,200	5,000	
Sydney Coal Company	5,420	7,458	5,989	6,000	6,000	
Fundy Mining Company			735		5,500	
Cape Breton Coal, Iron and Railway Co.	8,425	48,277	2,500			
Royal Coal Company		700	2,150			
Atlantic Grindstone Company	2,718	709				
Other small producers	3,497	2,693		3,348	4,000	
	7,263,485	6,650,031	6,709,951	6,171,424	5,660,000	
Percentage of production in:						
Cape Breton Island	81½%	81½%	82½%	81¼%	78%	
Mainland Collieries	18½%	18½%	17½%	18¾%	22%	
Reduction from the basis of 1913.		8½%	7½%	15%	22¾%	

The most noticeable feature of 1917 production is the increase in the number of new enterprises. It is probable that during 1918 there will be many further additions to the list of producers, but it is expected that these smaller companies will increase their production, perhaps to an aggregate of 200,000 tons. In 1917 the new enterprises added about 100,000 tons of additional production. Nevertheless, it may be anticipated that the total output of the Province during 1918 will fall below that of 1917, and will, barring accidents or stoppages of work, be in the vicinity of 5,300,000 tons.

The explosion at the Allan Shaft of the Acadia Coal Company will cause a restriction of output, to what extent it is not yet possible to say. The chief restriction will in all probability not arise from the damage to the mine workings caused by the explosion, but from the loss of the labor of the 88 men who were killed by the explosion. The combined loss of life in the Waterford explosion of last July, and in the most recent disaster, is 153 men. The work of 153 men should produce 140,000 tons of coal in 12 months, and in the present state of the labor market, the loss of life referred to will bring about a reduction in coal production to that extent.

In making this observation, which admittedly is made from a purely materialistic standpoint, the

writer does not desire for a moment to infer that in any person's mind it takes precedence over the considerations of sorrow and suffering that are involved in these dreadful accompaniments of coal production. No person who lives and works among a mining population would be guilty of a suggestion of this nature,

but in view of the enormous value of coal to-day, and in view of the importance of coal as a decisive factor in a moral struggle, as a most potent weapon in what we believe to be a struggle of right ideals against the forces of oppression and error, not the least of the harm wrought by these explosions is the effect on the production of coal. The men who died in these two explosions lost their lives in the Empire's cause as truly as though they had died by German arms, and the loss of their productive labor is equivalent to the loss of fighting men in battle.

The origin of the explosion is as yet only a matter of conjecture. Full exploration of the mine and complete recovery of the bodies has been hampered by heavy falls of coal and stone, and by the rising of water in the mine owing to the pumps being stopped by the effects of the explosion.

It is to be hoped that the investigation which may be expected to follow will not be marked by the conflict between the scope of a coroner's inquisition and the work of a technical departmental commission which was observable in the case of the Waterford explosion, and it is further to be desired that any proceedings in the nature of a criminal prosecution shall only be undertaken by the direction of a commission or other competent body of eminent technical men.

Ontario's Mineral Wealth

The rapid growth of Ontario's Mineral industry may be gleaned from the following figures. The drop in 1914 is attributable to the outbreak of the war in that year.

Year.	Value.	Year.	Value.
1893.....	\$6,120,753	1914.....	\$46,295,959
1903.....	12,870,593	1915.....	54,245,679
1913.....	53,232,311	1916.....	65,303,822

ONTARIO IS CANADA'S PREMIER MINERAL PROVINCE, the 1916 production being 45 per cent. of the total output from Canada.

NICKEL: Sudbury produces 80 per cent. of the nickel of the world, and in 1916 the nickel-copper matte output contained 41,299 tons of nickel valued at \$20,649,279, and 22,430 tons of copper worth \$8,332,153.

SILVER: Chiefly from Cobalt and outlying camps, 20,007,367 ounces of silver, worth \$12,703,591, were produced in 1916. The total silver production from the Cobalt camp up to the end of 1916 was 255,322,297 ounces, valued at \$135,829,548.

GOLD: For 1916 the gold output was 497,833 ounces, valued at \$10,339,259. From the Porcupine camp the total production to the end of 1916 was \$28,200,322. Ore reserves of the producing mines at Porcupine are estimated at \$50,000,000. The Kirkland Lake camp comes next in importance.

DIVIDENDS PAID TO JUNE 30TH, 1917* EXCEEDED \$70,000,000 FROM THE CO-BALT SILVER CAMP, AND \$10,000,000 FROM THE PORCUPINE GOLD CAMP.

The total valuation of the chief metals produced in Ontario up to the end of 1916 is as follows:

Silver	\$151,428,500	Gold	\$33,663,648
Nickel	89,128,164	Copper	33,452,628
Pig Iron	76,544,482	Cobalt	3,180,990

A Recent Discovery in Northern Ontario

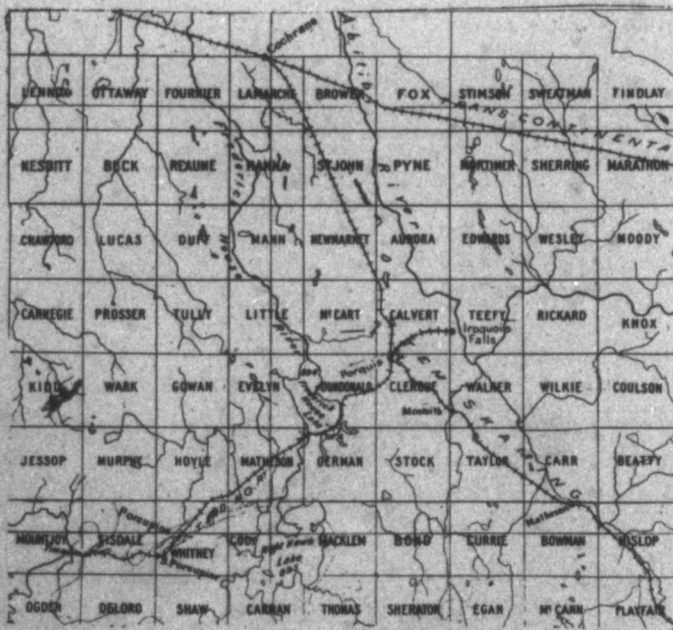
By Percy E. Hopkins

Ontario is at present Canada's chief gold producer, the output for 1916, largely from Porcupine, amounting to \$10,330,260. The success at Porcupine since 1910 has led to vigorous prospecting, resulting in other gold fields being opened from time to time, viz.: Swastika, Kirkland lake, Munro, Long lake, Kowkash, Powell, Rickard, Lightning river, and other localities. Rickard

The country is undulating, and superficial deposits consist of stratified clay through which occasional rocks rise as high as 100 ft. above the stream valleys. Much of the forest in this particular area was destroyed by the big fire in 1916.

Only a cursory examination has been made by explorers of the geology along the canoe routes. The rocks are pre-Cambrian, consisting of Keewatin pillow-lava schist (meta basalt) with subordinate areas of altered diabase and cherty iron formation, all of which have been intruded by narrow dikes of hornblende-granite porphyry and quartz-diabase, probably of Algomian and Keweenawan age respectively.

Gold was first found near the centre of the claim in a 3-inch quartz vein striking east and west in a rusty weathered carbonate schist. The main deposit, however, is on the north part of the claim and strikes east and west for at least 600 ft. The vein averages about six feet in width and has a vertical dip. Quartz,

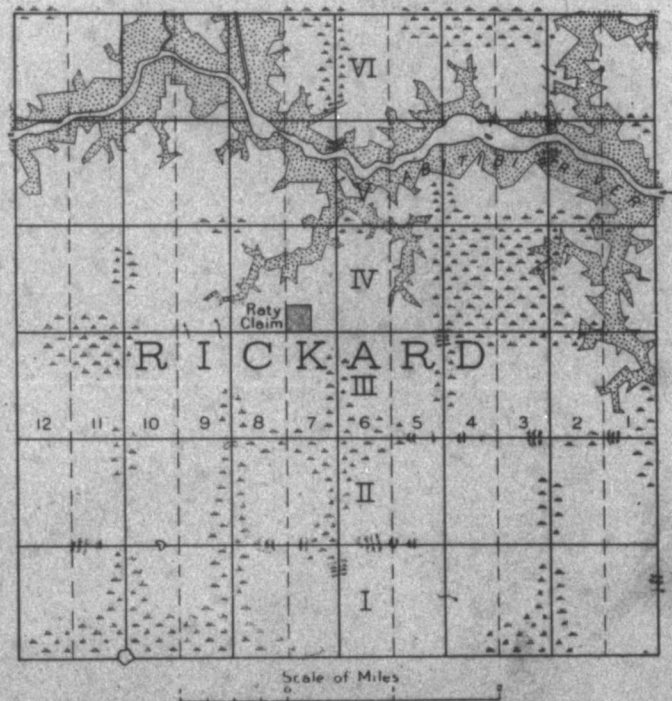


Sketch map showing position of Rickard township with reference to Iroquois Falls, Timmins and Cochrane

is one of Ontario's most recent discoveries. The township was named in 1902 after W. Rickard then M.P.P. for West Durham.

Rickard township is situated 100 miles north of Cobalt, 40 miles northeast of Porcupine, and 10 miles west of Abitibi lake. It can be reached by navigable water from the towns of Matheson or Iroquois Falls on the Temiskaming and Northern Ontario railway, or from Low Bush station on the Transcontinental railway.

In July, 1917, gold was found on the southwest quarter of the south half of lot 7, concession IV. of the township. The first discovery was made by a Finn named John Raty at a point 200 yards from a telephone line which runs from Iroquois falls to Couchiching falls on the Abitibi river and has been travelled for some years by the officials of the Abitibi Pulp and Power Company. Shortly after the discovery, representatives of two mining companies sampled the vein; but obtained low values. Later, in sinking, the prospector found a rich gold showing at a depth of five feet, which resulted in the Mining Corporation of Canada securing a working option. At present, January, 1918, the shaft is over 50 ft. in depth and much spectacular ore has been encountered.



Rickard township, showing location of the Raty gold discovery and topographical features. The stippled area will be flooded

the chief gangue mineral, has a milky appearance. Calcite occurs as a replacement mineral in the wall rock rather than in the vein itself. Talc and sericite are frequently met with, while feldspar is not so prominent. Among the sulphides, pyrite is the most abundant, there being also small quantities of copper pyrites, galena, and molybdenite. Molybdic oxide and native copper are secondary minerals near the surface. The gold,

which is extremely coarse in places and varies in color from light to dark yellow, occurs in crushed portions of the quartz with tellurides and other minerals, the gold usually crystallizing out after the tellurides. In the samples examined two tellurides have been identified, viz.: tetradymite (bismuth telluride) and altaite (lead telluride). A silver telluride may be present, as

considerable silver was found on analysis. The magmatic waters connected with the porphyry intrusions may have had much to do with the ore deposition.

The Mining Corporation of Canada is meeting with encouraging results so far. A small steam plant is in operation and diamond-drilling will be done. One may expect to hear more of this property in the near future.



Gold from a recently discovered deposit in Rickard township, Northern Ontario

This specimen is from the Raty claim, which is being worked under option by the Mining Corporation of Canada. The Raty claim is near the centre of Rickard township, about 10 miles west of Abitibi lake.

The illustration shows a smooth polished surface and the rough natural fracture.



PROVINCE OF ONTARIO

DEPARTMENT OF LANDS
AND FORESTRY
BUREAU OF MINES

GEOLOGICAL SKETCH MAP OF ONTARIO



The area of Ontario is 407,262 square miles, 70 per cent. being pre-Cambrian, which is pre-eminently the metal-bearing formation of the Province.

Ontario's mineral resources cover practically the entire list of metallics and non-metallics with the exception of tin and coal.

The producing camps are readily accessible by railway, the climate is invigorating and healthful, water power is near at hand, and other conditions are favorable for mining.

FOR GEOLOGICAL MAPS, ILLUSTRATED REPORTS, MINING LAWS, AND LIST OF PUBLICATIONS, APPLY TO

ONTARIO BUREAU OF MINES

PARLIAMENT BUILDINGS
TORONTO, CAN.

There should be no suppression of pertinent facts. The newspapers have published a statement on the authority of leading officials of the Acadia Coal Company that the proximate cause of the disaster was a "bad shot." If this is the case, the full facts should be disclosed, for it is a significant fact that every coal mine explosion of any magnitude that has occurred in Nova Scotia had for its proximate cause a "bad shot," either a "flaming shot," a "blown-out shot," a "windy shot" or some one of the various forms under which blasting shots are classified which, instead of expending their explosive energy on the coal, expend their force in the mine atmosphere.

Obviously, the firing of blasting shots should be confined to cases where no other method of coal extraction is feasible, or to hours when large bodies of men are not present in the mine. In some cases, it is open to question whether the larger and cheaper extraction of coal which has been rendered possible by the use of explosives has not in the long run been nullified by the loss of life and property, and of production, by disasters directly attributable to their use.

Whether the total abolition of the use of explosives in coal mines is possible or not is a matter that is conditioned by economic conditions that affect alike the miner, the operator and the consumer, because such a prohibition would increase the cost of coal enormously and would, for a long time, greatly reduce the rate of coal production, but it may be conservatively stated that all steps which tend to the restriction in the quantity of explosives used in coal extraction constitute progress in the right direction, and in the direction which will be followed in the future evolution of mining practice.

NEW YORK MEETING A.I.M.E.

New York.—War work for the mining engineer and a concentration of his efforts to meet the mineral needs of the country, will be the subjects to dominate the 116th meeting of the American Institute of Mining Engineers. The meeting opens in New York on February 18th, and continues for four days. During the sessions prominent men who have been in the center of war activities in this country and in Europe will address the gathering, and mining engineers from every part of the country will study means of solving the war mineral difficulties.

About 50 technical subjects will be presented at the Institute meeting. Some of them deal with such timely topics as the economy of electricity over steam for power purposes in and about the mines, the erosion of guns, extraction of gasoline from natural gas, the Chilean nitrate industry and the employment manager and labor turnover reduction.

An elaborate entertainment program has been arranged both for the Institute members and the ladies accompanying them. On Monday evening, February 18th a war smoker will be held. On Tuesday evening a novel entertainment, and on Wednesday a "Hoover dinner" at Hotel Biltmore. Herbert Hoover is one of the few honorary members of the Institute.

On Thursday, the last day of the convention, an all-day excursion will be made to Princeton, N.J., to visit the government aviation field and University campus.

Some of the features of the entertainment of ladies are a visit to the art galleries of Senator W. A. Clark and of Henry C. Frick, a matinee, a tea and several luncheons at the Engineering Societies' Building.

Metals and Metallurgical Research*

By S. F. Kirkpatrick.

The metals have played an important part in the development of civilization from the earliest historic times, down to the present. They have been a factor in determining the fortunes of war. The bronze armed warrior drove out the man of the stone axe and the iron equipped soldier in his turn subdued the bronze armed races. History tends to show that the claim "the strength of a nation can be judged by the success with which it practises the metallurgical arts" has a true foundation.

This is not, however, generally appreciated, and the Japanese in his worship of his sword and the sword-maker is an exception rather than the rule. The iron worker has held an honorable position as typifying honest toil rather than as holding a position in the fore-front of the civilization of his country.

To-day as never before the rulers of the nations recognize the part that the metals play in determining the fate of nations.

Great Britain was the greatest coal, iron, and general metal manufacturer of the 19th century and as such was secure in her premier position among the nations. Germany, however, early recognized the need of iron and steel for the furtherance of her scheme of conquest and as early as 1870 exacted from France as penalty of defeat what was then supposed to be practically all the iron fields of the Minette district of Alsace-Lorraine, the most important iron ore reserve in Europe.

With this resource and her own coal fields around Essen, Germany then proceeded to foster her steel industry, increasing her steel production in the quarter of a century immediately preceding the war almost twelve times from 1,600,000 metric tons in 1888 to 19,300,000 metric tons in 1913. During this time Great Britain's output increased only two and one-half times from 3,000,000 metric tons in 1888 to 7,500,000 metric tons in 1913. That is, at the beginning of the quarter century preceding the war, Great Britain produced twice as much steel as Germany, while at the end of that period Germany's production was two and one-half times that of Great Britain. Fortunately the production of the United States increased almost thirteen times during this period from 2,400,000 metric tons to 31,000,000 metric tons.

How Germany Prepared for War.

It is interesting to note that preparation for hostilities was probably one of the chief causes of the activity of the German steel industry during the years immediately preceding the war. For instance, part of the energy of the iron manufacturer was directed to the building of the strategic railways on the East and West fronts that in many cases were required for no other purpose than that of the rapid mobilization of troops. The German steel industry also led in the production of war munitions, such as the manufacture of cannon. The Belgian forts were equipped with Krupp guns that could be blown to pieces by larger guns manufactured in the same works.

It might also be said that Germany's success in the manufacture of steel was an important factor in encouraging her to defy the other powers of Europe.

When war started the main strategy of Germany was to cripple France in her coal and iron resources and by

*From an article published in Queen's Quarterly.

the advance through Belgium into the northern part of France Germany came into temporary possession of almost all the iron and coal of continental Europe. This would have been disastrous to French hopes if it had not been that Great Britain was ready, pressed though she was, to come to her assistance. We are only beginning to understand now how serious the situation was in the fall of 1914.

Germany was not so well situated in regard to some of the non-ferric metals especially copper, as she was manufacturing only three per cent. of the world's copper before the war, while consuming thirty per cent. But even in this industry we can see her appreciation of the metals, as some of the copper mines were said to be operating at a loss before the war and were being kept open only by government aid. This was then said to be a splendid example of the paternalty of the German government that wished to keep this industry on its feet so as not to have to throw so many miners and metallurgists out of employment. Now we are able to appreciate that there may have been other reasons for Germany's encouragement of this industry.

War Has Emphasized Importance of Metals

Since the war started, needless to say, all those closely in touch with military operations recognize the value of the metals as they are required for all parts of the huge army and navy machines. Never before has the need of replacing manual labor with machinery been so keenly felt in the industries.

Even an industry such as agriculture, often rather antagonistic to the industrial life of the country, is becoming more than ever dependent upon the metals and their successful manufacture into farm equipment. As an example, when Great Britain was first confronted by the intensive submarine war the authorities recognized the need of developing her neglected agricultural resources, but they had no men to throw on the land. It was to the machine manufacturer that they appealed and thousands of farm tractors were rushed over from the workshops of America to take the place of the army of men that would otherwise have been required.

The great need of metals is to-day emphasized by the recognized necessity of steel for ship building. The iron manufacturing resources of the United States, great though they are and stimulated by high prices, are being taxed to the utmost. Government orders take first place and the civilian consumer has often to wait. The tendency is to curtail all uses of metal that are not of immediate national importance.

This growing importance of the metals is not only a war effect, for the annual production of iron and steel in the United States has regularly doubled every ten years for the last century, and the end is not yet. Only part of this increased production is due to the increase of the population of that country as the production of iron in the world has increased about fifty per cent. for each decade for the last century.

This increase is followed by the other metals, copper having increased about six-fold in forty years and the latest addition to the family of common metals, namely, aluminum, showed a tenfold increase in the first decade of its use and a tenfold increase during the second decade. It is too early to say what the increase will be during the third, but it will be a very large one.

Increased Use of Alloys.

Not only is there a steady increase in the production and consumption of metals but in the variety of alloys or mixtures of metals employed in the industries.

Every part of the modern complicated machines of industries, of railroad equipment, army equipment, naval force or flying machines, is studied in order to adapt to each the metal or alloy best fitted to give the greatest service.

This entails a knowledge of metallurgy undreamed of fifty years ago. Now we use iron alloyed with various proportions of one or several of the following elements: Carbon, silicon, manganese, copper, chromium, tungsten, molybdenum, nickel, cobalt, uranium, titanium, vanadium, zirconium, aluminum.

Many of these elements are so important in conferring valuable properties on steel that it has been suggested for each in its turn that a nation cut off from its use could not wage a modern war. This claim has been made in technical and popular literature for nickel and it is only a short time ago that the Ontario people and press were much exercised over the chance that some of the nickel of Canada was finding its way to Germany. Chromium is as essential as nickel in manufacturing armour plates and projectiles.

A strong claim has been made for the vital importance of tungsten. This metal is used in the production of high speed steels and it has been claimed that if this metal could not be obtained the ability of the workshop to produce shells and other war materials would be reduced to a fraction of their present capacity due to the fact that the ordinary carbon steel cuts so slowly. Manganese is another metal almost essential to the manufacture of steel, and America is feeling a shortage of this metal at the present time.

Importance of Metallurgical Research.

The metallurgy of to-day is becoming a well-developed science, while only fifty years ago it could be considered an art. The properties of metals are determined by the chemist and metallographist with the assistance of physical testing laboratories rather than, as formerly, by the artisan. It is therefore to the trained chemist and metallurgist that we look for development in the production and use of the metals. Research of an industrial and scientific nature is becoming a more important factor.

This work has a bearing on the problem of the shortage of labor. In connection with the production of the metals themselves the tendency is to develop processes for the treatment of ores that will require few men to operate them. We now have large mills crushing and concentrating ten to twenty thousand tons of ore per day, operated by a mere handful of men.

Research also tends towards the elimination of waste. Twenty years ago most of the concentrating and metallurgical plants would have thought they were doing good work if they recovered 70 per cent. of the metals in an ore, now 90 and 95 per cent. would be expected and obtained. There has also been a development in the method of treating refractory ores containing a mixture of several metals. A few years ago the smelter would have been content to treat the ore for the recovery of one or two of the metals and to let the others go to waste. The modern metallurgist is not satisfied unless he is extracting and marketing all the metals in the ores. Much has been done in this line, but there is still much to do, though each year as it passes sees important gains made.

The war has only intensified the need for these economies and emphasized the need for all the metals we can produce. It also shows the necessity of a country adapting itself to its own resources. This is

forcing a greater development in the science and industry of metallurgy than that experienced before the war.

On account of the closing of certain trade routes and the shortage of shipping facilities, America is thrown largely on her own resources. No longer can she depend on the sulphur from the pyrites of Spain or on the manganese from Russia and India, nor altogether on the chromium of New Caledonia or Africa, or the tungsten of India. The metallurgists of America can and are replacing these ores by intensive search into the mineral resources of the country and by developing deposits formerly considered unworkable. New metals are also being developed and new alloys manufactured.

Canadian Resources Should Be Developed.

What is Canada's part in this work? We who are sending 500,000 men to France are one of the principal metal producing nations of the world and have a responsibility in regard to this development in metallurgy and the adapting of our metal resources to war requirements.

It is only within the last fifteen or twenty years that Canada has been actively developing her mineral sources and manufacturing metals, but she already takes an important place in the production of iron and steel, copper, lead, aluminum, and is the fourth country in order of gold production. This country also produces one-eighth of the world's silver, one-quarter of all the arsenic consumed on this continent, and has the leading place in the production of asbestos, nickel, and cobalt. Only within the last two years under stress of war conditions metallurgical researchers have added metallic zinc and metallic magnesium to the list of her products.

The main object at the present time must be the intensive production of those metals of prime importance for war purposes, but almost all of the metals mentioned come under this head. Steel, formerly so largely used for structural purposes, is in greater demand for war munitions and ships, copper for brasses, lead for munitions rather than paint, aluminum for army equipment and flying machines, and silver, generally considered as a luxury, is in greater demand than ever for the manufacture of currency. Canada supplies the arsenic for the insecticide requirements of over 25,000,000 people. Nickel is primarily a war metal, and cobalt, although used before the war practically altogether in the ceramic industry, is now largely consumed as an ingredient of high speed steel and in the manufacture of the new tool metal, stellite, used largely for the turning of shells.

The mining and metal production of Canada will be an important factor in post-war conditions, as an abundance of metals will be required during the building up stage, and with the influx of labor Canada should be able to supply these from her developed and undeveloped resources.

One of the few Nova Scotia coal operators to consistently increase output during the war is the Maritime Coal & Railway Co. This company leased two new areas from the Minudie company and increased its output to 203,887 tons in 1917. As Mr. Gray shows on another page, Nova Scotia has been unable to maintain its output when it is most needed. The coal is available, but the mines are short of men and ships are scarce.

SPECIAL CORRESPONDENCE

NORTHERN ONTARIO.

Nipissing.

An average production of nearly eleven thousand dollars per day was the record established by the Nipissing Mining Company, for the month of December, during which month the company mined ore of an estimated net value of \$340,793, and shipped products from Nipissing and customs ore of a net value of \$376,433. Several new crosscuts and drifts were started during the month, but no new veins were encountered. The underground work during the month was very similar to that of November. Shaft No. 63, which has been idle for two years, is being pumped out and will be in operation again in the near future. A diamond drill will be started shortly drilling in a possible favorable area of the diabase on claim R. L. 407. In his report to the directors, Mr. Hugh Park stated that the high and low grade mills were both busy with the annual clean-up. During the month the high-grade mill treated 71 tons and shipped 401,869 fine ounces of bullion, the low grade mill treated 6,281 tons. The year recently closed by Cobalt's premier mine was the best in its history, the earnings of the company amounting to \$3,358,973, the December output being nearly double that of the first month of the past year. The future outlook of the company with the prevailing high price of silver is indeed very bright.

Kerr Lake.

The production of silver at the Kerr Lake mine is being maintained at a rate of nearly seven thousand ounces per day, or about two and a half million ounces per annum. This figures out at close to \$6,000 per day with a net profit of about \$4,000 every twenty-four hours. With a substantial margin of profit, the Kerr Lake is maintaining its position as the third largest silver producer in the Dominion of Canada. Ore reserves of upwards of three million ounces were recently estimated officially, and the silver deposits are steadily being proven to extend beyond previously known limits. The company is becoming increasingly active in the prospective field, and at the present time are meeting with favorable results in the development of the Mondeau claims in McElroy township of the Boston Creek district, which they have had under option for some time. A system plant as been installed on these claims and development work is being carried on systematically.

Mining Corporation.

The Mining Corporation of Canada, which is the greatest silver producing company in the British Empire, has been adding to its Canadian properties located in Northern Ontario at a rapid rate, and at the present time owns and operates: the Cobalt Lake mine, the Cobalt Townsite Mine, the City of Cobalt mine, the Townsite Extension mine, the Little Nipissing mine. These properties comprise a total of 186 acres and are located in the Cobalt Camp. This powerful corporation at the same time has under option: the Waldman mine (silver) 87 acres, the Alexander (silver) 20 acres. Both of which are located in the Cobalt Camp: the Hylands property (silver) 260 acres, located in the Gowganda Mining District, and a gold property comprising 120 acres in the township of Rickard. According to unofficial reports, the production of silver for the company from its Cobalt properties for 1917 will total over 5,000,000 ounces. During the years 1915-1916 the com-

pany produced approximately 4,500,000 ounces. Owing to new processes of treatment installed, the company can now treat with a profit the huge amount of tailings which have been accumulating in the bed of Cobalt Lake, from which it is estimated that considerably over one million ounces of silver will be obtained. The Mining Corporation is entirely a self-contained plant which reduces its own ore to the form of bullion for shipment.

Temiskaming.

The Temiskaming mining company, which is the centre of a good deal of controversy at the present time, may be said to enjoy a fairly strong financial position. According to a statement issued on November 1st, the Temiskaming had \$441,862 in cash on hand, together with 298,554 ounces of silver, either in storage, due from the smelter, or bagged at the mine. The value of these quick assets with silver at 90 cents per ounce would be about \$710,000. The ore reserves still in the mine should yield a probable net profit of \$300,000, so it may be said that there is not far under one million dollars back of the Temiskaming mine. Since this report was made, one dividend of \$75,000 as been paid. The company has under option and is developing the Hoheuner claim No. L 5433, in the Kirkland Lake gold area. In addition to this the company owns the North Dome mine in Porcupine. The plant from the latter property has been moved to the Hoheuner claim at Kirkland Lake for the purpose of carrying on an extensive exploration campaign there.

Ore Shipments in 1917.

The total amount of ore shipped from the Cobalt Camp during the year 1917 was approximately 21,000 tons. This compares with 15,050 tons the preceding year and about 16,000 in 1915, and about 18,220 tons in 1914. This marked increase in tonnage is more remarkable when it is remembered that at the present time the various mills in the camp are treating greater tonnages of their ore at home than ever before in their history, and shipping the product in the form of bullion.

Trethewey.

The shareholders of the Trethewey mining company have decided to acquire a controlling interest in the Castle mining company, which owns claims adjacent to the Miller Lake-O'Brien mine in the Gowganda district, and which are said to include a portion of the contact along which the latter company are mining high grade silver ore. J. P. Bickell, of the McIntyre, and H. D. Symmes, of the Boston Creek mine, are identified with the Castle mining company.

Provincial.

New development work is to be done between now and spring in virgin territory contiguous to the older workings in the Provincial mine at Cobalt, according to recent reports. The mill at the property is said to be working twenty-four hours a day and giving splendid satisfaction. The management is now considering the installation of oil flotation equipment. It is considered probable that this will result in better extraction.

Coniagas.

According to the recent annual statement of the Coniagas mining company, ore reserves at the property were estimated to total 5,347,090 ounces of silver. This estimate included the sand and slime tailings which are estimated to contain 859,500 ounces. With the distribution of a two and one-half per cent. divi-

dend February 3rd, the company has distributed to its shareholders a total of \$8,840,000 in dividends.

Nipissing Discards Flotation Process.

The Callow flotation plant, at the Nipissing mine, is being discarded and preference is being given to the cyanide process. One factor which has much to do with the decision of the Nipissing is that great difficulty is experienced in treating and marketing the flotation product. Another feature is the possible litigation with the Minerals Separation Company, who claim control of the flotation patents. By the use of Wilfley tables, followed by cyanide, the Nipissing company find it possible to turn out a much more satisfactory concentrate, which is easily refined and made ready for the market in the form of high grade bullion.

Crown Reserve.

The Crown Reserve mining company, during the year 1917, made a net profit of nearly \$80,000 more than during the preceding year. The mine profit for the year 1917 amounted to \$82,572, as compared with \$2,973 during 1916. With a balance of \$770,533 carried forward from 1916, the profit and loss account shows a total of \$980,079, and after paying head office superintendence, taxes, depreciation, prospecting and exploration totalling \$148,314, the surplus was \$781,765, as against a surplus last year of \$770,533. The above statement of earnings at the mine came as a considerable surprise to the shareholders of the company, in view of the reports given out at the previous annual meeting. According to a recent report from New York, the Crown Reserve is said to be interested in a placer property near Idaho Springs, Colo., and is said to have obtained satisfactory results from diamond drilling operations. The company has also secured an option on the Welsh claims in the Gowganda district and has installed a three-drill compressor plant with two 40 H.P. boilers and other necessary equipment to thoroughly explore the property on which a number of promising veins were in evidence on the surface.

Adanac.

The vein along which the Adanac is drifting at the 310-foot level continues strong, and the geological conditions are considered favorable, being identical with those predicted in the recent geological survey of the property. Towards the north end of the Adanac the diabase dips sharply, and on the Prince claim to the north of the Adanac the diabase is within 250 feet of the surface. In the basin between the present workings of the Adanac and the Prince claim is the zone wherein leading geologists believe ore deposition is likely to occur, and it is this section the Adanac propose to develop.

Keeley.

The Keeley property, in South Lorrain, although it is considered one of the best silver prospects in the north country, is idle, owing to the fact that it is under option to an English company which is not bound to exercise its option until one year after the war. This arrangement, perhaps more than anything else, is serving to retard development in the South Lorrain district. In the early days of its operation the low price of silver, and financial mishaps, served to curtail operations. There are other properties in the immediate vicinity of the Keeley with considerable merit and there are quite a number of prominent mining men who still pin their faith in the future of South Lorrain and believe that prosperous days for that district will again be realized.

Pittsburg-Lorrain.

Mining operations at the Pittsburg-Lorrain (formerly the Currie property) are being attended with satisfactory results. During the past few weeks the mill at the Wettlaufer property which is under lease to the former company, has been kept going on ore from the Wettlaufer. However, a change has now been made and ore from the Currie is being treated. It was at one time thought that milling operations would have to be suspended during the winter, but such has not proven the case. At the present time, crosscutting at the third and fourth levels is under way, and the general outlook is said to be satisfactory. A diamond drill is also being used in the exploration of the property.

Chambers-Ferland.

A number of narrow but promising veins have been cut in the exploration work along the contact at the Chambers-Ferland property of the Aladdin-Cobalt mining company, but nothing of unusual importance has as yet been encountered, although geological conditions continue favorable.

Huronian to be Re-opened.

Once more arrangements have been made for the re-opening of the old Huronia Mine, in Gauthier township, about twelve miles east from Kirkland Lake. The Huronia has had a somewhat checkered career. For a time it was under option to the Timmins interests, during which time extensive diamond drilling operations were carried on, and a quantity of ore was proven; but not sufficient to warrant exercising the option. A small but more or less out of date mill is on the property. A number of men are now engaged in general work preparatory to the opening of the mine.

Alexo Nickel.

The Alexo Mine, at Porquis Junction, is shipping about a million pounds of ore per month to the Mond Nickel Company, at Coniston. It is understood to be the intention of the management to sink the main shaft to a depth of at least one thousand feet.

Plant on Mondeau Claims.

A steam mining plant has been installed on the Mondeau claims, in the township of McElroy, which are under option to the Kerr Lake mining company, of Cobalt, and a comprehensive plan of exploration and development has been mapped out. Until recently the property was being developed by the use of hand steel, but the installation of the steam plant will speed up operations considerably. According to latest reports, considerable encouragement has been met with at the property.

Davidson.

Early in February it is expected the new mill on the Davidson property will be in operation, which will add another producer to the growing list of Porcupine mines. During the past eighteen months the Davidson has been explored and developed very actively, the results being met with affording good reasons for optimism as to the future of the property. Milling operations will be watched with keen interest for the next few months.

Tough-Oakes.

It is expected that the first annual report of the new management of the Tough-Oakes Mine at Kirkland Lake will be a favorable one. The increased costs of mining and milling for the past year are expected to disclose smaller profits on operations for the year. How-

ever, the physical condition of the mine is understood to be very satisfactory, and it is in this direction that the report is expected to be optimistic. The mine has been developed to a depth of 500 feet, the main shaft having been sunk 400 feet, and this has been supplemented by a winze to the 500-foot level. At each level from the 100-foot down lateral work has been carried on with favorable results. An intrusion of diabase which has been present from the surface down to the present lower workings has served to shorten a number of the ore shoots. Despite this fact, however, there seems to be no reason to doubt that operations will not be carried on with good results to much deeper levels. The first report of the new management is being awaited with more than ordinary interest.

Lake Shore.

The mill at the Lake Shore Mine in Kirkland Lake should be completed by the middle of the present month and by the first of March, at the latest, the mine should be among the list of producers. The mill is among the most modern in Northern Ontario and will have a capacity of close to one hundred tons per day. The ore to be treated has an average value of upwards of \$15 to the ton, and a considerable margin of profit should be shown. There is a large tonnage of ore blocked out underground, besides considerable which has been conveyed to the dumps and can now be sent to the mill with a minimum of effort. The physical condition of the mine would appear to show that no difficulty will be experienced in keeping the ore reserves well in advance of the requirements of the new mill. About the last of January the downward continuation of the main orebody was encountered at the 400-foot level. The width of the vein at this point is approximately 22 feet and for the greater part the ore will average around eight or nine dollars to the ton, while two streaks appear in the vein in which the values are exceptionally high, particularly the last four or five feet passed through along the north wall, where visible gold is liberally sprinkled through the ore. Drifting towards the west was started without delay. Previous to the cutting of the vein at this depth the main workings of the mine were at the 200-foot level, where the results being met with were highly satisfactory. Proving the main orebody to continue to the 400-foot level and maintaining its splendid grade of ore is of the utmost importance to the Lake Shore, and also affords a good deal of satisfaction to those interested in the Teck-Hughes on the west and the Wright-Hargraves on the east, proving as it does the remarkable consistency of the vein system and the mineral deposition.

Porcupine Crown.

The Annual report of the Porcupine Crown mining company, as of December 31st, 1917, is not altogether favorable. The heavy decrease in ore reserves from that of a year ago came as quite a surprise to many. At the end of 1916 the ore reserves of Porcupine Crown were estimated to be \$1,050,000. During the year 1917 the company mined \$364,703, which on the basis of the 1916 ore reserves would leave \$685,297. It is, therefore, somewhat of a surprise to note that the management report only \$610,000 ore reserves left in the mine. During 1917 the workings of the Porcupine Crown were carried to a depth of 1,000 feet, where ore is understood to have been determined, yet there has been a cut in the amount of ore reserves to the extent of \$75,297 in excess of the gold produced. The only explanation which can be found is that the estimates for

the year 1917 are much more conservative than those of the year previous. After paying for mining, milling, allowing for depreciation, taxes, etc., the mining profits were \$109,421, against \$270,130 in 1916. Mr. S. W. Cohen, general manager, said that production had been seriously hampered by a cave-in at the mine during the month of April, which affected operations for about two months and a half and resulted in a considerable quantity of ore still being tied up in the mine. Labor troubles and high cost of materials had also been a detrimental factor in production, resulting in the reduction of dividends. Mr. Cohen further stated that no new ore bodies had been discovered during the year and that ore reserves had been decreased practically by the amount extracted.

Teck-Hughes.

Drifting at the 500-foot level of the Teck-Hughes mine is being attended with good results, according to recent information. The drift is to be continued to a point directly beneath the main shaft, where a raise will be put up to connect the shaft with the 500-foot level. A drift is also to be run from the winze at the 600-foot level to a point beneath the main shaft, where a raise will also be made to complete the shaft to the depth of 600 feet. A large station is to be cut at the 500-foot level and a rock crusher will be installed at this point, the intention being to make this the main haulage way of the mine. Here the ore can be released from the chutes directly into the cars and in which it will be trammed to the underground crusher, where after being reduced to the required fineness, it will be hoisted to the surface for treatment in the mill. The physical condition of the mine is officially stated to be very satisfactory. Since the closing down of the Kirkland Lake Gold, the Teck-Hughes has the distinction of being the deepest operating mine in the Kirkland Lake Camp.

Molybdenite Mining Encouraged.

It is anticipated that there will be considerable scouting done for molybdenum properties in the north country since the announcement by the Dominion Government that the export taxes on the product has been removed. Heretofore the molybdenum mine operators of Canada had a very narrow market for their product and secured perhaps the smallest price of any of the allied countries. The removing of the embargo will provide a much better market for the metal. The molybdenum deposits of Northern Ontario and Northern Quebec, the latter along the Transcontinental railway, should now be in line for considerable attention.

Vipond-North Thompson.

With the 100-ton mill running at almost full capacity and with mill heads recently being bought up to ten dollars per ton, the operation of the Vipond-North Thompson property is understood to be resulting in increasing profits. The mine is being quietly but aggressively developed and the outlook never appeared more favorable. The mine is now in a position where it should respond rapidly to more favorable labor conditions, and a return to pre-war conditions would find the property in excellent shape. The management have deferred the enlargement of the mill until conditions for accomplishing this work are more favorable. Although developments at the property have been confined largely to the main vein, the exploration conducted by diamond drill a few months ago has determined the presence of other valuable ore deposits. The property is bounded on the north by the Hollinger Consolidated

and on the west by the Porcupine Crown, and it is expected a continuation of many of the orebodies of these properties will be found on the Porcupine V.N.T.

Thompson-Krist.

Arrangements have been completed for the commencement of work on the Thompson-Krist property in Porcupine. The work is to be carried on by the Porcupine V. N. T. company from the 400-foot level of the latter mine. The geological conditions are quite favorable to the proving of ore on the Thompson-Krist and the general trend of some of the veins of the Vipond are in a general direction of the Krist.

Skead Mines.

Development work is being pushed ahead vigorously on the properties of the Skead Mines, Limited, in the township of Skead. A force of twenty-eight men are employed at the mine and the shaft has already reached the 100-foot level and a station is being cut preparatory to the commencement of cross-cutting for the purpose of tapping the various veins in evidence on the surface, and which have been indicated at depth by diamond drilling the mining plant consists of a four-drill compressor, hoist and 120 h.p. boiler. Although the Skead Mines is the major operation in this township, there are a number of other promising prospects in that district, among which is the Fidelity Mining company's property, on which arrangements are being made for the beginning of operations in the near future.

White Reserve.

Operations on the White Reserve property in the Elk Lake district are going ahead uninterruptedly. A large mining plant and a full crew of men are employed. A twelve drill compressor and adequate mining equipment to carry on operations to depth is installed. At the present time a cross-cut is being driven at the 140-foot level, with the expectation of encountering the continuation of the veins in evidence on the surface. The White Reserve has been in operation almost continuously for the past two years and is unquestionably the most consistent effort at mine making in the Elk Lake District. The formation is diabase and although very promising, the property is still in the prospective stage.

A Silver Discovery.

A promising silver find is reported to have been made south of Cobalt, at mileage 64 on the T. & N. O. railway, and consists of a fur-inch vein, containing silver values. The rock formation in the vicinity is diabase and Keewatin, with some Laurentian and a small area of conglomerate. Already the district is receiving the attention of Cobalt mining men, but up to the present nothing sensational has developed.

Lightning River Claims Sold.

A deal for the Lightning River claims, on which spectacular gold discoveries were made last fall, has been consummated and a second cash payment was made in Haileybury recently. The purchase was made by Mr. George Young, representing strong United States interests, who at the present time are carrying on extensive mining operations in the Western States. This is their first venture in Northern Ontario mining fields. It is understood that a mining plant will be installed without delay and the exploration of the property commenced.

Ankerite.

The downward continuation of the orebody at the Ankerite property of the Coniagas Mining Company in Porcupine has been encountered, at the depth of 200

feet. The orebody is well mineralized and is quite up to the expectations of the management. The three-compartment shaft on the property is being driven to the 500-foot level at record rate. When this level is reached a large station will be cut and lateral work will be undertaken both on the Ankerite and the Maidens-McDonald property, which is also owned by the Coniagas Mining company. It is expected the ore depositions from the Ankerite will be found to continue into the Maidens-McDonald. Results obtaining from present development and results encountered in diamond drilling indicates the Coniagas company have a valuable acquisition in their Porcupine properties.

BRITISH COLUMBIA.

Dissatisfaction has increased among mine operators, as more and more of them have come to realize what a heavy levy last year's tax legislation, which came into effect on January 1st of this year, will make upon them. Various Boards of Trade have taken the matter up, and prominent mine managers have also protested against this additional burden being placed on the mining industry of the province, this being additional to the taxation provided for by the Dominion Government last year. Whether the Provincial Government will or will not take steps at the forthcoming session of the local Legislative Assembly to meet the requests of mining men and others interested, is not yet known. Meanwhile it is claimed that this changed attitude of the government towards the mining industry is having the effect of deterring outside capitalists from putting more money into mining enterprises in the province.

In an official bulletin, issued last month by the British Columbia Department of Mines, there is included a statement which shows the dividends declared by metaliferous mining companies during the calendar years 1913, 1914, 1915, and 1917. The total for 1917 is made to appear to have been \$3,800,847, but in order to make this larger showing than in other years, two companies appear to have been credited with the dividend payments of five quarters each instead of four. The Consolidated Mining and Smelting Company, Trail, is credited with \$1,258,438, and the "Standard Silver-Lead Mining Co., Silvertown Co., Grand Forks" (which, presumably, is a careless misprint for the Granby Consolidated Mining, Smelting and Power Co.) with \$1,874,210. Now, each of the companies—the Consolidated and the Granby—paid four dividends in 1917 at the rate of 10 per cent. per annum, so it is quite evident the official figures have been improperly inflated. It is true, footnotes appended state that there are included \$261,935 for the one company and \$374,362 for the other, "earned and declared in 1917, but payable January, 1918," but even that does not justify the inclusion, in a statement purporting to show the year's dividends of one quarter each for two companies, the amounts of which had been included in the 1916 total. The misstatements were easily avoidable, since several newspapers and journals had already published dividend figures that were within a few dollars of being correct. Further, the Granby Consolidated Co.'s issued capital was \$14,998,520 at the close of its year ended June 30, 1916, and \$15,000,042 as at June 30, 1917, while the Consolidated Mining and Smelting Co.'s recently published annual report showed that at September 30, 1917, its issued capital was \$10,477,450, and that three dividends declared in 1917, prior to September 30, totalled \$784,317.50, so that there remained only the fourth quarter's dividend of \$261,936.25, payable January 1, to add, which would make the calendar year's total \$1,046,-

253.75. Instead, therefore, of the two companies mentioned having been stated to have declared dividends in 1917 together totalling \$3,132,648, they should have been shown as having declared dividends totalling about \$2,545,500, or approximately \$587,000 less than shown in the official publication here referred to.

East Kootenay.

The Cranbrook Herald recently ridiculed a report to the effect that the American Smelting and Refining Company has decided to establish smelting works in East Kootenay. It is stated that the company is doing diamond-drilling on some mineral claims on North Star Hill, in Fort Steele mining division, which property it holds under option of purchase, but beyond that the big United States company is not spending money in East Kootenay at the present time.

Published official statistics place the coal production of the several collieries in the Crowsnest district of Southeast Kootenay for 1917 at 552,358 long tons of coal, as compared with 882,270 tons in 1916. The quantity used for coke-making was about 187,275 tons, and the output of coke was 129,155 tons, as compared with 240,121 tons in 1916.

Official comment follows: "The output would have been considerably greater had not the Crowsnest collieries met with a series of misfortunes during the year that interfered with production, and, in addition to this, there was a serious shortage of labor—partly caused by the heavy enlistment of the younger men—and in the Fall there were labor troubles."

The collieries that were operated were those of the Crow's Nest Pass Coal Company, at Coal Creek, and Michel, respectively, and the Corbin Coal and Coke Company, at Corbin.

West Kootenay.

Ainsworth.—There is a promise of more attention being given to mines in the Woodberry Creek region, in Ainsworth mining division, this year, than for several years past. Lacking even wagon-road transportation facilities, though, the properties up that creek are under a great disadvantage, since pack-horses have to be used for taking in supplies and bringing out ore, consequently development operations are much restricted.

Mr. A. R. Langley, resident engineer for Eastern Mineral Survey District No. 5, in his published official report, includes mention of the Manganese Group, as follows: "This property is owned by A. J. Curle, of Kaslo, and A. G. Larson, and is situated on the Kaslo & Nakusp railway, six miles and a half from Kaslo. Very little development and mining work have been done as yet. Some 600 sacks of ore are ready for shipment, and the owners claim that a considerable tonnage is available for extraction at low cost. Average assays run as follows: Manganese, 42.06 per cent.; iron, 1 per cent.; moisture, 13.12 per cent.; silica, 4 per cent.; phosphorus, 0.01 per cent. The limited exploratory work done would indicate that the ore occurs as a blanket deposit lying on or near the surface and having a thickness of from 1 to 3.5 feet. This property has possibilities and further work should be done to determine the extent and character of the deposit."

Slocan.—According to a published official bulletin, the Government resident engineer for the district in which this mining division is situated, has reported approximate shipments of ore and concentrates in 1917 from mines in the division as follows: Of ore: Lucky Thought 923 tons, Echo 79 tons, Queen Bess 2,225 tons, Wonderful 250 tons, Sovereign 169 tons, Idaho-Alamo

164 tons. Of lead concentrates: Standard 5,200 tons, Galena Farm 1,307 tons, Van-Roi 1,739 tons, Hewitt 157 tons, Surprise 1,830 tons, Sloean Star 1,660 tons, Rambler-Cariboo 902 tons, Ivanhoe 770 tons. Of zinc concentrates: Standard 11,000 tons, Galena Farm 1,490 tons, Hewitt 200 tons, Surprise 2,523 tons, Sloean Star 800 tons, Lucky Jim 2,600 tons. In addition there were a number of mines that shipped smaller quantities of ore.

Nelson.—From Spokane, the headquarters of the managing director of the company owning the mine, has come information that mining operations have been resumed at the Hudson Bay zinc mine, situated a few miles from Salmo, in the southern part of Nelson mining division. An official report states that a considerable quantity of zinc ore was shipped from the mine in the first part of 1917, while the estimate of zinc in ore shipped is 1,800,000 lbs. In his published official report for 1916 the Gold Commissioner for the district gave the following particulars, which will serve to convey a fair idea of what earlier operations were: The H. B. Group is one of the most important groups of mines in the district. Production during eleven months of 1916 was: Zinc ore, 5,401 dry tons, yielding 2,910,675 lbs. of zinc; lead-zinc ore, 1,118 dry tons, yielding 461,980 lbs. of zinc and 182,322 lbs. of lead; total, 6,468 tons, yielding 3,372,665 lbs. of zinc and 182,322 lbs. of lead. Development work done in 1916 consisted of 1,906 feet of tunnel drift and 1,553 feet of diamond drilling. Average number of men employed, 40.

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
Cobalt oxide, grey, \$1.65 per lb.
Cobalt metal, \$2.25 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 15 cents per lb.

Feb. 13, 1918—Quotations from Canada Metal Co., Toronto).
Spelter, 11 cents per lb.
Lead, 9 cents per lb.
Tin, 85 cents per lb.
Antimony, 17 cents per lb.
Copper, casting, 31 cents per lb.
Electrolytic, 32 cents per lb.
Ingot brass, yellow, 20 cents; red, 26 cents per lb.

Feb. 13, 1918—(Quotations from Elias Rogers Co., Toronto).
Coal, anthracite, \$9.85 per ton.
Coal, bituminous, nominal, \$9.00 per ton.

SILVER PRICES.

	New York cents.	London pence.
Jan. 22	87 $\frac{3}{4}$	43 $\frac{3}{4}$
Jan. 23	87 $\frac{3}{4}$	43 $\frac{3}{4}$
Jan. 24	87 $\frac{3}{4}$	43 $\frac{3}{4}$
Jan. 25	87 $\frac{3}{4}$	43 $\frac{3}{4}$
Jan. 29	87 $\frac{3}{4}$	43 $\frac{1}{2}$
Jan. 30	86 $\frac{5}{8}$	43 $\frac{1}{4}$
Jan. 31	86 $\frac{5}{8}$	43 $\frac{1}{4}$
Feb. 1	86 $\frac{5}{8}$	43 $\frac{1}{4}$
Feb. 5	86 $\frac{5}{8}$	43 $\frac{1}{4}$
Feb. 6	86 $\frac{1}{8}$	43
Feb. 7	86 $\frac{1}{8}$	43
Feb. 8	86 $\frac{1}{8}$	43
Feb. 13	85 $\frac{5}{8}$	42 $\frac{3}{4}$

NEW YORK MARKETS.

Connellsville Coke—

Furnace, *6.00.

Foundry, *7.00.

Crushed, over 1-inch:

Beehive, *7.30.

*Fixed under Lever Act.

Straits Tin, spot, f.o.b. none offering.

Copper—

Prime Lake, 23.50.

Electrolytic, 23.50.

Casting, 23.50.

Lead, Trust price, 6.75.

Lead, outside, nominal, 7.00 to 7.12 $\frac{1}{2}$.

Spelter, prompt western shipment, 7.92 $\frac{1}{2}$.

Antimony—

Chinese and Japanese nominal, 14.00 to 14.25.

Aluminum—nominal.

No. 1 Virgin 98-99 per cent., 36.00 to 38.00.

Pure 98-99 per cent. remelt, 34.00 to 36.00.

No. 12 alloy remelt, 27.00 to 29.00.

Powdered aluminum, 75.00 to 85.00.

Metallic Magnesium—99 per cent. plus \$2.00 to \$2.50.

Nickel—Shot and ingot, 50.00.

Electrolytic, 55.00.

Cadmium, nominal, \$1.45—1.50.

Palladium, \$115.00.

Quicksilver, nominal, \$125.00.

Platinum (pure), \$105.00.

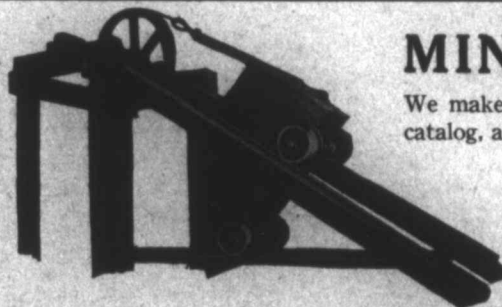
10 per cent. Iridium, \$113.00.

Cobalt (metallic) \$3.25 to \$3.50.

Tungsten—

Wolframite, \$20.00 to \$26.00.

Scheelite, \$30.00.



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