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The Canadian Mining Journal

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CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

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CONTENTS.

HUGH FLETCHER.

It is with deep sorrow that we record the death of Hugh Fletcher. To the mining fraternity of Nova Scotia his death is a particularly hard blow. There, in our easternmost province, he was known, respected, and by many persons of all classes regarded with affection. At Ottawa the loss will be felt no less severely.

Hugh Fletcher's father, himself a mining engineer of high character, brought him to this country over fifty years ago. Young Fletcher received his early education in Ontario. Later he became a gold medallist at Toronto University. In 1872 he joined the staff of the Geological Survey of Canada. Since that time Fletcher devoted practically all of his field work to examining the coal fields of Nova Scotia. Upon his carefully wrought-out conclusions has been based much of the commercial development of Nova Scotian coal. While it is not practicable now to sum up his work, it is entirely within bounds to assert that Hugh Fletcher left a strong impress upon the history of Maritime coal mining.

It is characteristic of Fletcher that no inducement could tempt him from his chosen path of duty. In season and out of season he stuck to his task. While his labours, translated into terms of money, put many thousands of dollars to the credit of the coal industry, he himself was satisfied with the meagre stipend that Ottawa bestows on genius and mediocrity alike.

Totally unexpected as Fletcher's death was, there is something peculiarly fitting in the circumstances in which it occurred. He died in harness, in the country where he had laboured, and he was buried in the quiet country churchyard of Springfield, Nova Scotia, where lies the body of his wife. Fletcher's grave is shadowed by a mountain and near it runs a river. The surroundings are calmly beautiful.

The Mining Society of Nova Scotia, the Provincial Government, and the coal operators joined to honour his memory. Representatives of all attended his funeral. From Ottawa came messages of sympathy. But it is pleasant to remember that appreciation and recognition came before Death called. We remember not one but several occasions on which the Mining Society of Nova Scotia, in annual meeting assembled, expressed its high sense of Fletcher's worth. On these occasions nothing was more noticeable than the sensitive modesty of the man. The shy, whimsical, altogether manly way in which he would receive the most flattering encomiums was one of his chief charms.

It is proposed, and the proposal meets with our warmest approval, to erect a tablet or monument to the memory of Fletcher in the new Technical College at Halifax. This is well. But a better and more effective memorial would be the founding of a "Hugh Fletcher" chair in geology.

. . . . . .

Linked with Fletcher's name in working out the

geological problems of Nova Scotia is the name of Fletcher's friend, E. R. Faribault, another faithful officer of the Survey. Although their spheres were quite distinct, both were animated by the same high purposes, and the names of both have been coupled in many a toast at the dinners of the Mining Society of Nova Scotia. And those names have stood and will continue to stand, as symbols of professional integrity and zeal, and lofty impersonal ambition for the work's sake.

THE DEPARTMENT OF TRADE AND COMMERCE.

A special note has just been sent by the Dominion Department of Trade and Commerce to every publication in Canada. Enclosed with the note is a circular form from the Export Bureau of the Department. This form is being distributed to the members of all Boards of Trade, Chambers of Commerce, and Trade Associations throughout the Dominion. When filled in and returned, the forms will give the Department the material for compiling an Index of Canadian Manufacturers, Exporters, and Producers. When this exhaustive compilation is complete it will be printed and sent to all the Canadian Trade Commissioners in the various parts of the world.

This is the first effort of the kind ever made in Canada. That it will facilitate trade is certain. But its value will depend upon its completeness. Printed forms are usually thrown into the waste-basket. Most of them deserve this fate. The Department's form, however, can be made a thing of value. The Department gives its service gratuitously. The amount of labour involved, so far as the Department is concerned, is immense. The one object of this labour is to open new channels of commerce for Canada. We believe that the proposed Index will be of large use to mine operators. For many Canadian minerals and mineral products there could be built up a considerable European demand. A ready source of reference, placed where the enquirer can see it with least trouble, will form an effective connecting link between the Canadian mineral producer and the foreign consumer. And no one can deny that this is badly needed.

THE NANAIMO DISASTER.

Thirty lives were lost in an explosion in No. 2 Mine Extension of the Wellington Colliery Nanaimo, B.C., on October 5.

No authentic details have been received before going to press. It is, therefore, superfluous to indulge in speculation as to the cause of the explosion.

But it is entirely appropriate to point out that upon the Government of British Columbia devolves the duty of making immediate and complete investigation of the circumstances leading up to the disaster. More than this, it is imperative that the present working conditions of the collieries of the province be fully ascertained.

We have grave doubts as to the efficiency (in numerical strength if in nothing else) of the present B. C. inspectorate. The duty of investigating such sad occurrences as this calls for ability of a high order. Moreover experience of a very special kind is required.

Modern research, both in America and Europe, has thrown much light upon the nature and causes of colliery explosions. To a large extent they are preventable. The government of British Columbia should lose not a moment in taking whatever steps are recognized as necessary by the most enlightened authorities of today. The snuffing out of thirty lives is a sufficiently poignant object lesson.

FAIRY GOLD.

A certain son of Belial is loose in the Lake of the Woods. Here, at Kenora, he has built him a plant wherein, by occult means, he renders from the ore gold not extractable by fire-assay nor by any other device known to man.

Indeed, if you wish to get some idea of what this gentleman at Kenora can do to a gold ore, all that is necessary is to multiply by three or four the results obtained by an ordinary or garden variety of assayer. And so convincing is the manner of this Kenora person that several mature citizens have not abstained from chipping in with him.

We are not unfamiliar with the kind of process that is being exploited in Kenora. There are many such varieties, based upon the alleged existence of "queen" gold, "latent" gold, etc., etc., and etc. But the real object of search in all these processes is another allotropic form of the metal named "fools'" gold.

Surely, surely, Kenora should have cut its wisdom teeth by this time!

ANOTHER CLAIMANT FOR THE POLE.

A third disputant has been added to the North Pole row. Our readers will notice in the letter of our Glace Bay correspondent a substantial claim put forward for the Dominion Coal Company. Peary's steamer, the "Roosevelt," was bunkered with Dominion coal, and our correspondent appears to fancy that this amounts to a lien upon the Pole. Is it possible that the coal was not paid for? Internal evidence, chiefly the fact that President Taft refused to accept the Pole as a gift, seems to strengthen this supposition. It will not surprise us if Mr. James Ross makes the next move in the game. In fact, if Mr. Ross has a valid excuse for attaching the Pole, we shall rise up and call him blessed. Obviously this is the only means of squelching Cook and Peary.

GOOD WORK.

The Temiscaming Mine Managers' Association, of Cobalt, has taken upon its shoulders the load of caring for the sick in that fever-stricken town. With mar-

vellous crassness, the town authorities refused to see the gravity of the situation. Officially nothing was done until the association literally forced itself into control of the situation.

It is fortunate for Cobalt that the Mine Managers' Association is composed of live, fearless, and humane men. To the enlightenment of its officers and members is to be credited the effective measures that have at last been taken to fight the typhoid plague.

The Canadian Mining Journal desires to give expression to its warm appreciation of the spirit that animates the Temiscaming Mine Managers' Association. Long may it flourish.

EDITORIAL NOTES.

We are glad to notice evidence of renewed interest in the silver mines of the Thunder Bay district. It is probable that the chief obstruction to progress is the fact that much of the mining land is held under old Crown grants and cannot be alienated except by special act of legislature. However, since the district has been moribund for so long, outside help should be eagerly welcomed.

The lead refinery of the Consolidated Mining and Smelting Company, Trail, B.C., was merely an experimental plant in 1902. It had then a capacity of six and one-half tons per day, and ten men were employed. To-day its capacity is 70 tons per day, or about 2,000 tons per month. Its employees number fifty. Its equipment is not only modern, but is, perhaps, the most efficient in existence.

The currency of the Chinese Empire is almost hopelessly complicated. Long ago the silver tael was the standard of weight. To-day the actual weight standard is the copper "cash." The value of silver currency is based upon the "cash," but in no well-defined relationship. The silver "dollars" of the different provinces and of foreign countries and the enormous number of 5-cent and 10-cent pieces in circulation further confound matters. The provincial mints have turned out such quantities of these coins that they are now subject to discounts ranging from 3 per cent. to 10 per cent. The Chinese market for silver is at present steady and strong.

Unless we are sadly mistaken those in control of the Waldman mining claims on the Gillies Limit are preparing for a stock-selling campaign. For some time readers of Toronto and Montreal newspapers have been kept artfully on the qui vive. The psychological moment for offering shares to the public may arrive at any moment. It will then be well for the public to remember that, so far as investment is concerned, the Waldman is an unknown quantity.

An enterprising firm of brokers and bankers,, F. B. McCurdy and Co.,, Halifax, N.S., is distributing an unusually useful little handbook entitled "Nova Scotia Financial Register, 1909." The Register contains a list of incorporated towns and municipalities along with their financial statements, and a classified schedule of incorporated companies. In this latter list we notice many mining companies. We make special mention of this "Register," because of the excellent manner in which it is compiled. It will serve as a model for similar work in other provinces.

THE PLANT AND EQUIPMENT OF THE COBALT HYDRAULIC COMPANY.

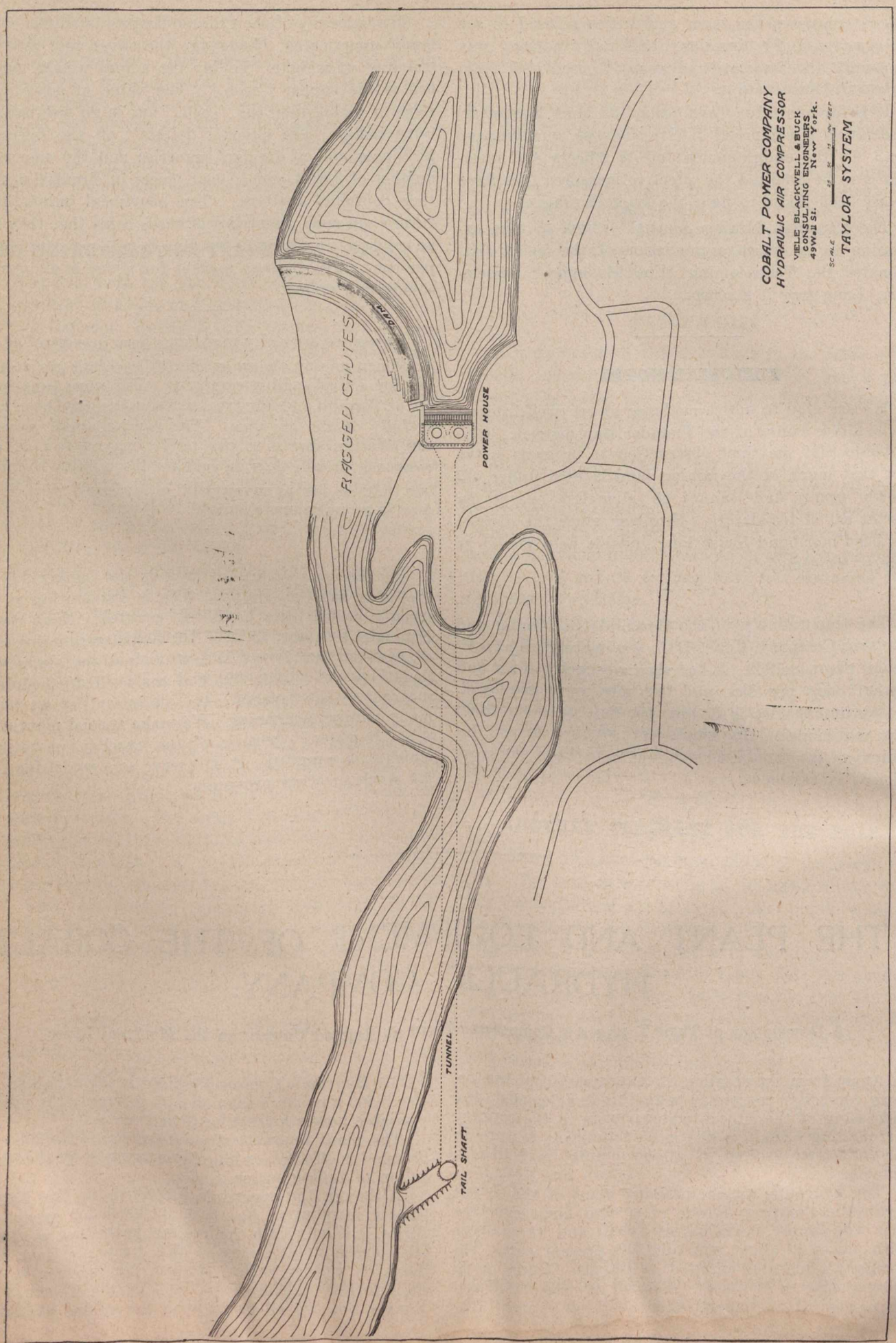
A Description of Their Taylor Air Compressor Plant at Ragged Chutes, on the Montreal River.

Apart from the erection of concentration plants, or, more correctly, conjointly with this development, the harnessing of the superb water-powers in the country surrounding Cobalt is the most significant feature in the industrial growth of silver mining in Northern Ontario.

The hydraulic air compressing plant of the Cobalt Hydraulic Company is one of several large concerns that will supply the mines of Cobalt and its environs with power at about one-third the present cost. The company's plant is situated at Ragged Chutes, eight miles south-west of Cobalt. Roughly, 10,000 horsepower be developed at Ragged Chutes at low water. The Cobalt Hydraulic Company's plant is calculated to furnish 5,500 h.p., more than enough to supply the present available power market in Cobalt mines.

The plant is practically automatic, as the air compression is effected on the Taylor system by the direct action of falling water.

Although the principle involved in the Ragged Chutes installation has been utilized for many centuries, it is only with the last few years that successful commercial applications of this principle have been made on a large scale. Modern plants, such as that built in 1900 at Ainsworth, B.C., by the Kootenay Air Supply Co., are all based upon the system elaborated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HYDRAULIC AIR COMPRESSOR
VIELE BLACKWELL & BUCK
CONSULTING ENGINEERS
49 Wall St. New York.
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TUNNEL
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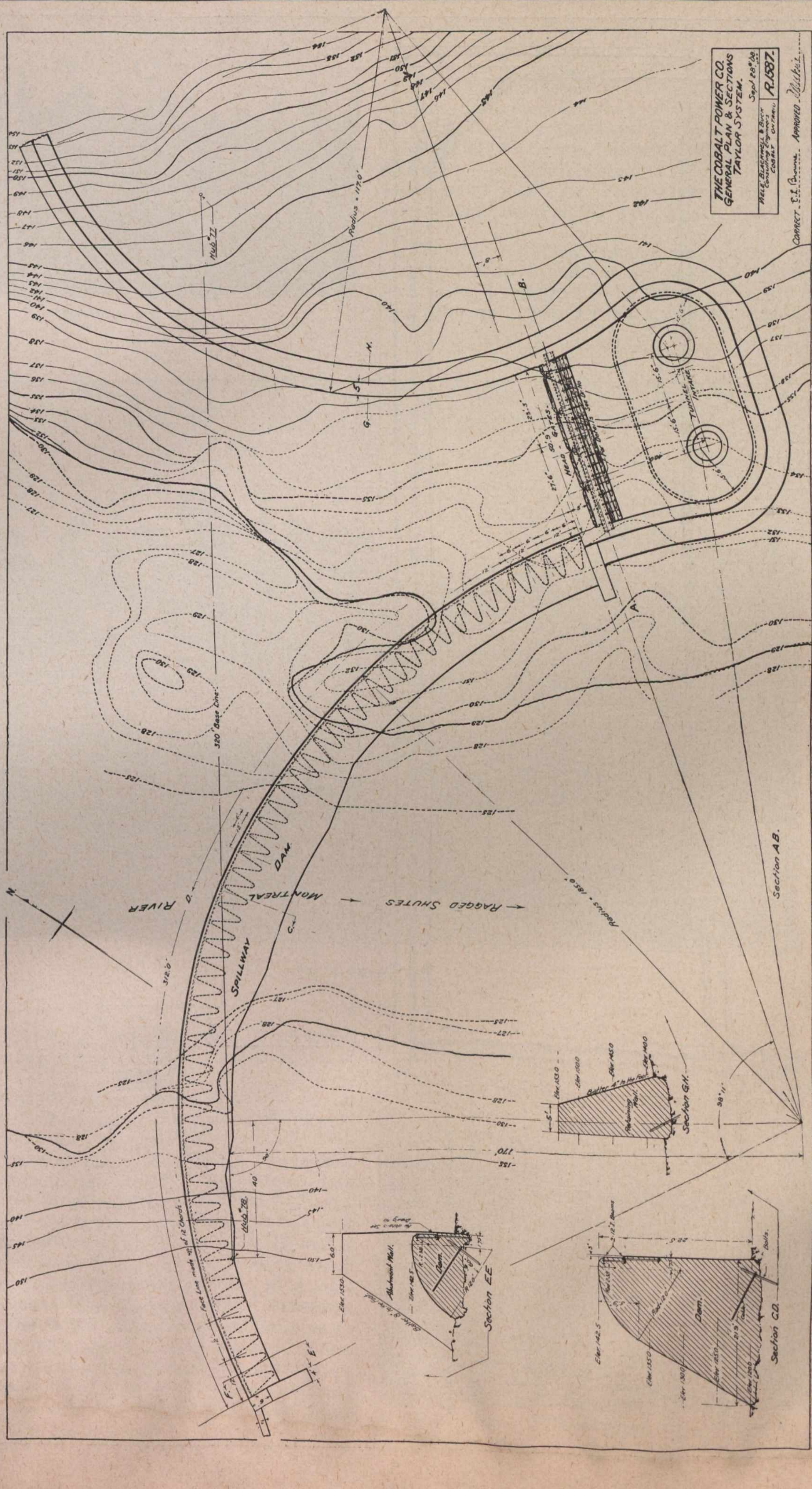
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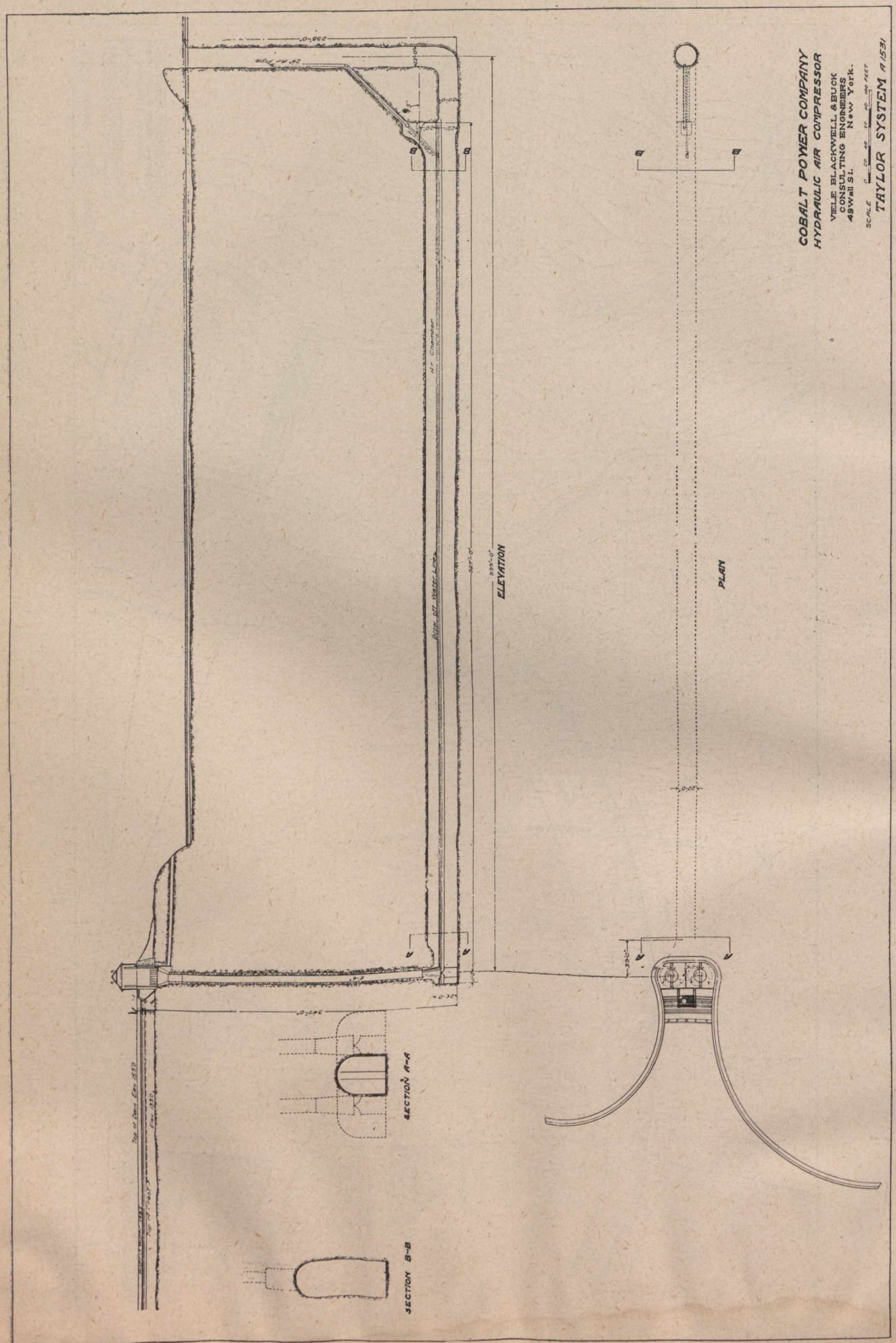
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PLAN
SECTION A-A
SECTION B-B

Part of General View.

are reduced to a diameter of 9 feet immediately below the spider. Forty feet from the bottom of the shaft the diameter is increased to 11½ feet. This increase of diameter tends to lessen the compression and to liberate the air. Two steel-sheathed concrete cones receive the full impact of the water and direct it into a horizontal tunnel 1,021 feet long, following the flow of the river. The tunnel is 22 feet wide and near the bottom of the tail-shaft 42 feet high. At the bottom of the intake it is about half this height. (See Fig. 1, Sections AA and BB.)

Diverted into this commodious channel, the water loses momentum, and the air is freed rapidly. It is now under a compression of 125 lb. per cubic foot. At this pressure it loses all but a negligible amount of its

Part of General View.

by Charles H. Taylor, of Montreal, who, in 1896, devised the equipment of the Dominion Cotton Mills, at Magog, Quebec.

Mr. Taylor's modification simply consisted in an effective method of breaking up the water and impregnating it with finely divided particles of air.

The Ragged Chutes plant is probably the largest natural compressor in the world. A 660-foot dam stretches across the Montreal River at Ragged Chutes. Here, at the intake gates, are two 16-foot intake pipes, to each of which is fitted 66 air-intake pipes 14 inches in diameter, placed some feet above the level at which the water enters the larger pipes, and set in a steel spider around these. The spider's conical extension partly occupies the mouth of the large intake pipe so as to leave an annular space for the water to enter. The falling water draws air in through the small pipes, and thus in its descent of 351 feet becomes a mixture of water and compressed air. The water intake pipes

Part of General View.

moisture. Near the bottom of the tail-shaft (see elevation, Fig. 1) a 24-inch steel pipe enters the tunnel and conducts the air to the surface, and into the twenty-inch main that serves the mines. The water races past, and, as the tunnel is smaller at this point, forms an air-tight seal that leaves the compressed air no other vent. The water itself enters the tail-shaft, and, since there is a drop of 48 feet between the intake and the mouth of the tail-shaft, it overflows into the river.

The 20-inch main is constructed of steel pipes brought from Germany. It is made up of 40-foot lengths of seamless flanged steel, each length weighing 3,000 lb.

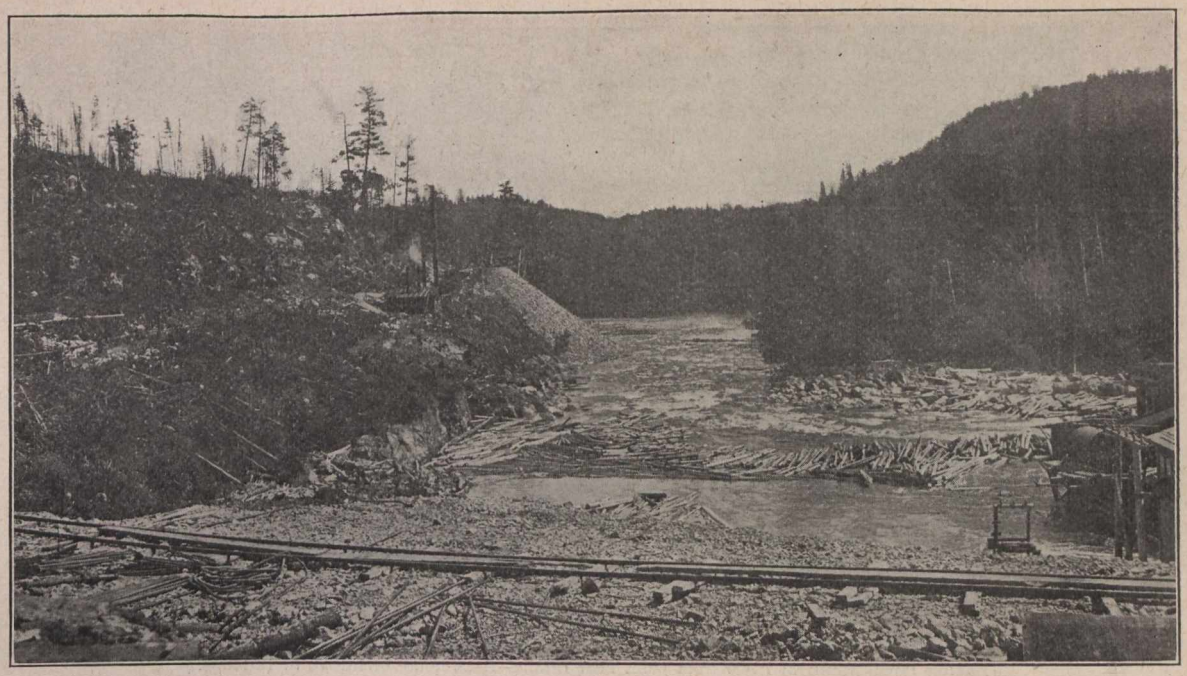
To guard against the evil effects of unequal temperatures, the pipe-line is anchored to heavy concrete piers on solid rock foundation at half-mile intervals. Halfway between each pier an expansion point is fitted in the system. Elaborate care has been taken with gaskets and with joints to insure absolute air-tightness. Every joint is supported by two rails which, in turn, are bolted to wooden ties buried beyond danger of damage by fire or weather.

Two 12-inch service pipes now connect the 20-inch main with La Rose. One of these loops through the Nipissing, Trethewey, Coniagas, Cobalt Central, Buffalo, Townsite, McKinley-Darragh, and back to the Nipissing. The other is carried over La Rose, Nipissing, O'Brien, Colonial, Victoria, and Nova Scotia. A third line will run north of Giroux Lake through the University, Foster, and other properties in that region. A fourth line is projected through in the direction of the Cobalt Merger.

The middle of November is set as the time when air will be ready for delivery into Cobalt. Twenty-five

Cobalt Hydraulic Power Co.—Construction Camp and East Abutment of Dam, Ragged Chutes.

Cobalt Hydraulic Power Co.—Spillway of Dam, Ragged Chutes.



Cobalt Hydraulic Power Co.—Looking Up Stream toward Dam and Head Works and showing Ragged Chutes.

cents per thousand cubic feet at 100 lb. pressure is the rate to be charged. This, of course, is a radical reduction of existing costs. The pressure will be uniform, the air dry, and the service not subject to interruptions.

Among other contracts, the following eight mines have signed for approximately one-third of the total capacity of the plant: La Rose, 350 cu. ft.; Nipissing, 250 cu. ft.; Kerr Lake, 200 cu. ft.; Coniagas, 150 cu. ft.; King Edward, 175 cu. ft.; Buffalo, 150 cu. ft.; Chambers-Ferland, 150 cu. ft.; and Colonial, 50 cu. ft.

Cobalt Hydraulic Power Co.—Intake Gates and part of Dam.

EVOLUTION OF DREDGES.

At the meeting of the Oroville Dredging Company, recently held in London, the chairman referred to an important development in the size of dredges likely to reduce working costs from 7 to 3 cents per cubic yard. He said they are now using 7 ft. buckets in their largest type, whilst neighbours in California are using 14 ft. bucket dredges. He had seen the accounts of the company operating the 14 ft. bucket dredges handling 250,000 cubic yards a month at a cost of under 3 cents per cubic yard. "Now, it does not require a great deal of intelligence," Mr. Baker continued, "to realize that if you have a property with a life of ten years, as we have in the Oroville alone, where operating costs are nearly 7 cents per cubic yard, if we can put in two 14 ft. bucket dredges at a cost of £80,000 we can make an economy. These dredges will each treat 250,000 cubic yards a month, or six million cubic yards in a year. With

Cobalt Hydraulic Power Company.
Looking Down Montreal River from point near Intake—Head-house of Intake in Distance.

these we could repay the cost of the two dredges in 18 months out of economies we can make in operating at a cost of under 3 cents, as against a cost of nearly 7 cents to-day." The large bucket dredges have been in actual operation for a little over a year, and the properties on which they are located are being examined by an engineer of high standing, and if he confirms the statements as to capacity and costs it is the intention of the Oroville Dredging Company to scrap most of its old dredges and put in the big modern dredges. In dealing with six million cubic yards a saving of 4 cents is equal to about £50,000 annually."

The above statement is really of world-wide importance, and will do to the dredging industry what the tube mill has done to the quartz mining industry. It will reduce costs of dredging to such an enormous extent as to permit of immense areas of formerly unpayable ground being profitably worked and give a great impetus to dredge construction, already an important industry. The advertisement of no fewer than three of the foremost firms of dredge builders in the world appear in the advertising columns of this issue, and the writer has marked the extraordinary progress which has been made in the latest designs of dredge construction. These modern dredges have outdistanced even the latest New Zealand designs, which have until recently been considered the most advanced in this class of work.—Financial Times, London.

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

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

Written for the Canadian Mining Journal.

Of the numberless minor reports written by the late Dr. Henry Youle Hind, none is of more present interest than that on the Riviere du Loup goldfields, written for a group of Boston investors.

The report proper is prefaced by a letter of transmittal from an Examining Committee. This letter, quaintly reminiscent of pre-Confederation days, sanctions "the purchase of certain lands and mining rights situated on the Riviere du Loup, emptying into the Chaudiere, in Lower Canada." It is addressed to "the subscribers to the conditional agreement, dated at Boston, May 6th, 1864." The letter itself is dated at Boston, June 23rd, 1864. The members of the committee bore names that were prominent in the business circles of Boston half a century ago. Here they are: Leverett Saltonstall, Danl. Sargent Curtis, P. C. Brooks, Jr., S. L. French, H. B. Ward, Pliny Fisk.

The committee touches first upon the direct and easy access afforded to the district by the Kennebec road from Quebec, and by the settled character of the surrounding country. It is remarked that ten miles of the Kennebec road is macadamized, and that the district is within forty-eight hours' travel from Boston. To-day one can travel in about one-quarter of that time all the way from the city of Quebec to Boston.

The specialists engaged by the Examining Commit-

tee, in addition to Dr. Hind, to report upon the district were Mr. Russell and Mr. Tuck, Californian miners, and Mr. St. John, "a successful quartz miner of Australia."

The letter of transmittal dwells upon Dr. Hind's distinguished geological and exploratory work, and mentions that, at the date of writing, he was engaged in making a preliminary geological survey of the province of New Brunswick at the request of the Government of that colony.

"Your Committee," the letter continues, "were also fortunate enough to have an interview, arranged by appointment, with Sir William Logan, the eminent geologist of Canada, who has been for upwards of twenty years employed by the British Government in the survey of Canada and other portions of British America, who expressed to your Committee the deliberate opinion that operations properly conducted upon this auriferous tract must prove highly remunerative."

Subject to the condition that the titles upon examination proved satisfactory, the committee closed negotiations for the purchase of the lands. All legal points were submitted to the consideration of George Okill Stuart, Esq., of Quebec, "a gentleman of the highest standing in the legal profession, and now, or lately, Queen's Counsel."

Dr. Hind's report is divided under seven heads, to each of which shall be given some attention.

I. Geographical Features.

The tract of country to which the report refers lies on the Riviere du Loup, a tributary to the Chaudiere, which empties into the St. Lawrence a few miles above Quebec. The Metgermette, a tributary of the Du Loup, flows diagonally through all the lots in Linière. Several small tributaries flow through the lots into the Du Loup.

East and west of the Du Loup the country rises to a plateau in some places in the form of an escarpment on the river, in others gradually, to an altitude varying from sixty to one hundred and twenty feet above the level of the stream. Where the rise is abrupt, landslides occasionally disclose the character of the sloping cliffs. These are seen to consist of a tenacious bluish clay, holding many worn fragments of rocks similar to the Upper Silurian slates exposed in the bed of the river, and masses of unworn slate showing a local origin, also small boulders and pebbles from a northern source.

In the ancient valley of the river the blue clay may be, in some places, fifty feet thick. But by tracing the course of the tributary streams, about two miles from the Riviere du Loup, and to an altitude exceeding 400 feet, the slates are seen in position some 25 to 30 feet below the surface of the drift clays and gravels.

The blue clay is capped by a yellowish gravelly clay, also holding numerous fragments of unworn masses of slate, as well as fragments of ferruginous, easily disintegrated quartz, similar to the interstratified quartz veins in the slates beneath.

The plateaux, referred to above, vary in breadth from a few yards to several hundred yards, and are succeeded on the west by a gradual rise to the summit of the ridge dividing the tributaries of the Du Loup from those of the Chaudiere. The highest points are not more than 500 feet above the river, or, approximately, 1,400 feet above the sea level.

The Du Loup, at its summer level, has an average width of twenty-five yards, its depth not exceeding fifteen inches. At the beginning of June its mean breadth is about thirty yards, with a depth in the channel of eighteen or twenty inches. In the early spring it rises fully five feet above its June level.

The current is very rapid, and its fall may be approximately estimated at twelve feet in the mile. In its bed are numerous boulders, mostly from the Upper Silurian slates, reefs of which cross the river occasionally.

The course of the Du Loup, within the property described, is nearly due north for a space of nine miles.

II. Geological Features.

(a) **Upper Silurian Slates.**—The rocks consist of Upper Silurian slates. The strike is west 15° south, magnetic; but the variation being 16° 45′ east, the true strike is west 31° south. The dip is southerly, at a very high grade, varying from 72° on the Metgermette to 85° on the Riviere du Loup. The slates appear in situ in many places on the Metgermette, the Riviere du Loup, and on a mill creek (lot 31, and the rear lot on the 8th. range of Jersey) at an altitude of about 400 feet above the main stream.

Reefs of these slates frequently cross the main river and its tributaries, forming rapids. Sometimes they present a banded or ribboned appearance, and occasionally a smooth reddish surface, and an arenaceous composition. When exposed to the action of air and running water they occasionally become very fissile, wearing down and disintegrating rapidly. Other bands, again, are hard and persistent, weathering red when exposed to running water. Sometimes a slab several feet square will be found to be studded with perfect cubes of iron pyrites.

(b) **Quartz Veins.**—The slates are intersected by three sets of quartz veins: 1. The largest and older veins, running generally with the strike of the slates, and often interbedded, but occasionally enlarging into branches, are highly crystalline, and composed, towards the centre, of white quartz containing cavities lined with quartz crystals. The outer portions of the veins are frequently coloured with peroxide of iron, and the cavities filled with decomposing iron pyrites, or, sometimes, with calcite or with chlorite. 2. The oblique veins.—When the slates crop out in the bed of the river they are sometimes seen to be capped with quartz, which sends numerous ramifications in all directions. One exposed reef, dipping at an angle of 80°, was found to be intersected by veins cutting them at an angle of 56° N.E. These oblique veins appear to be associated with the main veins, which generally run in the direction of the strike of the slates. Persons are liable to be much deceived by them, as they often expose a broad surface in the river; but none was found of a greater thickness than two or three inches. 3. The newest veins are the numerous small, continuous veins cutting the main veins either at right angles or obliquely. They are of more recent origin than either of the two systems described, and generally consist of quartz free from foreign material.

(To be continued.)

PRESENT PROVISIONS OF U.S. TARIFF AS REGARDS ORES OF ZINC.

Zinc-bearing ore of all kinds, including calamine, containing less than ten per centum of zinc, shall be admitted free of duty; containing ten per centum or more of zinc and less than twenty per centum, one-fourth of

one cent per pound on the zinc contained therein; containing twenty per centum or more of zinc and less than twenty-five per centum, one-half of one cent per pound on the zinc contained therein; containing twenty-five per centum of zinc or more, one cent per pound on the zinc contained therein: Provided, that on all importations of zinc-bearing ores the duties shall be estimated at the port of entry, and a bond given in double the amount of such estimated duties for the transportation of the ores by common carriers bonded for the transportation of appraised or unappraised merchandise to properly equipped sampling or smelting establishments, whether designated as bonded warehouses or otherwise. On the arrival of the ores at such establishments they shall be sampled, according to commercial methods under the supervision of government officers, who shall be stationed at such establishments, and who shall submit the samples thus obtained to a government assayer, designated by the Secretary of the Treasury, who shall make a proper assay of the sample, and report the result to the proper customs officers, and the import entries shall be liquidated thereon, except in case of ores that shall be removed to a bonded warehouse to be refined for exportation as provided by law. And the Secretary of the Treasury is authorized to make all necessary regulations to enforce the provisions of this paragraph.

PRODUCTION OF IRON AND STEEL BY THE ELECTRIC SMELTING PROCESS.*

By E. J. Ljungberg (Falun, Sweden).

On the whole there is at present not much more to add to what has already been published concerning the melting of steel by use of electric current. Many types of furnace have been evolved and constructed—the Heroult, Kjellin, Stassano, Girod, Rochling-Rodenhauser, and others. It is also well known that furnaces up to a capacity of 15 tons have been built for making special steel with good commercial results. For making steel of ordinary quality the electric method still seems to be too expensive, even where cheap waterpower is available.

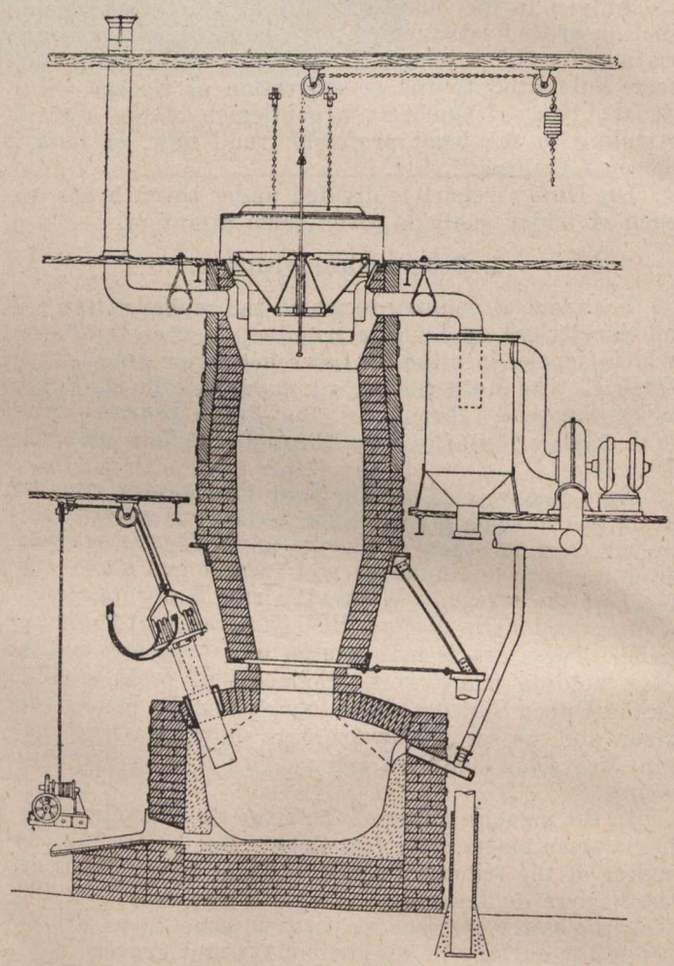
At Gysinge, one of the works belonging to the Stora Kopparbergs Bergslag, there is one Kjellin induction furnace with a capacity of 2 tons, but as this is working as a Talbot furnace, not more than about one ton at a time is tapped.

The continuous current used in this furnace represents about 200 kilowatts, and the output in 300 days amounts to about 1,200 tons of ingots using 50 per cent. pig and fifty per cent. scrap. As no other pig iron is used except the famous Dannemora brand made by the firm, which, as every one knows, is extremely low in phosphorus and sulphur, the process can hardly be called a refining process. The product is a carbon steel of high quality, possessing some superiority over steel made by the ordinary melting processes, the quality which I would instance specially being that it is comparatively soft to work, either hot or cold, although high in carbon. It is a superior carbon tool steel. It may be of interest to state that the company makes about 15,000 tons of Dannemora charcoal pig iron annually, of which about one-third is exported and two-thirds are used at the works at Soderfors and Elfkarleo for the manufacture of Dannemora Wallon bar iron, open-hearth, and crucible steel.

*Paper read before the Iron and Steel Institute.

In the electric furnace, as well as in the crucible plant, there are also produced, among different kinds of steel, high speed self-hardening steel, tungsten steel, chromium steel, and nickel steel. Such steels can easily be made in electric furnaces when the necessary care is taken. When speaking of high quality steel, all steelmakers know that the utmost care in heating, hammering, rolling, and tempering is necessary if a good result is to be obtained.

For a country like Sweden, possessing practically no coal-mines but numerous waterfalls, the manufacture of iron and steel direct from ore by the agency of the electric current is of much more interest than the melting of pig and scrap to make steel. At the works at Domnarfvet extensive and costly trials have therefore been made in the direct reduction of ore during this and the past few years.



In these experiments two modifications of a furnace, constructed by Mr. Wallin in Berlin, and several modifications of a furnace, constructed by Messrs. Gronvall &Lindblad (the Electro Metal Company), Ludvika, have been tried. Of these it is needless to describe any except the latest form.

The accompanying drawing shows a furnace similar to a common blast-furnace, but with three electrodes fed by three-phase alternating current at about 40 volts, 60 cycles, and 9500 amperes, averaging 674 horsepower, instead of tuyeres. In this furnace, which has been running for 1903 hours, there have been produced 28 tons of iron, containing from 0.95 to 3.09 per cent. of carbon.

In the manufacture of this quantity there was used:—

	Tons.
Ore	442
Lime	24
Coke	41
Charcoal	58
Electrodes, total	6.5
Electric current (kilowatt-hours)	891,623

or per metric ton of pig iron produced:—

		Kilogrammes.
Coke and charcoal		353.3
Power, horsepower year		0.492
Electrodes, effective	8.8 kgs.	
Wasted ends	13.9 kgs.	
		22.7
Pig iron from ore and lime		60.02
Pig iron from ore alone		63.50
Pig iron per horsepower year		2.03 tons

The temperature of the escaping gases from the furnace is generally very low, and contain on an average about 22 per cent. of carbon dioxide (from 8 to 41 per cent.). The amount of carbon monoxide varies from 39.4 per cent. to 61 per cent. The gases contain practically no nitrogen, but steam from the water in the ore, lime, coke, or charcoal is present.

The efficiency of the electric current ought to be higher than hitherto, if the considerable loss of heat by cooling water and radiation can be reduced. These losses seem to be about 30 per cent.

No air whatever is used in the process, and the gases are produced from the carbon in the charcoal and coke and the oxygen in the ores ($FeO+C=Fe+CO$). Either charcoal or coke may be used, but the consumption of fuel will be practically the same in either case.

According to the description of the inventor, the figure shows a vertical section, through the furnace which consists of a lower portion or smelting chamber, corresponding to the hearth of a blast-furnace, and a top section or shaft. The latter is supported on columns, which prevent any weight from bearing on the arch of the smelting chamber. The latter is so proportioned as to provide a considerable amount of free space between the charge and the arched roof through which the carbon electrodes project into the charge. The brickwork is thus protected against any very high temperature, and remains a non-conductor of electricity. This is an important feature of this furnace, since experiment has shown that if the electrodes enter the chamber at the point where the charge touches the walls, a very high temperature is generated at this point; the brickwork is destroyed and becomes a conductor of electricity, giving rise to a more or less complete short-circuit. The brickwork may be further cooled by means of a blast of cool gas taken from the top of the furnace and blown in round the electrodes with a fan, no heat being lost by this proceeding.

The ore and fuel are crushed to a suitable size, and are fed into the top of the furnace through the bell hopper in the usual way, the ore being partially reduced by the carbon monoxide rising through the charge. The latter spreads out in the smelting chamber, as shown, and the reduction is there completed. Since the electrodes project well into the charge, the highest temperature occurs in the centre of the latter, and the brickwork is thus kept cool compared with the walls of an ordinary blast-furnace.

It will be seen from the figures given in the paper that a step has been taken in the direction of replacing a considerable part of the fuel used in making iron and steel by the electric current, and that the problem is technically solved. As regards its commercial value, it is too early to make any definite statement yet, but this will be readily understood by all iron and steel makers when they reflect how many years it has taken to bring the Bessemer, the open-hearth, and the basic processes to their present state of perfection.

IRON ORE DEPOSITS OF NOVA SCOTIA.

(Continued from issue of Sept. 15.)

*Notes from report by Dr. J. E. Woodman, issued by Mines Branch, Department of Mines, Ottawa.

The Nictaux-Torbrook Basin.

Location, extent and ownership.—The important iron ore field of Torbrook and Nictaux is situated in eastern Annapolis county, on the south side of the Annapolis river valley and against the side of the highland to the south, locally called South mountain. The distance from the old Leckie mine to Wilmot, on the Dominion Atlantic railway, is 3 miles; from the Wheelock mine, 4.8. From Wilmot to Acadia mines, via Midland division (Windsor to Truro), 137 miles; via Windsor Junction, 153 miles.

It stretches from the Kings-Annapolis county line on the east to the granite back of Cleveland mountain on the west, a distance of seven miles. Its breadth is in places 15,000 feet from the granites on the south to the Triassic rocks on the north, but the utmost width of probable ore-bearing rock is 11,500 feet. Thus the territory within which iron ore is likely to be found may be roughly placed at fifteen square miles.

The iron ore deposits here, as at Clementsport, are held with the land, hence no royalty is paid upon the mineral. A large part of the district is now owned or controlled by the Annapolis Iron Company. The Londonderry Iron and Mining Company owns some of the remainder of the territory and controls still more. A few farms have not been included in these operations.

Topography and general features.—The district is part of an open farm country, easy of access at all times. The general trend of the topography is north-east in the main part of the field, owing to the line of slope of South mountain and the direction of Torbrook or Black river. This stream, flowing from South mountain northward into the centre of the basin, there turns north-east almost to the county line; thence north-west, passing out of the basin to the Annapolis river. The valley is narrow and steep where it emerges from South moun-

tain, but becomes broad and flat in the main part of the basin, so that few outcrops can be found along it.

North-west of this river, where the mines are situated, the land is again higher, although in no part more than 400 feet above the stream. Within half a mile of the latter it begins to decline toward the Annapolis river.

It is upon this very broad, ridge-like eminence that the north line of ore outcrops is situated, in the form of three, or possibly more, beds of iron ore interstratified with the sedimentary rocks of the region.

The southern line of ore, similarly situated with reference to the country rock, is found well up on the side of South mountain and everywhere at considerably greater altitude than the other, within a short distance of the granite which covers a large part of western Nova Scotia. The outcrops and openings are high on the west, declining eastward, because the strike of the deposit is slightly oblique to the trend of the South mountain escarpment, diverging in that direction. In like manner the altitude of the north line of the ore deposit declines eastward, being 365 feet at the Wheelock mine on the west, 131 feet at the Leckie mine on the east, and somewhat lower at the crossing of Torbrook river still farther east. The grades from the South mountain iron ore deposit towards the railroad on the north are rather severe at any point.

Transportation.—Transportation is not a serious problem in this field. For some years a spur line of standard gauge has run from Wilmot station southward 3 miles to the Leckie mine, over an almost level country. Thence it is 1.8 miles south-west to the Wheelock mine, with a rise of 234 feet. In 1906 the standard gauge track was extended to this part of the property, and in 1907 to a newer mine of small size, the Martin, somewhat farther west. As the Leckie mine is not now in operation, all the ore is conveyed from the Wheelock and Martin openings, which are nearly in the centre of the property, to Wilmot station. The district is controlled, and in large part owned, by the Annapolis Iron Company at Londonderry (Acadia Mines), where it is smelted into pig iron.

From the Wheelock mine to Nictaux station on the west is 2.27 miles, down a steep grade. Nevertheless it would not be difficult to connect with the Halifax and South-western railway at that point. This would insure opportunity to ship ore on the Bay of Fundy at Victoria beach by one rail haul, as this road belongs to the same interest as the first-named.

The South Mountain range of iron ore has not yet been opened sufficiently to warrant laying tracks from any present rail line, and greater difficulty would be experienced in grades.

Present transportation to Acadia Mines is unsatisfactory, as the ore has to be hauled over two lines. The Dominion Atlantic railway is used as far as Windsor in any case. From there two routes are possible; in one the ore goes to Truro by the Midland division of the Dominion Atlantic; in the other to Windsor Junction, the Dominion Atlantic and the Intercolonial sharing in this, thence to Truro and Londonderry by the Intercolonial railway. By either route freight charges are an important item.

Water power and wood.—Two streams of some size run through the district—the Nictaux and Torbrook rivers. Neither has natural storage in the form of head water lakes of any importance; and Torbrook (or Black) river has a valley so shaped that at no suitable point could it be dammed without great injury to farming interests.

Nictaux river flows northward throughout the breadth of the district in a narrow valley which broadens when the Triassic rocks to the north are reached. This valley could be dammed at a number of points, forming a succession of storage basins. As it is, there is but one dam, a short distance above the falls at Nictaux.

The horse-power of the stream was taken during an unusually dry time, when the stream had shrunk to small proportions. Assuming the installation of power at the lowest feasible point—where the stream valley widens, north of the village of Nictaux—a head of 122 feet could be secured from the site of the old Nixon dam with 5,800 feet of piping, and a minimum of 133 h.p. without such storage as to increase the minimum volume of water. From the present dam at the falls a head of 77 feet can be secured, and the estimate gives 135 h.p., showing that the increased discharge counteracts the decreased head. This, of course, could be much augmented by proper storage. Previous estimates, made in private reports on the district, range from 250 to 750 h.p.

There is no timber in the district, and none of value for a few miles to the south. But in the heart of the south country is a larger amount of excellent wood, both hard and soft, and of several varieties each, than many mines or electric smelters would require. The timber country is all controlled by one or another of the large lumber companies, with whom negotiations would have to be made.

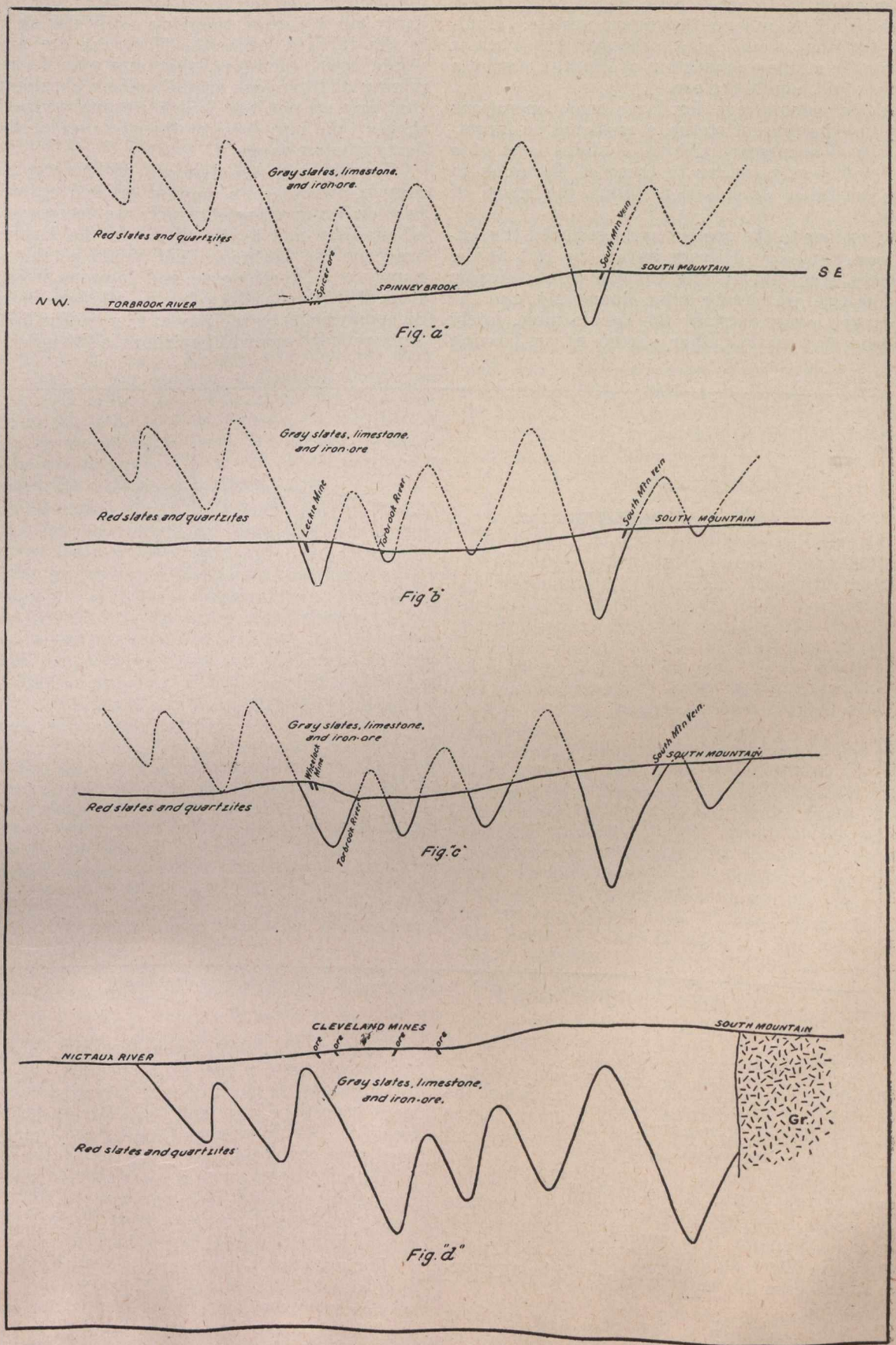
Local Smelting.—The possibility of a new western smelting centre is here reverted to, in order to show the relations of the different factors in the case.

The problem presents three aspects. According to one, the district as a whole may be regarded as a smelting centre, the coal being brought from a distance, Second, the ore may be shipped to an existing furnace, as Londonderry, Sydney or Sydney Mines. Third, it may be shipped to a new centre of reduction, to which also coal would have to be brought.

(1) There is undoubtedly sufficient ore in the basin to supply a moderate plant for so long a time as to warrant installation if other factors are favourable. In such event all the coal would have to be brought from a considerable distance, as western Nova Scotia south of Cumberland county possesses none. Coal could be had from any Cape Breton district by water shipment to Annapolis Royal, thence by rail to Torbrook or Nictaux, if the works were there. From the Pictou field coal would come by rail from Stellarton or Westville to Pictou Landing, and by water to Annapolis. From the present Cumberland field (Springhill) coal would come by rail to the Cumberland Coal and Railway Company shipping piers at Parrsboro, thence by vessel across Cobequid bay to Annapolis. Instead of using Annapolis as a debarking point, Victoria Beach, opposite Digby, might be employed, but this would necessitate a longer rail haul.

Limestone could be brought from near Windsor and from other points in Hants county. That near Windsor is an especially good grade of shell lime of lower Carboniferous age, similar in many ways to that of Red Island, Cape Breton, used at present by the Nova Scotia Steel and Coal Company.

The distance from Wilmot, where the spur line leaves the Dominion Atlantic main tracks, to Annapolis is 32 miles; to Victoria Beach, 40 miles; and to Windsor,



Diagrammatic section across centre of Nictaux-Torbrook basin, to illustrate possible synclinorium structure.

54 miles. In considering Victoria Beach for shipping, it must be noted that the Victoria Beach railway is a part of the Halifax and South-western system. Haulage from Torbrook would have to be over two lines at present, but by making connection at Nictaux station a single line would handle the ore.

In making calculations for large scale operations upon any but the present status, it must not be forgotten that the Clementsport district contains ores of a character sufficiently similar to those of Torbrook to bring its successful exploitation within the range of possibility.

(2) According to the present arrangements, the Annapolis Iron Company delivers its ore by rail to the Londonderry Iron and Mining Company at Acadia Mines. The two are closely allied financially, and the latter company owns outright the Leckie mine, lately closed down, and several other parcels of ore-bearing ground. Both companies own both land and ore on some farms, and only the iron ore rights upon others.

The ore is shipped from the property (at present the Wheelock and Martin mines only) to Wilmot, thence via main line of Dominion Atlantic and Intercolonial railways to Acadia Mines.

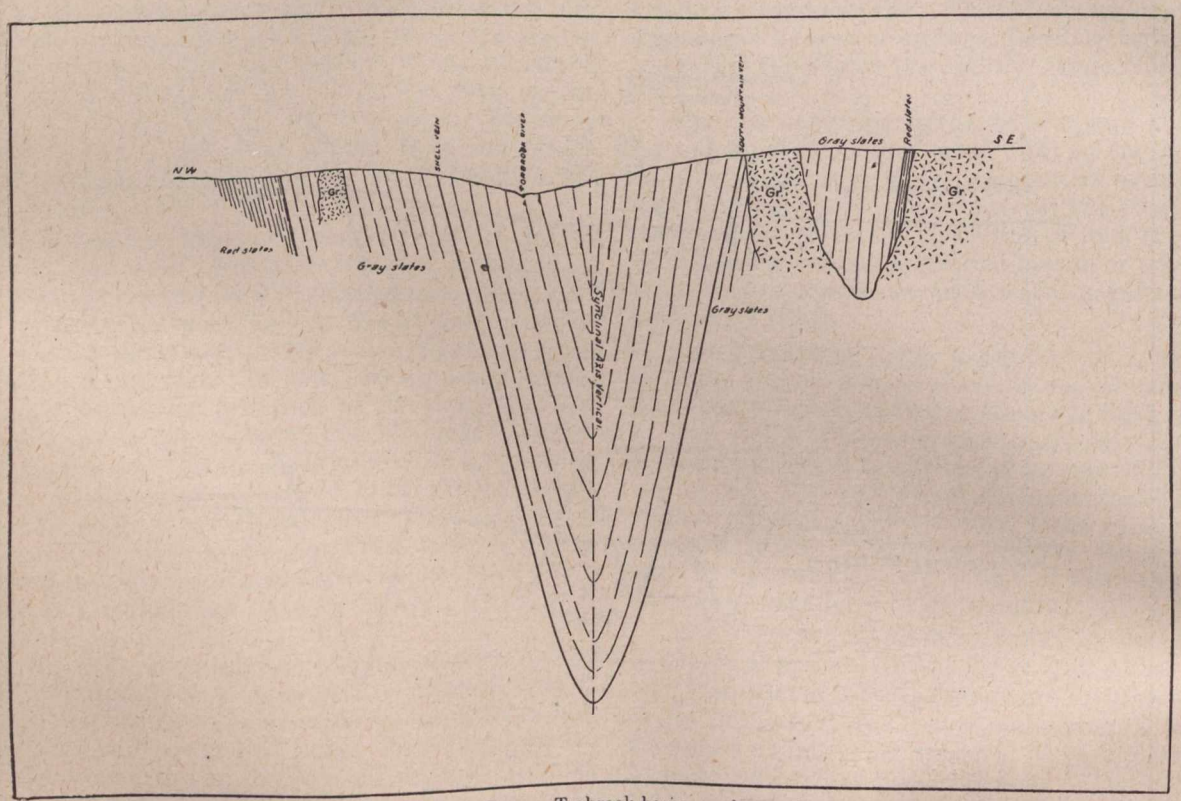
It would be practicable, at no greater cost, to ship the ore by water from Annapolis or Victoria beach to Mines or the Dominion Iron and Steel Company at the Nova Scotia Steel and Coal Company at Sydney Sydney. In this case the water haul would be approximately 650 miles.

(3) The last possibility is that of a new smelting centre. That the ores of Torbrook and Londonderry well supplement each other is readily seen when it is noted that the former is of good low grade quality, high in phosphorus and in part high in lime, and low in sulphur in most instances; while the latter is especially free from phosphorus and remarkably low in sulphur, but high in lime and magnesia. Moreover, the Londonderry ore is porous, reducing easily during its descent in the furnace, while the Torbrook ore is dense. It would seem, therefore, that any plan looking to the mixing of these ores should receive consideration, and that any scheme for a new western reduction centre should take into account the presence of the Londonderry iron ore range.

Leaving aside the financial problems engendered by present ownership, a smelter erected either at Parrsboro or Annapolis would fulfil the necessary conditions of situation and availability. In the former case the ore from the Torbrook field would be shipped at Annapolis or Victoria beach; and limestone, in part at least, from Windsor on Minas basin—all these being situated on embayments on the Bay of Fundy. The distance from Annapolis by water to Parrsboro is 100 miles; from Victoria beach, 84 miles; from Windsor, 30 miles. The coal would come in part from Springhill by a short haul to Parrsboro, as much does at present; and water shipment from the Pictou and Cape Breton fields would be feasible. Should western Cumberland county be developed as a coal field, fuel from the centre of the basin would come by rail with a much shorter haul than from Springhill; and that from the western rim of the basin would be shipped probably from Shulie, which is capable of being converted into a harbour.

For ore from Londonderry a road would have to be built along the north side of Cobequid bay. As a charter has some time since been granted for such a road, and survey made, its construction may be looked upon as feasible.

In the case of erection at Annapolis such material as would come direct to Parrsboro by land in the first instance could be shipped by water thence to Annapolis.



Diagrammatic cross-section of Nictaux-Torbrook basin, on theory of simple synclinal folding

History of Previous Operations.

Early Endeavors.—The existence of iron ore in the basin appears to have been known very early in the nineteenth century, and a small Catalan forge was set up at Nictaux Falls, in which a few tons of bar-iron were made. In 1825, as related in Part 11, chapter 1, the Annapolis Iron Mining Company was formed, erecting a large smelter on Moose river, in the Village of Clementsport. Part of the ore there treated came from the western part of the Nictaux-Torbrook field, near Nictaux river. Later a charcoal smelter was erected at Nictaux, and the veins of ore explored with some thoroughness. Slag from this furnace may even to-day be found in great abundance in the river bed.

In 1855 an English company mined a shell magnetite in the western part of the field, spoken of locally as the Shell bed, but never demonstrated to be the same as the long Shell bed to the east. At least two openings were used—one close to the furnace at Nictaux Falls, the other about two miles east. Limestone for flux was brought from St. John to Port George, on the Bay of Fundy, ten or eleven miles from the furnace, whence also the pig was shipped. The works closed don about 1860, because of too great cost of production.

Page and Stearns.—In 1870 Page and Stearns started to make rail connection between Middleton and Bridgewater, on the south shore of the province. In connection with the promotion of this scheme they opened ore pits at many places west of Nictaux River and as far west as Lawrencetown, six miles from Nictaux, all in magnetite. Some property was acquired, still known as the Stearns property of Cleveland mountain and the Page and Stearns property of Torbrook. Much more of the country was taken under lease, with the intention of development when their railway, the Nictaux and Atlantic, was completed. The scheme came to nothing, however. The railway was later completed as the Nova Scotia Central, and recently taken over as part of the Halifax and Southwestern system.

In all this early work the Leckie vein appears not to have been touched, all interest centering upon the Shell bed and various magnetic fossiliferous beds to the west. In these were made open cut trenches, often of considerable length, especially on the Shell bed from the Fletcher Wheelock farm west. No underground mining was attempted.

Leckie Mine.—In 1890 Major R. G. E. Leckie, then manager of the Londonderry Iron Company, took royalty options upon certain iron ore deposits in the eastern part of the district, where since has been located the Leckie mine; and in 1891 operations were started. In 1896 the property became idle, because of closing down at Londonderry and an absence of any other market for the ore. Previously the Leckie ore had gone in part to Londonderry, part to Ferrona.

In 1903 the mine was reopened by the Londonderry Iron and Mining Company, coincidentally with the reorganization of the Acadia mines, running until the summer of 1906, when it became exhausted and was shut down. Evidence will be offered later indicating that, while all the ore obtainable from the old shafts had been extracted, the same horizon may carry more lower down.

Annapolis Iron Company.—The Torbrook district has been identified with Londonderry since 1890. Recently the Londonderry interests obtained an option upon a large part of the district; and besides widespread surface prospecting and sinking of numerous boreholes, developed the beginning of a mine on the Shell bed, on the Fletcher Wheelock property and close to the Torbrook-Nictaux road. During the winter of 1906-07 these options were closed, a new company, called the Annapolis Iron Company, being formed to operate. Much the same financial interests are concerned as in the Londonderry company. Recently underground development has commenced in the Leckie vein of the Martin property, west of the Wheelock mine, with the purpose of making a new mine there.

Output.—The beginning of the arrangement to take ore from Torbrook (Leckie mine) to Londonderry dates back to 1889, and in 1890 a shipment is recorded of 1,365 tons; in 1891, 7,273 tons; 1892, 27,114; 1893, 29,839, of which 20,000 went to Londonderry, the remainder to Ferrona; 1894, 21,664, divided between the two furnaces; 1895, 29,940; 1896, 19,944 up to July, when the Leckie mine closed down. It reopened in April, 1903, and in the remainder of the year nearly 5,000 tons were mined. For 1904 no public record was made of the output; in 1905 it was 14,538 tons; in 1906, 27,000.

For the early years, during the life of Nictaux furnace, no adequate records exist.

General Lithology.

Series represented.—The western part of Nova Scotia, south of the Bay of Fundy, is largely underlain by the pre-Cambrian gold-bearing (Meguma) series and its associated igneous rocks. The latter include chiefly granites, of which the main body is a great massif occupying many hundred square miles and forming the northern margin of the main plateau of the province, to a height of 600 to 700 feet. To the north of the granite the sedimentary rocks are topographically much lower, and the escarpment thus formed is called South mountain.

Running along the face and base of this escarpment, intermittently from near Weymouth on the west to the Nictaux river, thence without interruption nearly to the Avon river on the east, are various types of sediments, ranging from the upper group of the pre-Cambrian gold-bearing series (Halifax formation) to the Devonian. In part these form a portion of the highland, or hilly country hardly lower in altitude; in part they are so low as to grade into the flat Triassic topography to the north. All are invaded by the granites or their basic marginal equivalents, which to some extent assume the from of diorites.

Inglesville district.—Of these sedimentary areas, the only ones of interest in this connection are (1) the Inglesville district and (2) the Nictaux-Torbrook basin. The first is bounded on the north by the Triassic sediments of the Annapolis valley and on the south by the main granite mass; on the west lies part of the main granite which south of Lawrencetown reaches northward to the Triassic. On the east, at Inglesville, a broad tongue reaches from the main mass of the granite up to the Triassic and cuts this iron area off from the Nictaux district, of which it is a logical extension.

Its rocks are in general similar to those of the eastern basin, and it contains a certain but quite unknown amount of bedded magnetic iron ore. But the country is little prospected, and natural outcrops are few. Nothing in detail is known of its structure, or of most of its iron.

Eastern areas.—From the east side of the granite tongue above mentioned sediments stretch without complete interruption for many miles, to the Carboniferous of the Minas basin. The detailed geology of this part

of the country is at present being worked out by the Geological Survey, and it is sufficient to say that the studies to date show a succession of rock series occupying areas that are much elongated parallel with the margin of the granite plateau to the south. It is unnecessary to enumerate these areas, the rocks of which appear to be conformable throughout a single unit, but, in some instances at least, unconformable with those of adjacent areas. Some are regarded as of the same age as those of the Torbrook basin; but thus far no iron ore deposit of importance has been discovered in them.

The limits of the Nictaux-Torbrook basin have already been noted. It appears to include two of the series represented to the east, according to the present views of the Geological Survey. Of these the upper, of Silurian age, contains the iron ore. Paleontological evidence as to age is abundant, and in published references hitherto part at least of the strata have been called lower Devonian.

Sediments of the basin.—The stratified rocks of the district include coarse and fine sandstones, and their altered equivalents as quartzites; gray, green, bluish and red shales, and their metamorphic forms possessing a slaty cleavage; and limestones. The last are, in certain instances, ferruginous, passing into hematite and magnetite.

The south side of the basin is everywhere occupied by dark green, gray and black slates. In the eastern portion, the centre and the area north of it present fawn, green, black and gray shales, and many bands of quartzites of various colours. These are all shown well in traverses along Saunders, Messenger, Burns, and Spinney brooks, and in the lower and eastern portion of Black or Torbrook river.

At the extreme west, a complete traverse of the basin can be had upon Nictaux river; and a section of the southern half upon Torbrook river, approximately three-quarters of the distance toward the western end of the district. In both these only the gray and black rocks appear, none of the fawn, light green or very light gray, coming to the surface.

The quartzites have some importance in any attempt to work out structure; as one apparently characteristic bed is found at known distances north of the zone of iron ore on the north side of the basin, and a similar bed is found in places south of the South mountain iron ore deposits. The quartzites in the centre of the basin at the east end are in many instances repetitions. Very coarse sediments are not known in the rocks of this basin.

Eruptives.—The general distribution of the granite has already been mentioned. Toward the margin, in places the rock becomes darker and finer, turning to diorite; but this is by no means without exception. In addition to the main mass of intrusives there are many isolated bodies of dark and more or less basic igneous rocks, of medium to fine grain. The number and distribution of these are not known.

Their chief importance in relation to the iron ore deposits consists, first, in the influence which they may have upon the distribution of the latter, second, in the metamorphic effect of the intrusives as a whole upon the hematite. As to the former, it may be said that in at least one place, west of the Leckie mine, an apparent absence of the ore along a line in which it should be found seems best explained as the effect of the presence of a boss of intrinsic rock immediately to the north. On the other hand, to the west on the properties of M. Hoffman, Page and Stearns, and Josephine Wheelock, the Shell vein, 80 feet south of the Leckie is not affected. But the Leckie is thin throughout this distance and as far west as beyond the Wheelock mine, becoming good once more on the Edwin Martin property. While the western part of this lean portion of the Leckie is quite far from any boss, it is possible that the depauperization is the effect of the presence of two intrusive masses north of the ore.

Metamorphism.—Metamorphism of both dynamic and contact types is shown in most of the field. In the north-eastern portion the bed rocks, and to a certain extent others, lack slaty cleavage; even here, however, the light coloured sandstnes have altered t dense quartzites. The southern part of the field has everywhere slaty cleavage in the finer rocks; and this is true wherever in the basin the gray sediments are found without the red strata. In part this is the result of dynamic changes.

However, on the south side of the basin there is a progressive increase in metamorphic effect westward, and inspection of the map shows that there the granite to the south approaches nearer. The western end of the district is all much more altered than the eastern, the slates being harder and the coarser rocks more massive. This appears to be due to increasing proximity of the granite tongue behind Cleveland mountain.

Ore beds.—The iron ores of the basin are all of the Clinton type, interbedded with the strata, and all originally hematites. In the east this is still true, both of those on the north side of the basin and of those on the south. Westward all the southern ore deposits and a part of the northern become magnetic; and west of the Bloomington road, between Black and Nictaux rivers, there are no openings upon non-magnetic ore. This appears to indicate that the change from Fe_2O_3 to Fe_3O_4 is a metamorphic effect depending upon the action of the granites.

This has another bearing. The age of the granites can be shown to be early Devonian. In exerting a metamorphic action upon the iron ore, they stamp the latter as of earlier age.

Clinton ores should possess great continuity on the strike; and in the Torbrook district two beds on the north side and one on the south can be traced for a long distance. Of the former, the Leckie can be identified for 15,000 feet, the Shell bed for 13,300 feet, with a probable extension westward. The South Mountain vein can be identified with moderate probability for 10,000 feet, and with fair possibility of its extension to 19,000 feet.

Little is known of the depth, except in the Leckie mine and in one or two of the calyx drill holes. The former lost the iron ore at 330 feet in the Woodbury shaft, not because of lack of concentration, but from pinching of the walls. This is 200 feet below sea level. The Fletcher Wheelock borehole left the Lean Hematite vein, north of the Leckie, at 382 feet, or slightly below sea level.

The difficulty in tracing the Shell vein westward is due largely to the fact that in this direction there is much repetition of shell ore beds across the strike—a condition which may indicate either a number of separate ore horizons or folding.

Structure.

The structure of the basin is of especial importance; because here, more perhaps than elsewhere in the province, should a knowledge of this feature aid in mining

development. It is to be regretted that, with all the work put upon the field by various students, there still remain several essential points to be established.

Previous studies: Simple folding.—It is unnecessary to expand here upon the stages by which present knowledge of the district has been reached. It is sufficient to say that up to 1905 no serious expression of opinion upon the structure had been made, other than that it is a single large syncline. This appeared obvious as in the north there are certain stratified deposits of hematite and magnetite dipping steeply south-east; and on the south are other beds, possibly identical with the first, dipping steeply north-west. From the first, it seems to have been assumed that the northern and southern beds were the same, and that the apparent structure indicated a single large syncline (see Plate).

The relation of the red beds in the east to the gray beds was not inquired into; although the presence of the former has long been known, because Messenger, Spinney and the other brooks near the county line have been justly celebrated as fossil localities. It is noticeable that, with all the collecting that has been done along these brooks, the rocks have never been divided into paleontological stages, which might perhaps prove a key to a structure most difficult to work out by lithological means.

Recent studies: multiple folding.—In 1905 appeared a preliminary description of the basin by Mr. Hugh Fletcher (Sum. Rep. Geol. Surv. Can. for 1904), and a reconnaissance geological map, which was of especial advantage in that it appeared at a time when large financial interests were about to become involved in the district. Both the map and the description of openings, of which by that year there were many, were the first published. It is somewhat unfortunate, however, that some of the descriptions of ore belts, where acquired from statements of other parties rather than from observation, cannot be verified.

Mr. Fletcher's field work in 1905, in the same district, led him to state (Sum. Rep. Geol. Surv. Can. for 1905, p. 120) "The work seems to prove that the rocks lie in several synclines."

Even with the evidence gathered during the field season of 1906, it would be hazardous to state dogmatically that multiple folding has been proved; although borings show the certainty of one subordinate fold south-east of the Leckie mine.

Hypothesis of pitching synclinorium.—What the structure traverses of the district and the lithological distribution of the rocks would appear to the present author to indicate are:—

(1) That the region is one of complex folding, being a part basin.

(2) That the longitudinal section along the strike of the axes of folds, approximately N. 40° E. (magnetic), shows a pitching of the composite fold as a whole south-westward, the angle of pitch being 10° or less. There is, so far as known, no north-eastward pitch at the south-west end of the field, so that the basin structure is incomplete.

(3) That the red rocks in the north-east, north and north-west underlie the gray as a whole, coming to the surface in these portions, but not out-cropping in other parts of the field because hidden by the overlying gray rocks.

(4) That the productive iron ore deposits, although not exclusively confined to the gray rocks, are characteristic of them, and are therefore more abundant toward the south-west.

(5) That transverse sections of the basin exhibit several anticlines and synclines, of which the exact number and the situations of the axes are, however, not completely determined.

(6) That, contrary to expectation, the dominant type of fold in this cross-section is the anticline in the centre of the basin, the synclines being shallower; while on the north-west margin the same condition obtains, and on the south-east margin the synclines are dominant.

This means that in the eastern portion of the district the red rocks reach the surface everywhere except on the southeastern side. In the middle of the field the central rocks are covered by drift; but while the strata on the sou heastern margin are exclusively gray, and also near the outcrops of the iron ore on the north-west, beyond the latter and adjacent to the Triassic the red rocks once more appear. In the western half of the basin no red rocks appear in the longest traverses.

(7) That it cannot be determined with certainty whether the South mountain ore beds are equivalents of the Leckie, Shell and Lean Hematite beds on the opposite side of the basin. Certain indications, however, point to this condition, specially their relation to a certain quartzite in both situations.

(8) That the frequency of iron ore occurrences in the western half of the field, in any traverse of the basin, may be due either to duplication of the three known beds by nearly isoclinal folding, or to the presence of a considerable number of ore-bearing strata which have separate origin. The former is as likely as the latter.

Some diagrammatic cross-sections of the basin, upon the hypothesis advanced above, are appended (Plates). They are not to be regarded as having any quantitative value, since all the factors—pitch, number, location and altitude of the subordinate folds—are still more or less in doubt; but they will serve to illustrate the principle.

Consequences of hypothesis.—The earlier ideas of structure involved a very deep fold in the ore-bearing rocks, allowing and requiring ultimately deep mining, should the iron ore carry throughout. The work of a few years ago assumed a number of small co-ordinate folds, so that the iron ore should be found repeated several times across the basin, possibly increasing the amount speculatively available and certainly decreasing its depth. It did not, however, account for the lack of ore in the centre of the basin at the east end and its prevalence near Nictaux river.

If the hypothesis advanced above be correct, it will account for the characteristic just mentioned; will indicate the improbability of iron ore in the centre in workable quantities until nearly as far west as where Torbrook river traverses this portion of the field; and will point to the probability of a number of ore occurrences in synclinal folds west of this stream at various points transversely across the basin. Whether these are duplications or successively new occurrences, and whether they, the South mountain and the Leckie, Shell and Lean Hematite beds on the north-west can all be correlated evidence is not yet sufficient to prove.

(To be continued.)

NOTE AND CIRCULAR ISSUED BY THE DEPARTMENT OF TRADE AND COMMERCE. SPECIAL NOTE TO THE PRESS.

The enclosed circular is being mailed simultaneously to every newspaper and other weekly and monthly publication in Canada, with the hope, in the interests of the development of Canada's export trade, that it will be published free of charge, and also that some editorial comment will be made thereon. The circular will be sent also to the members of all Boards of Trade, Chambers of Commerce and Trade Associations throughout the Dominion.

Nothing of this kind has ever before been attempted in Canada, and it will entail great labour in this Department in indexing this information to make it readily available when required. But it is to be hoped that it can be made the basis of a permanent list which will be immediately available at all times in the advancement of the Foreign Trade and Commerce of Canada.

The Department desires the name of every Exporter from the Atlantic to the Pacific, with a detailed list of the goods they are in a position to sell abroad.

When this information is furnished the Department all the Canadian Trade Commissioners in the various parts of the world will be notified immediately and the same information will be systematically indexed in the United Kingdom, one in France, two in South Africa, one in Mexico, one in the West Indies, two in Australia, one in China, one in Japan, one in Holland, and one in Newfoundland.

F. C. T. O'HARA.
Deputy Minister.

Department of Trade and Commerce.

EXPORT BUREAU.

Ottawa, October 1st, 1909.

The Department of Trade and Commerce desires to announce its intention of compiling an Index of Canadian Manufacturers, Exporters, and Producers generally, who desire to extend their trade abroad.

For this purpose the attached form should be executed and forwarded in the enclosed envelope to the Department without delay.

It would assist the Department materially if the details under "Articles Manufactured or Produced" be entered in alphabetical order.

The list compiled by the Department will be given the preference at all times when the names of such Canadian firms are required by intending purchasers abroad.

As the information is received at the Department it will be forwarded to all the Canadian Trade Commissioners in the various parts of the world, and be systematically indexed and be readily available in their respective offices.

Deputy Minister.

CANADIAN PATENTS.

The following is a list of patents issued by the Canadian Patent Office on Sept. 28, 1909, relating to Mining and Metallurging, and furnished by Fetherstonhaugh & Co., 5 Elgin street, Ottawa, Russel S. Smart, Resident:—

120773. T. L. Willson, M. M. Haff, Ottawa, Ont., processes for producing calcium silicide, T. L. Willson.

120775. M. D. Porter, Lewiston, N.Y., dehydrating apparatus, W. O. Rowe, R. S. French.

120781. W. J. Ellis, Andrews, North Carolina, Combined boilers and furnaces.

120784. J. Fleming, Lynn, Mass., regulators for polyphase furnaces, Can. General Elec. Co., Ltd.

120807. H. S. Blackmore, Mount Vernon, N.Y., processes for dissociating fluid salts or compounds by electrolysis.

120817. J. T. Carrick, Johannesburg, Transvaal, preparation of iron compounds.

120852. F. H. Headson, La Fayette, Ind., metallic compounds and processes of making same.

120857. A. C. Higgins, Worcester, Mass., methods of treating illuminous materials.

120857. L. S. Lachman, New York City, processes of electric welding.

120901. H. L. Orr, Georgetown, Wash., ore separators and concentrators.

THE NEPHELINE AND ASSOCIATED ALKALI SYENITES OF EASTERN ONTARIO.*

For a number of years two of the most capable geologists connected with our Canadian Survey have been studying an important area of the Archean in Eastern Ontario. Their work has been the most detailed and elaborate yet accomplished by the Survey, and we may hope soon to have in our hands a profound and illuminating volume on the Haliburton region. In the meantime the two maps prepared in connection with the work have been distributed and have proved of great interest, and several scientific papers on special points of the geology have appeared, the most important being the pamphlet mentioned above.

In the paper on Nepheline and Associated Alkali Syenites Dean Adams and Dr. Barlow have prepared what everyone expected from them, a most careful and thorough petrological study of a very interesting group of rocks, a group unique in various ways, such as the constant association of nepheline syenite with crystalline limestone, and its frequent association with corundum.

The paper includes an elaborate study of the minerals occurring in the group of rocks and the petrographical features and chemical composition of the various rock types, the new quantitative classification introduced a few years ago by Iddings, Cross and Washington being made the basis of classification. To old-fashioned petrographers the new names still have a look of strangeness and artificiality, though some reform in rock nomenclature was certainly needed.

From the economic point of view the most interesting feature of the work is the account of the great corundum deposits near Craigmont, probably the most extensive in the world. The beautiful blue sodalite occurring in Dungannon township and elsewhere is already of some importance as an ornamental stone.

The paper is excellent and there is little to criticise as to form or matter, unless perhaps to suggest that the good pioneer work of Dr. Miller, of the Bureau of Mines, in tracing out the long bands of corundiferous rock should have received a little more emphasis.

One naturally compares the work with that of Brogger on the Scandinavian nepheline rocks, but the two areas are so different in almost every respect that little is to be gained from this. It is a satisfaction to find a paper so finished and of so high a standard coming from Canadian Petrographers.—A. P. Coleman.

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*Trans.—Roy. Soc. Can., 3rd series, 1908-9, Vol. II., Sec. IV. Frank D. Adams and Alfred E. Barlow.

EXCHANGES.

The South African Mining Journal, July 3, 1909.—The Transvaal authorities are proposing to increase death duties in the Transvaal from one per cent., the present rate, to ten per cent. The South African Mining Journal comments caustically upon this. In an editorial headed "How Not to Attract Capital," the Journal predicts that the Transvaal will suffer heavily from this imposition. Instead of sweeping away altogether the estate duty, the Government actually contemplates magnifying this industrial handicap tenfold. . . . In every department this young colony is crying out for more capital. The latest proposal of the Government promises . . . to prove a most effectual deterrent to the oversea investor."

Electrochemical and Metallurgical Industry, October, 1909.—Our contemporary, commenting upon the need of a uniform nomenclature for iron and steel, recommends that leading societies in Great Britain, the United States, Germany, Sweden and France each appoint one member of a permanent international committee, each member to be appointed for one year only, so as to guard against too great fixity in the personnel of the committee. The functions of this committee will be to recommend such changes in existing nomenclature as it deems absolutely necessary for guarding against commercial dishonesty, and to recommend suitable and correct names for new commercial products as soon as they appear.

Mines and Methods, Volume I., No. 1, September, 1909 (Salt Lake City, Utah).—This is a new venture in technical journalism. Mr. Claude T. Rice is the editor and publisher. Mines and Methods will touch not only upon the subjects implied by its title, but will do its best to see that shareholders in mining corporations get a fair show. Curiously enough, this first number has not one advertisement. Editorially this is explained. Mr. Rice wishes to show the goods first, and then get after the advertiser. Possibly this is a good plan.

Anyway our new contemporary is attractive and instructive. If more room is needed there are several periodicals that can well be spared to make the necessary space.

The Colliery Guardian, September 24, 1909.—The Guardian discusses the portion of the second report of the Royal Commission of Mines, that deals with the subject of ventilation. Before a final report is made, much difficulty is expected. The debated point is whether the presence of two per cent. or three per cent. of firedamp is to be taken as the regulation minimum. The mine owners contend that, for practical purposes, a percentage of three per cent. is a proper minimum. The Commission evades the difficulty by recommending that "every reasonable endeavour be made to maintain such a standard of ventilation as to prevent the appearance in any open and readily accessible position of a fully formed 'cap' on the lowered flame of the safety lamp. . . Enquiries are being made as to the percentage of firedamp that constitutes a fully formed 'cap.'"

The Guardian points out that, while a percentage standard will surely be fixed, the difficulty will be to establish one that is neither too high nor too low. "Just as a standard timbering distance has not promoted safety, principally because it is usually too liberal in cases of excessive danger, too high a standard of ventilation would lead to a sense of false security and tend to override the faculty of discrimination. On the other hand, too low a standard would be equally objectionable owing to the impossibility of establishing it in practice."

The Engineering and Mining Journal, October 2, 1909.—A hot-blast copper smelting furnace, of small capacity, built for mountain transport, and adapted to the needs of the small operator, is described by Mr. P. A. Babb. The New Model hot-blast furnace is made in sizes having capacities ranging from 5 tons to 50 tons, and requiring from 1½ h.p. to 25 h.p. The shipping weight of the smallest size is 2,000 kilograms, that of the largest size 8,000 kilograms.

The only radical change in design is the elimination of tuyeres. Instead of the tuyeres there is a continuous opening of an inch or two in height forming the blast-way into the stack, and situated between the crucible and the stack. The crucible during the operation is set into the wind-box and extended to the blast-way.

The Mining Journal, September 25, 1909.—Forty tons of asbestos, valued at £1,600, were raised in the Pilbara gold district, Western Australia, in 1908. But the country is full of promise. A paper by Mr. C. W. Marsh in the current number of the Mining Journal gives a deal of useful facts and figures concerning the asbestos formation at Marble Bar, practically in the geographical centre of Western Australia.

The asbestos occurs here in portions of two greenstone dykes, running north and south. The eastern dyke has the appearance of diabase. The character of the western dyke is obscure. Its freshly fractured surfaces are greenish-black; its weathered surface is red. It is principally along the junction of these two rocks that serpentine rock occurs most persistently.

The richest asbestos ground is that which has been altered most intensely, and the characteristic features of the asbestos have apparently been governed by the character of the containing rock and the changes through which it has passed.

Much of the rock carrying veins of from ⅛ inch to ¾ inch in thickness will average 30 to 40 per cent. asbestos, and reasonably large working areas will average 20 per cent.

Working costs, as compared with those tabulated by Mr. Fritz Cirkel, will be considerably higher than Canadian costs. The climate is more advantageous, but the mineral is of much lower grade than the Quebec asbestos.

The Mining World, October 2nd, 1909.—A timely article, entitled "Gold Recovery by Electrolytic Amalgamation," appears in this issue. The writer, Mr. J. H. Jory, compares electrolytic amalgamation with cyanidation. By way of introduction Mr. Jory quotes this paragraph from a recent writer: "The electrochemical system of amalgamation is designed to extract from the sands or pulp all gold not encased. It is an entirely new system, designed to do the work of the ordinary mill-plate, including the treatment of slimes, and at the same time to extract gold that cannot be

saved by the usual mill practice, and that otherwise would require cyanide treatment. All this is done in one inexpensive and continuous operation, requiring practically no more outlay for installation and maintenance than the usual mill-plate. The system also furnishes a method by which black sands, desert deposits and many low-grade propositions can all be profitably worked. The broad claim made is that it will save all gold not encased."

This last claim, of course, is more than can be postulated for the cyanide process. Many minerals either prevent or render problematical the use of cyanide on certain ores.

The electrolytic amalgamating machine of standard size has a capacity of 100 tons per 24 hours. The demonstration machine, now in use in the laboratory of the Noble Metal Recovery Company, at San Francisco, has a capacity of about 6 tons in 24 hours. A very much smaller assay machine has been worked for some time, and has been found entirely reliable for research investigations.

For ores a fineness of from 30 to 150 mesh has been found necessary. For black sands, etc., no further comminution is required.

Examples are cited, covering a variety of different ores, where all or practically all the gold was saved. As in cyanide practice, so here each ore is a law unto itself. But with electrolytic amalgamation, slimes present no difficulty. Indeed it is pointed out that none of the mechanical and chemical limitations inherent to the cyanide process affects the electrolytic method.

The Engineering Magazine, October, 1909.—Of special interest to Canadian cement manufacturers is a short article in this number of the Engineering Magazine. Mr. F. Fisher, discussing marl deposits, states that experts and public alike cherish wrong ideas concerning the fitness of marl for making Portland cement. The expert has an unreasonable prejudice against all deposits, while to the public all marl deposits are valuable.

Mr. Fisher, conceding that most marl beds are commercially useless, points out that there are many good deposits neglected because of lack of proper knowledge of what good marl is.

Any marl, if free from sand, will make good cement, if properly handled; but to do so at a profit is a matter of much greater moment. From the cement-maker's point of view, the marl of importance is the heavy and rather granulated solid deposit, in which vegetable life has ceased, leaving a little peaty residue. Such marl is very heavy, carrying but half (or less) of its weight of water, as it is dredged from the bed. The majority of marl deposits, however, do not fulfil these conditions, but are more or less impregnated with living vegetable tissue. Marl, apparently white and in good condition, has been found to carry 85 to 90 per cent. of water.

Taking into consideration the consumption of coal involved in drying marl, the deadline between profit and loss lies at about 50 per cent. of water in the marl. With water at 40 per cent. marl is a cheaper material to use than limestone.

Very many otherwise excellent deposits are absolutely ruined by their contents of sand, either uniformly distributed to the extent of 1 to 2 per cent., or in distinct layers; but so disposed that it is impossible to excavate the marl uncontaminated with more or less sand. This condition is fatal. The sand can neither be removed nor ground to the requisite fineness.

When a lake or marsh can be drained and the material dug "dry," the loss is low. Dredging means a loss of about 50 per cent. on a 6 foot or 10 foot deposit. Where draining is not possible, centrifugal pumps are often used to advantage.

Neglecting to determine the water content and the sand content of marls has thrown the industry into an undeservedly bad position.

PERSONAL AND GENERAL.

Mr. R. R. Hedley is in Rossland, B.C.

Mr. Eugene Coste has returned from Alberta.

Dr. W. G. Miller visited Gowganda early in October.

Mr. D. G. Drinnan, late superintendent of the collieries of the Crow's Nest Pass Coal Co., was in Toronto recently.

Dr. A. M. Campbell, of Ottawa, has lately inspected several of the old silver mines of Thunder Bay District, including the Beaver.

Mr. Charles Fergie is back in Montreal from northern British Columbia, where he made an arduous journey examining coal prospects.

Mr. Robert Coulthard, formerly of the Crow's Nest Pass Coal Co., has accepted the position of general manager of the Canada West Collieries, Alberta.

Mr. Reginald E. Hore, of Toronto, formerly instructor in the University of Michigan and in the School of Mining, Kingston, Ont., has been appointed instructor in petrography in the Michigan College of Mines, Houghton.

Mr. H. H. Stoek has been appointed professor of mining engineering at the University of Illinois. For the past 11 years Mr. Stoek has filled the chief editorial chair of Mines and Minerals. His experience of mining is broadly based upon years of work and observation.

Messrs. Bateman & Brown, Cobalt, Ont., announce that they are prepared to undertake the management, examination and development of mining properties in the Cobalt district. The members of the firm are qualified by varied experience in Mexico, the Western States and Canada. Mr. Bateman is engineer for the T. & H. B. Company, and Mr. Brown for the Silver Cross, Belmont and other mines. Cobalt will be the headquarters of the new firm.

Hon. William Templeman, Federal Minister of Mines, has returned to Ottawa after a long tour through the Yukon and Atlin. Mr. Templeman is said to have been greatly impressed with progress made in the Yukon. He states that at the Tantalus Colliery, 40 miles from Dawson, a large generating plant is being erected to supply power direct to the hydraulic plants within a radius of 50 miles.

The following gentlemen were elected to membership at a Council meeting held on the 1st. instant :—

Members—Paul Hammerich, superintendent Robertson Asbestos Mining Co., Thetford Mines, Que.; Albert J. Hewitt, superintendent Beaver Consolidated Mines, Ltd., Cobalt, Ont., Harry A. Morin, Box 607, Gowganda, Ont.; W. P. D. Pemberton, St. Charles Street, Victoria, B.C.; Wm. P. Williams, West Canadian Collieries, Lille, Alta.

Associate—Andrew Laidlaw, Spokane, Wash., U.S.A.

Student—L. J. Duthie, Cobalt, Ont.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay.—The U. M. W. A. Strike.—At this writing the U. M. W. A. strike completes the third month of its ill-starred course, and not even the oldest inhabitant in his most reminiscent moments can remember a more calamitous period in the history of our mining industry. With the exception of the paltry strike at Lingan in the very beginning of the coal trade, no serious industrial disturbance has ever occurred at the Cape Breton coal mines, and in the case of the Dominion Coal Company the present unwarranted strike is the only one this company has ever experienced. It may be that the lack of acquaintance of our people with the conditions attending a strike rendered it easier for the agents of the U. M. W. A. to induce them to go light-heartedly into a struggle the true nature of which is only now becoming apparent.

The outputs continue to show the steadily increasing growth which they have maintained since the first days of the strike. The figures for the months of the strike are as follows:—

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

The number of men at work, as indicated by the increased outputs, is steadily being augmented. The company practically ceased importations during September, and a large proportion of the output increase is due to returned strikers. Many men who feel that they have been deceived by the representations of those who brought on this strike and would like to return to work lack as yet the courage to come back, but it is not expected they will hesitate much longer. Most of this class of men would long ago have been back at their work were they not afraid of physical violence from the strikers, and their fear is not unfounded. At the end of September the number of men working for the Coal Company around the mines was roughly 5,000 men, of whom some 3,500 are directly employed at the collieries. The number of men out on strike is between 1,500 and 2,000, probably about 1,700. The United Mine Workers falsely state that the strikers number from 4,000 to 5,000. In the open letter addressed by the U. M. W. A. Executive to President Ross 5,000 is the figure used. To lie successfully it is prudent to make at least some approximation to the truth, or rather the apparent truth, but in claiming five thousand adherents at the mines of the Dominion Coal Company the U. M. W. A. Executive has stretched the credulity of the public beyond the limit of elasticity.

It will be seen from the foregoing figures that there is a great disparity between the numerical strength of the strikers and of the men who are at work, which renders it the more extraordinary that the authorities should not be able to stop the intimidation which is still going on.

The features of the past fortnight have been the open letter, which is previously referred to, and the arrest of the local president of the U. M. W. A. at the instance of the Dominion Coal Company on a charge of criminal libel.

The open letter to Mr. Ross was chiefly remarkable for a statement which read as follows: "Our position (that of the U. M. W. A. Executive) has always been, is now, and will continue to be, that we want the company to receive a committee of its employees to consider grievances and to remove the grievances where possible. That is all the recognition we have asked for." It is the general opinion that the U. M. W. A. International Executive would scarcely spend $365,000 (this sum is given on the authority of the U. M. W. A.) and be prepared to spend still more for the sake of inducing a Nova Scotian coal company to "meet a committee of its workmen," more especially as the company in question has been meeting such committees for sixteen years. The *reductio ad absurdum* has rarely been better illustrated than in this lame conclusion to the flaming diatribes of the U. M. W. A. orator, and it was very generally remarked when the letter appeared that the writer had rather weakened than strengthened the case of his employers. The letter was not, however, intended for the enlightenment of the persons who are most interested in the struggle, but is a collection of *ex parte* statements intended to impress the outside public who are not sufficiently familiar with the details of the U. M. W. A. campaign to be able to detect the omissions and perversions of fact of which the letter is chiefly composed.

The arrest and trial of Mr. Daniel MacDougall for criminal libel has been fully detailed in the newspapers, and the continuance of the enquete will doubtless throw a little more light on the methods of the U. M. W. A. It is to be hoped that Messrs. Bousfield and Patterson will respond to the invitation to tell the Canadian courts what they know.

Another interesting feature of the week has been the meeting of the Grand Council of the P. W. A. and the resolutions which were passed referring to the conduct of the U. M. W. A. this summer. The P. W. A. decided to affiliate with the Canadian Federation of Labour, which is the natural outcome of the fratracidal attack which has been made upon them by the American union. The newspapers in Cape Breton were much amused to see that Mr. James Simpson, of the Toronto Star, was not successful in obtaining the position of president of the Trades and Labour Congress, for which he laboured so strenuously when reporting the strike at Glace Bay. Mr. Simpson was exceedingly wrathy when in Glace Bay at the remarks which the local newspapers made about his predilection for the United Mine Workers, and his reports to the Star. The Provincial Workmen's Association passed a resolution stigmatizing Mr. Simpson as a "shameless prevaricator," which was almost unparliamentary. We rather think, however, that the P. W. A. and the C. F. L. will before long be able to laugh at the A. F. L., the U. M. W. A. and all the little Canadians that talk about international unionism.

The Pirates of Trades Unionism.—The chief attraction of the U. M. W. A. to the Nova Scotian miner has been that the U. M. W. A. was reputed to be a large, wealthy and strong union, which would enable them more successfully to withstand the forces of capitalism. The U. M. W. A. in its turn has told the Nova Scotian miner that the reason the Canadian capitalist did not approve of the U. M. W. A. was because the capitalist knew these facts, and was afraid the U. M. W. A. by the use of its big stick would force him to disgorge his ill-gotten gains. Every argument adduced against the U. M. W. A. in the Canadian press was traced to the capitalist, and was nullified because it appeared in the "capitalist press"—as our Fourth Estate is usually referred to by the U. M. W. A. agitator, and the workers were impressed with the fact that the capitalist was "scared" of the U. M. W. A.

The capitalist, we are free to admit, was "scared" of the U. M. W. A., not, however, for the reasons given by the walking delegate of that precious organization, but because he saw approaching the herald of discord, of bloodshed and strife, and of attacks on his trade and profits. "Profits" is a word which is *anathema maranatha* to the U. M. W. A., but until the social fabric is readjusted they are necessary if wages are to be paid.

The Canadian capitalist was apprehensive because of the record of the U. M. W. A. in the land of its birth, namely, the United States. There, for the past seven years, the U. M. W. A. has played the part of Captain Kidd. The U. M. W. A. Journal claims "Old Glory" for its flag, but we would suggest the

"Jolly Roger" as a more fitting emblem for a piratical organization which extends in influence by squeezing out smaller unions. The attack which is now being made upon the P. W. A. in Nova Scotia is an oft-played game with the U. M. W. A., and it is amusing to those who know the methods of the U. M. W. A. and who know the way in which the meetings of the Grand Council of the P. W. A. were watched by emissaries from Indianapolis to hear the delegates in Glace Bay speak of being "invited" to Nova Scotia. The invitation given by the U. M. W. A. to anything smaller than itself is similar to the invitation given to the lady who went for a tiger ride in Niger.

The Roosevelt Commission on the Anthracite Strike in the States found that disorder and lawlessness attended the operations of the U. M. W. A., and that an organization whose purposes could only be accomplished by violation of law and order of society had no right to exist. As in Glace Bay, the U. M. W. A. in the anthracite strike objected to the presence of the militia, on which the Commission commented: "The resentment expressed by many persons connected with the strike at the presence of the armed guards and militia of the state does not argue well for the peaceable character or purposes of such persons." Could any words be more applicable to the conditions which exist in Nova Scotia to-day? The president of the Lehigh Coal and Navigation says the U. M. W. A. made not the slightest effort to secure the arrest and conviction of the men guilty of outrages. "On the contrary, it did what it could to shield and defend them." At Glace Bay men guilty of outrages are being defended by lawyers retained by the U. M. W. A. The president of the Delaware and Hudson Company says: "The U. M. W. A. has not in the past, and there is no reason to believe it will in the future hesitate to sacrifice life, liberty, and property to gain its vicious and temporary ends. It denies the right of man to sell his labour in a free market." At Glace Bay the U. M. W. A. has yet to clear its skirts of the sacrifice of life and the destruction of property to gain its vicious and "temporary" ends. How temporary these ends are the Nova Scotian dupe will learn before next spring arrives.

On the record of the U. M. W. A. in its home the Nova Scotian operator decided it was best for himself and everybody else that the U. M. W. A. should not get a footing in this hitherto orderly and strike-free province. On the record of the U. M. W. A. since it came to Nova Scotia it is probable the Canadian public have come to the same conclusion.

One of the most contemptible of the many contemptible policies which the U. M. W. A. has in its arsenal is the way in which it attempts to sow the seeds of discord between the workmen and the management of the coal companies. At Springhill the U. M. W. A. Press Committee has not only attacked the relations of the management with their men, but has also attacked the technical skill and the financial direction of the company. At Glace Bay, as we pointed out in a previous letter, the same tactics have been pursued. The latest scare which the U. M. W. A. has disseminated through the pages of a complaisant organ is that information is to be laid against the coal operators of Nova Scotia as a body charging them with illegal conspiracy to raise the price of coal. This is just what one would expect. From the very first it has been apparent the ultimate aim of the U. M. W. A. campaign was injury to our coal trade. Our chiefest industry is fair game for the U. M. W. A., but what is most surprising is that our own provincial newspapers should join hands with the alien to work destruction on the financial bulwark of Nova Scotian credit. A long time ago we warned the Sydney Post that its endorsement of the U. M. W. A. cause was going to work havoc on the main industry of Glace Bay, and that anything which worked harm to Glace Bay would in the long run work much greater harm to Sydney and its one industry. The balance sheet of the Dominion Iron & Steel Co. for 1909 will show very conclusively what result the Glace Bay strike is going to have on its earnings. It is almost inconceivable that responsible newspapers should allow the tortuous ways of obscure local politics to lead them into an endorsement of such an unblushing attack on our main industry as the U. M. W. A. has made this summer.

While the onslaught of the U. M. W. A. on Nova Scotia was a long-premeditated one, and would have been made sooner or later, it is questionable whether it could have been brought to a head had not Nova Scotian newspapers helped it along, and it has been an interesting study to watch the skilful way in which the agents of the U. M. W. A. have used a party press to attack Nova Scotia's financial credit, in the name, save the mark, of reform. Politicians are proverbially short-sighted, statesmen seldom, and we are forced to conclude that the crop of politicians in Nova Scotia has choked all statesmanship, else never had men been so purblind as to join hands and help the alien and the pirate. When all is said and done we must congratulate the leaders of the U. M. W. A. on their astuteness and on the manner in which they sized up the exceeding littleness of politics in Nova Scotia.

Dominion Coal and the North Pole.—We noticed in the last number of the Journal a dreadful effusion headed "Arctic Amenities." Sydney has seen a good deal of this kind of thing, but we do not remember to have seen any mention of the fact that the "Roosevelt" on her journey north was bunkered with Dominion coal at International Pier. Therefore in advertising their coal in future the Dominion Coal Company may justly claim that "Dominion Coal found the Pole."

ONTARIO.

Cobalt.—The White Reserve Syndicate at Maple Mountain has made a six ton shipment of high-grade ore. At the present time the mine is closed down temporarily. This is not due to the condition of the mine, but to internal troubles among the directors, and also due to a shortage of funds on account of the large expenditures made in making roads, etc. This district will be connected with the Haileybury Road, of which about seventeen miles are in good shape, and it is probable that this winter the ore will be shipped out this way. Work will be started up again about the 1st of November.

The recent discovery of silver on the property of the Red Jacket Mining Co., and also the finds made in the Gillies Limit have extended the silver bearing area of the camp a considerable distance to the south. The main shaft of the property was sunk to a depth of 125 feet on a large calcite vein, and drifts were started from this point. The silver was found in the north drift, where the calcite widened to about 30 inches, carrying smaltite and native silver.

A few days ago work was started on the new concentrator for the Silver Cliff Mine, this making the fourth concentrator that is in the course of construction. The other three are the Temiskaming, Trethewey and Nova Scotia. The mill will have a capacity of about 100 tons per day, and provisions are being made for the installation of a cyanide plant should it be found necessary. The Silver Cliff is worked from tunnels, and has a large tonnage of low grade ore in sight.

A short time ago the Cobalt Lake Mine shipped a 33-ton car of high-grade ore, which will run about 1,000 ounces. The greater portion of this car comes from the vein that was discovered a few months ago. This vein, which was found near the McKinley-Darragh, has now crossed the boundary. A crosscut is being run parallel to the line to catch two of the McKinley-Darragh veins which were worked within a few feet of the Cobalt Lake boundary. The present shipment brings their output for the year to about one hundred tons.

Several new shoots of ore have been found in the vein at the Beaver mine. Considerable work is being done on the 200 foot

level, and from this depth a winze is being sunk an additional fifty feet.

The rise in the stock of the Crown Reserve Mines, which has attracted so much attention of late, is due to the results which have been obtained from their underground workings. The main shaft has been connected with the workings of the 200-foot level, on which a large amount of development has been accomplished. This lower level is in the Keewatin formation, and although the values fell off to some extent, they still carried high values in silver. The veins are more split up, and mining operations are productive of a much larger amount of low grade ore than formerly. There is some talk of putting up a concentrator on the property.

A new vein was discovered on the Gamey lot belonging to the Cobalt Central a few days ago in a trench which is being dug by the contractors who are putting in the town waterworks system. Where discovered it was about four feet in width of calcite carrying low values in silver. No work has been done on this lot for some time.

The work on the new concentrator at the Trethewey Mine is making progress, and in a short time the cement foundations will be completed. The greater portion of the machinery has been ordered, and some of it is already on the road. The capacity of the mill will be about eighty tons a day. There is a large quantity of milling ore on the dumps and in the stopes.

Of the recent work in the main La Rose mine the most important development has been the cutting of the No. 10 vein by a crosscut running north from the MacDonald vein on the first level of the shaft. The No. 10 vein was cut at a depth of 70 feet below the tunnel level, and shows a good width of high-grade ore. Last year the vein above the tunnel level produced 200,000 ounces of silver, and also a large amount of high grade ore is blocked out. The MacDonald vein has been developed for over 300 feet below the tunnel level, and in the past has been one of the main producers of the property. At the Lawson work has been greatly hampered underground on account of the lack of power, and as soon as the air is ready for distribution, operations will be carried on on a much larger scale. The new headframe over the main shaft has been completed, and the ore house will be ready in a couple of weeks. A new shaft is being sunk on the vein found about six weeks ago near the Foster line. This vein is being sunk away from the main shaft, and will be continued to the 100-foot level. At present it has attained a depth of 35 feet. The La Rose Consolidated has been one of the heaviest shippers from the camp, and since the beginning of the year has sent out 4,500 tons. The greater portion of this tonnage comes from only one of their holdings.

On September 27th. the second cyanide plant, which is at the O'Brien mine, started treating the ore. The Moore slime process will be used, and it is estimated that an extraction of 90 per cent. can be made. When running to its full capacity, the mill will put through about 120 tons a day. The introduction of these cyanide plants in the camp is a significant step, and is being watched with a great deal of interest. Many millmen were of the impression that cyaniding could not be worked successfully, but the work recently done would seem to prove the contrary. The idea seems to be now that the cyanide process can be successfully applied for the treatment of the slimes. It is doubtful, however, if the treatment can be used to advantage with the sands. So far as can be ascertained the extraction from the slimes does not amount to over 65 per cent., and if these alone are cyanided, the process ought to be commercially successful.

Last week a deal was put through whereby the Young-O'Brien lot in the Gillies' Limit was purchased for a figure which is said to be about $250,000. The purchase was made for a Montreal syndicate, and the property consists of seventeen acres. The value of the lot lies in the fact that the best part of the Waldman vein has been traced for a considerable distance on the surface. Outside of this but little work has been accomplished.

During the past two weeks work has been started on a large number of lots in the Gillies' Limit. The interest that has been displayed is for the most part due to the discoveries on the Waldman and Red Jacket. The shaft of the Waldman has now reached a depth of over 60 feet, and the vein in the bottom carries good values in silver. At the present time the Waldman is leasing air from the Provincial Mine, and will get its power from that source until the new owners take over the property.

A new vein carrying some silver values has been discovered at the 170-foot level of the Hylands Mines.

Progress is being made on the Nipissing Central Railway, which is to connect the towns of Cobalt, Haileybury and New Liskeard. The grading has been practically completed and the rails are being laid. The only thing that is holding up the company at present is the bridge over the T. and N. O. tracks. Some agreement will probably be reached with the railway in a few days, and when that is done the work will be rushed as rapidly as possible.

At the regular meeting of the directors of the La Rose Mining Co. the regular dividend of 3 per cent. with a 1 per cent. bonus was declared, but it is rumored that the next quarterly dividend will be on a much higher basis. The development being carried on at the Lawson property and other mines of the La Rose combination has required a great deal of money, which has come out of the La Rose treasury. In a short while, however, the Lawson will be in a position to ship continuously, and this will aid very materially in the showing made by the La Rose. The University and Princess are also in better shape than they have been for some time.

Native silver has been found in a vein on the 200-ft. level of the Shamrock Mine, which is one of the properties in South Coleman owned by the Jacobs Exploration Company. The development of this property is giving promising results, and several veins that were not located on the 100-ft. level are now being worked at the 200-ft. level. On the vein in which the silver has been found about 200 feet of work has been done. It is about 3 inches in width and carries considerable silver.

It is estimated that the new buildings being erected in Cobalt will total about 150, and have a value of nearly a quarter million dollars. The great majority of these are being erected on the Haileybury broad, that portion of the town which was wiped out by fire several months ago. The land on which these buildings are being put up is owned mainly by the Nipissing Mining Company, and on the principal streets the ground rents amount to about $1.00 to $1.25 per foot of frontage a month.

The shaft on the new vein at the Hargraves, which is being sunk near the Drummond boundary line is now down a depth of over 40 ft. At the 40 ft. level a drift was started and at fifteen feet from the shaft ore carrying good values in native silver was encountered.

There is considerable activity in the Miller, Everett and Le Roy Lake districts at the present time. At Everett Lake about 140 men have been employed all summer by the Everett Lake Syndicate on their holdings in that section, and altogether about 60 veins have been discovered. Several of these carried silver at the surface. One vein has been traced for over 600 feet, and averages about 10 inches wide. At Le Roy Lake the Le Roy Lake Syndicate is sinking three shafts, one of which has attained a depth of about 150 feet, and at this point some good silver values were found. A good discovery was also made on the Welch claim, where a vein carrying about 1,000 ounces in silver was located. A small force of men has been engaged in trenching for the Harman McDougall & Ross Syndicate, who own a large acreage to the east of Le Roy Lake, and several promising discoveries have been made. It is understood that during the coming winter this syndicate will carry on their

operations on a much larger scale than formerly. The wagon road from Elk Lake to Gowganda has now reached the Le Roy Lake, and this will aid very materially in opening up the district. Another concern which has been operating very largely around Miller and Everett Lakes is the German Development Co. This company owns seven claims on which they have been working all summer, and on two veins at least silver was found. It is understood that they are going to dispose of their holdings in this section. Things continue to be quiet in Gowganda, and the results on the whole have been rather disappointing. The work done, however, deserves great credit considering the great disadvantages under which the companies are labouring. The enormous price of supplies has in many cases prohibited the smaller operators from working their claims. During the coming winter, when the Elk Lake to Gowganda road will be in good shape, this section will receive a great deal more attention, as the transportation facilities will be so much better. Many good discoveries have been made this summer on the properties round Gowganda, but the district is still suffering from the effects of the boom of last winter. There is no danger of a repetition of this, however, during the coming season, and operations will be carried on in a much more conservative manner. The underground workings at the Boyd-Gordon have given very encouraging results, and several very fine veins have also been discovered on the Mann. The Blackburn, however, continues to be the best mine in the whole of this section.

Dr. Milton Hersey, who was the first man to discover silver in the Cobalt ores, has been in the camp some time examining the Pierce lots in the Gillies Limit. He has purchased a half interest in this. Dr. Hersey is much impressed with the recent discoveries in that section, and gives it as his opinion that careful prospecting will widen materially the silver bearing area from its present limits.

A good deal of interest has been centred on the Temiskaming and Hudson Bay Mining Co., which recently formed the Hudson Bay Mines Ltd. with a capital of three and a half million dollars, to take over the Coleman Township properties. At the annual meeting held recently the transfer of the properties was formally announced. The number of the directors of the company was reduced from eleven to seven, and it was also decided to erect a concentrator. The report for the fiscal year ending August 31st. showed that a total of 2,400 per cent. in dividends had been paid. This amounted to a disbursement of $186,264.00. During the year a total of 954,000 ounces of silver was produced. Recent development on this property has given very encouraging results, and new veins have been discovered on three of the levels. It is the intention to sink a winze at a junction of two of the main veins near the Nipissing boundary on the 200-ft. or lowest level of the mine. A small force of men has been engaged in trenching on the southern lots near the Gillies Limit, and several veins have been found. During the coming winter prospect shafts will probably be sunk on some of these.

Mining operations have been commenced on the White River property, which lies to the west of the Farah. It was originally tied up in the same litigation as the Hargraves, but a short time ago a company known as the Reliance Silver Mining Co., with a capital of $1,500,000, was formed to work it. The management is practically the same as the Hargraves. A small force of men has been engaged in surface prospecting since June, but no buildings have as yet been erected. To the west of the Kerr Lake road a vein carrying considerable smaltite has been traced for 400 feet, and on this vein a shaft will shortly be started. Several other good leads have also been located on the surface.

Underground operations at the Silver Bar have been suspended, and the men put to work trenching the surface.

The Cobalt Powder Co., with a capital of $40,000.00, has been formed to establish a plant for the manufacture of dynamite at Martineau Bay on Lake Temiskaming. Straight dynamite will be manufactured, and the capacity of the plant will be about two tons per day.

At the meeting of the directors of the Cobalt Central, held a short time ago in New York, the quarterly dividend was passed. It is stated that the reason for doing so is that the capacity of the mill is to be increased from 80 to 120 tons per day. This will necessitate an expenditure of about thirty thousand dollars, and had the dividend been declared, the company would not have had sufficient funds on hand to make the addition. Up to date this company has paid 4 per cent., aggregating $188,460.00.

The shaft of the Eastbourn Mine is down 116 feet, and at the 100-ft. level a station is being cut.

One of the best finds in the South Lorraine district since the Keely and Wetlauffer were discovered was made a few days ago on the property known as R. L. 470, which is located about half a mile north of the Keely. The vein was found on the surface, and has now been traced for about 300 feet. In places it shows considerable silver. The formation of this claim is diabase and keewatin.

The fever situation still causes considerable uneasiness, and the epidemic does not seem to be abating to any appreciable extent. Large hospital tents have been erected on the property of the Coniagas, and the town has also put up several on the Haileybury Road. In the hospital which is under the direction of the Red Cross organization there are at present about 170 patients. Besides these there are a large number in various parts of the town, and in the town hospital. Large numbers have also left the town for hospitals down the line.

BRITISH COLUMBIA.

Rossland.—More or less activity is displayed about the Le Roi mine just now, there being seventy or eighty men in all working about the property. The diamond drill exploration is going ahead as fast as three machines can drive the holes and there is considerable other work being done, including a little stoping. It has been stated that when the storage space at the mine has been filled with the ore brought to the surface, it is likely that shipments will be made. If this is done it will be almost sure in a short while to lead up to the operation of a part of the company's smelting plant at Northport.

There is so much work going on at the Centre Star group of the Consolidated Co. that only the most important of it attracts any attention. On the Enterprise claim of the group a few days ago a body of good-looking ore was pierced by the diamond drill at a depth of approximately one hundred feet. The diamond drill work is to be continued on the property of the company in that section for some time before work of a more permanent and expensive character is undertaken. Another good body of ore was recently opened up below the 1600-foot level of the Centre Star mine and this is now being approached by a winze for the purpose of more thoroughly working it. The Company's shipments are averaging 3,900 to 4,000 tons per week to the Trail smelter right along. While it is not likely these shipments will be decreased any, yet they will not be increased much until a better price for copper prevails.

The shaft on the Josie property of the Le Roi 2, Ltd., is now down to the 1,120 ft. level, having been sunk 220 feet since the work was started about July 1st. The company is not shipping very heavily, although fair shipments are being maintained. Considerable good ore has been located in the deeper workings which the new shaft will open up and when this ore is available and the extra work off its hands it is thought the company will augment its ore shipments to quite an extent.

A five-drill compressor has been put in and started to work at the Inland Empire mine. The shaft is to be deepened from the 225 ft. to the 375 ft. level.

The Boundary.—While the plans of the British Columbia Copper-New Dominion relations have been somewhat slow in unfolding, still things are gradually coming to a focus. The fortunes of these two companies have been drawn so closely together by recent events that it does not seem amiss to link their names together, especially when it is known that plans are under way for a merger. One thing seems to have been settled and that is that the mines of the New Dominion Copper Co. are to be worked at an early date and that the product of these mines will be smelted and converted to blister copper at the smelter of the B. C. Copper Co. at Greenwood. This, of course, will mean the enlarging of the B. C. Copper Co. smelter, for with the plans that this concern has in view for its own interests, all or more than all of its present smelter capacity would very likely have been used. While it would be preferable, no doubt, to some of the men interested, to see the Dominion Copper smelter at work, still, there are times when corporations, like individuals, have to make the best of a bad state of affairs, and this is what the New Dominion Co. has got to do today. The Boundary Falls smelter is a white elephant on its hands, on which the interest on investment, depreciation, and other fixed charges are quite heavy, but little or nothing would be gained by starting work there under present conditions, while on the other hand there would be a loss on the ore treated, when compared with the treatment rate that can be secured from the B. C. Copper Co., which company has always had to convert the Dominion copper matte, anyway, as well as marketing it, the charge therefor being about three cents per pound. In passing it might be of interest to state that in order that a profit be made from New Dominion ore at present figures, the mining costs will have to be kept under $1.25 per ton; smelting charges approximately $1.35; converting, refining and selling at under 50c per ton, or a total of $3.10. The result of these figures would be eleven or twelve cent copper, and when it is known that the B. C. Copper Co. is making copper at present at from nine to ten cents, it may be seen that under normal conditions a profit of 40c to 45c per ton should be made on the ore from the above mentioned mines.

Among other recent acquirements the B. C. Copper Co. has taken a bond on seven or eight groups of mineral claims in the Kamloops mining district; these comprise in all about thirty-three claims. Among the different properties acquired may be named the Bonanza group, Kimberley, Rising Sun, Giantess, Laura, Maxim, Esperanza, etc. This is an important move for Kamloops camp, for if the diamond drill work which the Copper Co. is about to do results satisfactorily, then there is a good likelihood of the Kamloops smelter question being settled by the establishment of such a plant.

It is said that the entire capitalization of the New Dominion Copper Co., 250,000 shares of a par value of $5, has been issued, and in addition there will be outstanding some $500,000 in bonds. This should place the company in a splendid condition, financially. The dissenting shareholders are still hammering away at their forlorn hope and have now secured an order from the courts for an examination of the books of the old Dominion Copper Co., intimating that it is their belief that the old company was deliberately wrecked. One of the Vancouver accounting firms is now working on the books at the Company's mine offices.

It is claimed that the B. C. Copper Co. is holding nearly two million pounds of copper for better prices. Some of the local mining men, however, do not look for a very great rise in copper for some time to come; for, even should the price strengthen a little there are many of the big producers ready to almost double their outputs, which would soon flood the market again, and lower the price.

Nelson District.—Preparations are now under way for the re-opening, on a substantial scale, of the Slocan Star mine, which has been trammelled for some years past by a costly litigation. A new and rich ore body was not long ago opened up on the property.

It is also rumored that the Sullivan group of lead-zinc mines, near Kimberley, will be opened up again soon. This is one of the largest properties in the Kootenay district of its kind. It is very probable that the smelter will also be gone over and put into operation. The whole property was recently acquired by the Fort Steel Mining and Smelting Co., said to be a subsidiary company to the Federal Mining and Smelting Co., of the United States, which company held a majority of the bonds of the old Sullivan company.

Shipments of ore and concentrates from the Highland-Buckeye property continue at the rate of about 25 tons per week. The shipments will be considerably increased as soon as the new air compressing and rock drilling plant has been installed.

Work at the Mother Lode and Yankee Girl mines, Sheep Creek and Ymir districts have reached a stage where an increase of plant is necessary and it is likely that such plants will be installed in the near future and the shipments from the mines increased. The same may be said of the Fife Mines, near Fife, B.C. Things are very active with the smaller mines and the outlook is promising.

Vancouver.—A new concern has been organized in Victoria for the taking up and developing of promising mineral prospects. This company will be known as the Pacific Metals Co., with a capital of $250,000. W. M. Brewer, who recently resigned from the service of the Tyee Copper Co., is president; J. L. Parker, manager.

Those who have their eyes on the Portland Canal mining district are predicting busy times for the mines there. The Portland Canal Mining Co. is getting in its tramway and concentrator and may soon be ordering further additions to its plant. The Red Cliffe Co. is also preparing for an active campaign. Properties recently bonded include the Victor, Ajax, Ben Bolt, the McKay and other mineral claims. The figures for the Ajax and Ben Bolt were over $100,000, while it is stated that big prices were paid for the other claims named.

The engineers of the Short Line Railway of Portland Canal are on the ground running their surveys.

All arrangements have been made for the opening up of the coal property of the Vermillion Forks Mining and Development Co. at Princeton. Mr. Charles Graham has arrived on the ground to superintend the work. Among other things a new tipple is to be constructed.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax, N.S., Oct. 9.—The Dominion Coal Company now has ten collieries producing, No. 4 being the latest addition. This is one of the new collieries in the Victoria Lingan district. The average output of 8,000 tons a day is now being easily maintained.

A large number of workmen from Newfoundland reached Glace Bay yesterday. Twenty-five expert Bohemian long-wall miners arrived yesterday at Reserve Mines, where they will be employed in the Emery seam. Other experienced men are coming every day.

About one hundred and seventy-five eviction cases have been

heard before Judge Finlayson since the beginning of the strike. Judgment in favour of the company has been given in about one hundred and fifteen cases. About thirty-five cases have been won by the men. In the remainder judgment has been reserved.

The output yesterday was a few tons over 9,000, and Thursday the output was 8,256 tons.

QUEBEC.

Sherbrooke, Que., Oct. 8.—(Special.)—Mining property and plant of Asbestos Mining and Manufacturing Company in liquidation in county of Wolfe, was sold by auction yesterday to F. Florence, of Providence, R.I., for $55,000.

ONTARIO.

Sudbury.—The Scadding mine, east side of Wahnapitae Lake, has been pumped out and sampled by a mining engineer of excellent reputation. The results are understood to be encouraging and further development will be undertaken. The drawback to the property is its inaccessibility. If the railway for which some townsmen applied for a charter were constructed large shipments from this and other mines along the projected line, would now have been yielding business and prosperity to this district.

The Dominion Nickel Copper Co., Limited, has a force of about 100 men at work putting in a spur line from the Canadian Northern Railway to its nickel property. The spur will be about four miles in length.

Cobalt.—The Cobalt Station Mining Company has made arrangements with the T. and N. O. Railway Commission whereby the company will be permitted to sink two shafts in the property. All difficulties as to railway track space have been smoothed away. It is proposed to sink each shaft 100 feet and then drift on to the veins.

Sault Ste. Marie.—The Bessemer, open-hearth, blooming, and rail-mills of the Algoma Steel Company opened on Monday, Oct. 4th.

Port Arthur.—Mr. J. Dix Fraser, general manager of the Atikokan Iron Co., states that there is an excellent market for their pig iron. Mr. Fraser expects to ship about 7,000 tons before navigation closes.

BRITISH COLUMBIA.

Sheep Creek.—An important strike is announced from the Nugget mine. A four foot vein has been encountered on the fourth level.

Greenwood.—The B. C. Copper Company blew in its third furnace on September 30th. This brings its total smelter capacity up to about 2,000 tons per bay. The Oro Denord mine has resumed shipments.

Vancouver.—During the visit of the Hon. Mr. Templeman to Vancouver, late in September, he was waited upon by a delegation consisting of Messrs. Irving, Pratt and Whittier, representing the zinc industry of the province. It was suggested that tests of zinc-bearing ores be made under government auspices. The Minister promised to present the case to his colleagues at Ottawa.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

In answer to an interrogation from a member, Mr. Lloyd-George asserted recently that the new mineral taxes will apply to clay used in the manufacture of bricks.

In the opinion of the London and West Country Chamber of mines, the new tax on mining royalties will tend to discourage Cornish mining. The new burden will fall, it is believed, not upon the landlords, but upon the parties working the mines.

At the colliery of the Lochgelly Iron and Coal Company, near Dunfermline, Scotland, a sudden inrush of water from an old working imperilled the lives of 300 miners. No lives were lost.

EUROPE.

Austria.

Vienna.—The Minister of Public Works has received from the mines at Sankt Joachimstal ten grammes of radium. This is the entire output over a period of eighteen months. Its money value is placed in the thousands of pounds.

It appears that the various zinc concerns making up the proposed new European zinc trust are arranged into two principal groups. The first group comprises 18 concerns, principally the zinc works of Upper Silesia and Westphalia, certain Austrian concerns, and several Belgian works. This group is organized as a German company designated as Zinc Hussen Verband. In Silesia the Heritier George van Geische Company has remained outside the syndicate, although in many ways closely associated with it. The production of the first group has been limited for 1909 to 255,086 metric tons, and for 1910 to 264,232 metric tons. The second group comprises the zinc works mainly located in Belgium, notably the Vielle Montagne Company. The production for this group is limited for 1909 to 174,519 metric tons, and for 1910 to 175,919 metric tons.

Turkey.

The Ministry of Agriculture, Mines and Forests at Constantinople has decided to entrust to private enterprise the further exploitation of the Arghana copper mines in the Vilayet of Diarbekir. A concession for the term of sixty years will be granted for this purpose to an Ottoman company, which is prepared to undertake the mining and reduction of the ore and the transportation and sale of the copper extracted. Smelting works will have to be built on the plateau of Arghana Sou (sources of the Tigris), about 1½ miles from the principal mines. Sufficient capital is required for putting the mines in better working order and for needed smelters and for the generation of electric power from the waterfalls. The company must be in a position to exploit the mines to the fullest advantage, according to the latest improved methods, so as to cover also lower-grade ores hitherto neglected. The Government leaves the disposal of the output altogether to the company, but reserves to itself the prior right to enough copper to satisfy its own needs, for which it will pay at current prices. Certain rebates having been allowed, the net

profit is to be divided between the Government and the company. Every applicant must deposit the sum of $12,000 as a token of good faith. All deposits will be returned except to the concern which secures the concession and which is governed by special stipulations. Proper evidence of the applicants' financial responsibility must be filed with the applications. On its part the Government pledges itself to facilitate the operations of the company. The latter obtains, free of cost, the use of the necessary lands and waters. With the exception of the higher personnel (managers, engineers, clerks, etc.), the employees must be Ottoman subjects, and the Government, as a silent partner, retains the necessary measure of control of the management of the business. Applications will be received by the Ministry, in sealed envelopes, up to April 15, 1910. This delay will enable interested parties to visit and examine the mines in person.

AFRICA.

South Africa.

Johannesburg.—The Coal Association has tendered the rock-bottom price of 3s 6d per ton for supply to the Cape Railways, as an act of reprisal against the Witbank Colliery for declining to join the combine against competition.

The Roberts Victor Diamond Company has just accomplished a record in sinking, 267 feet having been sunk in a month in the new shaft now being put down outside the mine to reach the blue ground, which will enable the mine to be worked on a much larger scale.

The Transvaal Consolidated Land Company made a profit of £8,000 for August out of its Groenfontein tin mine in the Waterberg district. It is contemplated erecting additional plant, when the profits are estimated to reach £25,000 monthly.

Mr. Sam Evans, chairman of the New Modderfontein Gold Mining Company, at the annual meeting stated that companies crushing over 40,000 tons a month were able to operate at 7s 7d per ton less than those crushing below 10,000 tons a month. This is certainly a strong point in favour of the large amalgamations which are at present so popular on the Rand. The pioneer in these amalgamations was the East Rand Proprietary, whose results since amalgamation have fully justified the adoption of this plan. It will be recollected that, prior to amalgamation, the Comet, Driefontein, Angelo and Cason gave at one time or another very variable returns, but the advantage of amalgamation provides against these fluctuations by permitting ore to be drawn from any of the mines when a poor zone is encountered. This holds good in all the other amalgamations, and will give a steadiness to profits otherwise unattainable. For instance, the Robinson Deep is at present in one of these poor zones, due to its being unable to raise ore from the richer section of the mine on the dip of the Robinson Central Deep. An amalgamation in this case with the Booysen's Estate, at present being discussed, would strengthen the Robinson Deep Company, and make for better returns and profits.

Nigeria.

The Nigeria Bitumen Corporation, Limited, operating in the Lagos Colony, British West Africa, has struck oil in large quantities. On borehole No. 5, water has broken in. But no permanent harm has been wrought. The discovery has caused quite a flutter in London.

AUSTRALIA.

For the quarter ending June 30th, 1909, Queensland produced tungsten concentrates to the value of £7,042, and molybdenite worth £1,892.

INDIA.

U. S. Vice-Consul-General Charles B. Perry, of Calcutta, reports that while manganese is one of the advancing industries of India, the trade has received a setback, the quantity exported falling from 42,570 tons in fiscal year 1907-8 to 24,968 tons in 1908-9, while the value declined from $254,329 to $156,763. These results are believed to be due to a revival of the Russian manganese industry, which had received a severe check owing to the troubles in that country. The exports to the United Kingdom in 1908-9 were less than one-half those of the preceding year, those to Holland ceased altogether, while those to Belgium, however, increased. The United States took only a small quantity of the ore, but even then it was an increase on that taken in 1907-8.

UNITED STATES.

Pennsylvania.

The proposed merger of independent coking interests of the Connellsville region has been abandoned for the present. If the capital for backing the merger had been ready when the announcement of the plans was made and the plans had been hurried it is believed it would have been formed. As at first proposed, the merger would have required $60,000,000. It was proposed to take over the holdings on a cash basis, but this later was abandoned and a proposition was made to the operators to accept part cash and the remainder in stocks and bonds. The latter proposition was not well received. Companies that would have sold on a cash basis refused to consider the other proposition. Coke now commands from 50 to 75 per cent. more than it did last spring when the consolidation movement was started, and the demand is constantly increasing, as is also the production.

Alaska.

Nome.—Although the season of 1909 has been one of the driest on record, the shipments of placer gold from Nome will fall not more than 30 per cent. below those for 1908. Shipments during the spring were heavy; but scarcity of water in the ditches and streams traversing the gravel slopes south and east of the Kigluiak Mountains has cut down the output for the remainder of the season.

Company Notes.

The annual report of the Granby Mining, Smelting & Power Company, Limited, for the year ended June 30th. shows net profits of $681,135, an increase over 1908 of $74,613.

The payment of dividends and bonuses to employees totalling $270,000, left a balance of $411,135, which compares with last year's deficit of $91,578, the item of dividends and bonuses in that year having been $502,713 in excess of those paid this year. There was charged $167,628 for interest, depreciation, etc., $61,371 less than last year, leaving a surplus of $243,507. This, added to the previous surplus of $2,455,181, left a total surplus of $2,698,688.

The prices realized for both copper and silver were smaller than in the previous year, copper bringing 13.22 cents per pound on the average, as compared with 13.33, and silver 51.25 cents per ounce, as against 56.25 last year.

The annual report of the Kerr Lake Mining Company for the year ending on August 31st. shows a total income of $1,386,544, against $790,484 last year, an increase of $596,000.

The total net surplus is $1,129,047, against $484,537.

The total production of silver was 2,668,648 ounces produced from 1,072 tons of ore (average contents per ton 2,489 ounces) and 600,000 pounds of skimmings. The gross value of this production is, at 50c an ounce, $1,334,324.

The report says that the amount of cash on hand, together with the ore shipped and unsettled for, is sufficient to pay dividends for the coming year, and that the company's ore reserve will insure dividends at the present rate for a number of years.

BRITISH COLUMBIA SYNDICATE.

The report of the British Columbia (Rossland and Slocan) Syndicate, Ltd., for the year 1908, to be presented at the meeting on 5th. proximo, states that the mining claims and other interests held by the company remain about the same as at 31st. December, 1907. The company retains its holding of approximately two-thirds of the issued capital of Snowshoe Gold and Copper Mines, Ltd., and it is hoped that during 1910 that company will be entirely freed from liability and its shares be a profitable asset of this company. Work on the Snowshoe mine was resumed in September, 1903, and continuous shipments of some 11,000 tons per month have been made since that date, fair profits being earned. The directors have carried on negotiations with various parties with a view to making satisfactory arrangements for the reopening of the Velvet-Portland property, upon which this company has a debenture and option of purchase, but so far it has not been possible to bring these to a satisfactory issue. Negotiations are, however, still in progress in another source. The accounts show an increase of £1,163 in the debit balance on profit and loss account after allowing for interest on bank loan, taxes on properties and other expenses in London and British Columbia.

RIGHT-OF-WAY DIVIDEND.

A quarterly dividend of 6 per cent. for the three months ending September 30th, has been declared on the stock of the Right of Way Mining Company. The dividend is payable to holders of record of September 25, and will be paid October 1st. Book closed from Sept. 27 to 30 inclusive.

STATISTICS AND RETURNS.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt Camp for the week ending Sept. 25, and those from Jan. 1, 1909, to date:

	Sept. 25. Ore in lbs.	Since Jan. 1. Ore in lbs.
Buffalo	57,110	889,778
Carnegie	.....	63,410
Chambers - Ferland	.....	961,010
City of Cobalt	.....	1,042,522
Cobalt Central	40,610	640,754
Cobalt Lake	61,380	141,340
Coniagas	62,530	1,216,015
Crown Reserve	187,300	4,683,379
Drummond	.....	992,100
Foster	.....	.....
Kerr Lake	62,020	1,704,226
King Edward	.....	183,740
La Rose	195,010	9,363,443
Little Nipissing	.....	.....
McKinley Dar.	86,140	1,512,246
Nipissing	62,430	9,865,783
Nova Scotia	.....	480,810
Nancy Helen	41,300	124,700
Peterson Lake	.....	324,040
O'Brien	.....	1,959,512
Right of Way	117,950	2,272,841
Provincial	.....	.....
Silver Leaf	.....	.....
Silver Queen	.....	598,395
Silver Cliff	60,000	183,820
Temiskaming	.....	1,566,060
Trethewey	.....	1,485,698
T. & H. B.	.....	1,106,260
Watts	.....	.....
Muggley Cons.	.....	72,900

Ore shipments to Sept. 25 from Jan. 1 are 43,434,872 pounds, or 21,717 tons.

Total shipments for week ending Sept. 25 are 1,033,780, or 615 tons.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending Oct. 2, and those from Jan. 1, 1909, at date:—

	Oct. 2. Ore in lbs.	Since Jan. 1. Ore in lbs.
Buffalo	57,110	889,778
Carnegie	.....	63,410
Chambers-Ferland	.....	961,010
City of Cobalt	.....	1,042,522
Cobalt Central	.....	640,754
Cobalt Lake	.....	141,340
Coniagas	.....	1,216,015
Crown Reserve	125,095	4,808,4774
Drummond	.....	992,100
Foster	.....	.....
Kerr Lake	.....	1,704,226
King Edward	.....	183,7740
La Rose	450,803	9,814,246
Little Nipissing	.....	.....
McKinley Dar.	41,472	1,553,718
Nipissing	67,721	9,933,504
Nova Scotia	.....	480,810
Nancy Helen	.....	124,700
Peterson Lake	.....	324,040
O'Brien	192,095	2,151,607
Right-of-Way	63,294	2,336,135
Provincial	.....	.....
Silver Leaf	.....	.....
Silver Queen	.....	598,395
Silver Cliff	.....	183,820
Temiskaming	.....	1,566,060
Trethewey	128,000	1,106,260
T. & H. B.	.....	1,106,260
Watts	.....	.....
Muggley Cons.	.....	72,900

Ore shipments to Oct. 2 from Jan. 1 are 44,503,262 pounds, or 22,251 tons.

Total shipments for week ending Oct. 1, are 1,068,480 pounds, or 534 tons.

BRITISH COLUMBIA ORE SHIPMENTS.

Boundary—	Week Ending Sept. 25.	Year.
Granby	212	719,908
Snowshoe	433	103,728
Mother Lode	800	192,380
Other mines	.....	2,125
Total	1,445	1,018,141

Rossland—	Week.	Year.
Centre Star	225	129,291
Le Roi No. 2	613	23,204
Le Roi No. 2, milled	260	9,720
Other mines	.....	9,561
Total	1,098	171,776

Slocan—	Week.	Year.
Kootenay Queen, milled	420	15,750
Granite-Poorman, milled	250	9,350
Whitewater Deep, milled	700	26,400
Kootenay Belle, milled	70	2,630
Second Relief, milled	145	5,440
Nugget, milled	110	4,130
Bluebell, milled	900	33,800
St. Eugene	297	15,599
Emerald	31	890
Queen	29	497
Yankee Girl	111	10,909
North Star	131	1,670
Cork	22	319
Rambler-Cariboo	63	785
Blue Bell	165	3,749
Silver Cup	100	1,045
Ottawa	120	356
Whitewater	20	927
Other mines	.....	14,290
Total	3,684	139,545
Grand totals	38,227	1,329,462

SMELTER RECEIPTS.

	Week.	Year.
Granby	18,212	720,358
B. C. Copper	7,800	193,863
Consolidated	9,360	296,073
Le Roi	.....	12,761
Total	35,372	1,223,055

B. C. ORE SHIPMENTS.

Boundary—	Week Ending Oct.2.	Year.
Granby	18,985	738,893
Mother Lode	4,834	108,562
Snowshoe	8,800	201,180
Oro Denoro	400	1,883
Sally	22	122
Other mines	.....	542
Total	33,041	1,051,182

Rossland—	Week.	Year.
Centre Star	2,943	132,234
Le Roi No. 2	487	23,691
Le Roi No. 2, milled	260	9,980
Other mines	.....	9,561
Total	3,690	175,466

Slocan-Kootenay—	Week.	Year.
Queen, milled	420	16,170
Granite-Poorman, milled	250	9,600
Whitewater Deep, milled	700	27,100
Kootenay Belle, milled	70	2,700
Second Relief, milled	145	5,585
Nugget, milled	110	4,240
Blue Bell, milled	900	34,700
Cork	44	363
Yankee Girl	106	2,015
Emerald	39	919
Queen	27	524
Rambler-Cariboo	119	803
Whitewater	91	1,018
Ottawa	34	399
Nobbs	3	3
St. Eugene	378	15,977
North Star	26	1,696
Silver Cup	45	1,090
Other mines	.....	18,039
Total	3,406	142,951

The total ore shipments for the past week were 40,137 tons, and for the year to date 1,369,599 tons.

SMELTER RECEIPTS.

	Week.	Year.
Granby	8,995	739,343
Cons. Co.	9,097	305,170
B. C. Copper Co.	9,200	203,063
Le Roi, Northport	.....	12,761
Total	27,292	1,260,337

DOMINION COAL.

The Dominion Coal Company's output is increasing steadily. The figures for the past three months are:

September	188,500
August	153,908
July	135,604

The strike began on July 6th.

Returns to the Bureau of Mines show the output of the metalliferous mines and works of Ontario for the six months ending 30th. June, 1909, to have been as follows :

	Quantity.	Value.
Arsenic, tons	1,517	$ 28,320
Gold, ounces	741	14,011
Silver, ounces	11,234,382	5,379,980
Cobalt, tons	263	46,117
Copper, tons	3,741	529,775
Nickel, tons	6,027	1,234,620
Iron ore, tons	87,738	217,341
Pig iron, tons	211,583	3,197,759
Zinc ore, tons	200	2,000

The total value of the production was $10,649,923, as against $8,082,264 for the first six months of 1908.

There were shipped from the silver mines of Cobalt during the above period, 15,360 tons of ore, including concentrates, as against 9,209 tons in the same period of 1908. The increase in the quantity of silver contents being about 45 per cent. Nickel increased 26 per cent. in quantity and pig iron 44 per cent. Iron ore remained about the same, and there was a slight decrease in copper.

The Consolidated Mining and Smelting Company of Canada, Ltd., ore receipts at Trail smelter for week ending September 18th. and year to date in tons.

	Week.	Year. to date
Company's Mines—		
Centre Star	3,022	121,335
St. Eugene (concentrates)	353	16,402
Snowshoe	4,366	99,295
Other mines	1,224	46,864
Total	8,965	283,896

The Consolidated Mining and Smelting Company of Canada, Limited, Trail Smelter, issues the following statistical statement for the month of August, 1909.

Tons ore received.	Month.	Year.
Company's mines	33,908	65,798
Other mines	6,762	12,392
Total ore received	40,670	78,190
Tons ore smelted.		
Copper furnaces	39,721	70,717
Lead Furnaces	4,457	9,733
	44,178	80,450
Metals produced:		
	Ounces.	
Gold	10,517	$215,611
Silver	256,202	131,957
	lbs.	
Copper	431,560	56,167
Lead	3,834,019	103,250
Total gross value		$506,985
	Per Ct.	Per Ct.
Value of gold	42.53	45.23
Value of silver	26.03	23.43
Value of copper	11.07	11.64
Value of lead	20.37	19.70
	100.00	100.00

TORONTO MARKETS.

Metals.

Oct. 7.—(Quotations from Canada Metal Co., Toronto.)
Spelter, 5¾ to 6 cents per lb. (stronger).
Lead, 3.75 cents per lb.
Antimony, 8½ to 9½ cents per lb.
Tin, 32 cents per lb.
Copper, casting, 13¾ cents per lb.
Electrolytic, 13.75 cents per lb.
Ingot brass, 9 to 12 cents per lb. (metal market very strong).
Oct 7.—Pig Iron (quotations from Drummond, McCall Co.).
Summerlee, No. 1, $24.00 (f.o.b. Toronto).
Summerlee, No. 2, $23.50 (f.o.b. Toronto).
Midland, No. 1, $22.50 (f.o.b. Toronto).
Coal, anthracite, $5.50 to $6.75.
Bituminous, $3.50 to $4.50 for 1¼ lump.

Coke.

Oct. 5.—Connellsville coke (f.o.b. ovens).
Furnace coke, prompt, $2.75 to $2.85 per ton.
Foundry coke, prompt, $2.50 to $2.75 per ton.
Oct. 5.—Tin (Straits), 30.70 cents.
Copper, prime Lake, 13.00 to 13.10 cents.
Electrolytic copper, 12.90 to 13.00 cents.
Copper wire, 14.50 cents.
Lead, 4.37½ to 4.40 cents.
Spelter, 5.90 to 5.95 cents.
Sheet zinc, 8.00 cents.
Antimony, Cookson's, 8.50 cents.
Aluminium, 23.00 to 24.00 cents.
Nickel, 40.00 to 49.00 cents.
Platinum, $26.50 to $30.25 per oz.
Bismuth, $1.75 per lb.
Quicksilver, $43.00 to $44.00 per 75-lb. flask.

SILVER PRICES.

	New York. Cents.	London. Pence.
September 23	51¼	23 11-16
" 24	51¼	23 11-16
" 25	51¼	23 11-16
" 27	51⅛	23⅝
" 28	51⅛	23⅝
" 29	51¼	23 11-16
" 30	51⅜	23¾
October 1	51⅜	23¾
" 2	51⅜	23¾
" 4	51⅜	23¾
" 5	51½	23¾
" 6	51½	23 13-16
" 7	51⅜	23¾
" 8	51¼	23 11-16

MARKET NOTES.

In a circular, dated October 1st, D. Houston & Co., N.Y., have this to say concerning the copper market:—

"The supply and demand problem as it relates to copper is a complex and far-reaching one. The hope for market improvement does not lie so much in the curtailment of output as in an expansion of demand. The modern mining and smelter equipments contemplate operations at high pressure, and if demand lags it must be stimulated by every means possible until it equals production and licks up the surplus stocks. The law of the land, the law of economics, and the necessity of keeping the full complement of labour constantly employed all stand in the way of reducing output. The sensible plan would be to let the development of new properties wait until they are needed. As for the copper mining properties now in the field the world must regard them as permanent factors while ore lasts, organized and equipped to produce up to their capacity irrespective of manufacturing requirements. Shut-downs at mines are expensive remedies, being followed by depreciation of machinery, disorganization of labour forces, and a loss of revenue too heavy for any probable immediate compensating gains likely to accrue. Partial restriction of production also has its drawbacks owing to the increased cost of turning out a smaller product. With the remarkable activity in iron, and the flood of orders pouring into the steel companies, demand for copper will eventually broaden out greatly in a way that will perhaps surprise the entire trade. Copper will yet come in for its full share of the industrial and business prosperity to which the country is looking forward."