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ENGLISH AS SHE IS WROTE.

Though it has been pretty well known for some months past that the Geological Survey of Canada intended publishing a monograph on Niagara Falls, whispers have lately circulated in scientific circles that the report was held up on account of differences between the author and those in authority as to the merits of the work.

A very short synopsis of the report has been published, by the author, Dr. J. W. Spencer, in the October issue of the Geological Magazine, and if it be a sample of the work submitted to the Geological Survey, surprise at its non-appearance will be small compared to curiosity as to the statements it upholds.

The two pages referred to contain a few opinions regarding Niagara Falls and a great many opinions regarding Dr. Spencer's connection with them. Nature and the Almighty have, it seems, had very little to do with the Falls themselves, for Dr. Spencer nobly assumes full responsibility. The doctor tells us in, practically, the only grammatical sentence included in the two pages, that "Almost all the physical changes in the history of Niagara Falls have been made by me, at different times." It is a large and comprehensive statement; it is a statement that upsets some of our choicest geological theories; it is a statement that makes us despise most of what we absorbed in our Science course, but we believe the doctor—though thousands wouldn't.

Hard must it press, however, on the staid and solid Survey to accept the doctor's personal interference with poor Niagara; easy for all to understand the reluctance to give it publicity.

If the powerful professor whose almighty arm, as the hymn says, has played such havoc with the topography of this Province, had stated the rest of his premisses in grammatical English the Geological Survey might have doubted, but could never have misunderstood, his claims. A genius, however, is seldom a cosmopolitan genius, if one may use the term, and the difference the professor has made in our Falls is scarcely inferior to the indifference with which he treats our Mother tongue. What, indeed, is mood compared to metamorphism, and why should tenses trouble when terraces attract? Why indeed? They shouldn't, and they don't. Is it to be presumed that the professor—wielding a power almost creative—is likely to be trammelled by grammatical conventions? The man in the street may foster the belief that what is written is intended to be understood, but he fails to appreciate the triple advantage of Dr. Spencer's prose—it may mean anything at all, or nothing at all, or something quite different, and is naturally worth three times the money.

Joking apart, however, it is really sad to see one of our Canadian writers hold himself up to ridicule in an English magazine, and we look forward with some interest and a large amount of apprehension to the coming publication of the Geological Survey.

A VISIT TO LARDER LAKE.

A visit to Larder Lake is education—rapidly and comprehensively education. Heaslip, an inhospitably small station on the T. & N. O., is the starting point for what is probably the better trail of the two. At Boston the other trail begins.

After a good frost one walks from Heaslip to Tomstown, three miles, over a well-laid and level road. From Tomstown to Wendigo, where the alternative of a canoe route is offered in summer, the first few miles are execrable in soft weather, passable in frosty weather, and must be delightful after the snow flies. Settlers, mostly Englishmen, have taken up small farms along the road. The soil, slayey or gravelly, as one may choose, is remarkably fertile.

Wendigo, seven miles on, we found in a state of inter-seasonal quiet. Long rows of canoes (we counted forty at least) were stacked in frames for winter storage. We were told that already the smaller lakes were frozen over and that one sharp night would close the whole route to Larder. A water power of not inconsiderable dimensions exists here.

The trail from Wendigo to Tremblay's (Half-way House) is, for the most part, over clean gravel ridges. The walking, even when the rains descend (and descend upon us they did) is excellent.

From Wendigo on to Fitzpatrick's Bay on Larder Lake the road measures eight or nine long, heavy miles. From the bay a paddle of four miles takes one to Larder City.

For reasons various and apparent Larder City is sitting on her heels. Transportation is almost out of the question and will be until snow comes. The only symptom of mining near the "City" is to be seen on the Harris-Maxwell claims. The lake shore is dotted with empty camps, prospecting shafts and test pits.

Larder Lake is a deep and unquiet body of water. In its cold waters the lusty lake trout, the predatory pike, the piratical pickerel, multiply surprisingly. These hardy fish are firm of flesh and make sweet eating. Of wild duck we saw many. Through the long trails over the hills we disturbed dozens of partridge.

We also came upon signs of certain beasts of prey. The track of the wild cat was not hard to read. Winter-staked claims, discovery posts cunningly hidden by ambiguous legends on the corner posts or placed merely on an outcrop of country rock, or not placed at all, these are signs which he who runs may read.

There are two errors that obsess the average prospector in the Larder Lake district. The first is that quartz, of

itself, constitutes a valuable discovery. The second is that a vein or dike must improve to the deep—usually in a geometric ratio. Neither conclusion is sound; indeed both are baseless.

All generalizations regarding mineral deposits should be received with a full appreciation of possible exceptions.

Whilst it is true that Larder Lake is yet far from being a proved mining district, we have not and we do not make this statement with the intention of injuring the district. Incalculable harm has been done already by newspaper advertisements and reading notices. A totally false impression has been created in the public mind. It has been announced that the district is an enormously rich one. This is false. But brokers and promoters have used the daily papers all over Canada to create this impression and, with the help of the various champions of the people, they have obtained money from thousands of poor folk under false pretences. A little common business sense upon the part of the daily newspapers would have obviated this. The least investigation would have elicited the truth about Larder Lake. But investigation was not made and the readers and subscribers of our powerful dailies find themselves betrayed.

Of the thousands of dollars subscribed by the public to develop Larder Lake mining claims by far the greater part has been divided between the newspapers and the promoters. This is a cold, irrefutable fact.

It is obvious that in common justice the newspapers must be held as parties to the crime. They constituted the only medium through which the promoters could appeal to the public. Had they denied the use of their columns to the wild catters Larder Lake might now have been a thriving camp, producing gold bricks instead of tragedies.

The end is not yet. When the story of fraud, waste, theft and incompetence is complete we believe that Toronto newspapers will revise their code of morals. No logic can justify a participation in the fruits of knavery.

This, however, is a digression. We feel strongly upon the subject.

We wish to conclude with an expression of opinion as to the present and future of Larder Lake.

What Larder needs, more than anything else, is a group of strong, competent mining engineers who will be free alike from the pernicious influence of promoters and from the hampering interference of directors.

Up to the present there has been (with one or two notable exceptions) no evidence of clean, intelligent mining. Stores have been wasted. Machinery has been transported over summer roads at paralyzing cost. Materials of construction have been ordered at any price and with no reference to the especial needs of the mining property. Much of this has arisen from the fact that wild cat companies do not care to employ reputable professional men.

The above is not true, we are glad to add, of several mining properties in Larder Lake. There are honest companies whose mistakes are mistakes of ignorance. But not more than two or three have settled down to an honest attempt to develop a mine.

All available facts indicate that Larder Lake, if it survives, will become a low grade camp. What this means very few people appreciate. For one thing it implies the careful expenditure of large sums of money, first in exploring the ore bodies and then in erecting commensurately extensive plants. These steps will take at least three years. Not before many years more have elapsed can dividends be expected, if dividends there are to be. Over and above all the district needs experienced, careful mining engineers who will conserve the funds entrusted to them and expend them wisely and well. Larder Lake cannot support the horde of promoters who now are sucking her blood.

On our way to Larder we met seven miners, employees of the Larder Lake Proprietary Gold Fields, Limited. They were walking out from Larder without enough money to pay for their meals on the way. For three months, so they informed us, they had not received a dollar of pay. Also they complained of lack of decent food. Ordinarily complaints of this sort are not to be taken seriously. In this case, however, we feel justified in making public the facts of the case.

About one mile from Fitzpatrick's Bay we came upon thirty bags of flour, stacked on the ground, with an insufficient shelter of boards. Here they had lain for weeks exposed to the weather and to the attention of the beasts of the field. Half the bags were torn open. The flour was spoiled beyond use. When one remembers that transportation alone cost between four and six cents per pound to this point, it becomes impossible to furbish up an excuse for negligence such as this.

These things must stop. The country cannot afford to have money thrown away.

NEEDED—A DIRECTOR.

Upon the recent organization of the Mines Department at Ottawa, Dr. A. P. Low was appointed Deputy Minister. Under his care were placed the two divisions—the Geological Survey and the Mines Branch. Dr. Haanel is Director of the latter. Dr. Low is still, nominally, the Director of the former.

The burden of administrative work falls heavily upon the Deputy Minister. It is understood that, to allow him to do justice to his higher duties, a Director must soon be appointed to take over the actual management of the Geological Survey.

Upon the staff of the Survey are many faithful servants who have served their time and who should be retired with honor. No one of these is capable of pulling the Survey out of the rut into which it has fallen. Reorganization must be left to a young and vigorous

man. His appointment must not depend upon politics. His hands must be free to smite and to build.

A political appointee would be a misfortune.

Of all Federal appointments this is the one that most concerns mining men. The Government choice will be influenced largely (indeed it should be decided wholly) by the recommendations of such bodies as the Canadian Mining Institute. The man chosen must be not only a geologist—he must be a fearless, just and capable manager. There is restlessness and dissatisfaction among the younger members of the Survey staff. The new Director must deserve and win the respect of these men, and must also have the earnest co-operation of the older men.

Editorial Note.

New Brunswick will soon become a producer of iron ore. At Bathurst and at Lepreaux work is being done in substantial deposits of magnetite.

Urgent enquiries are being made of us as to possible sources of molybdenite. We shall be glad to hear from any of our readers who are in a position to ship this ore. A large market demand is developing.

Technical education is making headway in Nova Scotia. The system of schools is somewhat clumsy. But under its present energetic management there is no doubt that good results will follow. In no other Province of the Dominion is so much attention being paid to the education of workmen.

The *Canadian Engineer*, in a recent issue, referred to the Atikokan blast furnace as the "first blast furnace to produce pig iron from all-Canadian ore." This is quite incorrect. For years the Londonderry Iron & Mining Company's furnace at Londonderry, Nova Scotia, has been producing pig iron from domestic ores. Moreover, the Radnor charcoal furnace at Radnor, Quebec, has been doing the same. Also a considerable number of charcoal furnaces in Quebec have in the past used entirely Canadian ores. Our contemporary should avoid dangerous ground.

As we are going to press telegraphic advices have been received to the effect that the Granby smelter has been closed, throwing at least two thousand men out of employment. The low price of copper is said to be the immediate cause of this unfortunate event. A contributory cause has been the excessive wages paid to workmen. A rigid minimum scale of wages is a serious detriment to any industry. In hard times it should be possible, easily possible, to adjust wages to conditions. Unions, for their own good, should make this a recognized principle. The labor organizations very promptly demand a share of profits when trade is good. They should not expect employers to bear all the burden when depression comes.

NO "UITLANDERS" NEED APPLY.

Having ransacked the world's scientific centres and attained to that perfection where the metallurgical engineer is being requisitioned to solve close questions remaining unsolved, it is proposed by the leader of the Opposition to the Jamieson Administration at the Cape that South Africa shall proceed instantly to be self-sustaining in the matter of geologists, mining experts, miners, engineers and metallurgists.

No country has profited more fully than South Africa from the brain products of Freiburg, McGill, California and Stanford, Cornell, the Royal Schools of Mines, and technical institutes generally; nowhere has a higher premium been paid to the specialist. Becker, Molen-graaff, Williams, the Jennings, Hammond, Ross Browne, Corstorphine, Hatch, Webb, Yeatman, Iaverneh, Raymond, Webber, and others of more or less note, were commandeered by Hamilton Smith and his successors in the exploitation of the low grade bankets of the Witwatersrand and diamond mines of Griqualand West, Orangia and the Transvaal. Coarse crushers and the Californian stamp reduced exceptionally hard rocks to requisite meshes. The Home Country's improvised cyanide process released precious gold contents otherwise not economically extractable. Filter presses, conceived in Germany, rock drills, diamond drills, all the appurtenances of mining at great depths, were provided by foreign instrumentalities.

A section of South Africans, born in the sub-tropics, recognizes all this, and would have been worse off had it not been so, but it is the fatuous contention of those so holding, that diamonds and gold leaving that country offer no permanent substitute, consequently mining is to be measured, industrialism divorced from the prime factor of profit in the tonnage turnover, and ultimately the foreign authority is to be given "Paddy's Rise." Mr. Merriman, once a party to the Rhodes amalgamation of Kimberley interests, and now the leader of the Bond or South African party at the Cape, outlines this programme. Upon this platform he seeks to effect the federation of South African States. A Government monopoly in wines and liquors, together with training institutions precedent to the implied exclusion of foreign talent, completes the Merriman conception of the fitness of things. When this has been accomplished, he argues, there will be no occasion for outsiders. Nothing, however, is said of the competency of those undertaking all this to find the millions of fresh capital for which there is urgent demand from the directorates of non-producing or undeveloped properties which are unlikely to place a set of timbers until the Rand's credit improves.

Because the Witwatersrand is the greatest of gold-fields, its concentrated riches being so unique as to permit of large capital expenditure in the reasonable certainty of return on the same over a fixed period, anything pertaining to technical mining chiefs there employed is of international importance. The diamond mines of Kimberley have left little to be determined in the treatment of "blue ground" contained in the "pipes" or the recovery and classification of the gems. Economics in breaking rock and bringing it to mills, in expediting cyanidation, in secondary agencies, in promoting the efficiency of labor units, white and black, are still in the making. Recently stamp duties have been increased, extraction has attained to 95 per cent. and over of assay values. Stopping devices promise important curtailments in costs. Explosives are half what

they were ten years ago in the item of mining. Spraying and ventilation regulations have minimized the risks of phthisis.

Such are the benefits of interchanges of knowledge. Had Bantjes and Struben been left to their own resources their discovery of the auriferous "bankets" would have been insignificant. It was the adaptation of cyanide and what has followed, the enterprise of Fraser & Chalmers, Gates, Allis-Chalmers, Ingersoll-Sargent, the General Electric Company, Westinghouse, Sandycroft, Babcock, Koppel & Company, the Jeffrey Company, and hosts of others, that induced promoters to wisely and unwisely capitalize the Witwatersrand at £300,000,000 and more. Mr. Merriman was one of the beneficiaries of this industrial progression. He now takes the insular rather than the intercontinental view revealed in Rhodes scholarships and endowments and Beit bequests. Where he errs is, in the contention that South Africa has chapter and verse, precept on precept, for what its young men should know in order to supplant Canadian, American, British and German scientists. The sooner he unlearns or sets aside these conceits, the quicker will be the recovery of a gold-getting industry upon which international exchange markets are impinging.

Under the Milner Administration, counselled by a Technical Commission and Prof. Hele-Shaw of Liverpool, the Kimberley School of Mines was absorbed by the Transvaal authorities and became the nucleus of a high class collegiate institution for the benefit of young colonials and those employed in the mines. "Nowhere," said Prof. Shaw to the writer, "is there such a perfect training ground as the Witwatersrand. Here you have the most up-to-date mechanism, the most modern methods, an infinite variety of material for experimentation." The late Mr. Beit provided in his will for this Transvaal University. Hardly had his will been probated when it was proposed to locate this technical institution at Pretoria, thus throwing into disuse the ground previously donated by the member of the firm of Wernher, Beit & Company, the ramifications of which are worldwide. The historic rivalry between the political capital, Pretoria, and the industrial capital, Johannesburg, again asserted itself. Rather than do as Beit decreed, as Sir Julius Wernher in greater degree is now striving for in London, the disposition seems to be to accept the Merriman dictum that South Africa must be up and doing for itself—a proposal that is excellent in principle, though ill-advised when premised upon proscriptive, however remote that policy must be in its consummation.

Scientific living to learn has universal interdependencies. The outside expert and technical adviser does not always make the most efficient inside counsellor and friend. On the other hand, "the new man in the camp" commands respect. South Africa has the raw material with which to promote great enterprises. It has produced a dozen wealthy mining speculators—Robinson, Bailey and others—and several capable engineers and mine managers, among the engineers being Greathead, who first projected the London "Tubes." In the work of pioneering the sub-continent has distinguished itself, but when it is claimed that those colonies can become self-sustaining in matters of research and capital, Mr. Merriman might as well advise that Canada should do the same, that emigration is prejudicial, that scientific associations are unnecessary evils, that free trade in ideas is not to be entertained.

Canada stands foremost with Germany in its popular and higher educational systems. The United States, with all its wealth and educational resources, has taken leaves out of the teachings of pedagogues of all nations. The Mother Country is awake to its own shortcomings. South Africa has excellent material for much of what Mr. Merriman suggests, yet when that gentleman decries prevalent pessimism and advocates the narrower view in order to gain political advantage, he becomes as pastoral as his "backveld" constituents.

Apropos to the foregoing, the London *Daily Mail* of October 2 has this on another phase of the Merriman-Bond party programme, in which Gen. Botha is co-operating:

VICTORIA FALLS AND THE RAND.

While Mr. Mershon is talking of the practicability of conveying power from the Victoria Falls to the Rand, the *Glasgow Herald* has unearthed a speech much to the point by General Botha, delivered on August 24, which, it says, has hitherto remained unreported. General Botha, according to our contemporary, "speaking at Standerton at a meeting of Boer electors, declared that

the Transvaal Government would oppose the introduction of electric energy from the Victoria Falls—that is, the grant of the way-leaves necessary. The argument of the Prime Minister of the Transvaal was that this proposal would ruin the coal mining industry of the Transvaal, and incidentally reduce the colony's revenue from the mineral traffic of its railways."

How ridiculous all of this is will appear when it is recalled that the Botha-Merriman party opposed Chinese labor, demands prolongation of production irrespective of returns on capital, and now threatens a power scheme which might save the industry from the embarrassments arising from political wrangling. Many doubt the feasibility of power transmission all the way from the Zambesi to the Vaal River. Mining firms are taking the risk because their power bills are very large. For Mr. Merriman to advocate what he does, and Gen. Botha to threaten the Victoria Falls scheme, rather than recognize the advantages of domestic economics of the Government, leaves capital more than ever indoubt regarding South Africa.

ALEX. GRAY.

Liverpool, Oct. 2, '07.

THE DELORO MINING AND REDUCTION COMPANY.

I.

A smelting establishment, as interesting as it is unique, has been completed at Deloro, Ontario. The cause of its erection was the crying need of a Canadian metallurgical plant that would treat the arsenical ores of the Cobalt district. Such a plant, of course, does exist at Copper Cliff. But the increasing output of Cobalt camp, the complexity of the ores, and a growing sense of the futility of shipping ore to American smelters, pointed indisputably to the necessity of building a new plant.

Deloro is historic ground. The superintendent of the Deloro Mining & Reduction Company, Mr. P. Kirkegaard, has played an important role in the development of the famous gold-arsenic mines of the district. It may then be not irrelevant to incorporate a short sketch of Deloro's mining history in this article.

I shall not attempt to trace the mining activities of the famous Deloro mine farther back than 1898. The mists of nine or ten years are hard enough to penetrate. The rising generation thinks in years, not decades.

The year 1898 witnessed the reopening of the Deloro mine after a shut-down. The Gatling, Tuttle and Keswick shafts were deepened to 192 feet, 122 feet and 50 feet respectively. Eight hundred and seventy-eight feet in all of levels were reported in the mine. A new 10 stamp mill, a bromo-cyanide plant, a well-fitted laboratory and a new power house were added during this year.

Great progress was made in 1899. Not only were extensive underground developments carried through, but the plant was enlarged so as to include the process of arsenic recovery. The owners, the Canadian Gold Fields, Limited, were now successfully extracting gold and arsenic from the Deloro mispickel ores.

The concentrates from the stamp mill after being treated with bromo-cyanide were dried and roasted in a revolving cylindrical roaster. The volatilized arsenic trioxide was then condensed in a series of brick chambers with vertical baffle walls and collected from these

chambers. The product was refined by re-roasting and re-condensing.

Important enlargements were projected and begun in 1900. The stamp mill was doubled in capacity. Wilfley tables, Bartletts and Frue Vanners were installed, and an extra vat for the cyanide plant was built; the arsenic plant, moreover, was completely reorganized; and underground development was not neglected.

In 1901 operations were continued on a full scale. Improvements and additions were constantly being made.

Calamity overtook the mine in March, 1902. A heavy flow of water was encountered in sinking a winze from the fourth level. As a consequence mining was stopped and the stamp mill ran out of ore. The arsenic plant, however, continued treating concentrates and ore from other properties.

There had been, meanwhile, much talk of consolidating the various mispickel properties of the Marmoro region and of centralizing operations at Deloro. Nothing came of this. Work was then suspended at the mine and plant of the Canadian Goldfields, and was not resumed.

The production of arsenic from 1899 to 1902 inclusive, all of which is credited to the Deloro works, is shown in the following table:—

Year.	Tons.	Value.
1899	57	\$ 4,842
1900	303	22,725
1901	695	41,677
1902	800	48,000

The suspension of operations was due mostly to a heavy drop in the price of white arsenic. The intricate problems associated with the reduction and smelting of the ore and with the recovery of arsenic and gold had been attacked and solved by Messrs. Kirkegaard and Wright. The mine and plant had been brought to a condition of great efficiency. But an absentee board of directors and a depressed market turned the tide.

It will throw light upon the present work of the Deloro Mining & Reduction Company to glance for a moment at the methods employed by their predecessors.

As to the form and origin of the Deloro deposits, Dr. W. G. Miller confirms the conclusions reached by Mr. Kirkegaard. In the Eleventh Report of the Ontario Bureau of Mines, Dr. Miller writes thus of them:—

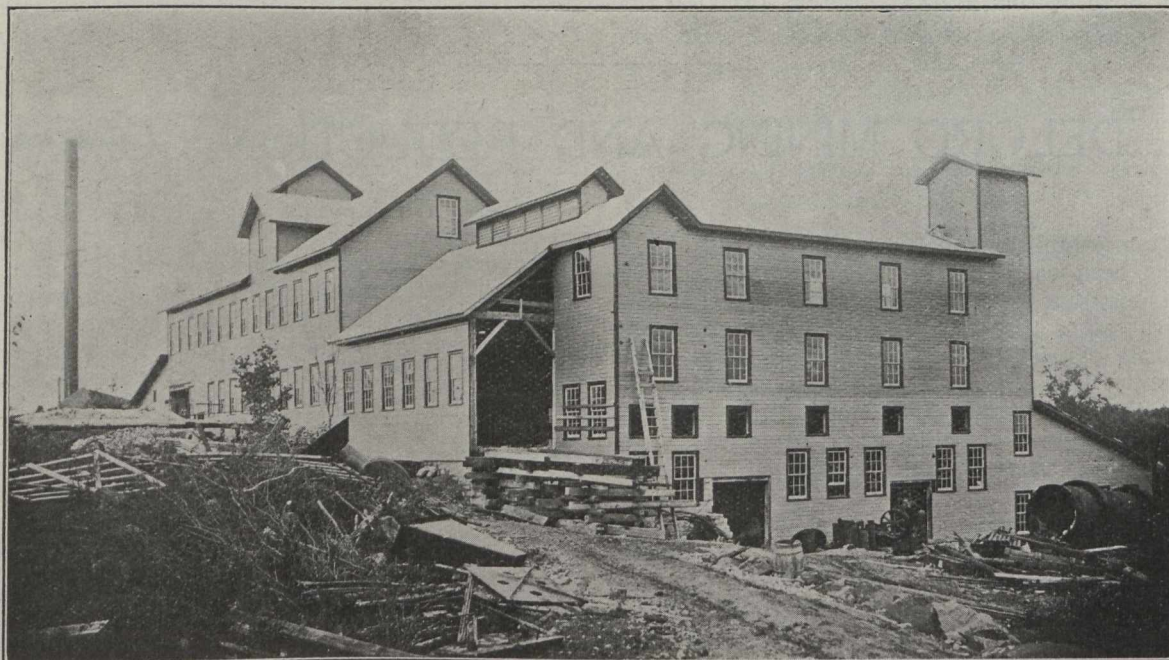
“The ore . . . consist essentially of mispickel . . . together with gold in quartz. Associated with the quartz is considerable dolomite and calcite. This latter mineral frequently contains iron in the ferrous condition . . . Iron pyrites in much smaller quantities than mispickel is also present. Copper pyrites is found at times . . . Secondary minerals, such as hematite, arsenolite and chlorite are also present. The mispickel at times occurs well crystallized in characteristic forms.

“Gold is found in visible grains and scales in the quartz and associated with the mispickel, sometimes, but rarely, occurring in minute rounded grains attached to

ter is met with in the workings it is an indication that an ore body is near at hand.”

A further extract from papers read by Messrs. Kirkegaard and Wright before the Canadian Mining Institute at Montreal in 1901 describes the treatment of the ore.

“A modern system for hoisting, sorting and carrying the ore a distance of 800 feet to the mill has been adopted. There are 20 stamps weighing 850 pounds each, 10 dropping 100 times to the minute with 6 to 7 inches drop. Screens are 40 mesh burr slot. Crushing capacity is 80 tons a day. The average saving is 57 per cent. of assay value by amalgamation only. The concentrating plant consists of three hydraulic classifiers, and five 6 foot smooth belt vanners for the old 10 stamps; and three Wilfley tables, one classifying cone, and one Bartlett table for the new 10 stamps. The tailings carry only 2 to 2.5 per cent. of the original gold values and 0.5 per cent. of the arsenic contents of the milling ore. The concentrates are transported in cars to the leaching plant, where they are treated by the bromo-cyanide pro-



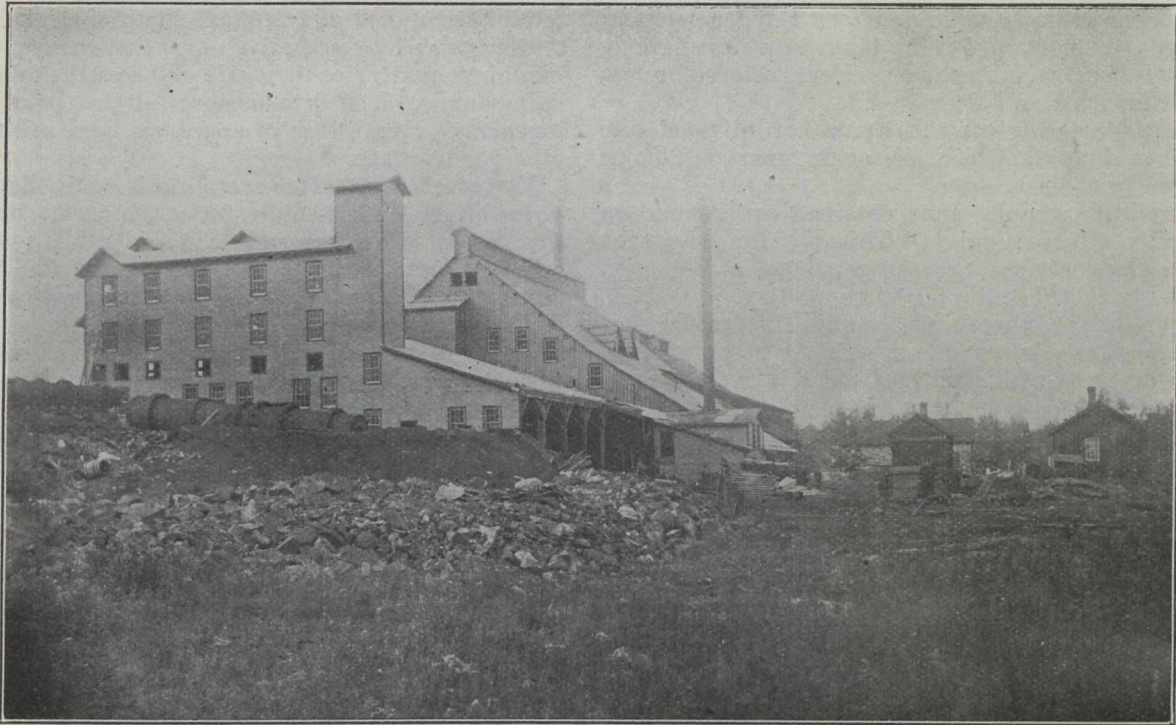
NEW COBALT PLANT—LOOKING NORTH-EAST.

the faces of mispickel crystals. The greater part of the gold is, however, mixed through the mispickel in a very finely divided and invisible form . . . The diorite in which the ore bodies are found at the Deloro is finer in grain than at the Belmont mine. There appears to be two varieties of dark colored rocks in this vicinity, one of which is clearly of igneous origin, holding fragments at times of the other. The latter may be different in origin from the former and is often closely associated with crystalline limestone or calc schist . . . The ore bodies in the diorite cut across granite dikes, as is evident from the dump heap . . . Since dikes of granite are never found cutting through or disturbing the ore bodies, it is evident that the fissures or cavities now occupied by the ores were formed subsequently to the period when the granite cut through the diorite . . . Along the walls where the diorite has been decomposed the rock is a schist, talcose or chloritic in character. The edges of the ore lenses pass into this schist, which is distinctly laminated. When rock of this charac-

ter is met with in the workings it is an indication that an ore body is near at hand.”

cess. This consists (1) Extraction of gold by leaching the finely ground ore with a solution of potassium cyanide to which is added a small quantity of a solution of cyanogen-bromide—a haloid salt of cyanogen; (2) precipitation of the gold from this bromo-cyanide solution by means of metallic zinc; (3) removal and smelting of the zinc-gold slimes, thus obtaining the pure gold.

“The plant now in use, situated in a two storey building below the mill, consists of four leaching vats fitted with sand and pebble filter bottoms and bottom discharge gates, four solution or ‘liquor’ tanks on the floor above, three small Northey duplex steam pumps for circulating the liquors, three small ‘sump tanks,’ each of 40 gallon capacity, two 50 gallon tanks holding stock solution of cyanogen-bromide, one Salman’s patent precipitating cone for zinc fume, filter press, one zinc box pipe systems, one acid treatment tank, one settling tank and one filter tub. The extraction of gold from the concentrates gives an average of 90.5 per cent. This with the values saved by amalgamation gives a total



NEW COBALT PLANT—LOOKING NORTH-WEST.

saving of 88 to 90 per cent. of the original gold contents of the ore, a result which, as an average of two years' steady work, is generally admitted to be exceptional on so refractory an ore. The concentrates, after the extraction of the gold, are sent to the arsenic works, where they are calcined for the arsenical contents. The crude arsenic resulting from the roasting is refined, and produces white arsenic of a pure white color, analyses of which show 99.6 to 100 per cent. pure arsenious oxide (As_2O_3). The production is eighty tons per month."

The reader will gain from the above a fair conception of the manner and scale of operations conducted by the Canadian Goldfields, Limited. It may be remarked that the Deloro plant stands unique in America.

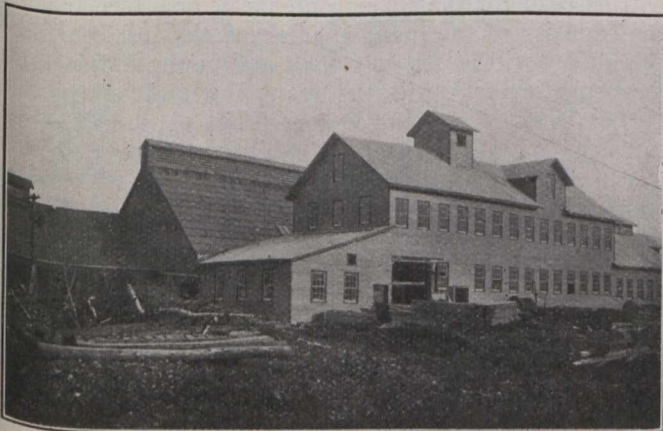
II.

After a year or more of preparation the plant of the Canadian Goldfields has been remodelled, large additions have been made and the new, complete and modern metallurgical establishment operated by the Deloro Mining & Reduction Company has commenced treating ore from Cobalt.

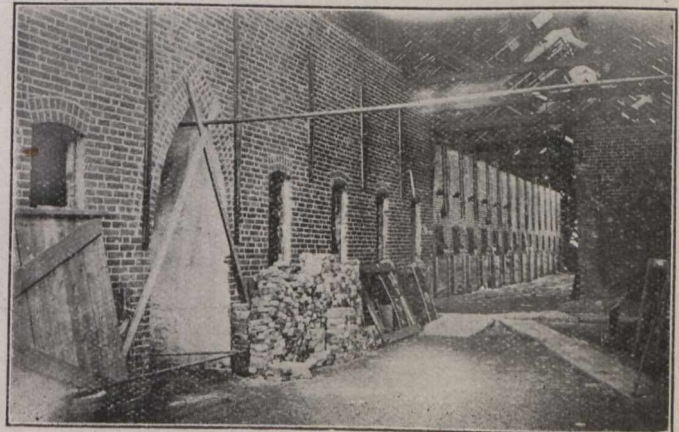
The crushing department of the establishment is equipped with one Blake crusher, 7 inches by 10 inches; high speed rolls, 8 inches by 24 inches; and a No. 5 Krupp ball mill. The ore, after crushing, is elevated to the upper floor in cars on a 6 foot by 6 foot platform elevator. Both floors are provided with a system of rails and turntables to facilitate moving of cars from the various departments to the elevator; and again from the elevator to the bins. The ore is elevated to the top floor, emptied into large steel stock bins and thence fed automatically to sampler. One-tenth of the ore is cut out for a sample and is then taken to sampling floor.

SAMPLING DEPARTMENT.—The sampling department consists of two rooms, one having a smooth sampling floor of concrete, the other containing a complete set of sampling machinery. This machinery includes rock breaker, sample grinder, pebble mills, bucking plates, screens, scales, moisture scales, drying oven, etc.

The bulk ore, after being fine-milled and weighed, is elevated to a steel hopper from which it is fed automatically to a Snyder sampler, which is set to cut out 10 per cent. of the ore.



New Cobalt Plant and Old Arsenic Works—Looking East.



Interior of Arsenic Works—Condensing Chambers.

This 10 per cent. is again fed to a Snyder sampler, the quantity thus obtained being taken in a closed buggy or barrow to the sampling floor. Here, after thorough mixing, it is coned and quartered.

The first quarterings of this sample are divided into two distinct samples, which are again quartered down independently of each other.

The duplicate samples thus obtained are ground in pebble mills after weighing. This obviates losses by dusting. The metallics are separated on a 100 mesh screen, and weighed and assayed separately.

From each of these final pulp samples six sets of laboratory samples are drawn, the remainder of pulp being sealed up and retained until settlement is made for the shipment of ore.

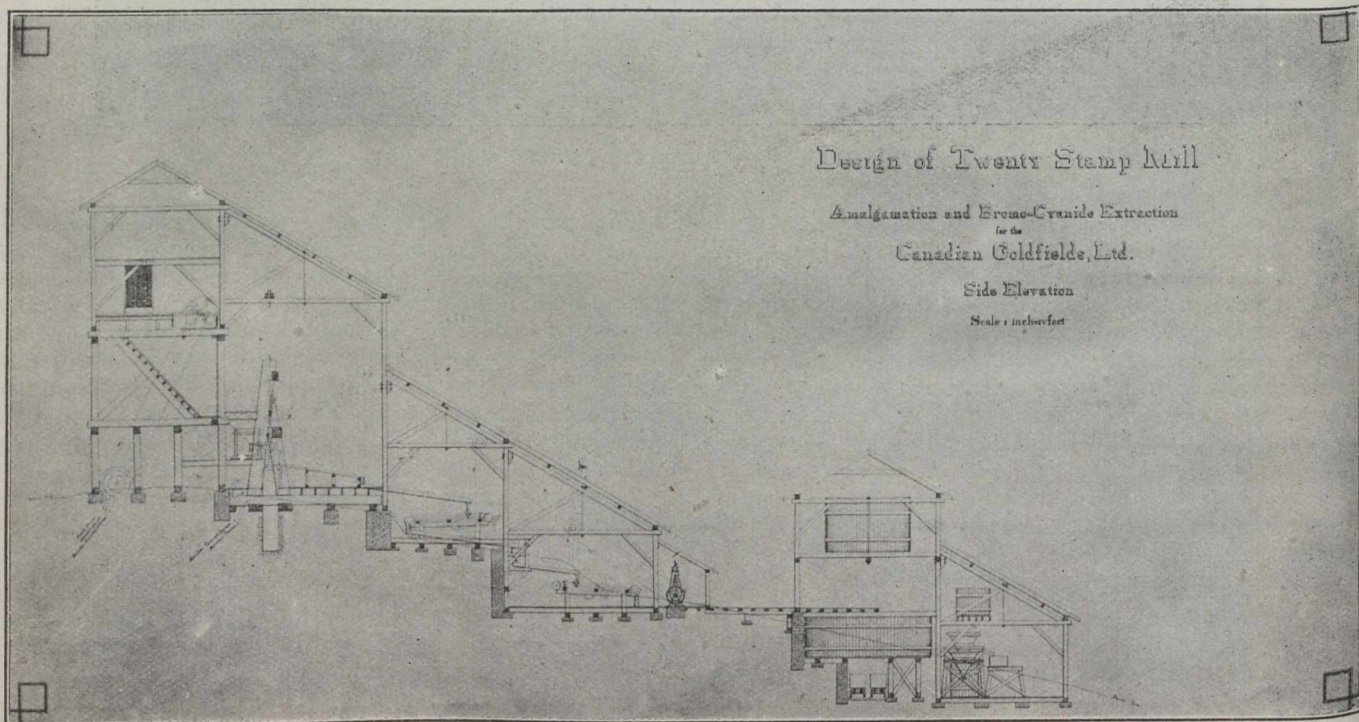
The six sets of samples above mentioned are sealed in the presence of the shipper's representative, two samples being handed to the latter, two to the Deloro Mining & Reduction Company's sampler and the remaining two retained for umpire assay in case of any disagreement in shipper's and smelter's assays.

room is composed of two glass partitions. This permits the shipper's representative to see the whole operation of weighing, quartering, etc. He also sees the taking of the bulk sample. The arrangements at this point are most ingenious. Every inch of space has been utilized to the utmost advantage.

The crushed ore after sampling is again elevated to a series of stock bins. For storage both of a large quantity of any given ore and of considerable quantities of different ores, capacious steel bins are provided. Large platform scales are placed on the first and second floors. Under the bins scales also are placed to weigh out aliquot amounts of ore for treatment. All the bins are fitted with gates. A system of tracks and turntables under the storage bins reduces traffic to a minimum.

As the ore is taken from the bins it is again weighed accurately and is transported to that section of the plant where it will meet with treatment best suited to its requirements.

A large revolving cylindrical drier, designed at Deloro, is being completed.



When practicable the metallics from the screening of these samples are similarly divided into three portions.

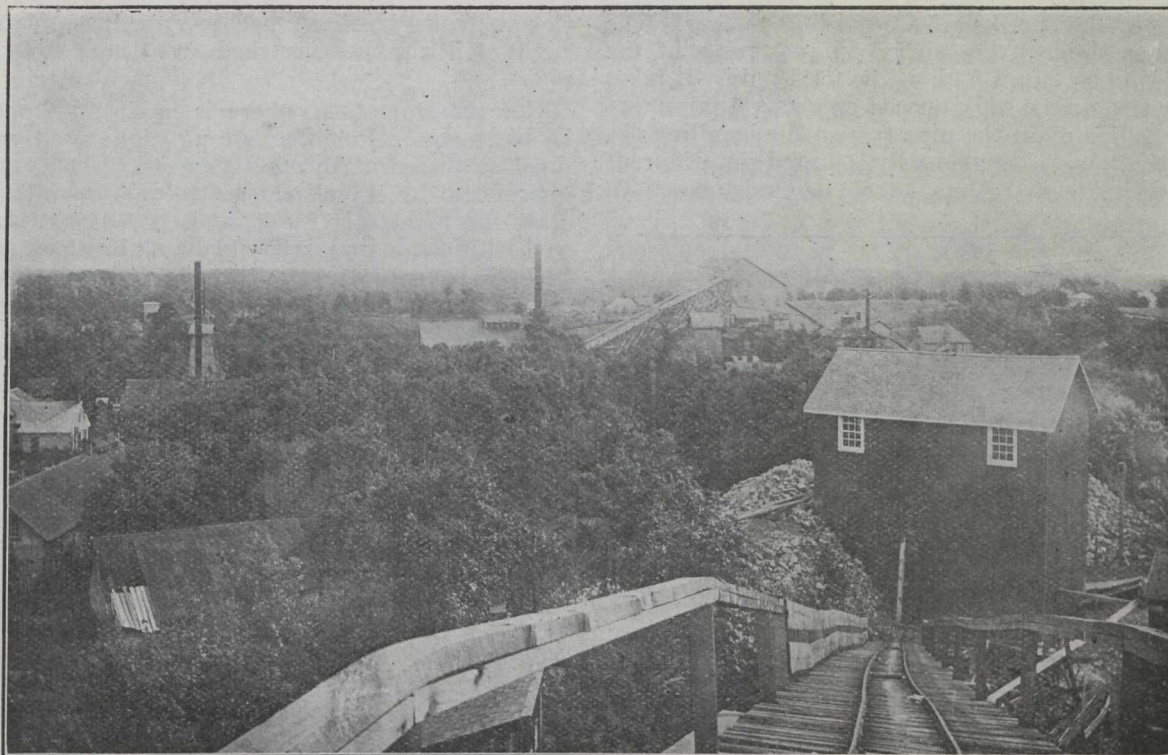
The metallics obtained from milling bulk ore are melted into bars which are weighed and sampled by drilling. A special mill is used in the sampling room for reducing the drillings to the necessary degree of fineness for final sampling and assaying.

All final quartering of samples is done on a table fitted with a plate glass top, which presents an ideal surface for this particular work. It is at this stage that errors are most apt to creep in. As the samples are reduced to smaller and smaller size the dangers of contamination increase. A wooden surface is retentive of the finer particles of ore and metallic silver. An iron surface wears unevenly and fragments of its surface are often included in the sample. A glass surface is smooth, hard, readily cleaned and easily renewed in case of accident.

The sampling department occupies the north end of the new building. The passage between the crushing department and the laboratory section of the sampling

In treating custom ore the Deloro Mining & Reduction Company will pay not only for cobalt (above a certain per cent.) but for arsenic also. Full value of course will be paid for the silver contents of ores received. As the capacity of the plant is enlarged the full benefits of this policy will be felt in Cobalt and newer districts. But most particularly will the reopening and enlargement be felt in the district of Deloro. The plant has an output capacity of three tons of white arsenic per diem. It will thus be able to handle a large quantity of arsenical pyrites without interfering with its functions as a reducer of Cobalt ores in the slightest. It is now prepared to treat about 20 tons of Cobalt silver ores per diem. Many of its units, however, are sufficiently large to allow for twice this tonnage. It is therefore only a matter of time and slight additions of machinery before 40 or 60 tons may be treated daily.

The old plant was a large one. The new two storey building measures 30 feet by 150 feet. An ell extends from this measuring 60 feet by 100 feet. The old plant,



GENERAL VIEW OVER DELORO MINE—LOOKING NORTH.

all of which is now in commission, measured 60 feet by 150 feet.

The stamp mill, which is in excellent condition, presents more points of interest than can well be enumerated here. Manager Kirkegaard has for years past carefully changed and improved his milling practice until now the stamp mill embodies the last word of modern methods.

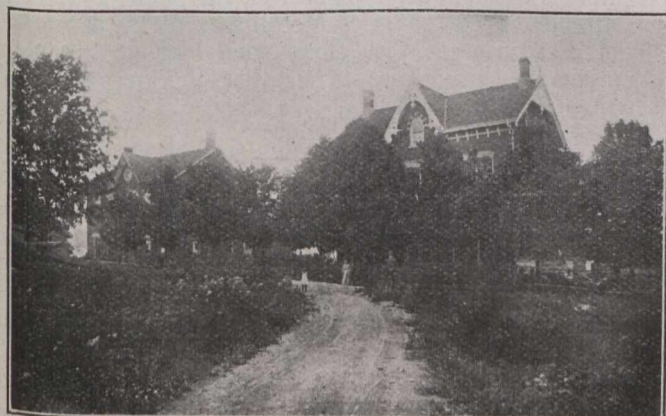
The general equipment of the stamp mill has been described already. A Vezin sampler has been added. A crushing capacity of 75 tons of ore per diem is attained with the stamps dropping 100 and 110 to the minute. The height of drop is 7 inches. To secure this rapid drop Manager Kirkegaard has designed a cam with a special involute. Even at 110 steel never touches steel in the mortars. Repairs are seldom necessary. The pitch of the amalgamating tables is extraordinarily steep—2 1/4 inches to the foot. The plates themselves are broken up into short sections. These features are necessary to keep the plates clean and to secure a maximum amalgamation. Below the tables a screen is placed to catch any coarse particles.

The mill practice has been evolved, of course, with reference to the heavy, sliming arsenical ores of Deloro. Experience has proved already that it is well adapted to Cobalt ores.

Water is fed to the mortars from the bottom, in line with the dies. This prevents banking and cogging and has proved very effective with the dead, inert ores treated.

The battery frames are constructed on lines of wonderful simplicity and strength. Roughly the elevation corresponds in shape to the letter A, which makes it self-contained. Vibration is minimized.

After leaving the plates the pulp is run through a mercury trap. Thence it goes to the first set of concentrators. The tailings from these are classified hydraulically, making three products, which in turn are treated separately. The combined concentrates are then subjected to the bromo-cyanide process. The tailings are led off in a launder and automatically sampled at the point where they leave the mill by a special sampling device, designed by Mr. Kirkegaard. The basic idea of this sampler is original. The flowing pulp is the motive



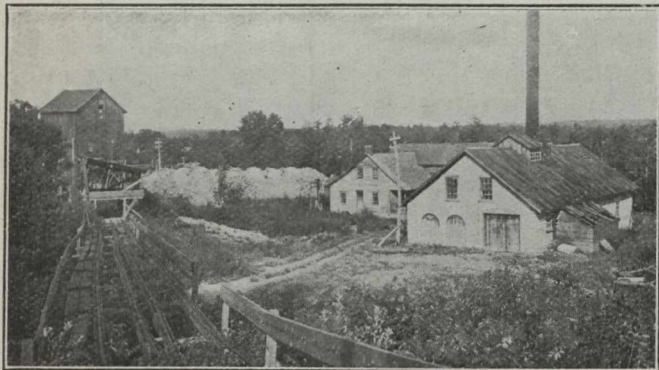
Manager's Residence and Company's Office.



Deloro Village.

force. Hence the speed varies according to flow. The samples, it is claimed, are always aliquot parts of the run. The sampler cuts 1-60th of the total pulp. It takes samples across stream at intervals of about 6 minutes.

In the cyanide plant the pipe system for handling the different solutions is ingeniously painted in different colors—red, white and blue—to obviate mistakes. To



General View Over Deloro Mine—Looking South.

Mr. S. Wright, who, with Professor S. F. Kirkpatrick, is associated with Mr. Kirkegaard, belongs the credit of this effective scheme.

While a detailed description of the cyanide plant is impossible just now, a few outstanding features may be noticed. In the large settling box, for instance, sheets of glass are used as settling plates, and the circulation of liquors is effected by direct acting pumps.

A commodious laboratory, detached from the other buildings, completes a square, the other three sides of which are formed by the stamp mill, cyanide plant and power house, all of which are also detached and independent.

The power house is an airy, well-lighted brick building. The 20 drill compound steam and single stage air Rand compressor has been sold to the Cobalt Central Mining Company. Its place will be supplied by a motor driven compressor. In addition to this there also is a smaller compressor, cross-compound steam and air, which is exclusively devoted to pumping from the mine.



Deloro Church.

The system is known as the Harris air-lift. It is capable of handling 500,000 gallons in 24 hours.

The installation of one 150 h.p. Weber suction gas producer is now complete. The order was filled by the Weber Gas Engine Company of Kansas City. This drives a 100 kilowatt alternating generator of the Bullock type. Power is transmitted 1,800 feet to the new

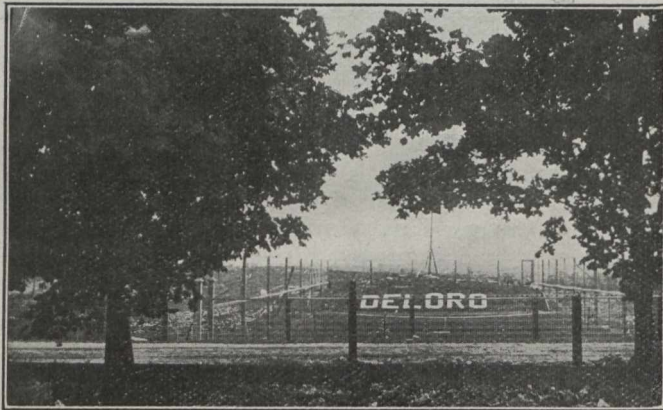
Cobalt plant, where all machinery will be motor driven. Light will also be furnished from here for the whole plant.

For the stamp mill there is independent power. A 75 horse-power Robb-Armstrong high speed engine has given extraordinarily good service. The engine was guaranteed by its makers not to vary more than 2 per cent. So admirably governed is it that its speed varies well within this limit when two rock breakers (requiring 20 to 30 horse-power) are thrown off or on. This engine has had four continuous years of high speed mill service and has never required repairs. It certainly seems to demonstrate the suitability of a high speed engine for stamp mill work.

The concentrators are run by a separate small engine.

Within the limits of a short article it is quite out of the question to attempt to do more than merely indicate a number of the more striking facts of such a plant as that of the Deloro Mining & Reduction Company.

One is struck, on arriving at Deloro, by the neat houses of the workmen; the substantial offices; the attractive assembly hall, which is used for and adapted to both religious and social purposes; the tennis court; the manager's residence. All have an air of permanence and comfort.



Deloro Tennis Court.

As mentioned above, three men, Messrs. Kirkegaard, Kirkpatrick and Wright, all of them in their several branches exceedingly well qualified, conceived and carried out the scheme of establishing a metallurgical plant at Deloro.

They have evolved their methods with elaborate care. Mr. Kirkegaard brings to the work a rare mechanical genius and a lifetime of experience. Mr. Wright is a metallurgist, and chemist, of solid attainment and keen executive ability. Mr. Kirkpatrick has made a reputation already in the chair of Metallurgy at the Kingston School of Mining. With three such men at the helm there should be nothing to hamper the progress and growth of this new plant.

At the annual meeting of the Providence Mining Company, held recently at Greenwood, B.C., a resolution was passed authorizing the directors to issue \$500,000 6 per cent. bonds, to enable sinking to be continued to the 1,000 foot level. The following gentlemen were elected to the Board of Directors: Messrs. M. F. Madden, F. Byrnes, M. S. Madden, O. V. O'Donnel, H. J. Fitzgerald, F. Rudolph, D. B. Scully, of Chicago, and W. S. Macy, of Phoenix.

RESCUE STATIONS IN GREAT BRITAIN.

In the issue of *THE CANADIAN MINING JOURNAL* for 15th April, 1907, the author gave a brief description of the various types of rescue apparatus in use in the Old World, and a few notes on the progress of rescue stations and rescue work in mines in Great Britain may not come amiss to the readers of this *JOURNAL*.

A large amount of interesting information was recently given to a Royal Commission by Mr. M. H. Habershon from experience obtained in the working of a joint rescue station at Tankersley, near Barnsley in the South Yorkshire coal field in England.

This station was erected in 1901 by three colliery companies, who between them worked in the neighborhood of twelve mines. The building of this station was largely in the nature of an experiment and was looked upon as of somewhat doubtful value by many mining men. The funds available were very limited, too limited in fact for any really effective work to be done, more especially in view of the fact that six years ago breathing apparatus were not the finished and effective devices they are to-day. The first apparatus obtained were the Giersberg helmets. These are now completely obsolete and never were of any real utility. Then several apparatus of the Shamrock type were obtained, and a Pneumatogen also. The latest addition to the station, and one that has given considerable satisfaction is the Draeger helmet apparatus.

Mr. Habershon gives some figures of tests made with the Draeger apparatus, which show that it is a really practical machine. One man wore the helmet for four hours and three minutes, doing no work during this time. Another man wore it for five hours and walked 7,400 yards during that period. At the conclusion of the test he was very hungry, which it is said is the most noticeable effect of wearing the apparatus for any long period of time. This same man raised a 56 pound weight to a height of seven feet 610 times in one hour and forty minutes, which is equal to 239,120 foot pounds of work.

The more important points brought out by Mr. Habershon in his evidence as the result of his six years' experience are summed up in the following:—

All men are not constitutionally suitable to be trained to wear breathing apparatus, and it is not a matter that can be mixed with ordinary ambulance training.

Apparatus of this kind is worse than useless, and is in fact a veritable death trap unless it is under the charge of a trained man and kept in constant and perfect readiness for instant use.

Mr. Habershon is opposed to apparatus being kept at separate collieries where it might not be properly overhauled periodically, but thinks it is essential where a group of collieries is to be served to have a central rescue station in charge of a thoroughly competent man. He states that the number of really competent men of this kind could be counted on the fingers of one hand in England to-day.

From the remarks made by Mr. Habershon he appears to have no doubt that the best and most practical apparatus is the Draeger, and he prefers the helmet to the mouthpiece.

A complete justification of the expenditure involved and of Mr. Habershon's remarks as to the value of a central rescue station has just been given by an underground fire that occurred on the 15th of October this year at the Wharncliffe Silkstone Collieries. It was to the initiative of the managing director of these collieries,

Mr. Geo. Blake Walker, that this station really owed its origin, and it is singular that the first really effective use of breathing apparatus in dangerous underground conditions in England should have occurred at this colliery. The fire in question originated in an electrical engine house about one mile and a half from the pit bottom. It was impossible to approach the seat of the fire in consequence of the pungent fumes, and word was sent to the rescue station, where in a very short time three of the officials were fitted with the Draeger helmet and proceeded to the engine house. They had a hard and a hot time, but succeeded in extinguishing the fire after an hour and a half's work. The Wharncliffe Silkstone Colliery Company work six seams, which are all connected by means of stone drifts and shafts, so that a fire in one seam would in time have involved the whole mine, and it would have been a very difficult matter to seal such a mine. The confidence of the men who put out this fire in the efficacy of their apparatus is shown by the fact that after all the men had been withdrawn from the two seams immediately involved the three of them proceeded a mile and a half from the pit bottom clad in these helmets as their sole protection from suffocation. Such confidence can only be obtained by constant practice, and the knowledge that the man who was responsible for the condition of the apparatus knew his business and was to be trusted in a time of emergency.

Another proof of the efficacy of these apparatus in saving human life was recently given at the Saar and Mosel Colliery at Merlbach in the Saar district of Germany. An explosion occurred and immediately afterwards a party of twelve men descended. After an hour's work they brought the survivors safely to bank, eight in number, and also salvaged the bodies of four men whom the explosion had killed. This makes a total of about 50 lives which have now been saved by the use of the Draeger apparatus.

Although primarily these breathing apparatus were designed with a view to saving life after explosions, yet it is possible that their greatest practical utility is in fighting underground fires. Like all fires, those that start in a mine are small affairs at first, but although they do not really increase so rapidly as fires on the surface, they are much more difficult to approach, because of the confined area and the restricted ventilation. The breathing apparatus enables men to approach and extinguish an underground fire in its incipient stage. One fire thus averted will repay many times the initial outlay for material and training and as remarked once before in the columns of the *JOURNAL*, no colliery company that values the lives of its men and the property of its shareholders can afford to ignore the provision of apparatus of this kind.

F. W. GRAY.

The Le Roi Company is to be very heartily congratulated on securing the services of so able a metallurgist as Mr. Thomas Kiddie to take charge of operations at its Northport smelter. Mr. Kiddie has made a notable success of smelting on the coast, especially in connection with the operation of the Tyee Copper Company's works at Ladysmith, which were designed and erected under his direction. He has lately acted as manager of the Hadley smelter, Prince of Wales Island. Mr. Kiddie, it is understood, will enter upon his new duties on December 1st.

MONAZITE AND ZIRCON.

(Advance chapter from "Mineral Resources of the United States," 1906.)

By DOUGLAS B. STERRETT.

INTRODUCTION.

The demand for thorium for the manufacture of Welsbach and other forms of incandescent gas mantles has increased yearly, and until some other invention takes place of these mantles this demand will continue. Improvements are made from time to time in the manufacture of gas mantles, and two new inventions with this object in view have been reported—one in use in Germany, the other in England. The German mantle uses a form of copper cellulose impregnated with the proper salts; the English mantle is made more durable by adding an ingredient called "laddite" to the thorium and cerium solution in which the mantle is dipped. It is said that the latter mantle has not been injured after burning 2,500 hours.¹

The minerals from which thorium and the other rare metals used in the manufacture of gas mantles are obtained are monazite, thorianite, and thorite. The bulk of the supply of thorium is obtained from monazite, which is essentially an anhydrous phosphate of cerium, lanthanum, and didymium, containing a small and variable percentage of thorium. Though occasionally found in crystals and masses of many pounds weight, the source of the commercial material is in the form of sand. The grains are opaque to translucent and sometimes transparent, and they vary from light yellow to reddish yellow to brownish in color. They also sometimes slightly greenish. The freshly broken or unaltered mineral has a resinous luster. This luster is brilliant, especially on the cleavage faces. The mineral is brittle and has a hardness of 5 to 5.5. It can readily be crushed between the teeth and yields a soft grit, quite distinct from the harder minerals sometimes mistaken for it. The specific gravity varies from 4.9 to 5.3, and is mostly over 5.

Thorite is a silicate of thorium, theoretically containing 81.5 per cent. of thoria, though practically it generally carries less than 70 per cent. Thorianite is an oxide of thorium containing uranium and the metals of the cerium group, and carries from 70 to 80 per cent. of thoria. These two minerals have been obtained in commercial quantity only in Ceylon.

MONAZITE.

NORTH CAROLINA, SOUTH CAROLINA, AND GEORGIA. LOCATION AND OCCURRENCE.

The area in which workable deposits of monazite have been found in the Carolinas is growing yearly, especially to the southwest in South Carolina, where parts of Laurens, Pickens, Anderson, and Oconee countries are now included. This extends the belt in which deposits of commercial value are known to exist nearly to the Georgia line. To the northeast the belt has been extended beyond the limit set for it in southern Caldwell and northern Catawba countries into northern Iredell County, and will doubtless be traced farther. This area contains upwards of 3,000 square miles, and includes part of all of Iredell, Caldwell, Catawba, Burke, and Polk countries in North Carolina, and Cherokee, Lau-

rens, Spartanburg, Greenville, Pickens, Anderson, and Oconee countries in South Carolina.

Monazite has been found at other places outside of this area, but as yet no workable deposits have been developed. Thus Nitze² mentions the finding of monazite in Hall County, Ga., near The Glades, on the north side of Chattahoochee River, about 10 miles northeast of Gainesville, where it occurs in the gold placers of Flat Creek and its tributaries, the Glade, Stockeneter, Hamilton, and Hiram branches.

A prospect in the extreme northeast corner of Georgia, in Rabun County, is being investigated at the present time for its values in monazite and gold. Through the courtesy of the party interested in the property the writer has learned that the concentrates assay over 5½ ounces of gold per ton, with 30 per cent. of cerium oxide and 4 per cent. of thorium oxide. Since such a high content of cerium would correspond to nearly pure monazite, carrying no other minerals such as are generally found in concentrates, the oxide of lanthanum and didymium were probably included in that report for cerium. In that case the concentrates would run a little over 40 per cent. monazite if the rare earth oxides found by assay all came from monazite. If the percentage of concentrates that can be washed from the gravel is large, such a deposit is very promising.

Among other places, monazite is reported to occur in some quantity at a few localities in Clay County, N. C. At Wilkesboro, N. C., a small quantity of monazite was found in a trial panning in Cub Creek. The area of known commercial deposits of monazite will doubtless be extended both to the northeast and to the southwest as the demands for monazite increase and the old deposits become exhausted.

The greater part of the monazite belt lies in the Piedmont Plateau. The belt crosses the South Mountain, however, in Burke, McDowell, and Rutherford counties, and borders on the foothills of the Blue Ridge. In the monazite region the elevations of the Piedmont Plateau vary from 700 to 800 feet to 1,500 feet above sea level. Much of this area is dissected by river and creek valleys from 50 to 300 or 400 feet deep.

Workable deposits of monazite do not occur everywhere in the monazite belt as described, but are confined to certain smaller belts whose direction and extent are controlled by the trend and continuity of certain rock formations from which are derived the deposits found chiefly in the gravels and sands of creek and stream beds and adjoining bottom lands. Gravel deposits may be too low grade to work on the upper part of a stream, while lower down, where the area drained contains favorable rock formations, the gravels may be rich. Hence for successful prospecting a general knowledge of the geological formations and ability to recognize those from which the monazite of the placers is derived is desirable.

GEOLOGY.

Classes of rocks.—Practically all of the rocks of the monazite region are either gneisses or schists.³ The most important formation includes both of these types and is called Carolina gneiss. Other rock formations are gneissoid and porphyritic granite, hornblende gneiss

and diorite, pegmatite, peridotite and allied rocks, and diabase.

The Carolina gneiss is by far the most extensive formation in the monazite region and appears in nearly every section. The granite-gneiss rocks are next in importance and occur in belts and irregular shaped masses throughout the area of the Carolina gneiss. These granite masses vary from small dikes measured in feet or inches in thickness to large bodies 3 or 4 miles across. After the granites comes the hornblende gneisses, which are most prominent along the northwest side of the region, where they are generally associated with large granite masses. Hornblende gneisses occur in other portions of the monazite belt, but are not of so much importance. The Carolina gneiss presents considerable variations in composition and structure. The most common types are mica, garnet, cyanite, and graphite gneisses and schists, or combinations of two or more of these types. These rocks vary from light gray to dark gray in color and often have a light bluish-gray to bluish-black cast when graphite is abundant in them. Some of the schists are fine grained and are often composed of several distinguishing minerals, as muscovite, biotite, cyanite in fine needles, and graphite, besides fine grains of quartz and other minerals; others are composed of the same minerals in coarser grains or flakes. Garnets appear in each rock type and may be fairly large even in the finer grained schist. The presence of much pegmatitic material is a characteristic feature of the Carolina gneiss.

The granite gneisses are either biotitic, muscovitic, or hornblendic in composition, and in places have a typically porphyritic texture. In the latter case the feldspar phenocrysts generally assume an augen form, caused by crushing and elongation in the direction of shearing. There is an abundant development of small red garnets throughout many large areas of these granites. A microscopic section cut from a porphyritic granite forming the bed rock at the Moon mine, 9 miles east of south of Greenville, S. C., contained the following minerals: Microcline, orthoclase, albite, quartz, biotite, muscovite, garnet, and a little zircon. The rock showed the effects of shearing, with the development of introduction of secondary minerals. The feldspar phenocrysts had been fractured and elongated, and secondary quartz had been deposited between the fragments. As a result of these metamorphic processes the feldspar crystals form augen-shaped bodies which lie parallel to the schistosity of the rock mass. The garnet is plainly secondary, and contains considerable quartz intergrown and included with in it. In other parts of the region, as in the Carpenters Knob section and much of Cleveland County, N. C., there are large areas of granite gneiss which have an even granular texture and are composed chiefly of white feldspar, gray quartz, biotite, muscovite, and garnet.

The hornblende gneisses and diorites are the only other types of rock of much importance in the monazite region. The hornblende gneisses are nearly black to dark green in color, and are composed chiefly of small interwoven and matted hornblende crystals. They grade into diorite, which is also dark colored but contains a noticeable amount of feldspar and has a granitoid texture. These hornblende rocks are more prominent throughout the northwestern side of the monazite belt, where, along with large areas of granite, they assume considerable importance.

Pegmatite is of common occurrence throughout the region, especially in those areas where commercial deposits of monazite are found. There is a wide varia-

tion in the nature of this pegmatite. In some places it occurs as distinct masses or bodies with the typical composition and texture—that is, composed of quartz and feldspar, with or without mica and other accessory minerals, crystallized out on a large scale. In other places the pegmatite represents a re-crystallization of portions of rock formations with the formation or introduction of the component minerals of pegmatite. Sometimes the secondary minerals consist chiefly of quartz with smaller quantities of the others. Often it is difficult to determine whether certain smaller rock masses are granite or pegmatite, when the texture is not very coarse and the relations to the inclosing rocks can be clearly seen in the small portions exposed.

The peridotites are not of very common occurrence in this region. They are dark green to greenish-black basic rocks, containing the ferromagnesian minerals olivine, pyroxene, and sometimes hornblende as their chief constituents. The peridotites often outcrop prominently and generally leave rounded, "nigger-head" boulders on the surface near their outcrop. In the majority of cases, however, the peridotites will be found to have partly altered to soapstone or serpentine at the surface. In some cases the whole mass has been thus metamorphosed.

Diabase is not uncommon in certain parts of the monazite region, and is readily recognized by its dark color, weight, and the characteristic spheroidal of "nigger-head" boulders it leaves scattered over the surface.

Age.—Most of the gneisses and schists of the monazite region are of great age and represent highly metamorphosed sedimentary and igneous rocks. The metamorphism, folding, and faulting of these rocks have been extreme, and in most cases it is difficult to determine the original nature of the formations, since much of the sedimentary bedding and igneous texture has been destroyed by mashing and re-crystallization. This is especially true of the Carolina gneiss, which is the oldest formation represented and has been cut by intrusions of later age. The hornblende gneiss and diorite, the peridotite, and part, at least, of the granite-gneiss are also very old rocks and are intermingled and folded with the parts of the Carolina gneiss in a very complex way. Other gneisses and granites are of later age and have not been subjected to the same degree of shearing as the older ones, so that the development of schistosity in them has not been so extensive as in the older types. The gneisses and schists, particularly of the Carolina gneiss, having been interbanded with an cut at all angles by numerous streaks of pegmatitic or granite material. These streaks range from a fraction of an inch upward in thickness. In some places pegmatization is so thorough that mica has become strikingly like granite gneiss.

Associations of monazite.—The best deposits of monazite have been found in or near areas where large granite masses outcrop or where pegmatization of the country rock has been extreme. On the other hand, where the gneisses and schists are nearly free from pegmatitic material and there are no granite masses in the neighborhood the stream gravels are found to be very poor in monazite. When monazite has been found in place to any extent in the country rock it has not been in the ordinary pegmatite streaks and masses, but in portions of the rock formations where there has been extensive re-crystallization, with the development or introduction of pegmatitic material. Such pegmatization is locally a common feature of the Carolina gneiss, which is accordingly a favorable kind of rock for the occurrence of monazite.

Monazite deposits in regions where hornblende rocks are abundant generally contain a large percentage of black sand. In such cases it is often difficult to concentrate the monazite to a marketable grade. As an offset to this, however, especially in regions where granite is associated with the hornblende rocks, gold is often found in the concentrates in more than sufficient quantity to pay the cost of separation, and in some localities the concentrates generally carry also a quantity of zircon sufficient in some cases to pay for separation. This zircon is in the form of small clear crystals with a brilliant luster, which range in size up to 1 millimeter square and about 2 millimeters long. A fairly clean separation can be made by cleaning with an electromagnetic machine and careful washing. The quantity and the size of the zircon crystals found in the monazite concentrates are in general smaller in the deposits located in areas of Carolina gneiss than in the granitic and hornblende rock; likewise the quantity of gold found in the deposits in areas of Carolina gneiss is smaller and rarely pays the cost of separation.

Weathering and soils.—The rocks of this region have undergone such extensive weathering that good outcrops are the exception, and a thick mantle of residual soil covers much of the country. The kind of rock underlying certain soils can be determined, unless decomposition has been too thorough, by studying the outcrops and the gradations from such exposures into the residual soil. Thus the nature of the soils furnishes a clew as to the probability of monazite being present in quantity in the gravel of the streams; and, conversely, the nature of the country rock that a stream drains can often be told and the probable occurrence of monazite be conjectured by examining the debris in the gravels of the bottom lands and of the stream bed.

The Carolina gneiss, on partial disintegration and decomposition, often forms a gravelly soil with red clayey matrix. This is especially characteristic of the graphite-cyanite type, which is abundant in parts of the region. The pebbles are composed of small fragments of the original rock, often tufts of cyanite, impregnated with hematite or limonite, or small pieces of pure iron ore.

Garnets may or may not be present. On more complete decomposition a reddish clayey soil results, with no decided characteristics. Other types of the Carolina gneiss, in which mica is an important constituent, leaves a micaceous soil which often assumes a purplish color. Granites, on partial disintegration and decomposition, yield light sandy soils. Often blocks of undisintegrated granite occur scattered through the soils, giving additional evidence of the nature of the underlying rocks. On more complete decomposition granite yields soils of a light to dark reddish color, depending on the quantity of ferromagnesian minerals in the original rock, as biotite or hornblende. The quartz grains of the granite remain as sand mixed through a clayey matrix. Where the Carolina gneiss and granite are intimately associated, or where pegmatization has been extensive in a body of Carolina gneiss, there results a sandy soil, characteristic of granite, containing scattered through it pebbles of iron ore, characteristic of the Carolina gneiss. The relative importance of the iron-ore pebbles decreases in the soils as the quantity of pegmatite or of granite in the rock formations increases. These features of the soils are especially marked on the broad flat ridges characterizing much of the Piedmont Plateau. The hornblende rocks yield a dark reddish-brown to chocolate-colored clayey soil which is very characteristic.

MINING AND CLEANING.

Wet concentration.—Nearly all of the monazite shipped from the Carolinas has been obtained from gravel deposits. These deposits lie in and along the stream and creek beds, where the monazite has collected after liberation from the decomposing gneisses and schists of the region. A part of the production for 1906, however, was obtained from a monazite-bearing gneisses rock by crushing and then separating on concentrating tables. The percentage of monazite contained in the ore treated in either type of deposit is small and probably does not often run over 1 per cent.

The usual method of working the gravel deposits has been washing in sluice boxes, though in 1906 concentrating tables were employed at several places. The form of table most used in the Wilfley or one of similar type. It is set up at the mine as convenient as possible to the gravel deposit to be treated, and is operated by a gasoline or kerosene motor. The gravel is dumped into a shaking hopper through which water is continually passing. The sand is washed through the hopper and passes over the table, while the oversize is shoveled out. At one mine the gravels are raised by a mechanical elevator and the oversize is removed in a revolving screen, from which the sand is passed over a table. In the better class of machines a number-one product can be taken off in the first washing, and the middlings be passed over a second time along with new sands. In some cases, however, where only two grades are separated, concentrates and tailings, a considerable quantity of rough concentrates is first washed out and then carefully sent over the machine a second time. In this way the grade of the sand is raised, and a very clean product is obtained.

The degree of concentration it is possible to attain by wet methods depends largely upon the composition of the gravels to be treated and the care used in treating them. Where black sands, such as magnetite, ilmenite, etc., and other minerals with a high specific gravity are abundant it is difficult to bring the concentrates up to 50 per cent. monazite, even with good concentrating tables, and the product from sluice boxes may run as low as 15 per cent. and under. In more favorable deposits, where the percentage of black sand is not large, a concentrate running 80 or even 90 per cent. can be obtained with concentrating tables, while in sluice-box washing the grade can be brought up to 70 or even 80 per cent. Where the monazite is separated from the hard rock formations the grade has been brought up to 95 per cent. and over by the use of concentrating tables. Taking the monazite region as a whole, there are not many large gravel deposits which will yield concentrates of over 40 per cent. monazite in sluice-box concentration, and the average yield of crude monazite would probably not be far from 30 per cent. Should the use of concentrating tables increase the grade of the crude monazite produced will be raised correspondingly.

Formerly the deposits of monazite-bearing gravels in the bottom lands along the creeks and streams were worked without any thought of the land being left in such a condition that farming could be resumed after mining had ceased. So the soils were washed away, and the gravels were piled up in irregular heaps and ridges. In this way the best farming lands were being ruined, and those farmers who had leased their monazite deposits found themselves possessors of nearly worthless land, with only money received on the leases. This has been remedied in many cases by more systematic working of the gravel beds. The top soil is thrown on the side of the working pit opposite to that on which the deposit

lies, and the underlying gravel is washed. When the next block of gravel is opened the soil is thrown off upon the gravel already washed in the adjoining pit. By spreading the gravel out somewhat evenly and placing the soils smoothly over it nearly the whole land is kept in condition for farming after the monazite has been removed.

It has been found that, when the stream gravels are washed for monazite and then left for a few months, especially in rainy weather, another crop, so to speak, of monazite can be obtained. This results from the washing in of monazite from the surface of the surrounding fields and hills, where it has been left by the decomposition of the original rock matrix. With this end in view, the lands draining into the streams should be plowed now and then, to give the surface waters a chance to wash the monazite into the stream beds. In many cases the farmers have preferred to wash the stream gravels themselves once or twice, or more times, a year. The usual cultivation of their farm land keeps a fresh supply of monazite stirred up in the fields, from which much of it is washed into the creeks.

Electrical cleaning.—A portion of the crude monazite is shipped to the manufacturers as it comes from the mines. The greater part, however, is cleaned by electrical machinery at local cleaning mills in the monazite region. In this way the percentage of monazite in the sand is greatly increased and the freight charges on waste products are minimized. The different types of machinery in use are (1) the Wetherill electro-magnetic machine and its modifications, (2) a machine in which the minerals are deflected by electro-magnets while falling, and (3) a static machine.

Of the Wetherill machines there are two specially designed, improved types operated in different parts of the region—one in North Carolina, the other in South Carolina. In these machines there are four magnetic fields, which lift the different varieties of sand from a main conveying belt passing through them. Smaller belts, between the main belt and the magnetic pole lifting the minerals, carry the sand attracted by the different magnets out of the magnetic field and drop it into proper receptacles. In this way magnetic iron is removed by the first field; titanite iron, garnet, and other minerals of similar magnetic intensity by the second; and coarse and fine monazite by the third and fourth fields, respectively. Quartz, rutile, zircon, gold, and other highly nonmagnetic minerals pass off as tailings. This type of machine readily cleans the sand to 90 per cent., and is able to raise it to 95 per cent. monazite by careful handling. In another type of the Wetherill machine, of which several have been used in the monazite region, there is but one magnetic field, which generally removes magnetic and titanite iron and garnet, while the monazite is left with the quartz, zircon, and other highly non-magnetic minerals. The cleaned product from this machine probably averages about 80 per cent. and does not often run over 85 per cent. monazite. When the field magnets are properly constructed it is possible to pass the sand through the machine a second time under a much higher magnetic intensity and to free the monazite of many of the other minerals left with it in the first cleaning.

In the second type of the electro-magnetic machine the sand is passed over a series of belts, and the separation is affected by the deflection in a magnetic field of the grains of mineral as they fall over the ends of the belts. The different minerals are drawn out of their ordinary course of fall by powerful magnetic fields and

are carried off in different chutes. In this way a very clean separation of monazite is said to be effected.

In the electro-static machine all the minerals but monazite and garnet are lifted from the sands. This is accomplished by a cylinder about 2 feet in diameter and 3 feet long, covered with sheets of vulcanite, slightly separated from one another, 8 by 12 inches square and three-eighths of an inch thick. The vulcanite is excited by rubbing with felt-covered cylinders revolving at a high rate of speed. The speed is regulated by cone pulleys, and is made greater when the atmosphere contains considerable moisture. The sand is heated by two gasoline lamps before exposure to the electrified cylinder. The latter is revolved slowly, and all the sand attracted to it is removed by brushes.

MONAZITE IN ORIGINAL MATRIX.

(New Company and Plant.)

A new company entered the Carolina monazite field during 1906. This was the British Monazite Company, representing the South Metropolitan Gas Light Company of London, which undertook to mine monazite to secure a source of supply that could be depended on at times when the selling price of thorium products becomes excessive, or the supply in the market is limited by monopolies. The new company located about 3 miles northeast of Shelby, N.C., where it has opened the old Campbell mine with improved machinery and methods. The proposition at this mine is different from that of any other mine being operated in the region, and consists in crushing a monazite-bearing rock and separating out the monazite with concentrating tables. For this purpose a frame-work mill, well designed for the placing of the machinery used in treating the ore, was built adjacent to the outcrop of the ore body. Through the courtesy of Mr. Hugh Stewart, manager for the company, the following outline of the operation is given:

From the quarry the ore rock is trammed to the mill and dumped on the feed floor whence it receives the following treatment:

1. Crushed in Gates gyratory crushers to 1 inch.
2. Elevated to bin, whence it is discharged to rolls crushing to one-sixth inch diameter.
3. Product from the latter is discharged into sizing apparatus (sieves). Material of one-fourth inch diameter or under goes through sieve and is discharged into second elevator. Material over one-fourth inch, goes over sieve and is discharged into second crushing rolls, where it is reduced to one-eighth inch and is also discharged to second elevator.
4. Second elevator sends ore into Huntington mills, fitted with 16-mesh screens, through which the ore is discharged.
5. Ore from the Huntington mills is collected in hoppers and fed to 1 Wilfley and 3 Overstrom tables. The seconds and thirds from the first Wilfley and middlings from the Overstrom are passed over second Wilfley table for final concentration.

REFERENCES.

- ¹Consul F. W. Mahin, Nottingham; Daily Cons. Rept., January 10, 1907.
- ²Monazite and monazite deposits in North Carolina: North Carolina Geol. Survey, Bull. No. 9, 1895, p. 28.
- ³Complete descriptions fitting many of these types of rocks may be found in the geologic folios published by this Survey: see Geologic Atlas U.S., folio 116 (Asheville), folio 124 (Mount Mitchell), by Arthur Keith.

(To be continued.)

HARVEY GRAHAM.

There died on Thanksgiving Day a man whose strong purpose and manful accomplishment meant very much to Nova Scotia.

Harvey Graham breathed his last at his home in New Glasgow, on October 31st, 1907.

Mr. Graham was born fifty-nine years ago in Little Harbor, County of Pictou, Nova Scotia. In New Glasgow he was educated and there he spent the early years of manhood. His first wife, Miss Hannah Fraser, was a New Glasgow lady. His second wife, a daughter of the late Alexander McKay, of North Sydney, died last August, while her husband was on his way home from Brazil.

Mr. Graham was successively manager of the Nova Scotia Glass Company, manager of the Black Diamond



Coal Company, and manager of the New Glasgow Iron, Coal & Railway Company. The last position he filled until the New Glasgow Company was absorbed by the Nova Scotia Steel & Coal Company. For several years before his death he filled the offices of director and assistant general manager of the Nova Scotia Steel & Coal Company. In these joint capacities Mr. Graham gave evidence of the stability and calm, deep strength of his character.

As a Nova Scotian and as a Canadian Mr. Graham always identified himself with progress and reform. He was an ardent, though not a bitter, advocate of temperance. He, himself, was an exemplar of true temperance—the temperance of a sound mind in a sound body.

The death of such a man is an event of sad moment to any community.

TANTALUM.

The fruitful activity in experimental metallurgic work during recent years for both scientific and commercial purposes, especially in electro-metallurgy, has made possible the reduction of metals that were before unutilized and almost unknown. The determination of the properties of these metals has suggested uses for them, with the result that there is a growing demand for ores that but a few years ago were sought only as mineral curiosities.

One of the most remarkable of these metals is tantalum. It is not attacked by hydrochloric, nitric, or alkaline solutions. It can be drawn into fine wire having a tensile strength greater than soft steel. A red-hot lump of tantalum may be at once hammered into a plate which, on repeated rehammering, becomes as hard as diamond. A diamond drill running continuously for three days at 5,000 revolutions a minute failed to penetrate such a plate, although it was but 1 millimeter thick, while the drill was much worn.

A British patent has been obtained for making writing pens from tantalum, whose hardness, elasticity, and resistance to corrosion would seem to fit it well for such use.

Tantalum is now employed principally as a filament in an electric incandescent lamp which was put on the American market in 1906. This lamp consumes but two watts per candle power, as against more than three watts per candle power for the ordinary carbon filament lamp.

The principal ores of tantalum are tantalite and columbite (a combination of iron, tantalum, and columbium), which occur in pegmatites, or coarse granites. In the United States tantalum ore may be found probably in the greatest quantity in the Black Hills of South Dakota. In 1906 one mass weighing 600 pounds was discovered. A small lot was shipped to Germany from Canyon, Colo., during the year, and small shipments have also been made from Mitchell County, N. C.

MOLYBDENUM IN 1906.

The only production of molybdenum reported to the United States Geological Survey for 1906 was from Homestake, Mont., but deposits at Dillon, Sheridan, Ophir, and other places in the same State are being prospected. Ores of this metal are found also in Maine, Washington, Oregon, California, Nevada, Utah, Arizona, New Mexico, and Colorado.

The ores are molybdenite (molybdenum sulphide) and wulfenite (lead molybdate). Molybdenite is much the more common, but most deposits are too small to justify expensive machinery and the demand is at present comparatively small. Wulfenite is more easily saved, but often carries so many impurities that it is almost impossible to use it.

The metal is employed as an alloy of steel, and, in the form of ammonium molybdate, to determine the presence of phosphorus in iron. In Europe ammonium molybdate is utilized as a fireproofing material and as a disinfectant for cloth used in railway passenger coaches and for other similar purposes. It is said to be a powerful germicide. Molybdenum salts give a fine blue color to pottery glaze. The uncertainty of the supply of this metal has probably prevented its more extensive use in steel, in which it has nearly the same effects as tungsten, even when added in a much smaller quantity. Efforts to use metallic molybdenum as a filament for incandescent electric lights have been unsuccessful, owing to its comparatively low melting point.

ENGLAND'S PREMIER COBALT MINING COMPANY.

With the permission and approval of the persons concerned we reproduce herewith a letter, written by a prominent mining engineer, in answer to enquiries about England's Premier Cobalt Mining Company.

We understand that action is being brought against this mining company by purchasers of its stock in England. Its claims are dealt with briefly and pointedly by the following letter. There is little need for us to enlarge upon it.

My Dear Sir,—

I have your letter of the 5th inst. enclosing prospectus of England's Premier Cobalt Mining Company, Limited, in which you state that the company which you represent have subscribed for shares in the said mining company, and ask me to examine and criticize some of the statements contained therein, which I take pleasure in doing so far as statement does not apply to the merits of the mine itself, of which I have no knowledge.

In the prospectus you have numbered the various paragraphs, and I will discuss them by the numbers as designated by you.

Paragraph No. 2 states that the property is in the heart of the Cobalt silver mining camp, and adjoins the Steindler, Edison, Evans and other mines, and is in close proximity to the Buffalo, Silver Queen and Hudsoy Bay properties. This property does not adjoin either the Edison or Evans mines, and is not in the heart of the Cobalt district, and with the exception of the Evans property, is more than three (3) miles from any shipping mine.

Paragraph No. 3.—The Evans mine is principally valuable for its cobalt, and their ore does not run high in silver.

Paragraph No. 4.—The Portage Bay district is at present an entirely unknown quantity, and with the exception of possibly the Evans mine, does not at present contain any paying mines.

Paragraph No. 5.—The Edison property is being mined solely for the cobalt values in the interest of Mr. Thomas A. Edison, who needs cobalt for electrical purposes. The Portage Bay district is not experiencing a boom, nor is there any reason for thinking at present that much of the best shipping ore will come therefrom.

Paragraph No. 7.—As to the formation. The report of Mr. Foster, contained in prospectus, shows that the formation is diabase and gabbro. The ore-bearing formation on the "Nipissing" is neither of these.

Paragraph No. 8.—Although rich values have been found at depth in some instances, it does not necessarily follow that rich ore will be found by sinking if it is not found at the surface. The entire surface of the Cobalt district has been planed down by glacial erosion, and surface prospecting, for that reason, is much cheaper than prospecting by sinking. Therefore, unless surface showings of value can be obtained, there is no especial reason for prospecting to depth.

Paragraph No. 10.—The Trethewey mine is not down over 300 feet, but the extreme depth is 120 feet. Values have not increased either in the Trethewey or La Rose mines (nor Drummond mine) with depth. All of these mines had exceedingly rich ore on the surface, and the owners will be perfectly satisfied if values remain the same at depth.

Paragraph No. 11.—Many of the mines in the district are shipping ore containing less than 100 ounces of silver per ton.

Paragraph No. 12.—Although it is necessary that a claim be passed by a mining inspector before lease is issued, it does not prove that this inspection is evidence of value sufficient to yield profit. They simply require that a well-defined vein giving possibility of profit be exposed. This is one of the commonest arguments used to prove that a claim is of value, but it signifies nothing from the commercial standpoint. Inspectors have been especially lenient in the Portage Bay district, because it is a new district and they desire to encourage prospecting as much as possible.

Paragraph No. 13.—Prospectus mentions that two (2) shafts have been sunk, but does not give their depth. This is exceedingly indefinite. Nor does the prospectus state the width of ore streaks which are claimed to have shown values from 321 to 900 ounces silver per ton. If these assays were made of small specimens, they are of no special use.

Paragraph No. 14.—There is no reason given in the prospectus for assuming that dividends may be confidently expected during the present summer.

Paragraph No. 16.—Prospectus states that on adjoining property (presumably the "Evans") average assays show over 3,000 ounces of silver per ton. This is not true.

The Cobalt district is a great mining district, and will be an important element in the production of silver. The district is now producing at the rate of about 1,000,000 ounces of silver per month, which is an excellent showing considering the short time the district has been in operation. During the past few months considerable deep exploration has been made, which in many cases tends to prove the strength of the veins, and the fact that in some instances rich ore is found at considerable depth.

The great success of some of the mines has stimulated the flotation of mining companies on ground of little value. In this, as in all other mining districts, there are rich and poor mines. All ground is not necessarily valuable, and unless there is evidence in the form of rich ore there is no reason why high prices should be asked for unexplored territory.

LONDON LETTER.

A Diamond Trust.

ALEX. GRAY.

A "corner" in diamonds is projected by the dominant factors in the DeBeers Consolidated and Premier Mines of South Africa. Conferences are taking place and the result is of greatest moment to the mining and monied worlds—to say nothing of the cutting trades of Amsterdam and Antwerp, and all who trim themselves with precious gems. Those who want diamonds will doubtless have to stretch their purse strings.

Details of the working agreement between these diamond producers are impossible of ascertainment; and they will so continue to the uninitiated laity. Primarily the object is to regulate the supply, but in reality the arrangement is an expansion of the Cecil Rhodes plan whereby diamonds could be won and distributed through

a central organization whose dictum is final—at least until rival mines are discovered. The Rhodes idea has proved its efficacy in practice. Its evolution has been one of the most thrilling chapters in the story of latter-day mining. If Canadians are to follow their fancy for “blue whites,” “Cape whites,” “Canaries” or better class “stuff,” as it is characterized by the trade, they either will have to pay tribute to the contemplated clearing house or find a few mines of their own. That there are diamond mines on your side of the water is an undisputed fact. Whether those mines are payable is another matter, yet the doubt will never be removed by those of Kentucky and elsewhere who prefer rotary presses for printing scrips in bulk to “rotaries” for washing their diamantiferous ground in quantity. Diamond bearing mines need not necessarily be confined to South Africa. Whether at Hudson Bay territory, Iceland, or the “Blue Grass” country, the associated minerals noted offer opportunity for legitimate exploitation; so the prospective advance in diamonds may induce trans-Atlantic mining men to closely investigate their own fields. Then the South African combination will revise their visiting lists.

For thirty years or thereabout, the diamond-laden craters of Kimberley have yielded gems of “purest ray serene.” More recently the Orange River and Transvaal colonies have contributed in varying quantity and quality. The “Diamond Syndicate,” of which the pending proposal is an extension designed to assort and sell the diamonds, was contemporaneous with the amalgamation of controlling forces in DeBeers, Kimberley, Wessington, Bultfontein, DuToitspan and Jagersfontein, constituting the basis of DeBeers Consolidated. Instead of individuals and smaller concerns holding and working claims to more or less disadvantage in these respective mines and forcing their diamonds on to indifferent markets at 18s., 19s. and 20s. per carat, as was the case twenty years ago, Rhodes, Barnato, Wernher, Beit & Company; Rothschild, Ponges, and others, took the DeBeers outputs month by month, or week by week, at contract prices. With minor changes in the personnel of this combination, the syndicate has since so preserved their diamond markets that to-day an average of 70s. per carat is realized. It has cost the public well on to a round hundred millions sterling to bedeck those who will have diamonds, and notwithstanding forebodings lest the supply exceed the popular demand, the annual output has attained a value of about £10,000,000 from South Africa alone. At one time Rhodes thought the world's yearly absorption of diamonds might justify finding £4,000,000 worth. That was when the per carat value was a sovereign and a Cape tax was imminent. Either Rhodes under-estimated the prowess of himself and colleagues or he did not comprehend the persuasive eloquence of American womankind, for his own creation has exceeded his estimate for a twelvemonth by putting out £5,000,000 to £6,000,000 worth. In twenty years the five Kimberley mines have accounted for about 43,000,000 carats, valued at about £70,000,000, to say nothing of Jagersfontein, the stones from which are also controlled by the Diamond Syndicate, their quality being superfine. If you add the syndicate's profit, and the jeweller's profit, to the £70,000,000 valuation before the diamonds left Kimberley, the calculation that it has cost the public a hundred millions sterling to adorn the fair sex is not wide of the mark. Really these diamonds have been excellent investments. To comprehend this it is necessary only to state that the selling price of DeBeers diamonds has advanced 50 per cent. in the past

eighteen months. Those who possessed jewels at previous prices have corresponding consolation.

Until the discovery of the Premier Mine near Pretoria in the Transvaal, the syndicate operating to such advantage in DeBeers diamonds had a free market, easily manipulated; because one or two small producers elsewhere, and alluvial areas on the Vaal River were negligible quantities. The Premier Mine is as large as the combined DeBeers “pipes,” and when it demonstrated that its yield was a matter of machinery, the DeBeers Syndicate foresaw difficulties in their markets. Since all mines have low quality diamonds, and the Premier Mine has more of these than others, the mutual plan is to pool everything and uphold selling prices. The technique of diamond dealing is so complicated that a few perfect stones are certain to turn a loss on an average “parcel” into a profit. Consequently it has been accepted by all parties that 200,000 carats per month of Premier Mine diamonds, worth 25s. to 30s. are a menace to choicer assortments taken from the mines of Kimberley and Jagersfontein.

Rather than try conclusions with the Premier Mine product—some of which is unexcelled in quality—and precipitate a conflict that would adversely affect the general quality as taken from the DeBeers mines, the Diamond Syndicate consented to the pending negotiations. Obviously the public will “pay the piper,” but what does it matter if the diamantiferous contents of craters in payable quantities are confined to South Africa? Not all diamond “pipes” are to be worked profitably. There are “blind” and low grade “pipes,” just as there are barren or unpayable reefs, veins or lodes. Rhodes and his associates made diamond mining a science first—a correct principle in all mining—subordinating the speculative element. The yearly output of the DeBeers combination is worth more than Rhodes and others paid to accomplish that combination. The Premier Mine product is worth two and a half millions annually—or 40 times what Cullinan paid Prinsloo for the premises five years ago. A rich man's opportunity is thus presented for the control of diamond markets—until Canada or the States exploit their craters of which some have fallen into the precarious possession of the scrip peddler.

Later mail advices, under date September 19th, confirm the foregoing, although the statement appearing September 17th in the *London Times* that an arrangement between the DeBeers and Premier Diamond Companies for the sale of stones “had been concluded in outlines,” is denied. The basis of the negotiations is, that “the output of the two companies will in future be pooled and sold in fixed proportions to the syndicate which at present deals with the DeBeers production only.” All the parties concerned are hopeful of a “mutually satisfactory result,” and it is believed that the Transvaal Government, which holds 60 per cent. interest in the Premier Mine, will not interpose since the maintenance of market prices for diamonds will favorably affect the profits derivable therefrom. Thus another trust approaches consummation.

A meeting of the Mining Society of McGill University was held at Montreal on Friday, November 8th in the Mining and Metallurgical Building of the University. An interesting paper was presented and read by Mr. Bell, followed by a discussion in which several present participated.

A METHOD OF MINE SURVEYING.

For my own use I have devised the following method of instrumental work and preserving of notes which I find answers the purpose exceedingly.

I think it is particularly free from many of the defects of those methods I have heretofore seen.

The only requirement to the ordinary mining transit is to have the horizontal limb graduated from 0°00' to 360°00' in either direction, but preferably to the right, i.e., a rotation to the right through north, east, south and west increases the angle read by the vernier.

In ordinary work only one vernier is used, but in cases where extremely accurate results are required, as when placing sills on lower levels to catch those on the next higher as in square sets, both verniers are used and the angles doubled. This does not alter the method of entering notes in the record.

Sights wherever possible are taken horizontally, the elevations being run later by means of the telescope bubble and a short levelling rod.

This, of course, applies to the main hubs rather than to the unimportant side points.

In steep sights, or where it is more convenient, the slope, distance and vertical angle are measured.

The field book has five columns. The first contains the numbers at beginning and end of course; column two the deflection angle, column three the distance, and column four the vertical angle if the course is measured along the slope. Finally the fifth column contains the number of the back sight.

To eliminate errors of collimation the telescope is not transited about its hor. axis, nevertheless, although the telescope is turned through the interior angle, it is the deflection angle which is read. This is done by merely setting the vernier at 180° instead of at zero for each reading. Suppose the vernier set at zero, telescope inverted and clamped along the back sight. Turning the telescope about its horizontal axis gives a F. S. exactly 180° from this. Any reading of the vernier will indicate the deflection angle.

If, however, the vernier be set at 180° and a B.S. taken, and the telescope be turned about its vertical axis through 180° it will read 0°00' and its line of sight will coincide with the former, therefore whatever reading be indicated by the vernier will be the deflection angle.

This as stated before eliminates on one reading the collimation errors.

Fig. I. shows a sample page of notes. This page is 8 1/4 by 19 inches, and being of the loose leaf form is contained between solid covers and can be added to or altered without defacing the work.

The station numbers in the first column refer to the beginning of the course on that line, i.e., it is the hub where the instrument is set up. The number in the next column is the elevation of that hub. In the third column the deflection angle as read in the field is entered, directly from field book. The "forward azimuth" of any course is in the fourth column. It is the deflection of the course from a true north line, the quantities in this column being always "the azimuth of the preceeding course plus the deflection of the required course minus 360°, if their sum be greater than 360° thus, example:

$$\text{Azi } 403-404 + \text{deflection } 404-405 = \text{Azi } 404-405 \text{ or } 136^{\circ}10' + 45^{\circ}07\frac{1}{2}' = 181^{\circ}07\frac{1}{2}' = \text{Azi } 404-405$$

JONES EUREKA LEAF PATENTED FEB. 7TH 1905

RECORD BOOK PAGE 34
 TRANSIT BOOK No. 44-1
 SURVEYED July 23rd of
 PLOTTED 24th of
 JOHN B. SHAW'S CO., INC. ESTABLISHED 1880, CHICAGO, ILL.

South Drift 400' level.

STATION	ELEV.	DEFLECTION	FORWARD AZIMUTH	HORIZONTAL DISTANCE	BEARING	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	REMARKS
400	4682.29	110°07' 1/2	136°10'	21.46	S 48°10' E		30.53	19.41		34.439				
401	4682.29	45°07' 1/2	181°07' 1/2	22.26	S 19°15' W		22.55		3.0	32.484				
402	4682.29	339°03'	180°49' 1/2	8.25	S 0°45' W		8.25		1.23	43.960				
403	4682.29	339°03'	179°07'	33.81	S 0°38' E		33.80	.83		38.880				
404	4682.29	290°21'	219°01'	31.31	S 38°01' W		28.21		2.56	35.959				
405	4682.29	20°30'	239°31'	18.59	S 68°01' W		19.91		14.84	33.968				
406	4682.29	344°34'	227°05'	34.21	S 0°21' W		34.21		2.5	28.913				
407	4682.29	180°21'	180°21'	38.41	S 43°05' E		28.01	26.29	3.44	26.106				
408	4682.29	313°16'	180°21'	29.08	S 16°33' W		29.82		4.853	14.622				
409	4682.29	316°20'	136°05'	99.65	S 29°09' W		89.02		11.81	110.64				
410	4682.29	12°36'	209°09'	34.34	S 79°38' W		35.58							
411	4682.29	348°29'	194°38'											
412	4682.29													
413	4682.29													
414	4682.29													
415	4682.29													

MINE

FIG. I

Again

Azi 405-406 + deflection 406-407 = Azi 406-407 or
 $180^{\circ}49\frac{1}{2} + 358^{\circ}17\frac{1}{2} = 539^{\circ}07 = \text{Azi } 406-407$ and
 $539^{\circ}07 - 360^{\circ} = 179^{\circ}07 = \text{Azi } 406-407.$

Considering these examples, it will be noted at a glance that there is no possibility of error as to the deflection being right or left, an error being apt to occur in small deflections where the method of a "left" or "right" is used. Also all collimation error is eliminated.

The sixth column gives the course in terms of the compass, i.e., N, E, S or W, and is derived directly from the forward azimuth column, thus:

Forward Azimuth.	Bearing.
0°00' to 90°00	N.E.
90°00' to 180°00	S.E.
180°00 to 270°00	S.W.
270°00' to 360°00'	N.W.

From this last column the latitude and departure co-ordinates are reduced, and these co-ordinates refer to the hub whose number is in column on "Remarks." (Through a typographical error the proper column for these foresight hubs was omitted.)

As a check, I close the survey on the starting point, using the same hubs but different angles. Only one series of set-ups, however, is required. Suppose the instrument set up on hub 410 B.S. on 409, F.S. on 411 and read deflection angle to 411. Now unclamp, reset at 180°, B.S. on 411 and F.S. to 409, noting deflection either on another page or underneath the previous deflection.

The second deflection should be equal to 360° minus the first. Any error is spotted at once, in the field, and

the the method also eliminates the possibility of repeating an error and gives two readings, the mean of which can be accepted as correct.

In making simple connections, running raises, etc., the auxiliary telescope is used as a top scope, but for more accurate work as a side scope, to eliminate slight errors of adjustment of horizontal axis.

In steep sights where the auxiliary is used as a side scope the back sight is taken with the latter, then the foresight made from vernier. This, however, does not give the true azimuth and necessitates some corrections covered by formulae A.

Fig. II. represents instrument set up at D 111 at the collar of shaft, say with the side scope backsighted on D 110, the azimuth or bearing of 110-111 being known the azimuth of line of sight from D 110 through side scope is = azimuth of 110-111 + tan an -1 d-D (the minus sign being used when side scope is to right of observer and vice versa) when d = perpendicular distance between telescopes and D the horizontal distance 110-111.

Now turn telescope around both axes; but do not transit; and foresight on 112 through side scope. This deflection added to the azimuth of backsight through the side telescope gives the azimuth of foresight through the side scope thus Azi (D 110-D 111) + tan d-D + deflection = azi of line of sight through side scope.

The slope distance from centre of telescope at D 111 to D 112 and vertical angle being measured, the horizontal distance D is calculated and the small angle d=d is tan -1 d-D, whence the azimuth D 111-D 112 becomes azi (D 110-111) + tan -1-D + deflection + tan -1 d-D, the upper or lower signs being used

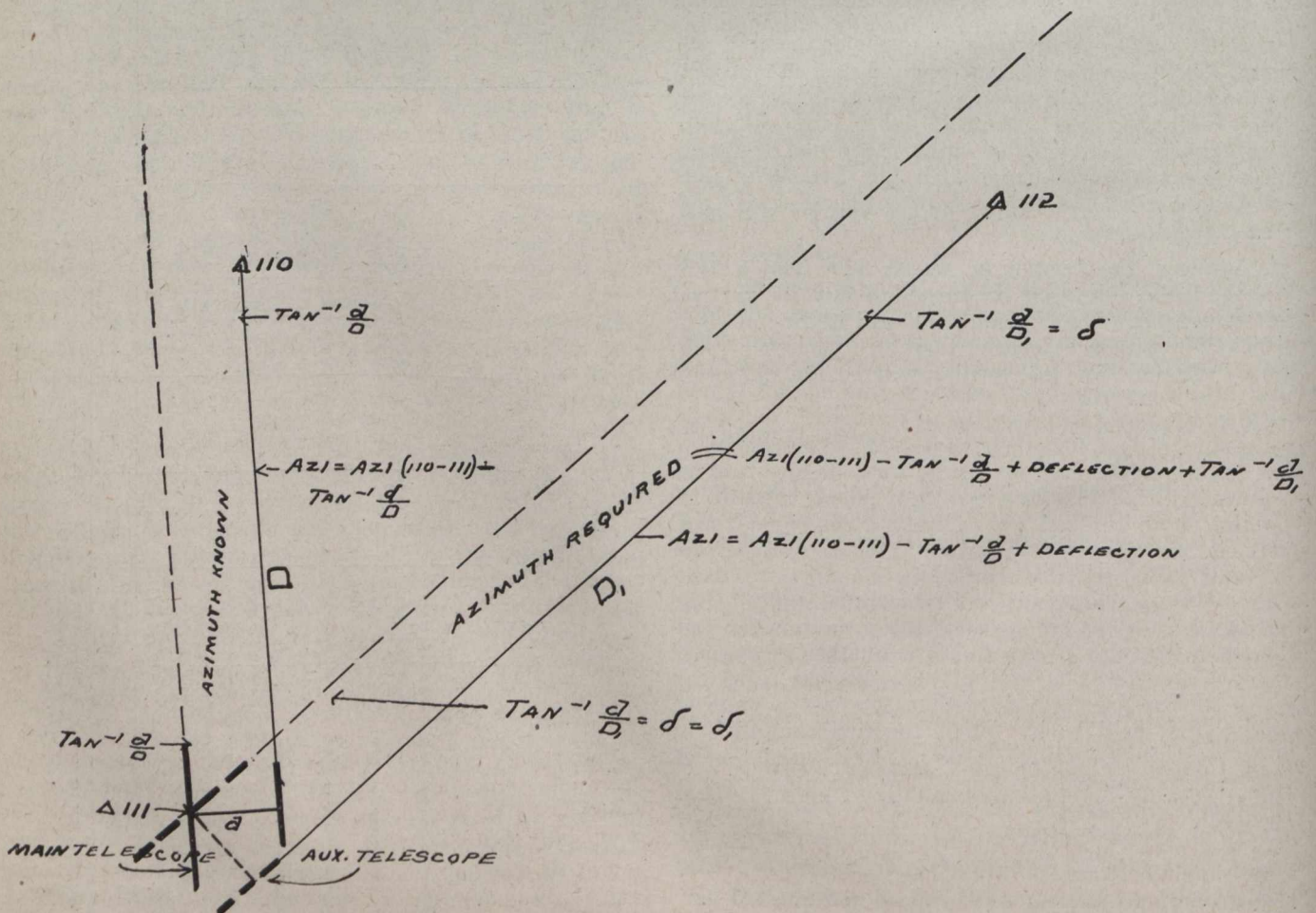


FIG 2.

when side scope is respectively to right or left of observer. This operation is repeated with the horizontal axis at 180° to its first position.

Extremely accurate results can be had in this way even if the instrument be considerably out of adjustment.

If it is required to run a line from some known hub to some other known hub, the bearing of the line required is calculated from the latitudes and departures of the two hubs. This bearing is converted into azimuth and the deflection from the nearest known hub is the azimuth of the required course minus the azimuth of the preceding, thus:

Deflection = azimuth course required—azi of course containing back sight.

This method I have no doubt will be familiar to many, though I have never seen it used or described. It is one I devised for my own use as being one less liable to error than any I know of. No doubt it can be expanded or altered to suit special conditions, but personally I find it all to be desired, as it is equally suitable for shaft work drifts, tunnels, stipes and open cuts.

A. B.

EXCHANGES.

The *Colliery Guardian*, October 25th, editorially discusses qualification for coal mine managers' certificates. Whilst certain objections are developed against the interchange of certificates as between the United Kingdom and the rest of the Empire, the *Guardian* does not condemn such reciprocity entirely. It traverses Mr. Stokes' suggestion that three years' service in a mine abroad be taken as equivalent to one year in the United Kingdom.

The *Mining and Scientific Press*, November 2nd, gives a good article on "Jigging by Hand" in Mexico. "Hand rigs can often be effectively and advantageously used in treating dumps of low grade material, without crushing, and with but a very small amount of water, when the material is too fine to be economically sorted by hand." The advantages are summed up thus: (1) Need of a very small amount of water (2) low cost of installation; (3) facility for moving from one place to another.

Writing on pumping machinery employed in mining, in the *Mining World*, November 2nd, Mr. Jos. H. Hart endorses the use of compressed air. "Given an air compressor, the operation of the pump itself is extremely simple. It consists merely in sinking a well to a slightly lower depth to obtain the pressure head with which to operate. . . . In ordinary practice the height to which air can be elevated by this process seldom exceeds one and one-half times that to which the water falls in the well without reversal occurring. If the pipe which carries the air and water upward is tapped and more compressed air rejected, the process becomes continuous, and the water can be lifted to any height. . . . The air lift process is much more efficient, however, than the ordinary surface pump. It possesses all the advantages of the ordinary single or multiple turbine pump."

Economic Geology, September-October number, presents a fine range of papers. One on the "Precipitation of Copper from Chloride Solutions by Means of Ferrous Chloride" is especially worthy of note. Gustave Fernekes is the writer. A series of analyses of mine waters was made upon samples from different mines at depths ranging from 800 to 5,000 feet. The waters proved to be more or less concentrated solutions of calcium chloride, sodium chloride and sodium bromide, with traces of sulphates. Concentration increased with

depth. No copper was deposited by means of ferrous sulphate. The cause of the failure was the fact that metallic copper is soluble in hot dilute hydro-chloric acid. To make precipitation of copper possible the hydro-chloric acid must be constantly neutralized. This neutralization can be brought about by the carbonates or silicates of calcium and sodium. Calcium hydroxide was first tried, then calcium carbonate and finally calcium silicate in the form of the mineral wollastonite. The experiments were successful, the copper being deposited in from ten to fifteen minutes' heating at 200 degrees C. Interesting, though tentative, conclusions are reached in the course of the paper.

PERSONAL AND GENERAL

Mr. H. J. Carnegie Williams, manager of the Bruce Mines, Ont., left recently for England.

Mr. T. J. Drummond, of Montreal, sailed for England on the Londonderry Iron Company's business on the 7th inst.

Mr. Jay P. Graves has returned to Spokane from attending the meeting of the Granby Company in New York.

Mr. R. D. Thompson has resigned as superintendent of construction at the Dominion Coal Company's collieries, Glace Bay, N.S.

Mr. W. S. Johnson, of Lachine, Que., is visiting the West on business in connection with his mining interests in the Slocan district.

An examination of the Laurentian gold mine in the Manito udistrict, Ontario, has recently been made by Mr. H. H. Newcomb of Boston.

Mr. William J. Penhallegon has resigned the superintendency of the Manitou Mining Company and the Frontenac Copper Company.

Mr. G. P. Player, late accountant for the Hall Mining & Smelting Company, Nelson, B.C., has opened offices on his own account in that town.

Mr. J. E. Hardman, of Montreal, has recently returned from an examination of an important new iron area in New Brunswick on behalf of clients.

Mr. S. Yamada, a Japanese mining engineer, in charge of an important copper mine in Japan, is visiting the smelters and mines of the Boundary district.

Mr. Anthony J. McMillan, managing director of the LeRoi Company has left Rossland enroute for England, where he will spend the next three months.

Mr. J. K. L. Ross, the new commercial manager of the Dominion Coal Company, graduated from McGill University in 1897 and is a son of Mr. James Ross, of Montreal.

Dr. John H. Banks, of Messrs. Ricketts & Banks, metallurgists, of New York, is preparing a special report on the extraction of metal values from the ores of the Cobalt district.

The report that Mr. Hays Hammond was about to sever his connection with the Messrs. Guggenheims, for whom he is acting in the capacity of advisory engineer is officially denied.

Mr. Alexander McLeod, consulting geologist, has recently returned to Sidney, C.B., from Newfoundland, where he was engaged in examining mineral properties for American clients.

Mr. Fred. Demuth, superintendent of the White Bear mine at Rossland, has denied the report that he is leaving the company's service or that the closing down of the mine is contemplated.

Mr. James S. Quigley, for the past five years underground manager at the Mabou mines, N.S., has accepted an appointment on the engineering staff of the Maritime Company's Joggins mines.

Mr. M. S. Irwin has resigned the secretaryship of the Hastings (B.C.) Exploration and other companies, leaving Nelson recently for California. He is succeeded by his brother, Mr. William Irwin.

Mr. Fred. G. White, until recently accountant at the Cariboo Consolidated, Bullion, B.C., has been appointed manager of a business department of the Yukon Gold Fields Consolidated, at Dawson.

Mr. W. Anderson, for many years superintendent of the Cascade Power & Light Company of Cascade, B.C., has been appointed hydraulic engineer to the West Kootenay Power & Light Company, with headquarters at Rossland.

Mr. Thos. Thompson has resigned as superintendent of the Dominion Iron & Steel Works' open hearth furnaces to accept an appointment in New York. He is succeeded by Mr. James K. Fraser, for some time past senior foreman.

Mr. C. H. Low, a director and secretary of the recently reorganized Payne Mines, Limited, of Sandon, B.C., accompanied by the company's engineer, has just completed an examination of the property, which is to be extensively developed.

Mr. H. Cecil, acting for a British Company proposing to erect a copper smelter on Uchuckleset harbor, near Alberni, B.C., is at present in the West securing estimates and other information to lay before the directors of the company in London.

Mr. T. R. Stockett, manager of the Western Coal Company's collieries at Nanaimo, B.C., in a recent interview stated that labor conditions there were now satisfactory and that the company was now able to maintain a daily output of about 2,400 tons.

Mr. W. J. Prisk, who retired recently from the management of the Dominion Antimony Company's mine at West Gore, N.S., was presented by the president, directors and employees of the company with a gold watch suitably inscribed, in appreciation of his services during his connection with the company.

Mr. A. G. Larsen, superintendent of the LeRoi mine at Rossland, reports that the property is looking exceedingly well, and that shipments are being maintained at the rate of 300 tons a day, which tonnage would not be exceeded until an improvement took place in the copper market conditions.

In a recent interview Mr. R. W. Coulthard, general sales agent of the Crow's Nest Coal Company, stated that two new seams of coal are being opened at the Morrisey, from which it was expected coal would be shipped early next year. The company has recently engaged a number of experienced miners from Wales and Staffordshire to work in the collieries.

Mr. Alexander Dick has resigned as general sales agent of the Dominion Coal Company. The resignation goes into effect on the 1st of May next. Mr. J. K. L. Ross, who has been with the company since 1900, has been appointed commercial manager, and will, it is understood, also have direction of the department at present under Mr. Dick's charge. Mr. Dick's resignation is much regretted.

CORRESPONDENCE.

Phoenix, B.C., Oct. 24th, 1907.

To the Editor,

CANADIAN MINING JOURNAL, Toronto.

Dear Sir,—Allow me to congratulate you on the stand you have taken in exposing the methods of mining sharks in robbing (no other word fills the bill) the public by the sale of stock in companies owning a few acres of, in all likelihood, barren ground. This refers more particularly to operations on the reputation of Larder Lake.

The many glowing statements of this district, e.g., "Richest gold camp in the world," etc., are not only exaggerations but absolutely false. I spent a large part of last summer in the vicinity of Larder Lake, in fact, my camp was continually within a few yards of it, while working this district. The party consisted of five men, myself and partner (also an engineer), two guides and cook. We were prospecting for a syndicate, and it would be difficult to find a better outfitted party or one in which the work of prospecting was carried out with more method and study, the work of each day being gone over during the evening, all geological data, pro and con, being duly considered.

I can say that the country in which these big (?) finds are being made was pretty well covered either by myself or partner.

Now to the point. I am not at liberty (and even if I were it would not be advisable to make it public without certain qualifying statements) to state my views as to the richness of the district, but this much is a fact: the party disbanded in the fall without staking one single claim, and it was not deemed advisable to do any more work in that district. This conclusion was arrived at on the strength of my report.

I was fortunate enough in preventing many of my friends from losing money by investing in these wild cats, and though I was considered in the light of a pessimist at the time, my opinion has since been fully justified.

I should be much surprised to see anything but Dumpit (a name jocularly applied by miners to wash) come out of the district. Moreover, I am convinced that whatever ore, if any, does come to the mill will be in homeopathic quantities, statements to the contrary notwithstanding.

I remember some time ago reading an advertisement of a company which had a 5 stamp mill on the way to one of its claims. Remember it was "on the way," not on the ground. After several flamboyant and fiery statements, the advertisement stated the desirability of erecting a 200 stamp mill from the proceeds of sale of stock.

At the most there could not have been more than 100 feet of drifting or sinking, and this could not have blocked out much ore (in keeping with the statements of these men there was probably none at all).

Now Mr. Editor, can you conceive of the knavery of men who will deliberately put before the public such barefaced frauds to rob those who have in the course of years saved a few hundred dollars; for these are the ones who are caught. Men with capital who can afford to lose are not tempted by such bait. They know too well that good properties need no advertising to raise money for development. Only those to whom sums of a few hundred dollars appear fortunes are convinced by such, and they are not in a position to find out the actual facts.

Mining is a legitimate profession, and many honorable men are to be classed amongst its members, and if miners do not wish to have the name "Mining Engineer" synonymous with shark it is up to them to discount and expose the practices of these vicious pirates.

It has taken British Columbia many years of uphill work to regain her credit as a mining province, a credit which had been strongly jeopardized by these get-rich-quick leeches. The press of Ontario and Quebec has it within its power to eliminate the tremendous losses to the public and the discredit which must inevitably follow the indiscriminate advertising of fake mining companies.

Yours truly,

LEGITIMATE ENGINEER.

OBITUARY.

Mr. Harvey Graham, assistant general manager and a director of the Nova Scotia Steel & Coal Company, died at New Glasgow on October 31st after a somewhat tedious illness. Mr. Graham had been associated for many years past with industrial enterprises in Nova Scotia, having been manager of the Nova Scotia Glass Company, Black Diamond Coal Company, and New Glasgow Iron & Coal Company up to the time the latter was absorbed by the Nova Scotia Steel & Coal Company. Recently Mr. Graham undertook the task of perfecting arrangements for the development of large iron ore deposits in Brazil.

The death occurred near Duncans, Vancouver Island, on the 28th ultimo, of Mr. Clermont Livingston, managing director of the Tye Copper Company, and a gentleman very highly esteemed and respected throughout the Province of British Columbia, where he resided for fifteen years. Mr. Livingston after acquiring the Tye mine some years ago first organized a small development company, which was finally merged in a big-

ger concern, and erected the smelter at Ladysmith, which has been very successfully operated. In the words of one of his contemporaries: "The death of Mr. Livingston is a distinct loss to the mining community. His properties have been the most straightforwardly managed and straightly conducted of any in the Province, and his name has been a synonym for honest dealing. Even when it was against his own interests and that of his company he has not checked the truth, and the result has been that capital at home and abroad has had the fullest measure of confidence in him and his judgment."

The Canadian Mining Institute and the mining industry generally has suffered a severe loss in the death of Mr. John Blue, which occurred on the 2nd inst. at Eustis as a result of an accident. At the time Mr. Blue, while overseeing certain work at the mine, was struck and run over by a water car, sustaining injuries from the effect of which he only lived a few hours. Mr. Blue was born in Scotland, but coming to America as a young man, engaged in engineering work and later was put in charge of important operations in connection with the building of the Hoosac tunnel.

For many years past he has occupied the position of superintendent of the Eustis Mining Company's works, at Eustis, Que., and was one of the charter members of the Institute, on whose Council he has served as a representative of Quebec mining interests and subsequently as a vice-president. At the funeral, which took place on Monday, November 4th, the Canadian Mining Institute was officially represented by Mr. John Penhale. The Institute also sent a wreath of flowers and a telegram of condolence as follows, which was despatched to the widow of the deceased:

Mrs. John Blue, Eustis:—Officers and members of the Canadian Mining Institute desire to express deepest sympathy in your sad bereavement and to record their great regret at the untimely loss of one of their oldest and most respected members.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

GLACE BAY.—It has often been said that one must leave home to learn the news, and we have learnt some most peculiar news from an article that was recently dished up for the delectation of the innocent readers of the "New York Times." This precious screed is a fair sample of the "guff" with which some papers feed their readers, and it is perhaps hardly worth while quoting except that its very ridiculousness may amuse some of our Glace Bay readers. The effusion in question ran as follows:—

TOPICS OF THE TIMES.

FAME CAME BY MERE LUCK.

"Glace Bay, the name of which—though not its pronunciation—has suddenly become known all over such parts of the world as counts, was about the last place that even a long-distance prophet would have picked out for a glorious destiny. All there was to Glace Bay before Mr. Marconi, driven from Newfoundland by the futile jealousy of the cable company, went there was the bay, and the bay itself is a poor thing, as bays go, a mere shallow inward sweep of the Nova Scotia coast, with no protection for ships and therefore no town. Indeed, there is hardly a hamlet—just a thin scattering of mean houses over sterile, rocky hills.

"There is, to be sure, a little station on the disconsolate little branch railway that wanders down from Sidney to Louisburg and serves a few coal mines and sawmills, but one could hardly imagine anybody's stopping there except from stern necessity or staying any longer than the stern necessity compelled. Most parts of Nova Scotia have a rugged beauty, but the region around Glace Bay is only dull—so dull that even the second growth birches and spruces that cover most of it have given up in despair and died before they were worth cutting.

"Had it not been for the fact that Louisburg is just beyond, nobody would ever have even passed through Glace Bay or known of its existence, but as it is, a good many people have given the place a glance, for Louisburg, even though it hasn't much to show the visitor, does remind him of great events and make him wonder why a fortress that cost the King of France unnumbered millions to render impregnable should have fallen as soon as a few companies of New England militiamen made an attack on it. But nothing ever happened at Glace Bay, and, as it doesn't seem any better fitted for a wireless telegraph station than any other spot along that coast, its selection for its high destiny and sure immortality is at least as mysterious as anything connected with the new method of communication.

"As for the pronunciation of the name, it is as simple as possible, with the "a" like that in "race" and no Frenchified toyings with the final "e." At least that's the way the folks living thereabout speak it, and if they do not care to remember its origin there is no reason why anybody else should do so. The name was chosen, doubtless, because any ice that wanted to drift in and accumulate there was free to do it to its heart's content. The word is English and meaningless now, however, and its fate is only another illustration of the failure of the French to make any lasting mark on the province that cost them so much and was relinquished so reluctantly."

We may give the genius who penned the above some little information that he badly needs. Although according to him "nothing ever happened at Glace Bay," it is a little more than "a little station on a disconsolate little branch railway." That "little branch," which by the way is some 40 miles long, handled last year over 4,000,000 tons of coal; the little hamlet he speaks of is an incorporated town with a population of about 15,000, and the "few mines and sawmills," furnish almost the entire provincial revenue of the Province of Nova Scotia. There is another "little" industry at Sydney, which is altogether indebted to these mines for its existence and profits, we mean the works of the Dominion Iron & Steel Company. The shipping port of the mines is Sydney, and at Sydney, we may say they have the largest colliers afloat, and the most efficient coal piers on this continent.

We have an idea that the gentleman who wrote the article in question, gives the show away, when he comments on the local custom of pronouncing Glace Bay as "Glays Bay." He knows too much not to know more, and perhaps the whole thing is a labored joke. Maybe the scribe was one of those whom Signor Marconi, caused to sit out in a field, where they had a lovely view of the October woods, and a very distant view of the Marconi Towers. Some of these same gentlemen were very sore and passed backhanded compliments to the great Italian in their various sheets. It is possible that one of them hailed from New York. There is one germ of truth in the whole article. The writer states that the region around Glace Bay is "dull." We admit it, but has the writer ever heard an old Yorkshire proverb which says: "Where theres muck theres money"? Glace Bay has the full sweep of the Atlantic gales to purify its atmosphere, and while no one ever accused it of being a beautiful place, it has all the scenic distinction of a rugged coast line and a boundless sea front.

Newspaper reporters do offer some remarkable information every now and then, particularly when they venture on technical matters. There is a tradition around Glace Bay, that on the occasion of the Caledonia explosion many years ago, one local paper informed its readers that "the bottom of Caledonia Mine had fallen out." We noticed recently in a newspaper paragraph describing the progress in pumping at the Hub Mine, that "but a comparatively small quantity of water remains in the pit bottom." At this rate there must be quite a lot of water in the deeps yet! At various times these same reporters assure the country that such and such mine is either nearing its finish, or that it has still many years to run. These estimates it is strange to contemplate vary with the politics of the newspaper, and they are given quite gratuitously and free of charge. However, they are not worth anything. Everybody must have noticed that whenever a news paper reports an occurrence with which they are quite familiar, the report is incorrect in some particular or other. Yet every other occurrence reported in that paper, we accept as gospel, so great is the respect born in us for the printed word. The probabilities are that they are no more correctly reported, than the occurrences we happen to know about.

As was anticipated the output of the Dominion Coal Company's mines for October, was the largest of the year, being a little over 342,000 tons. The output for October last year was 350,000 tons, notwithstanding the fact that on the 21st the reserve bankhead was

burnt down. Had the Hub Mine been working this October, the output would easily have been the largest on record for the Coal Company's mines. The labor situation is easier owing to the fact that the picnic season is over, and that men are returning to the mines from their farms, and from Newfoundland. There will be no slacking in outputs till the end of November, and coal is being shipped up the St. Lawrence at a great rate. Shipments will be continued as late as possible.

Following on the appointment of District Superintendents, by the Coal Company, is the appointment of Mr. James D. Maxwell to the position of manager of Nos. 2 and 9 Collieries. Mr. Maxwell was formerly assistant manager of No. 2 Colliery, and has for some little time back been the manager of International Colliery. His place at International will be taken by Mr. Bart. Connors, late assistant manager of Reserve. Mr. William Wilson, has been appointed to the management of the Hub Mine—No. 7—in place of Mr. Robt. Robertson, resigned. Mr. Wilson was for some time underground manager of No. 7, and has lately been engaged as coal inspector for the whole of the Coal Company's mines.

Mr J. K. L. Ross, the son of President James Ross, has been appointed commercial manager of the Dominion Coal Company, at Glace Bay, with charge of the commercial operations of the company, including the shipping, sales, railway and stores departments.

The contract for the grading of the Victoria Branch of the Sydney & Louisburg Railway has been given to the Lindsay Construction Company, who recently completed a contract on the Halifax & South Western Railway. They have leased the Grand Lake Hotel, and are already vigorously pushing the work. Up to date about two miles of right of way has been cleared, and grading has been commenced at three points on the line of route.

The vagaries of the Stock Market are beyond the understanding of the average man. Why should Dominion Coal drop to 37 and Dominion Steel to 13, when both concerns are getting bigger outputs, and if payrolls and shipments are any indication, are in better condition than ever before? Stock market quotations do not seem to be much of an index to the actual health of industrial concerns.

The Dominion Coal Company have let contracts for 100 miners houses in the No. 2 district. These houses will all be completed in time for occupation next spring, when No. 2, 9 and 7 mines will be putting out about 120,000 tons a month. In October No. 2 bankhead dealt with over 100,00 tons of coal, quite a respectable performance. The erection of four new Babcock & Wilcox boilers has been commenced at this colliery to meet the increased demands for power necessitated by the recent additions of electrical generating plant.

The North Atlantic Collieries Company are making steady progress at Port Morien. General repairs have been made of the patchedmine and the daily output is about 150 tons. New boilers, and a new smoke-stack have been installed, and a new haulage rope put on. The first shipments made by the new company were dispatched in October, some 100 tons being sent to Newfoundland and 600 tons to Quebec.

The Dominion Iron & Steel Company, according to a report that appeared in the "Sydney Record" of 19th Oct., have leased the areas of the New Brunswick Iron Company, at point Lepreaux, N.B. The lease is for eighty years, on a royalty basis of 25 cents per ton. The directors of the New Brunswick Iron Company, are as follows: C. V. Wetmore, John S. McLennan, F. P. Jones and F. A. Crowell, of Sydney and Jas F. Robertson, of St. John. The Steel Company will develop the property, and ship ore to Sydney for use in their works.

ONTARIO.

COBALT.—There has been another rich strike of silver on the Silver Leaf, causing renewed interest in this property, which has improved rapidly the last few months.

The McKinley-Darragh are shipping some very rich ore; returns from a 25 ton car produced pure silver, 61,200 oz. Smelter charges were \$400.00 per ton, freight charges \$25.00 per ton, mining expenses averaging \$60.00 per ton, total \$485.00 per ton. This makes a net profit of \$49,075.00.

The Temiskaming & Hudson Bay Mining Company are building extensively on their property adjoining Trethewey. A large sleeping camp is nearly completed.

The men at the Badger Mine went out on strike the other day, the management having returned to the 10 hour a day. New men were at once employed. There are too many idle men in the camp at present for a strike to have any effect.

Cross cutting at the 85 foot level, the Cobalt Lake Mining Company struck their "Niccolite" vein. Here it averages over 28 inches in width, and carries much higher cobalt values than at the surface. This is in all probability the most wonderful vein of its kind known. On vein No. 4 of this property, they have again found rich Argentite and Native Silver values.

SILVER BIRD.—About one mile and a quarter to the northeast of Cobalt town and adjoining Bucke Township, is the Silver Bird property. On a visit to this prospect, we found that operations had been suspended.

The property consists mostly of swamp land, the geology of the rock formation is difficult to determine, as there are few, if any, rock exposures being covered by heavy "drift." Doubtless during their operations they discovered rock, as a rock heap of some dimensions was found at the shaft-house, which was built on a slightly elevated piece of ground overlooking a small creek.

The buildings consists of shaft-house, boiler-house, small though comfortable sleeping camp, besides one or two other small buildings.

It is evident that the management had great faith in the camp, having to sink through such a depth of drift. Prospecting for veins had to be done by cross-cutting, undeniably a very expensive operation. Evidently, as the work has ceased, no "pay vein" was encountered.

This property at one time in its history was famous on account of the extent and character of the advertising given to the stock, which was placed on the market seemingly at a very low figure; much energy being displayed by the brokers who handled it in the construction of the advertisements.

"See Silver Bird Fly." Has it flown?

ALBERTA.

Mr. Sherman interviewed gave out the following statement: "The final sitting of the board has resulted in a disagreement, as, on behalf of the men I represent I could not possibly agree to the report, which will be forwarded to the Government, as adopted by Mr. Fisher and Mr. Macdonald. They will draw up their own report and send it in, and I will send a very different conclusion. The Government will consider the evidence taken on the case and thresh the matter out. Regarding the mines at Hillcrest, it is now up to them. They can strike if they want to or they can continue work, but I will certainly refuse to recommend the report to them, as made by Messrs. Fisher and Macdonald, I cannot give at present any details of the disagreement, as both reports will have to be sent to the Minister of Labor first. Afterwards they will be given out."

HILLCREST.—The conciliation board under the Lemieux Act, appointed to investigate and report on the labor trouble at the

Hillcrest Mine near Frank, has held its final session. The board which consists of Hon. C. W. Fisher, the chairman and J. R. MacDonald representing the operators, and F. H. Sherman representing the United Mine Workers of America, could not arrive at an unanimous verdict. Messrs. Fisher and Macdonald made the report, which will be presented to the Minister of Labor, without Mr. Sherman's signature. The board had a long conference discussing the evidence taken at the previous sessions, but after many hours of work they found they could not agree, and the meeting adjourned. Mr. Sherman immediately left for Calgary, while Mr. Macdonald remained to draw up the report to be presented to the Government, as drafted by Mr. Fisher and himself.

The Hillcrest Coal & Coke Company were fined \$200.00 and costs, at Frank, for locking out about a hundred of their miners, while the Arbitration Board was sitting for the purpose of trying to bring about a settlement of the dispute between the company and the men.

The company closed down their mines and posted a notice requesting their employees to accept the company's terms or remain idle. This the miners claimed was a breach of the Lemieux Act. The men instituted proceedings against the company and obtained a conviction. This is the first conviction under the Lemieux Act obtained in the West, if not, in the whole of Canada.

Hillcrest is a mining camp lying about 3 miles, in a easterly direction from the town of Frank. The camp is tapped by a spur line from the Crow's Nest branch of the C.P.R. The principal seam of coal at present being mined, is about 15 feet in thickness, and is a high grade steam coal. The C.P.R. has contracted for a large quantity of the output from the Hillcrest mines.

Labor troubles have been going on at the mines more or less for the past 8 months, and have been brought to a head by the present disagreement.

The Hillcrest Coal & Coke Company is one of the few companies, which has not joined the Western Coal Operators Association.

HOSMER, B.C.—The Board of Investigation appointed under the Lemieux Act, to report on the labor troubles at Hosmer have concluded their investigation, and have forwarded a unanimous report to the Minister of Labor. A few minor points were conceded on both sides, and representatives of the company and of the workmen came together and amicably threshed out several points with the result that a satisfactory basis for agreement was reached. The board consisted of Judge Wilson, chairman; F. B. Smith the company's representative and F. H. Sherman the representative of the workmen.

BRITISH COLUMBIA.

THE KOOTENAYS.—The recent fluctuations in the price of copper and silver have affected this district in a more or less degree during the past fortnight. At the present writing copper is slowly climbing back up the hill of higher prices and with it the spirit of the district is taking on a more elevated feeling. A few days ago when copper made the lowest point it has seen in a long time, things looked really serious for the copper mines of this country, but with the price of the red metal ascending, affairs look brighter just now. Copper need not sell at an abnormal figure to enable the mines of this section to work at a fair profit. While most of the ore is low grade, mining on a large scale, as we are doing at the present time, will place the mines in a position where they can realize a good profit and continue successful operation, if copper sells at anywhere near a general market price, say, sixteen to eighteen cents per pound.

It is obvious even to the cursory observer that monetary conditions will have to be much more serious than they are at the present time, to precipitate anything in the nature of a panic here in the West. In this district the business men are meeting their obligations promptly, and are enjoying a good steady trade.

Taking everything into consideration, the mines and smelters operating at a fair profit, the merchants doing a steady business and the general population with plenty of money on hand, it looks as though the affairs of this district would show up well on the balance sheet at the end of the year.

The big mines are working steadily at Rosslund, but there is a small surplus of labor. This is principally caused by many of the old timers and quite a few new miners coming here from the Butte and other districts, where the copper mines have temporarily ceased to operate. Upon the renewal of activities at some of the Butte mines recently, many of the miners who were in a position to do so returned to that point to get back their old positions.

The White Bear Mine has closed down, temporarily it is stated, and it is not known when they may resume work. The pumps have been taken from the mine and it will be allowed to fill with water. It is a much more economical operation to allow the mine to fill with water, provided they may be idle two months or more, than to pump steadily, as the mine when full of water can be pumped dry for the same sum that it would take to keep the water out for a month.

The Consolidated Mines are shipping approximately 4,000 tons of ore per week and Le Roi about 2,000 tons. These are good average shipments and may be materially increased in the future, on the part of Le Roi Company, anyway. Development work on the Consolidated property is being earnestly pursued and the showing on the Idaho claim continues to improve as depth is gained. The workings on this claim, from the surface, are now down over 200 feet in depth. The new motor and rope driven compressor, which was recently started up, is running smoothly now and doing good work. This type of a drive is a great improvement, both from an efficient and economical point of view, over the old steam driven compressor, electrical motor power costing here approximately \$34.00 per annum.

Mr. Thos. Kiddie, well known throughout this country, has been appointed manager of the Northport smelter, vice Albert J. Goodell, who recently resigned. Mr. Kiddie will relieve Mr. Goodell on December first, when the latter will leave for Marysville, B. C. to take charge of the smelter of the Sullivan Group Mining Company, at that point.

Mr. Kiddie is known as a capable man and has done much good work in the Province. He designed and erected the smelter of the Tye Copper Company, at Ladysmith, and operated it until he assumed charge of the Britannia Smelting Company's works at Crofton. He leaves the service of the Alaska Smelting & Refining Company, of Hadley, Alaska, to come here. The successful smelting of Rosslund ores is a task that requires earnest application and Mr. Kiddie will find plenty of that work here, which delights the heart of the specialist. There has been much discussion indulged in as to whether Le Roi ores can be smelted cheaper at the plant of the Consolidated people at Trail, B. C., than they can be treated at Northport. The late management at Northport claim that they beat the Trail figures. Contrariwise, the advocates of Trail smelting have things to say in a different light. So Mr. Kiddie will have an excellent opportunity to do some good work at Northport for Le Roi Company.

The Japanese have been quick enough to recognize to true worth of the copper deposits of British Columbia, and have acquired large interests on the Coast, at Ikeda Bay, Moresby Island, where they have a large force at work. It is humorously stated that there is only one white man on the job, and he drives a horse. Mr. S. Yamada, consulting engineer for these people, passed through this district a few days ago. One could not help but note the assiduity of this Japanese engineer, when inspecting the mines. He did not see much of any of the properties outside of the Consolidated, and he only investigated certain work at that property. He delved deep on special features, such as drifting, sinking, etc.

Owing to the reaction in the price of copper, wages may be placed back on the old scale, in the Boundary District, in the next few days. If so, it is very likely that Rosslund will fall in line.

In the Boundary District the Dominion Copper Company's plant still remains idle, awaiting word from the officials of the company. Sufficient steam is being made to keep the pumps going, but that is all. The general feeling in the Boundary, is that the Dominion Copper shut-down will be of, but short duration.

There are rumors of an amalgamation of the Dominion Copper and British Columbia Copper interests. A consolidation of these two concerns would be a money making venture, from more than one point of view.

The big mines in the Boundary are not doing as much development work just at present, as they were a few weeks ago, hence they are not employing as many men in their mines. However, the ore shipments are being maintained at a steady output, and outside of the Dominion Copper Company, the district is busy and working along as usual.

The Granby Mines are shipping about 3,000 tons per day to its Grand Forks smelter; the Mother Lode Mine (B. C. Copper Company), is shipping from 500 to 600 tons per day to their own smelter at Greenwood; and the Snowshoe Mine, Phoenix (Consolidated Company), is shipping a large output to both the B. C. Copper Company and Trail smelters. The total shipments from the Boundary for the week ended Nov. 2nd, were 30,739 tons; total for the year to date 1,087,587 tons.

Comparing these figures with the Rosslund output, one recognizes the importance of the Boundary District: Shipped from Rosslund during the same week 6,465 tons, and for the year 229,284 tons. But this output will be materially increased in the future.

The Providence Mining Company, operating the high grade Providence Mine, at Greenwood, held their annual meeting in Greenwood about ten days ago. The old officers were re-elected, and an issue of bonds to the extent of \$50,000.00 was authorized. These bonds will bear 6 percent. interest and the proceeds will be used to sink the workings to the 1,000 foot level.

The Maple Leaf Mine, at Franklin, up the Kettle River from Grand Forks, has closed down for the season. This will leave the camp practically deserted for the winter. There are some excellent showings at Franklin camp, and Mr. F. Aug. Heinze had a bond on some properties there. The people of Grand Forks are wondering if Mr. Heinze will now have time and money enough to take up his bond.

The Princeton Liberal Association has been making overtures to the Government with a view to having the platinum fields of the Tulameen district examined by one of the geologists of the Dominion Geological Department. They have been given to understand that an effort will be made to meet their wishes in the premises. Platinum has been known to exist in this district for a long time, and an official report on the deposits would be of great value to the many who are at present interested.

In the Slocan a good strike of ore has been made on the Highland Light claim at Eight Mile, and it is also reported that the Ottawa Company has made a strike of importance in the long tunnel that they are driving on their property.

Things are going along in the Ymir District. The Queen Mine is showing up some good ore and work is being done along the usual lines. A rich strike of free milling gold ore, has just been made on the Devlin group, which is close to the Queen. There are some who predict that the Ymir District has not seen its best days yet. There are many properties with excellent showings in that district, and it certainly looks as though there should be some good mines, where the indications are so good.

The Hewitt Company is putting in a new electro-cyanide process, devised by a Spokane man. It is claimed that this process will make a saving of approximately 90 per cent. in the tailings,

the usual saving being about 70 per cent. If Professor Parks' process will save 90 per cent. he will have placed a device in the hands of the milling people that will be worth millions of dollars to them, and he will incidently reap a golden harvest himself, for there is hardly a milling plant in the country, but is sustaining a heavy loss in this direction at the present time.

Three additional furnaces are to be installed at the Sullivan Group Mining Company's smelter, at Marysville, B. C. The present plant has a capacity of about 120 tons per day. The mine is shipping about all the ore the smelter can handle. A new strike has been made on the 100 foot level of the mine, assaying from 60 to 70 per cent. lead, silver 1.2 ounce to one per cent. lead. Between 50 and 60 men are employed at the mine and considerable development work has been laid out for the near future.

It is rumored that A. I. Goodell, recently resigned from the Northport Smelter, will assume charge of the Marysville Smelter. Mr. Goodell is a man who has had a life long experience with the treatment of lead-silver ores and would be an invaluable man to the Sullivan people.

The board that is arbitrating the differences between the employers and employees of the St. Eugene Mine, Moyie (Consolidated Company), will meet at Nelson, B. C. on Nov. 6th, and go into the matter at further length. In view of the decline in the prices of silver and lead it is hardly expected that the demands of the employees can be acceded to—but we will know more about this anon.

The Hillcrest Coal & Coke Company, Hillcrest, Alberta, have recently been fined \$200.00 under the Lemieux Act, for locking

out a hundred or so of their miners, while the dispute between the company and the men was being arbitrated. The Hillcrest Company, has had a lot of trouble with its men, and it would seem that it was about time they got together and settled their differences quickly and got down to hard work.

Mr. D. Davies, Comptroller for the Crows Nest Pass Coal Company, Fernie, for some time past, has resigned and will be succeeded by A. Klauer, erstwhile chief clerk in the Fernie office.

Mr. R. G. Drinnan, general superintendent of the Crows Nest Pass Company's mines, has also resigned and will go to Hosmer, there to succeed Mr. John Brown. Mr. Drinnan is a man who has spent the greater part of his life at coal mining and knows every round of the ladder. Mr. Drinnan will be an important factor in the opening up of 4,000 acres of coal land at Hosmer by the C. P. R. Company. The machinery is being installed at the present time to begin the work with. It is stated that the C.P.R. will produce coal in a year, on such a scale as will augment the production of the Northwestern Canadian coal fields to 1,000,000 tons per year. This with the many other properties that will be producing in the next year or two will place the country for hundreds of miles around, far beyond the pale of such a thing as a coal famine.

The C. P. R. has had an agreement with the Crows Nest Pass Coal Company, not to compete in coal production for 10 years from 1899, but the latter company will be only too glad to have them start in now, two years ahead of the agreed time, to help relieve the situation.
Nov. 5th, 1907.

GENERAL MINING NEWS

NOVA SCOTIA.

ANTIGONISH.—Under the supervision of Mr. George Corbett, a two mile road is being built to the Arisag iron mines. Tunnelling will be started as soon as the road is completed. Mr. Corbett intends spending a considerable amount of money on the property.

SYDNEY MINES.—In a short time coal will be conveyed from the new colliery of the Nova Scotia Steel & Coal Company, known as No. 4. Already the two and a quarter-mile branch railway, which will connect the new mine with the rest of the company's works, is about finished, so far as ballasting is concerned, and the moment the connection is completed, much is expected of No. 4. Next week work will be commenced for the erection of a new bank-head. At present there is at least two thousand tons of coal on the bank, which will be quickly used up once the line is connected by railway.

The month of October will go down in history as a record one, so far as the Nova Scotia Steel and Coal Company is concerned, in the output of its collieries and blast furnaces. Although men employed on the big works lost considerable time at the beginning of the month, latterly a decided change has taken place in the number of men showing up to work after pay days. As a result of this steadiness on the part of the men, last month's output of the different collieries, not including No. 4, exceeded the month of September by nearly nine thousand tons. Following are the figures for October:

No. 1	24,256 tons
No. 3	26,256 tons
No. 5	6,599 tons

This gives a total of 57,071 tons against 48,656 for September, an increase of 8,415 tons.

In the steel department the same degree of activity prevailed, there being an increase over the previous month in every depart-

ment. The output of pig iron was 5,755 tons, increase of 300 tons over month of September; steel output reached 6,986, being no less than 1,476 tons more than in September; while 8,772 tons of coke was produced, being 1,100 tons more than in the previous thirty days.

SYDNEY.—The survey of the shore line from Sydney Mines to Point Aconi, has been begun. The Steel Company claim a right of way through the Coal Company's areas via the Burehell property, to reach their submarine areas. This the Coal Company dispute.

GLACE BAY.—Mr. J. K. L. Ross has been appointed commercial manager for the Dominion Coal Company.

Mr. Alexander Dick, has resigned his position as sales agent. His resignation will take effect next April.

HALIFAX.—The formal order for judgment in the Steel-Coal case was taken out by the Steel Company's solicitors, on Saturday, before Judge Longley. The defendant Coal Company has ten days within which to give notice of appeal.

In the decree the Judge declined to formulate his findings of fact, or to state the basis on which he required the contract to be specifically performed.

The defendants asked that the specific findings of fact be put on the face of the judgment, and if the contract was to be specifically performed that the judgment should state what the Judge holds, the contract required as to quality.

The plaintiffs opposed having any findings of fact formulated or the Judge's interpretation of the contract stated.

Further directions are rescinded, and it is not known at present whether the Coal Company will be required during the 95 years to get out of the seam the Steel Company names, suitable coal, whether it is there or not, paying damages if it is not there, or what effort the Coal Company will be required to make to find

out if it is there in order to purge the attempt involved in not obeying the order.

Neither is any limit on sulphur contents yet stated. The percentage of sulphur in the coal, which renders it unfit for metallurgical purposes depends upon the percentage of sulphur in the iron ore and the limestone used by the Steel Company, and if the sulphur contents in the supply of these ingredients increase, the decree may involve a command to the Coal Company to mine from the seam named by the Steel Company, coal very much less in sulphur than any coal heretofore mined.

NEW BRUNSWICK.

FREDERICTON.—The Londonderry Iron & Mining Company have secured a lease of iron mining areas, eleven miles from Bathurst, near the Nepisiquit River. A branch railway is to be built to Bathurst. The local Government is to receive a royalty of 5 cents per ton on all ore mined. The iron ore deposits are in the county of Gloucester, and will probably be known by that name.

ONTARIO.

COBALT.—At the annual meeting of the shareholders of the Foster Cobalt Mining Company, Mr. Frank Loring, their consulting mining engineer presented the following report of progress:—

On vein No. 1 shaft 45 feet was sunk, showing two to five inches of Cobalt ore for the entire depth. At vein No. 5 considerable high grade ore was extracted from the surface, as well as between it and the 75-foot level. The stope, which is 125 feet long above this level, and extends to an extreme height of 40 feet, has been mined, and the top of it has been connected with the surface by a shaft.

The stope on vein No. 6 has been continued towards the surface and southwesterly for a distance of 15 feet.

On vein No. 7 a drift 15 feet long has been driven from the 70-foot level of No. 5 vein. The face shows three inches of smaltite, and a well defined fissure. A drift has been constructed to the northeastward from the 70-foot level of shaft No. 5 on vein No. 8, exposing as much as 12 inches of Cobalt ore high in silver. This is now the best showing on the property, being indeed one of the most excellent ever developed on the mine, and it should be a large producer. Veins Nos. 7 and 8 will probably come together.

On vein No. 11 a drift 40 feet long has been made to the northeastward, from the 70-foot level of vein No. 5. Three streaks of Cobalt ore, aggregating four inches in width, have been exposed.

No. 5 shaft has been sunk 85 feet below the 70-foot level, and at 65 feet a new level has been started. The prospect is promising that extensive bodies of high grade ore will be encountered.

A rumour is going around that Silver Leaf, Nova Scotia and Keer Lake properties are to be amalgamated. The last named mine was bought from the Ontario Government originally, for \$312,000. Whether there is truth in the report or not, it is easy to say. But no doubt an amalgamation would be most advantageous.

The new strike in the Cobalt Lake property, is more than two feet in width. It was made in a cross-cut, north from No. 4 shaft. The vein is largely smaltite and niccolite.

An electric railway is projected between Haileybury and Cobalt.

The Rothschild's mine at Cobalt has been turned over to the owners of the Kerr Lake mine, on a lease and bond similar to the system of many deals in the western camps. It is reported the sale price is to be \$150,000, the option to run six months, and the operators agree to spend \$30,000 in development work in the meantime. A large force has been employed doing surface prospecting.

This will be continued during the open weather, and during the winter extensive work will be done on the property with diamond drills.

The annual meeting of the shareholders of the Trethewey Silver Cobalt Company was held on the afternoon of Nov. 5th, and though a large number were present, the session lasted but a short time. No changes were made in the officers or in the Board of Directors. Some questions were asked about the dividend, but the answers were indefinite, no promises being made, though it was admitted that prospects looked quite bright. It was explained that ore shipments were being kept back because of unsatisfactory arrangements with United States smelters. It was stated that one smelting company actually desired \$300 a ton to smelt ore, which was much higher than previously. It was intimated at the meeting that the company was holding back until the completion of the Deloro smelter in Hastings County, when shipments would be made there. The question of a concentrator is still under consideration on the part of the Trethewey management.

Cobalt's output for October, 1,124 tons sets a monthly record. Ten mines shipped during the month. La Rose and McKinley are the leaders. The camp's output for this year is estimated at over \$7,000,000.

The annual statement of the Foster Mining Company, presented at the general meeting of shareholders held in Toronto on November 6th, shows a cash reserve of \$63,000. The present board took charge in May. Of the 100,000 shares of treasury stock authorized to be sold last June, 15,585 shares have been sold, at 75 cents per share. Expenses have been curtailed and the company is reported to be sound and strong financially. Shaft No. 5 is down 140 feet. On the 140-foot level veins No. 1 and No. 2 have been drifted on. From No. 8 vein, composed of smaltite and native silver, a car load of high grade ore has been shipped recently.

SAULT STE. MARIE.—The erection of a large smelter at or near Sault Ste. Marie, is projected by the Canadian Smelting & Refining Company. The proposed capacity of the smelter is 150 tons. It will treat cobalt, nickel and copper ores. We notice the name of A. G. Penman, the promoter of the Cobalt Silver Mountain Mining Company, among those interested in the scheme. It would be well for Mr. Penman to devote his energies to pulling his Cobalt scheme out of the bog, before indulging in any more appeals to the public.

PORT ARTHUR.—Colonel Shaw, who holds 20 claims in the Silver Mountain District, has put in some development work on his claims. He reports a 6-foot vein on R. 65.

A large pump has been installed at the Beaver Mine. The mine is now unwatered. There are 40,000 pounds of ore ready for shipment.

ALBERTA.

LETHBRIDGE.—The Hillcrest Coal & Coke Company was fined \$200, and costs for locking out miners while an arbitration board was sitting, thus violating the Lemieux Act.

BRITISH COLUMBIA.

FERNIE.—A landslide occurred over No. 9 mine at Coal Creek, in the last week of October. The slide was very light. There is no danger of a serious accident.

With the \$700,000 received from the Granby Consolidated Company for stock, the Crow's Nest Pass Company will increase its output from 2,500 to 7,000 tons per day. The Granby Company is prepared greatly to increase its smelter capacity as soon as it is assured of a supply of 1,200 tons of coke per day from the Crow's Nest Pass Company, equivalent to 2,000 tons of coal per day.

VANCOUVER.—Mr. Thomas Kiddie, who designed and erected the Tyee Copper Company's smelter at Landysmith, and who has

been successively manager of the Britannia Smelting Company's works, at Crofton, and of the Alaska Smelting & Refining Company's smelter, at Hadley, Alaska, has been appointed to the management of the smelting works of the Northport Smelting & Refining Company at Northport, Washington. The Northport smelter consists of six furnaces. It is situated 10 miles from the international boundary and 18 miles from Rossland. The plant is actually owned and operated by the Le Roi Mining Company.

BOUNDARY.—Although the force at the Mother Lode Mine has been reduced by about 50 men, the output of ore has not fallen off.

A new crusher is to be installed at the B. C. Copper Company's smelter in Greenwood. It will be like the crusher now in use at the Granby mines and will be operated by an electric motor of 100 h.p.

ATLIN.—The Otter Hydraulic Gold Mines Company suspended work for the season on October 12th. During the season 2,000 feet of flume and ditching has been made, giving a head of 150 feet. The ditch has a carrying capacity of over 2,500 inches. The dam, six miles from Surprise Lake, is 75 feet long and 12 feet high.

YUKON.

DAWSON.—The individual claimowners in the Dawson district have asked Commissioner Henderson to make representations to the Minister of the Interior, with a view to securing relief in the matter of water supply. It is stated that the Guggenheims hold possession of all water rights. This acts very detrimentally to private operators of placer ground.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

The text of a Royal warrant, by which the King institutes a new medal to be awarded in recognition of heroic acts performed by miners and others who endanger their own lives in saving or endeavoring to save life from peril in mines or quarries within the Empire, is published in a recent issue of the "London Gazette." The medal will be of two classes, which shall be designated and styled the Edward medal of the first and second class. The first will consist of a circular medal of silver with His Majesty's effigy on the obverse, and on the reverse a design representing the rescue of a miner, with the inscription "For Courage." The second medal will consist of a circular medal of bronze of similar design. The new medals will only be awarded to those who, while rescuing or attempting to rescue others, endanger their own lives, and will be made on the recommendation only of the Home Secretary. When acts of gallantry are performed by one upon whom the decoration has already been conferred, such acts may be recorded by bars attached to the ribbon.

Statistics of British steel output for the first half of 1907, compiled by the *Iron and Steel Trades Journal*, show an advance in both the great categories of steel production. Thus the make-up of open hearth steel has increased from 2,196,853 tons in the first half of 1906 to 2,337,794 tons in the first half of 1907, while the make of Bessemer steel has increased from 919,620 tons to 1,068,972 tons.

Some interesting information is afforded in Part II. of the General Report and Statistics Relating to Mines and Quarries for 1906, a recently issued blue book. Here we find that the total value of minerals raised in the United Kingdom during the year amounted to £105,842,992, a considerable increase over 1905, largely attributable to the increased output and advance of price in coal, whereof no less than 251,067,628 tons, valued at £91,529,266, was produced. The output of iron ore showed an increase ployed under the Quarries' Act at mines and quarries during the year of 909,703 tons, while increases are also reported in the production of copper, lead and tin. The total number of persons employed was 1,004,092. The loss of life from accidents was 1,275.

In a book, about to be published by *The Mining Journal* (London), entitled "A Key to Cornish Mining," the author, Mr. E. W. Meyerstein, postulates: (1) That no mine has ever been worked out; (2) the deepest mine in the country, after 150 years, has only attained a depth of 3,000 feet, and there finds ore far above the average grade of the country; (3) that the majority of mines have only been scatched, and that at shallow depth.

GERMANY.

A Consular report states that Germany lays claim to the largest labor organization in the world, embracing as it does over four hundred thousand workers, and includes practically every branch of the metal-working industry. Last year this vast union collected funds to the amount of £376,000.

NORWAY.

The British Consul at Christiania reports that the Sydvaranger Iron Company, which owns large iron areas in South Varanger, are building a railway to the port of Kirkenas, where ore will be loaded into ships' holds. The ore to be exported will be treated by the Gustaf Gronsberg process. The present average metallic content is 37 per cent., but by this process it will be made into briquettes ranging from 66 to 68 per cent. iron. Arrangements are being made for a production of from six to nine hundred tons annually.

SPAIN.

The directors of the Rio Tinto have issued an interim report upon the company's operations during the current year. This states that the deliveries of pyrites have been rather below the average in the United Kingdom, but that continental consumption has been higher. Notwithstanding the scarcity of water from prolonged drought, the company's output of fine copper will be only from one to two thousand tons short of the 1906 production. The directors have declared a dividend for the half year ending June 30th of 2s. 6d. per share on the 5 per cent. preference shares, and an interim dividend of 47s. 6d. per share, free of income tax, on the ordinary shares, payable Nov. 1st.

UNITED STATES.

The report of the Alaska-Treadwell Company for the year ending May 31st last shows net earnings of \$625,595 from 702,953 tons milled. The total receipts per ton are given as \$2.2658, while costs are shown as \$1.3759. The average assay value of the ore is \$2.42, and the average saving \$2.15. The mine development included 197 feet of sinking and 9,200 feet of other development work. The estimate of ore reserves aggregates a tonnage of 4,982,883, including broken ore in stopes. The company has two mills, one of 240 stamps and the other of 300 stamps. The loss

of quicksilver in amalgamation was 35.2 per cent. in the 240 stamp mill and 32.5 per cent. in the 300 stamp mill. The average number of men employed was 493.3, and the average wage paid \$3.23 per day.

The condition of the copper market is responsible for the suspension of operations in the erection of the large copper smelter at Coram, Shasta County, California, which had almost been completed. In Butte conditions seem to have settled down, the miners having agreed to a reduction of fifty cents a day in wages.

At Elko, in Nevada, a revival of interest in gold properties, the result of recent rich finds, has, it is said, set in after nearly a quarter of a century of inactivity.

The Amalgamated Republic Mines contemplate the erection of a large customs mill in Republic camp, Washington, designed to treat these ores economically by a special process. As much Canadian capital is invested in the mines of this district, this information should prove of interest to many of our readers.

The official returns of gold and silver production in the United States for the year 1906 show a gold yield valued at \$94,373,800 and a production of silver of 56,517,900 fine ounces, valued at \$38,256,400.

According to advices received by post at Victoria, B.C., the miners and smelter employees of the Alaska Smelting & Refining Company, at Hadley, Alaska, recently seized the company's property to enforce the payment of wages in arrears. An explanation is offered that in consequence of the decline in copper and the demands of creditors it became necessary to appoint a receiver. The liabilities of the company are \$350,000. The assets include the smelter and copper mines at Ketchikan and in British Columbia.

The zinc ore production of New Jersey for 1906 amounted to 361,330 tons, constituting a record achievement in this respect.

SOUTH AFRICA.

The gold production of the Transvaal last month is estimated to have been 550,000 ounces, as compared with 538,000 ounces, the official returns for September.

Mr. J. B. Robinson, a South African magnate, recently expressed his views on the Transvaal labor question to a Reuter's representative. In this gentleman's opinion the labor supply for the mines will be ample, the Government having arranged to bring natives from Natal, while the Cape Colony is also in a position to supply labor. Mr. Robinson also stated that the mining industry had never been in such a favorable position as it is today, notwithstanding that there are now some 190 mines standing idle. Considerable discussion has, meanwhile, taken place, as to the possibility of economically increasing the number of white miners, it being proposed that one white miner at 30s. per shift be placed in charge of five or six machines, each manned by one white runner at 10s. for four holes and 2s. 6d. per extra hole. It is stated that as compared with Kaffir labor the efficiency should increase 25 to 50 per cent., and the cost per ton would then be lower.

The Transvaal Government has decided to work the new tin field in the district of Pietersburg itself, in order to give employment to white labor requiring it. The line of the tin-bearing zone extends for a considerable distance across the tops of range of granite hills called Macapaan. The metal occurs in aplite and in the coarser grained granite. Ore is at present being hand sorted and anything over 30 per cent. tinstone shipped to England.

CONGO.

An official report issued by the State comprises some interesting information on the mineral resources of this area. It is stated that in the Katanga district, at the southeastern portion of the State bordering on Rhodesia, and elsewhere, enormous belts of

copper and iron have been discovered, as well as large deposits of tin. While the occurrence of gold, platinum and mercury is also reported.

NEW ZEALAND.

The report of the Department of Mines for the year 1906 places the value of New Zealand's mineral yield for that year at £3,871,811, an increase of half a million sterling compared with 1905. This satisfactory showing was chiefly due to an expansion of the gold mining industry in general and of the increased production of the Waihi gold mine in particular. Dredging operations, however, seem to have been carried on rather less extensively, and it is stated hydraulic sluicing and elevating have in many instances replaced bucket dredging. The number of dredges at work at the end of last year were 167. The average cost of dredging in the southern districts is given as about 1 3-4 d. per cubic yard, and on the west coast 2d. New Zealand's production of coal was 1,729,536 tons, chiefly pituminous or semi-bituminous in character. The number of persons employed in the industry was 12,408.

Company Notes.

The cutting of the Consolidated Mining & Smelting Company's ten per cent. dividend in half has necessitated similar action by the Canadian Gold Fields Syndicate, which owns some 4,000 shares of Consolidated, and has been paying out of its receipts from the Consolidated 7 per cent. It will hereafter pay half that in quarterly payments.

The first annual meeting of the Green-Meehan Mining Company was held on Saturday. The balance sheet showed \$5,292.95 cash on hand. In reply to a question it was stated that \$325,000 had been paid for the property in the first place by the present company, and of this \$250,000 was cash. Instead of the 40 acre claim only 33 acres had been procured. It was decided to cancel the 1,000,000 shares of stock held in the treasury, making the new capital stock \$1,500,000. The board of directors was re-elected. Manager O'Connell stated that owing to the delay in delivering machinery the development work of the mine had been greatly retarded. The present plant is valued at \$21,676.15.

The balance sheet presented showed:—

ASSETS.	
Cash on hand and in bank	\$5,292.95
Accounts receivable	193.04
Unearned insurance	172.15
Supplies	658.67
Power plant, buildings and equipment, including buildings, equipment, power plant, tools, office furniture, etc., etc.	21,676.18
Development	6,626.94
Mine Location No. 60	1,299,955.00
Trust stock in treasury	185,000.00
	\$1,519,574.93
LIABILITIES.	
Accrued wages, payable November 9	\$1,284.60
Capital stock originally issued	\$2,500,000.00
Less stock held for cancellation	1,000,000.00 1,500,000.00
Profit and loss account	18,290.33
	\$1,519,574.93

ANNOUNCEMENT.

The Birmingham branch office of the Sullivan Machinery Company is now located at number one Twentieth street, south, instead of at number twelve, as heretofore. Additional space is thus provided for Sullivan mining and quarrying machinery carried in stock at this office.

STATISTICS AND RETURNS.

British Columbia shipments, week ending October 26th:—

Boundary shipments—Week, 31,354; year, 1,049,156.

Rossland shipments—Week, 6,281; year, 234,801.

Slocan-Kootenay shipments—Week, 3,725; year, 123,240.

The total shipments from the mines in the above districts for the past week were 41,360 tons and for the year to date 1,397,197 tons.

CROWS NEST PASS COAL COMPANY.

The output of the collieries for the week ending October 25th was 21,996 tons; daily average, 3,666 tons.

Following are the weekly shipments from Cobalt camp, and those from January 1 to date:—

	Week ending	
	Nov. 9.	Since Jan. 1
	Ore in lbs.	Ore in lbs.
Buffalo	40,000	2,138,830
Coniagas		4,622,820
Cobalt Central		101,360
Colonial		74,250
Drummond		108,920
Foster		513,396
Green-Meehan		196,790
Hudson's Bay		45,170
Imperial Cobalt		37,530
Kerr Lake (Jacobs)	62,000	495,730
La Rose	456,000	2,513,970
McKinley-Darragh		891,240
Nipissing		4,287,301
Nova Scotia		156,000
O'Brien	260,000	2,605,580
Red Rock		91,443
Right of Way		134,530
Silver Leaf		43,518
Silver Queen		837,157
Trethewey		1,594,688
Temiskaming		229,011
University		61,383

The total shipments for the week were 954,000 pounds, or 477 tons. The total shipments since January 1, 1907, are now 22,003,406 pounds, or 11,001 tons.

The output of the collieries of the Crow's Nest Pass Coal Company for the week ending November 2nd was 21,172 tons, a daily average of 3,529 tons.

The output of the collieries of the collieries of the Crow's Nest Pass Coal Company for the week ended November 8th totalled 22,115 tons, a daily average of 3,686 tons.

COPPER EXPORTS FOR OCTOBER.

The exports of copper from the United States for the month of October were the next largest on record, amounting to 28,786 tons, the largest being in January, 1904 (when they totalled 29,085 tons).

A leading copper producer figures that the total sales of copper by all companies and agencies over the last four or five weeks aggregated between 200,000,000 and 250,000,000 pounds, most of which was purchased by foreign dealers. Of the total amount the

United Metals Selling Company sold between 100,000,00 and 125,000,000 pounds.

Following are the weekly shipments from Cobalt camp, and those from January 1 to date:—

	Week ending	
	Oct. 26.	Since Jan. 1
	Ore in lbs.	Ore in lbs.
Buffalo	60,000	2,058,830
La Rose	309,538	1,908,100
Trethewey	64,680	1,594,688

The total shipments for the week were 434,218 pounds, or 217 tons. The total shipments since January 1, 1907, are now 20,522,093 pounds, or 10,261 tons. In 1904 the camp produced 158 tons, valued at \$136,217; in 1905, 2144 tons, valued at \$1,473,196; in 1906, 5129 tons, valued at \$3,900,000.

DOMINION COAL OUTPUT.

The output of the Dominion Coal Company's collieries for the month of October was 3422,469 tons, or ahead of any month in the year, and only exceeded once last year, when the October output was 350,000 tons. The showing is some 50,000 tons better than in September. Comparative figures by months:—

	1907.	1906.	1905.
January	252,248	231,606	160,612
February	226,190	225,716	128,778
March	203,194	310,220	228,765
April	316,384	296,417	221,541
May	328,947	323,777	294,647
June	319,560	325,911	332,926
July	314,559	318,291	329,164
August	316,633	327,734	329,172
September	295,058	323,733	322,288
October	342,469	350,000	333,317
November		308,367	303,440
December		206,884	211,877
Totals		3,248,565	3,196,527

Philadelphia.—The anthracite production in October was 6,015,551 tons, as compared with 5,384,768 tons in October last year, an increase of 530,783 tons. This is the largest month's production.

Nelson, B.C.—Following are the ore shipments and smelter receipts in Southeastern British Columbia for the week ending November 2nd and year to date in tons:—

	Year.	
	Week.	Year.
Ore shipments—		
Boundary	39,701	1,079,857
Rossland	6,197	230,998
East of Columbia	3,699	131,689
Totals	40,497	1,442,544
Smelter receipts—		
Grand Forks	20,739	595,147
Greenwood	7,150	290,158
Boundary Falls		158,394
Trail	7,955	213,588
Nelson		11,340
Northport	2,204	82,605
Marysville	600	26,400
Totals	28,648	1,377,622

RAND GOLD OUTPUT.

Gold production of the Transvaal last month, as estimated by Kaffir houses in London, was 550,000 ounces, fine, against 538,000 officially announced for September. Value of the October output, calculated on the basis of the above estimate, compares as follows: October, 1907, \$11,687,000; October, 1906, \$11,422,000.

COPPER STATISTICS.

Copper exports from the United States for ten months this year according to Government returns, have been 156,689 gross tons, equivalent to 351,000,000 pounds, approximately. Total consumption in the United States for ten months is estimated at 440,000,000 pounds, making a total consumption of 791,000,000 pounds.

Total production for the month is figured at about 682,000,000 pounds.

Following are the weekly shipments from Cobalt camp, and those from January 1 to date:—

	Week ending	
	Nov. 2.	Since Jan. 1
	Ore in lbs.	Ore in lbs.
Buffalo	40,00	2,098,830
Foster	66,000	513,306
La Rose	249,870	2,157,970
McKinley-Darragh	120,000	891,240

The total shipments for the week were 475,870 pounds, or 237 tons. The total shipments since January 1, 1907, are now 21,049,406 pounds, or 10,524 tons. In 1904 the camp produced 158 tons, valued at \$136,217; in 1905, 2144 tons, valued at \$1,473,196; in 1906, 5129 tons, valued at \$3,900,000.

COBALT'S OCTOBER OUTPUT.

The shipments from Cobalt camp for the month of October have been almost a record.

For September last the output from the camp was 760.5 tons, while for the month of October it was 1,174.56 tons, or an increase of 414.06 tons. The shipments for the month were as follows:—

	Tons.
La Rose	432.51
McKinley-Darragh	351.62
Buffalo	120.00
Trethewey	91.83
Coniagas	32.50
Drummond	32.31
O'Brien	32.30
Nipissing	30.50
Kerr Lake	29.99
Townsite	21.00

The total output from Cobalt camp for the first ten months of this year is 10,924.65 tons, or a monthly average of 1,092.46 tons.

METAL, ORE AND MINERAL MARKET.

Aluminium, No. 1 grade ingots—45 to 47 cents per lb.
 Antimony—9 1-4 to 11 1-2 cents per lb.
 Arsenic, white—6 7-8 to 7 1-4 cents per lb.

Barytes, crude—\$18 to \$20 per short ton.
 Bismuth, metal—\$1.75 per lb.
 Cadmium, metal—\$1.50 per lb.
 Carbons for drills—\$70 to \$90 per carat.
 Carborundum, powdered—8 cents per lb.
 Chromium, metal pure—50 cents per lb.
 Cobalt, f.o.b., Cobalt, Ont., unrefined—30 to 40 cents per lb.
 Corundum—7 1-2 to 10 cents per lb.
 Feldspar, ground—\$10 per short ton.
 Flourspar, lump—\$8 to \$13 per long ton.
 Graphite, domestic—\$50 to \$150 per ton.
 Gypsum, lump—\$7 per short ton.
 Infusorial earth, ground—\$15 to \$30 per ton.
 Manganese, pure metal—75 cents per lb.
 Mica, ground—\$45 to \$75 per short ton.
 Mica, scrap—\$10 to \$15 per short ton.
 Molybdenum, pure—\$1.70 per lb.
 Molybdenite ore, 90 per cent. pure—\$4.50 to \$5 per unit.
 Nickel, metal—45 cents per lb.
 Platinum, ordinary metal—\$26.50 per ounce.
 Platinum, scrap—\$19 per ounce.
 Pyrite—10 to 11 3-4 cents per unit for 38 to 45 per cent. sulphur, lump ore or fines.
 Quicksilver—\$45 per 75 lb. flask.
 Sulphur—\$10 to \$21 per long ton.
 Tale—\$15 to \$30 per short ton.
 Tungsten, pure metal—\$1.30 per lb.
 Tungsten, ore, 60 per cent. pure—\$9.50 per unit.

MARKET NOTES.

Silver.—October 17th, 60 7-8 cents; October 18th, 60 cents; October 19th, 60 cents; October 21st, 61 1-8 cents; October 22nd, 61 1-2 cents; October 23rd, 61 5-8 cents; October 14th, 61 3-8 cents; October 25th, 61 cents; October 26th, 60 1-4 cents; October 28th, 60 1-2 cents; October 29th, 59 1-8 cents; October 30th, 59 1-8 cents; October 31st, 59 3-8 cents; November 1st, 59 1-4 cents; November 2nd, 59 7-8 cents; November 4th, 60 1-8 cents;

November 6th, 60 5-8 cents.

Mexican dollars, 47 3-4 cents.

Sterling exchange, \$4.8575.

Copper.—Since October 17th lake copper has fluctuated between 11 3-4 cents on October 23rd and 15 cents on November 6th. More business is doing, but the market is still very quiet. New York, lake, 14 3-4 cents; electrolytic, 14 cents. London, £63 12s. 6d. for spot.

Spelter.—Market quiet. New York, 5.10 to 5.15 cents; London, £21 15s.

Lead.—Lead is steady at 4.75 cents, New York; London, £18 for Spanish.

Tin.—New York, 30 1-2 cents per lb.; London, £138 10s. for spot. Market weak.

Pig Iron.—No. 2 foundry quotes at \$21, Pittsburg. Basic iron, \$19.