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THE VISIT OF THE AMERICAN INSTITUTE OF MINING ENGINEERS TO ONTARIO.

The Ontario Provincial Government, animated by a desire to further the mining interests of this Province and wishing, also, to give the representatives of a world-wide institution a more or less definite idea of the richness and variety of Ontario's mineral deposits, invited the American Institute of Mining Engineers to visit Toronto and to make a tour of certain important mining districts. The various towns visited vied with each other in welcoming the visitors. In every respect the visit was a phenomenal success.

THE CANADIAN MINING JOURNAL wishes to congratulate the Local Government upon its wise liberality. Such enlightened acts denote a spirit refreshingly beyond and above the dark realm of party politics. The invitation was extended with the sole objects of rectifying current erroneous ideas and of indirectly advertising the mines and minerals of Ontario. That much good will result need not be doubted for a moment. But too much must not be expected. The visiting engineers are, as a body, keen, observant and hard-headed. They did not gush, nor were they expected to. Each of them, however, will in future have a much fairer conception of what Cobalt signifies. Many of them, who had not visited Copper Cliff before, have now some conception of the magnitude and promise of that nickel-copper industry. In Moose Mountain the visitors will recognize that the hem of what may prove a vast iron ore range has been touched.

Lest any of the recent visitors should carry away the impression that Ontario stands alone in her mining possibilities, it may not be unwise to point to the coal, iron and gold of Nova Scotia, the oil shales and copper of New Brunswick, the asbestos, graphite, mica and chrome ore of Quebec, the coal and oil of Alberta and Saskatchewan, and the unrivalled variety and wealth of British Columbia's minerals. These things we mention because it is not improbable that a special view of one or two sections of Ontario may tend to destroy the perspective when looking at the Dominion generally. This, however, is a digression.

One result of the visit will be that the mining men of Ontario will continue their work with a lessened dread of the evil effects of stock manipulators.

We publish in this issue a letter from Mr. Alexander Gray, formerly editor of *The South African Mines, Commerce and Industries*, of Johannesburg. Mr. Gray is soon to move to Canada.

THE COBALT STRIKE

In justice to the more responsible of the miners at work in Cobalt before the strike was declared, it must be said that the strike was evidently forced upon them. The representative of the Western Federation, carrying with him the prestige of that Union, flushed with a sense of his power and eager to enlighten the ignorant, though happy, victims of the tyrannic mine owners, appeared upon the scene of peace and plenty. Before his lusty educative efforts were put forth, not a single complaint had been heard. On the other hand, the camp was overflowing with well-fed, well-paid miners. Considering the tender age of the mines and the fact that even yet the camp as a whole is not self-supporting, the wages paid were very high. In no other metalliferous mines east of British Columbia are wages as high. The food is, in our own humble opinion, not to be excelled anywhere.

It is not therefore evident, or, at best, it remains to be proved, that the miners had any substantial reason for attempting to tie up the camp.

In discussing any of these clashes between employer and employe, it is difficult to preserve that spirit of impartiality which is so essential to the furthering of peace and progress. The heat of debate, the friction of contending factions and the incidental losses of time and money do not induce a calm and judicial spirit. Yet, in fairness to the workmen, it is well to remember that labor organization have accomplished a vast deal of specific good. On the other hand, certain of these organizations have developed an aptness for abusing their powers. And, lastly, it is high time that Canadian workmen managed their own affairs. They gain nothing by the help of the Western Federation. The very name of that organization stands for methods for which Canadian workmen should be the last to subscribe.

The Cobalt strike has failed because it did not deserve success. The leaders of the Western Federation appear to be surcharged with the desire to precipitate collisions between labor and capital. They did not, in this instance, work up even the color of an adequate excuse. For this they merit condemnation. But, though this attempt failed, there is no reason to doubt that similar attempts will be made in the near future.

It is the duty, not only of Canadian operators, but of Canadian workmen, most especially of Canadian miners, to avoid utterly any measures which bring upon the country loss and discredit. Industrial disputes can and must be settled without the costly strike. It is incumbent upon mine operators to see that good feeling and mutual respect are fostered as between themselves and their employes. Repressive measures are offensive and stupidly ineffective.

Employers and employes generally should prove themselves much more amenable to reason and should observe the letter and spirit of arbitrators' awards with decidedly greater strictness.

ALBERTA MINING CONDITIONS

The report of the Alberta Coal Mines Commission is soon to appear. The points with which the Commission's report will largely deal are the eight-hour day and the question of compensation.

The eight-hour "bank to bank" day is strenuously objected to by a majority of the operators. If the eight-hour day were fixed as the actual time occupied by the miner at his work, the operators would offer no objection. But when the eight-hour day is defined as including the time necessary for the miner to reach his work in the mine and that required to reach the bank-head again, the operator becomes subject to very considerable loss.

This "bank to bank" eight-hour day, more especially in older mines whose workings are extensive, implies a diminution in output which should in justice be met by a reduction in the men's pay.

The report of a similar British Commission, commented upon recently in these columns, demonstrated that a nine or eight-hour day is only nominally such. The actual hours worked in any coal mine are uniformly less than the hours paid for.

MINERS' ANEMIA

Mr. F. W. Gray writes, in this number of THE CANADIAN MINING JOURNAL, on a subject which, in all probability, will be new to most of our readers. Ankylostomiasis, or "miners' anemia," is by no means confined to coal miners. "Broadly speaking, the parasite will be found to occur normally on either side of the Equator, between the fortieth parallels. Within these limits the disease may be endemic and the population may be affected as a whole." Beyond these limits the disease may occur in epidemic form, especially when industrial operations create an artificial environment favorable to the propagation of the parasite. Thus, large brick kilns; hot, moist, unsanitary mines; and deep tunnels may become breeding grounds for these noxious organisms.

Applying the results of European research to Canada, Mr. Gray points out that, while in no sense are our coal mines (especially those of Cape Breton) to be regarded as possessing what is termed a "disposition" to infection, still, on account of the large number of European miners now employed in Canadian coal mines, the possibility of a serious epidemic should be guarded against.

The completeness, the elaborateness and the effectiveness of the campaign carried on by the German provident society, Knappschafts-Verein, under Government supervision, against the spread of ankylostomiasis, arouses unreserved admiration and no small degree of amazement. In striking contrast is the situation in Belgium, where the ignorance and prejudice of the affected classes have been allowed to deter the work of eradication. France, England and the United States have

seriously grappled with the problem of eliminating this loathsome infection. Canada may have to face the problem at any time.

PORT ARTHUR'S NEW INDUSTRY

The blast furnace of the Atikokan Iron Company was blown in about the middle of July. The presence of a modern and well-equipped plant, in so well-situated a locality as Port Arthur, should encourage the exploitation and development of iron ore deposits in all the adjacent districts. A strong iron industry is a pre-requisite of the normal growth of our material prosperity. A successfully operated blast furnace in Port Arthur will give a strong impetus to the opening up and settlement of new territory and will increase most appreciably the importance of the town itself.

NOVA SCOTIAN ENTERPRISE

The economy of generating power at the coal pit mouth and distributing it in the form of electricity to industrial centres has long been evident. It has remained for a comparatively small colliery in Nova Scotia to put the idea into practice. At the collieries of the Maritime Coal, Railway & Power Company, situated in Chignecto, N.S., a large installation has recently been completed and put in operation. The progressive town of Amherst will be the principal consumer of the power generated at the collieries. The men who conceived and made actual this enterprise are deserving of sincerest praise.

EDITORIAL NOTES

The iron ore deposits of Ontario have been the objects of sporadic attention in the past. Fitful attempts have

been made to exploit them. At Sault Ste. Marie, at Midland, at Hamilton and at Deseronto pig iron and steel have been manufactured for some years largely from imported ores. At Port Arthur the new Atikokan blast furnace is in operation. Thus Ontario may boast of a fair start in the iron industry. But vast fields of iron ore still lie untouched. In Northern Ontario deposits of great promise exist. In Eastern Ontario proved bodies of ore are found in places favorable for shipment to a lake port. Limestone there is in abundance. There are several points on Lake Ontario where iron ore, limestone and coke could be assembled at prices well within commercial limits. Rich as Cobalt is, it will play no such part in the future of this Province as will the iron ores.

On another page the Secretary of the Canadian Mining Institute replies to our editorial of August 1st. We do not wish to make extended comment upon any of the points raised until further discussion has taken place. But it must be borne in mind that our suggestion was constructive and not destructive. To our mind the Institute can be made more useful. We hope that all concerned will look upon the question from the point of view of the Institute. The matter of personal feeling, so far as THE CANADIAN MINING JOURNAL is concerned, will not be allowed to affect the question in the slightest. We fear, however, that the ardour of the Secretary has led him somewhat far afield. The merits or demerits of the executive are not under discussion. The various officers of the Institute are worthy and blameless men. But the Institute, as a corporate entity, does not take as active a part in mining affairs as many of its members desire it should.

TWO SPECIMENS AND THEIR BEARING ON THE GOLD MINING INDUSTRY OF NOVA SCOTIA.

By E. PERCY BROWN, S.B.

The photographs on the cover of this issue of THE JOURNAL illustrate two specimens of gold ore as found in Nova Scotia.

If the reader will carefully compare the photographs he will be able to appreciate what the writer considers is one of the chief reasons why the gold mining industry of Nova Scotia occupies the position that it does to-day.

The specimen on the left is a typical example of what is generally regarded as characteristic of Nova Scotia gold ore.

It is unfortunately a fact that the average miner of this Province, even to-day, pays little attention to any other class of ore. He believes that his eyes are the best guide as to the value of any ore, and, as he expresses it, he wants to see the gold sticking out of the rock. Fur-

ther than this, the Government of Nova Scotia, by exhibiting just such specimens of gold ore as this wherever the ores of the Province are shown, tend to impress this very point upon the minds of the mining public the world over. The consequence is that when one hears or sees a reference to gold mining in Nova Scotia he finds that it is classed as hazardous and uncertain, and the deposits are said to be pocketey.

The second specimen, showing merely some mineral (arsenopyrite) distributed through a dark blue quartz and slate, represents what is generally known as low grade ore. It is unattractive to the ordinary miner, who views with suspicion the man who tells him that such ore is worth \$6 per ton. If he does believe the statement he interprets it to mean that a large amount of capital would be necessary to work such an ore and that

ordinary free milling practice would not save enough of the values to make a paying proposition.

Now what are the facts regarding the comparative value of the ore represented by the two specimens?

Both come from the same vein or belt. That portion of the belt from which specimen No. 1 is taken averages in value from 50 cents to 75 cents per ton and does not pay to handle. The specimens are of course very pretty in themselves, and if there were enough of them the ore would be all right, but it is sometimes a long way between the specimens, and that portion of the belt carrying the gold is but a small fraction of the whole and it is impossible to separate it by sorting, so that as a sound business proposition this portion of the belt is a failure.

Specimen No. 2 comes from a portion of the ore body that has yielded an average return by free milling alone of \$5 per ton, and an extra 50 cents or 60 cents by further treatment.

Can there be any question as to which is the more profitable ore?

I believe that if this so-called "low grade" ore were thoroughly exploited throughout the Province that mining would assume a very different aspect.

It may be doubted in some quarters that there is a profit in handling ore yielding \$5 per ton in a small mill, say 10 or 20 stamps. This can be answered by stating that on a certain property in Nova Scotia a large inclined shaft 10 by 12 feet is being sunk on the ore body at a cost of \$12 per foot, one air drill being used. This cost covers all expenses underground except timbering, the cost of which is very small. This does not include the cost of hoisting and the power for drills.

It may thus be seen that sixteen tons are mined at an expense, outside of the items stated, of \$12, or 75 cents per ton. Any mining man can judge whether or not a yield of \$5 per ton under such circumstances would cover all expenses and leave a margin of profit, even as a ten stamp proposition.

The Toronto Meeting of the A. I. M. E. Visit to Cobalt and other Mining Districts.

In our last issue an outline was given of the meetings of the Institute to Toronto on the 23rd and 24th July. The visiting members, together with representatives of the Ontario Government and a considerable number of Canadian mining engineers and press representatives, left Toronto on the evening of the 24th on a special train for the Cobalt district. The special train consisted of ten Pullman cars and two diners. The party numbered about two hundred.

The Hon. Frank Cochrane, Minister of Mines, took official charge of the visitors. He was assisted by the Hon. Dr. Pyne, Minister of Education, and by the Toronto and various other local committees.

On arriving at Cobalt the party was met by the following committee: Mr. A. A. Cole, representing the T. & N. O. Ry.; Messrs. R. W. Leonard and D. B. Rochester, from the Cobalt Chamber of Mines; Messrs. Running and Martin, from the Cobalt City Council; Messrs. McLeod and Farland, from the Township Council of Coleman, and by a special committee to guide the occupants of each car through the leading mines. The party was divided into sections, each section visiting four or

five mines. Camp dinners were served at the Coniagas, Nipissing and Cobalt Central Mines.

New Liskeard was reached at 8 p.m., and his Worship, Mayor Blair, at the head of a deputation, read an address of welcome. Headed by a band, the visitors then proceeded to the steamer "Meteor," and the evening was spent in a moonlight excursion on Lake Temiskaming. Speeches were made on the return trip.

On the morning of July 26th Cobalt was again visited. In the afternoon an excursion was taken on the steamer "Meteor" from Haileybury. On the return of the "Meteor" the members of the Haileybury Club entertained the delegates. Dinner was served in the grill room, and the evening was devoted to speech-making, interspersed with music.

The special train left Haileybury for Temagami (about 36 miles south) early on the morning of Saturday, July 27th. The deposit of iron ore near the station was inspected. In the afternoon the steamer "Bell" was boarded, and the visitors were taken up the beautiful Lake Temagami. At Temagami Inn (12 miles up the lake), and at Lady Evelyn Hotel, on Lady Evelyn Lake, Sunday was spent quietly.

Sudbury was reached on Monday morning, where the Sudbury Local Committee met the train. At the invitation of the Canadian Copper Company, their plant at Copper Cliff was inspected, and the Creighton Mine was visited. At the latter place a camp dinner was served. In the evening a complimentary banquet was tendered to the Institute by the citizens of Sudbury. Lennon's Opera House, in which the dinner was held, was superbly decorated for the occasion. Covers were laid for 250 guests. Many notable speeches were made in response to the toasts.

On the following day the Moose Mountain Iron Mines (30 miles north of Sudbury) were visited. Here also a typical camp meal was enjoyed, under a temporary roof erected for the occasion. In the afternoon the Vermilion placer gold workings were the object of brief inspection. At North Bay many of the party left. The return to Toronto was marked by a mock trial and by an unpremeditated expression of appreciation to the Hon. Mr. Cochrane by the American delegates.

Space will not permit of reference to many of the pleasant features of the trip. The citizens of Cobalt, New Liskeard, Haileybury and Sudbury spared no pains to extend the heartiest possible welcome to each and all of the delegates. The O'Connor Steamboat Company most courteously put their steamers at the disposal of the visitors on Lakes Temagami and Lady Evelyn. At Cobalt the Local Committee presented the whole delegation with brooch pins of native silver. Incidentally, the silver was supplied by the Trethewey Mine.

It was the intention of THE CANADIAN MINING JOURNAL to publish in this number a much fuller account of the meetings and itinerary of the American Institute's Ontario visit. To that end a full stenographic record was made covering all the proceedings and speeches, both in Toronto and at the other points visited. Owing to pressure upon our columns it has been found quite impracticable to utilize more than a small fraction of this material. It has been decided, however, to publish within the next few weeks a compendious handbook. In this will be included historical sketches of the mining districts visited, portraits of the discoverers and pioneers of the mining camps and a full account of the whole proceedings. The volume will be copiously illustrated, both with color plate and with half-tones.

ANKYLOSTOMIASIS

"Miner's Anemia."

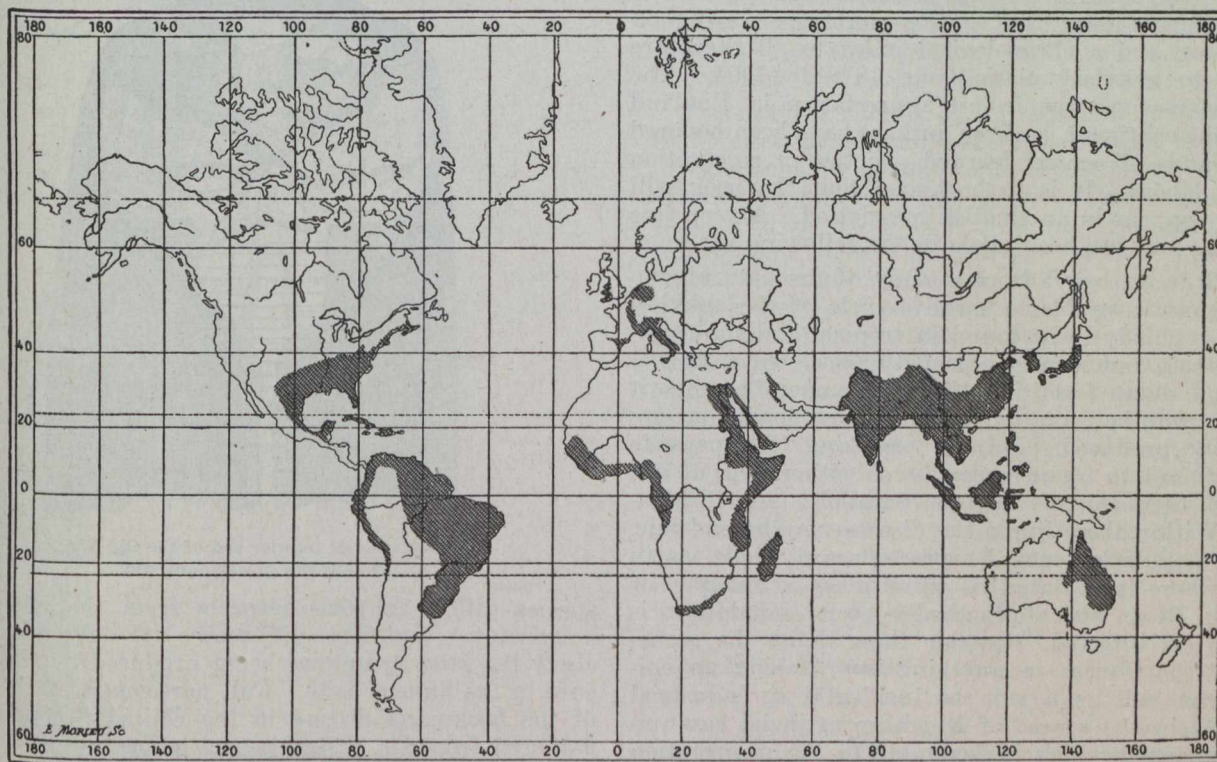
By F. W. GRAY.

The mining population of Europe, particularly that portion engaged in coal mining, has suffered considerable pecuniary and physical inconvenience from the prevalence in recent years of a disease variously known as ankylostomiasis, miners' anemia, hookworm disease, etc. Unfortunately, this disease has been given a name of portentous length that unfailingly excites the risibility of mining men who have never come into contact with the "unspeakable worm." The English miners named the disease "hanky-panky," and their bantering attitude has been reflected in other mining districts by men who should have known better, for in many places experience of the ankylostome has been dearly purchased, and could have been avoided had due regard been paid to the warnings of medical men, and had any regard at all been paid to sanitary conditions underground.

European coal districts may serve to put us on our guard against the introduction of ankylostomiasis infection into our coal and ore mines. This is not at all a far-fetched possibility, when we consider the steadily increasing tide of European immigration that is now setting towards our Dominion, and further that our mines are but in their infancy.

Recent literature on the subject of ankylostomiasis in the English language is not very extensive, as the subject has not yet been so forcibly brought to the attention of either England, Canada or the United States as it has been in France, Germany, Belgium, Italy and other European countries.

The principal English authority is Dr. J. S. Haldane, of the Home Office, who is so well known to mining circles by reason of his researches into carbon monoxide



Geographical Distribution of Ankylostomiasis

The following notes have been collated from various sources, chiefly European, as the result of somewhat extended reading on the subject. They are written purely from the standpoint of the mining engineer, and it is solely the fact that in the nature of things so few members of the medical profession have any intimate acquaintance with the technics of mining or actual physical conditions underground, that the writer has ventured on a subject so very largely medical, but which, from its intimate connection with and its dependence on local conditions and systems of coal extraction, and from its serious effects on the health and general prosperity of the miner, very largely appeals to the mining engineer, and should be of vital interest to the mining industry in general.

The subject is comparatively new in Canadian mining circles, and a recapitulation of what has happened in

poisoning and mine gases generally. Dr. Haldane published a Blue Book in 1902 on the outbreak of ankylostomiasis at the Dolcoath tin mine in Cornwall (1), and in 1903 published a further report detailing the results of his visit to the infected districts of the continent. (2)

Several papers on the subject will also be found in recent numbers of the Transaction of the Institution of Mining Engineers, Eng. (3)

An excellent handbook is published by *The Colliery Guardian* at a nominal cost, which has had an extended circulation.

In the United States much attention has been given to the study on the "hookworm disease" or "uncinariasis" (which is for all practical purposes identical with ankylostomiasis), by Dr. Ch. Wardell Stiles, of the Hygienic Laboratory at Washington, who in 1903 issued a report on "The Prevalence and Geographic

"Distribution of Hookworm Disease in the United States," (4) attached to which will be found a very comprehensive bibliography of general literature relating to ankylostomiasis in various quarters of the globe.

Recent continental writings are more voluminous, and apart from the monumental works of Perroncito, Leichtenstern, Looss, and other eminent European authorities, which are purely medical treatises, reference may be made to the published report of the Commission appointed by the German authorities to enquire into the Westphalian epidemic, and to various articles that have been contributed by medical correspondents to "Gluckauf," the semi-official organ of the Westphalian coal operators.

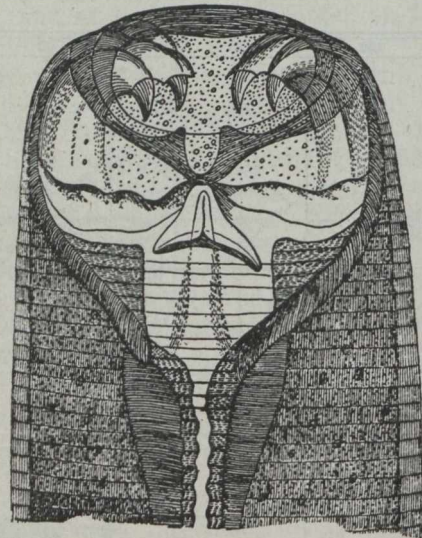
But the most recent and perhaps the most important contribution from the standpoint of the mining engineer is a work published in 1906 by Drs. Calmette and M. Breton, of the Pasteur Institute at Lille (5), which covers with painstaking detail the whole subject, and the authors state in their preface was in part written especially for the benefit of the mining profession. Attached to the work is a comprehensive collection of official documents issued in various countries bearing on the disease, and a chronological index to all literature relating to ankylostomiasis from 1878 to 1904. The work has received the fullest appreciation in England and on the continent, and the authors have been honored at the hands of several learned societies in recognition of their labors. It is to be hoped that the book will some day appear in an English translation. A very free use of the text has been made in the following notes.

As will be gathered from a study of the natural conditions most favorable to the life cycle of the ankylostome, it is chiefly to be found in tropical and sub-tropical countries, and is more especially associated with low-lying and damp localities. In the temperate zones it will as a rule be found only where these conditions are artificially produced. Broadly speaking, the parasite will be found to occur normally on either side of the Equator, between the fortieth parallels (see illustration). Within these limits the disease may be endemic, and the population may be affected as a whole, as in Egypt, where it is stated no social class is immune, or in Porto Rico, where practically every inhabitant is more or less infected. Outside these limits the occurrence of the disease in anything approaching an epidemic form will as a rule be incidental to industrial operations in the course of which an artificial environment is created which is favorable to the propagation of the parasite; such conditions as, for instance, occur in the neighborhood of large brick kilns, in hot, moist, unsanitary mines, and in deep tunnelling. The persons affected, therefore, are likely to belong to distinct industrial classes, and the disease will assume the aspect of a trade malady (*Berufskrankheit*).

The disease is not new, and Sandwith states that the symptoms of a malady described in an ancient Egyptian papyrus, written so long as 3,450 years ago, leave no doubt that this sickness was well known to the physicians of that far-off day. The first recorded description of the ankylostome itself was given in the year 1838

by Angelo Dubini, who discovered the worms in the intestines of a young Italian peasant who had died in the hospital at Milan.

According to the various authorities cited by Dr. Calmette, ankylostomiasis is endemic over the whole of Egypt, Abyssinia, Ethiopia, along the shores of the Red Sea, and in fact over the African littoral generally. It is fairly widespread among the natives of British Central Africa, which, considered in connection with the fact that ankylostomiasis is common among the agriculturists of Southern China, suggests the advisability of preventive measures in the deep mines of the Rand. In Asia it is found over that portion of the continent extending from India through Cochin China and Siam to China and Corea. It is found in Japan, particularly round Nagasaki, in Formosa, and throughout the whole of the Malayan archipelago. In Australia it exists in the northern portion of the Island, especially in Queensland. In America it affects practically all the continent lying between the fortieth parallels. The American



Dorsal view of interior end of the Old World Hookworm greatly enlarged.

species differs in some respects from the Old World ankylostome, but these differences are only minor, precisely the same symptoms being produced by their presence in the human body. Full particulars of the extent of the hookworm disease in the United States may be gathered from Dr. Stiles' report before referred to. Dr. Stiles made a visit to the Southern States in the winter of 1902, studying the disease on the ground, more particularly in the Carolinas, Georgia and Florida, and found the disease widespread, particularly in sandy districts. In his report he writes: "Speaking in general terms, however, the facts at my disposal at present seem to indicate that, taking the Southern Atlantic States as a whole, uncinariasis must be considered as one of the most common and widespread maladies. Among the whites of the rural sand districts uncinariasis is apparently the most common disease found." He further states: "In all probability further study will show that in Mexico, Central America and parts of South America, hookworm disease is more important and more common than in the United States." Speaking of the economic bearing of the hookworm disease, Dr. Stiles draws a very depressing picture of the poverty and mental backwardness among the "poor whites" of the infected districts, and to quote further, he says:

(1) Home Office Cd. 1318—1902. Price 4d.

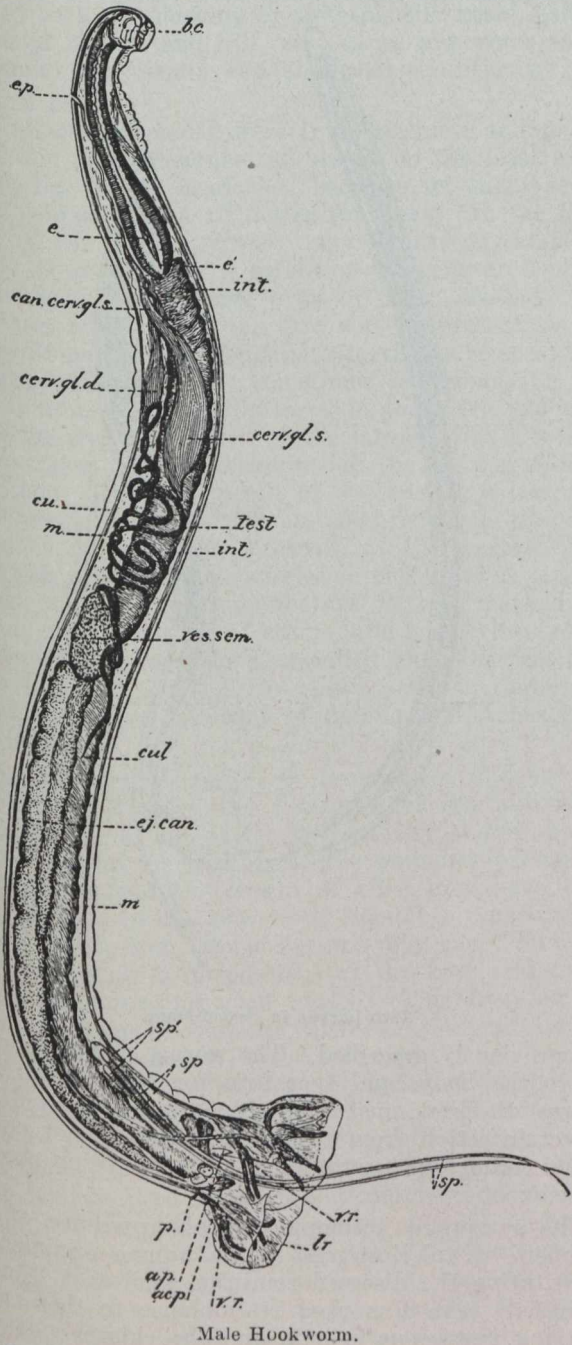
(2) Home Office Cd. 1843—1903. Price 2d.

(3) Trans. Inst. Min. Eng., pages 183-201, 1904; Trans. Inst. Min. Eng., pages 196-211, 1905.

(4) Hygienic Laboratory Bulletin, 1903, No. 10.

(5) L'Ankylostomiase (*Anémie des Mineurs*), Mason et Cie, Paris, 5 fr.

"Considering the subject in the light of all I saw on the trip, and taking what I believe to be a conservative view of the subject, I find it exceedingly difficult to escape the conclusion that in uncinariasis, caused by *Uncinaria Americana*, we have a pathologic basis as one of the most important factors in the inferior mental, physical and financial condition of the poorer classes of the white population of the rural sand and piney wood districts. This sounds like an extreme statement, but it is based on extreme facts."



Male Hookworm.

In Europe, although known to exist since the date before mentioned, the disease never assumed a serious aspect until the alarming outbreak in the St. Gothard Tunnel in 1879, whence it is extremely probable the infection was carried to other parts of Europe by the exodus of the workmen at the completion of the work. Ankylostomiasis is said to be endemic over a large portion of Italy and the low-lying plains of the Danube and the Theiss in Southern Hungary. The condition of the sulphur miners caused by the extensive in-

fection that exists in Sardinia is truly deplorable. More detailed reference will be made to the disease as manifested in the coal mines of France, Germany and Hungary, at a later stage of these remarks.

In England an epidemic of a mysterious nature broke out at the Dolcoath tin mine in Cornwall, which was eventually traced to ankylostome infection, and this also will be dealt with more fully later.

The *ankylostome duodenale* is a parasitical worm belonging to the nematode order (thread-like). The adult female is approximately one-half an inch in length, the male being shorter and thinner, and easily distinguishable from the female by a characteristic umbrella-like caudal process surrounding the genital organs at the tip of the tail. The adult worm of both sexes is provided with a formidable suckorial apparatus, consisting of a circular mouth opening, furnished with four in-curved teeth, leading to a strongly muscular esophagus which acts like a pump, the whole forming, to quote Dr. Calmette, "a veritable cupping glass." The name of hookworm popularly applied to the ankylostome is not derived, as would at first sight appear, from the hooked teeth with which it is so liberally provided, but from the fact that the head of the worm is bent round like a hook, the mouth being on the under surface.

The natural habitat of the adult ankylostome is the small intestine of man. Here the female lays her eggs in enormous numbers, commencing to do so the day after impregnation. The eggs are very minute, about 1-400 inch by 1-700 inch, oval in form, and delicately transparent. They are provided with an inner membrane, which in conjunction with the concentrated fluid interior exerts a great osmotic pressure, and renders the eggs almost impermeable, consequently they possess extreme powers of resistance to outside agencies. They pass out of the body with the feces, usually partially developed, but development to the larval stage in the body itself is prevented by the natural heat and the lack of oxygen in the intestinal passage. After leaving the body the conditions necessary to hatch out the larvae are warmth, moisture, and the presence of oxygen. All these conditions must exist together, and if any of them are absent development will not take place. Below a temperature of 68 degrees Fahr. or above 98 degrees Fahr. development is retarded or entirely prevented. Given favorable conditions, however, the eggs will hatch out very quickly, the time varying from several hours to two days, according as the conditions are more or less favorable. The young larva is very active, and before hatching may be observed coiling and recoiling itself with extraordinary rapidity within its shell. When it succeeds in breaking out and emerges as a free larval worm it commences to feed voraciously on the fecal matter surrounding it, and grows rapidly, changing its skin on the second or third day. At the end of from four to six days it commences to secrete a vitreous transparent fluid, gradually loses its mobility and becomes rigid, and within four to five days the larva is completely enveloped in a smooth yellowish chitinous capsule, impervious to water, enabling it to resist with ease physical and chemical influences that would have been fatal to it when newly hatched. The larva at this stage possesses remarkable vitality, and has been observed by Looss to live for a period of 300 days when immersed in water, which is said to be a medium well suited for the preservation of the encysted larvae. They have also been known to resist desiccation prolonged over five days.

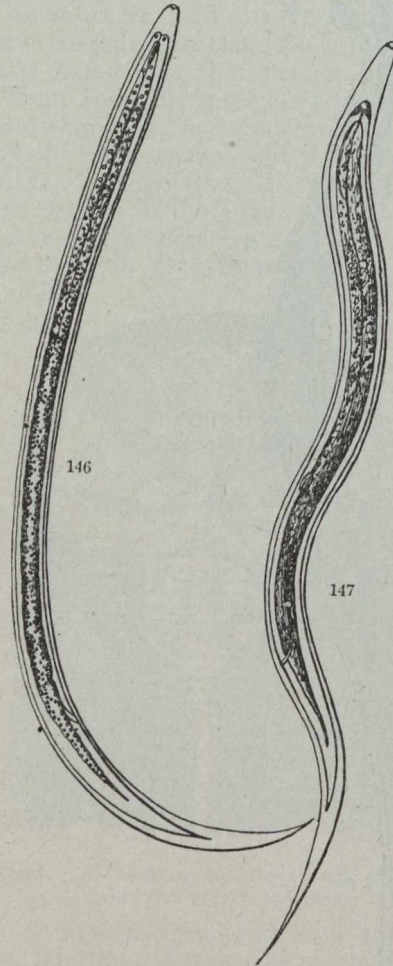
This stage completes the development of the ankylostome outside the human host, and it awaits an opportunity to gain entrance to the body. It was formerly supposed that the larva of the ankylostome could develop into a sexually mature free rhabdite capable of producing eggs and disseminating infection outside of the human organism, but this theory is not now accepted. The encysted larvae may gain entrance to the body either through the mouth by swallowing or through the pores of the skin. The possibility of this latter mode of infection was for some time disputed by several medical authorities, especially in Germany, but the extensive researches of Dr. Looss, of Cairo, whose conclusions are endorsed by Dr. Calmette and Dr. Haldane, have proved, beyond doubt, that the encysted larvae can penetrate the pores of the skin, pass with the blood stream to the lungs, and from there find its way into the esophagus and finally the stomach.

A peculiar feature of the recent epidemic at Dolcoath, Cornwall, was the prevalence of pustular cutaneous eruptions known by the miners as "bunches," and many authorities record instances of cutaneous infections accompanying ankylostome infection. These eruptions occur more particularly on those portions of the body which are exposed to contamination by dirty water or mud, the chief vehicles of infection. The encysted larvae, being able to resist a comparatively long period of dryness, can also, according to Calmette, be transported by air currents, and may find entrance through the respiratory organs, but this mode of infection is probably exceptional.

When the encysted larvae reaches the stomach the protective covering of chitin is softened and loosened, permitting the worm to disengage itself from its envelope, for which it has no longer any need. Dr. Calmette remarks that the envelope is not dissolved by the gastric juices as has been supposed, but merely relaxed, he having found both the pancreatic and intestinal juices quite negative in their action on the material of which the covering is composed. After remaining in the stomach sufficiently long to divest itself of its covering—the stay there never exceeding fifteen hours—the liberated ankylostome passes into the duodenum. Here its growth is at first slow, but after a week a provisional mouth cavity makes its appearance, which is gradually modified, until finally the complete dental apparatus with its four curved teeth is perfected, and in from four to five weeks after the infection the sexually perfect adult ankylostome is evolved and another cycle commences. The worms attach themselves by their teeth to the mucous lining of the intestines, in which they bury their heads deeply, sometimes indeed they penetrate to the submucous membrane and exist in a sort of blood bath. They do not remain in the same spot all the time, but move about from place to place, so that the bites are more numerous than the actual number of the worms. If no fresh infection occurs the worms will decrease in numbers and gradually die off, but they have been known to live from five to seven years in the intestines.

It does not appear that the ankylostome duodenale can exist in any other host than man. Various experiments have been tried to infect pit horses, mine rats, rabbits, dogs and mice with preparations of ankylostome larvae, but with entirely negative results. Dr. Bruns, of the Gelsenkirchen Institute of Bacteriology, speaking before the Berlin Conference on Ankylostomiasis in 1903, detailed some experiments on higher anthropoid apes brought direct from the Tropics. The animals were given food containing the encysted larvae of the

ankylostome, and microscopical examination of their feces, after the lapse of the ordinary incubation period, revealed the presence of ankylostome eggs in no wise to be distinguished from those contained in human feces. The eggs developed to young larvae, also exactly resembling the ordinary young ankylostome, but the adult worms were quite dissimilar, being unencysted, longer, more active and incapable of reproduction. The ankylostome would appear, therefore, to possess an organism highly specialized for life in the human body, and incapable of reproducing itself except in the man-



Two Larvae in second stage.

ner previously described. The worms cannot reproduce inside the body, and therefore for every adult worm present the host must have absorbed an encysted larva. Direct infection from person to person is not possible, actual contact with contaminated matter being necessary to contract infection.

The symptoms accompanying the presence of large numbers of ankylostomes in the human organism and constituting the diseased condition known as "ankylostomiasis" bear a marked resemblance to those accompanying pernicious anemia and the chlorosis of young women. The skin of the face becomes pale, assuming a waxy appearance as the disease advances; the mucous membrane of the lips and the inner surface of the eyelids become bloodless, and the tips of the ears have a greyish hue. Pains are experienced in the region of the stomach, sometimes accompanied by distention of the abdomen.

Diarrhoea is a feature of the disease, originating no doubt in the intestinal irritation set up by the worms, and this alternates with an obstinate constipation. The

feces present often a brownish or reddish cast owing to the bleeding of the intestines from the bites of the worms. As in all diseases of this nature, the appetite is capricious and irregular, sometimes abnormal and at other times poor. The taste becomes perverted, the sufferer evincing a desire for such things as pickles, salt and dirt. Dr. Stiles makes extensive remarks on this feature, which occurs very frequently among the "poor whites" of the Southern States, where he found cases of "sand-lapping," "resin chewing" and "dirt eating," and he remarks that this perversion of taste may be "classed with the chewing of slate pencils, resin, coffee, sucking of lemons and salt, etc., as an abnormal appetite due to the anemia and abnormal condition of the intestinal tract."

The affected person suffers from dizziness and palpitation, and from shortness of breath on the least exertion; he has frontal headaches, becomes extremely sensitive to cold and loses all desire for work. In the final stages of the disease dropsy may supervene, and the sufferer is reduced to a condition of general debility that renders him an easy prey to other diseases. In some cases affections of the skin may be present, as before mentioned, and a bronchial catarrh has been noticed by Belgian doctors as sometimes accompanying the other symptoms. These latter symptoms are probably due to the irritating effect of the larvae when effecting their entrance through the skin, but the main symptoms are without doubt the result of the anemia consequent on the altered condition of the blood, which is the most prominent result of the presence of the worms. The proportion of the red corpuscles in the blood is largely reduced, and a distinctive feature is the marked increase in the proportion of eosinophile leucocytes (colorless corpuscles of the blood, so-called from the fact that they are readily stained by eosin), which under the microscope afford a means of diagnosis that has been found of value.

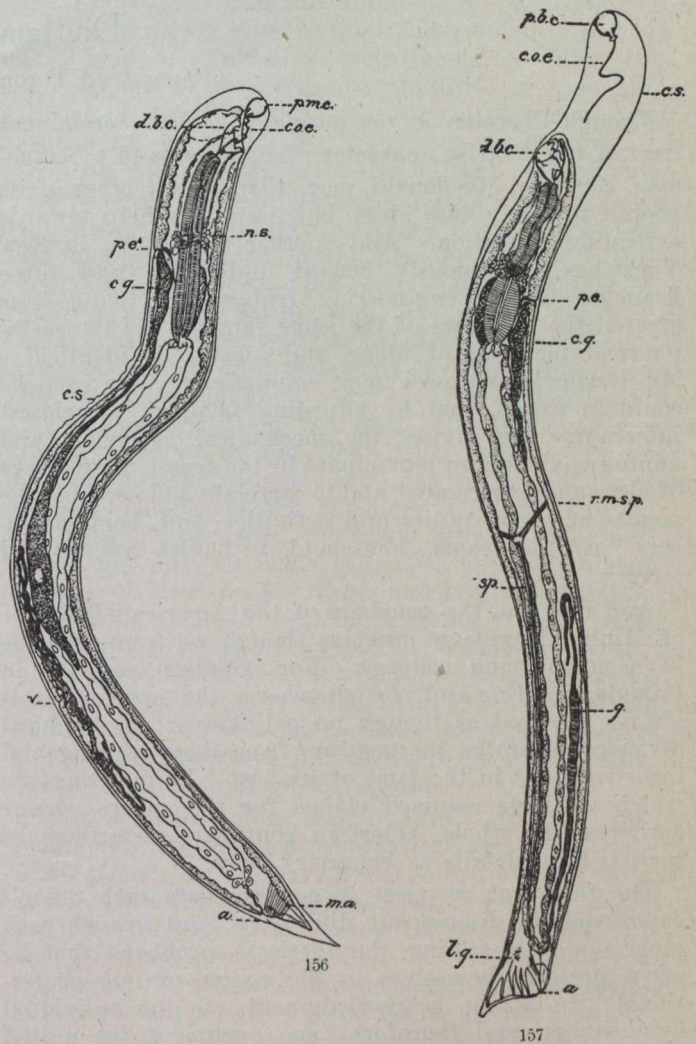
The symptoms of course are progressive, and are not the same in all cases, the resistance of the individual playing an important part. The severity of the anemia is dependent on the number of the parasites present in the intestines and the length of time they have been there, modified by the powers of resistance possessed by the person attacked. Some persons may carry numbers of the worms quite unconscious of the fact, and to all appearance possessing good health. This fact led the German doctors to separate their ankylostomiasis patients into two classes—"worm-carriers" and "worm-sick." The first named class included those persons whose dejecta contained the ova of the ankylostome, but who were not apparently unhealthy. The second class was composed of those in whom the ravages of the worms had so far advanced as to present all the characteristics of a disease, the patient being visibly anemic, and exhibiting plainly the peculiar symptoms of ankylostomiasis.

The blood-sucking propensities of this creature, while sufficiently serious, do not altogether explain the marked alteration which takes place in the character of the blood, and several authorities incline to the opinion that the parasite secretes a toxin which causes this altered percentage of the blood constituents. Sandwith, referring to fatal cases of ankylostomiasis that had come under his observation, states:—

"The actual cause of death was exhaustion from utter absence of rallying power. It is difficult to believe that the pathological effects are induced only by hemorrhage from the daily suction of scores or even hundreds of worms. In addition to this loss of blood we have general

thickening and degeneration of the duodenum and jejunum, and consequent interference with normal digestion; then non-assimilation, and eventually a process of slow starvation. It is also worthy of note that there may be in prolonged cases some self-poisoning from the great number of bites in the intestines containing ill-digested and perhaps decomposing food."

In prolonged and severe cases of ankylostome infection the outward symptoms of paleness, etc., are sufficiently obvious, but, as before mentioned, not all "worm-carriers" exhibit outward symptoms, and the recognized and perhaps the only absolute test for the presence of the worms is microscopical inspection of the feces for the ova of the worms. Dr. Stiles gives a quick and ready method for preliminary diagnoses of suspected cases. About an ounce of flesh feces is placed on a



Male and Female Hookworm before the fifth casting of skin. 14 to 15 days old.

sheet of white blotting paper and allowed to stand for from twenty minutes to an hour. In medium or severe cases of ankylostomiasis a reddish brown stain will be left on the blotting paper. The blood examination for ankylostome infection is based on the proportion of eosinophiles. The finger of the person under examination is pricked with a needle, and the resulting drop of blood is smeared on a slide, which before examination under the microscope is treated with eosin dye. This method is quicker and less repugnant than fecal diagnosis, and while not absolute, as there are other intestinal parasites which have a similar effect on the blood corpuscles, it is still very accurate, and affords a rapid

and cleanly method especially applicable to the preliminary selective examination of large numbers of men. It has been largely used in England by Dr. Haldane in connection with his enquiries in the mining centres of that country.

Thymol and male fern are the two drugs usually administered to expel the worms. Thymol is preferred by the American and English profession, while in Germany extract of male fern has been very generally used in connection with the Westphalian epidemic. The use of these drugs is not unattended with danger where the patient is weak, but as a rule two and rarely three doses

are sufficient to expel the worms. In some cases, however, repeated doses will not do this, more especially where the infection is of long standing. After the parasites have been removed the debilitated constitution of the patient requires to be built up by means of a nourishing diet and the administration of iron in some form. Where the disease has not progressed too far the patient will usually make a rapid recovery, but after a certain stage the health remains permanently impaired, even when the worms have been all expelled.

(To be continued.)

SOME REFLECTIONS IN SECRECY ON THE ARTS.

Dr. James Douglas

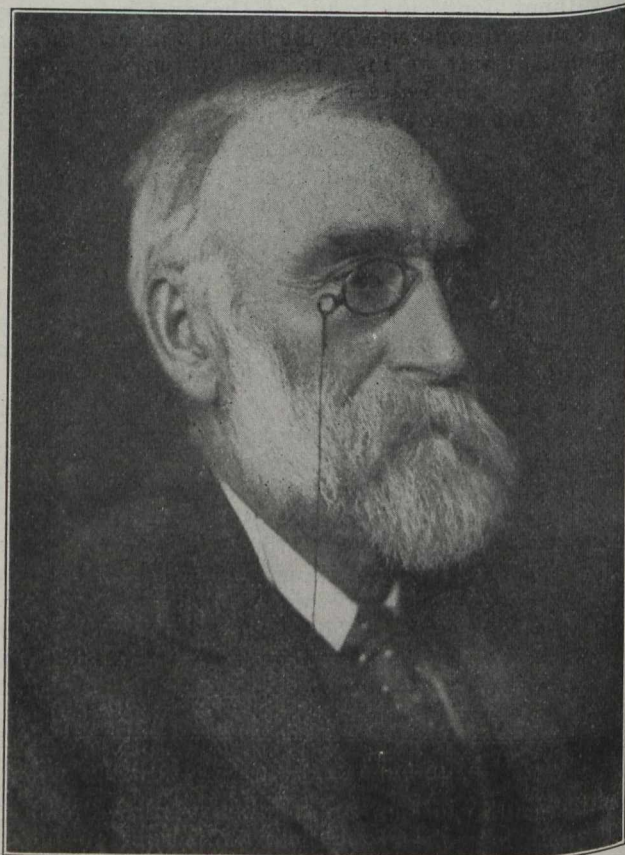
(Paper read Toronto meeting A. I. M. E.)

Though liberality is not supposed to be a prominent trait of the Scottish character, Canada owes to a Scotchman, Sir Wm. Macdonald, more than to any other of its people, not only wise ideas, but pecuniary help towards extending education. And another Scotchman in New York has sumptuously housed under one roof three branches of the engineering fraternity. Being thus created the members of the same family—for the metaphorical meaning of house and kinship is identical—Mr. Carnegie expresses more emphatically than even he could in words, that by affording facilities for closest intercourse, he invites the mechanical, electrical and mining engineers to participate in the freest interchange of ideas and experiences, and to correlate and combine the results of their studies and activities, and, being members of the same household, to banish reserve and secrecy.

And now we, the members of the American Institute of Mining Engineers, meet as though we were at home in a neighboring country. For whether we meet in Canada, in England, or elsewhere, the association is always received as though no political or geographical divisions separated its members from those of congenial incorporations in the land of its host. In fact the title which we have assumed claims for the sphere of our activities the whole American continent, regardless of such trifling details as boundary lines.

The fact that we meet to communicate each other's experience, to discuss our difficulties, and to seek each other's aid in solving the intricate problems that so often present themselves in the course of our professional life, is an acknowledgment of our individual helplessness; and therefore an argument for united effort. But no effort can be of any value if there is an underlying suspicion of reserve and lack of candor in our treatment of the technical questions which it is our province at these meetings to discuss. And yet there are limits to the extent to which we may go as officials of public companies. We know that even as professional men it is not always easy to reconcile principles with practice, and on this subject of sincerity and transparent diffusion of our experience there is both difference of opinion and difficulty of application. Few of us are as favorably situated as the college professors, whose first duty is to unbosom themselves to their students of all they know, and perhaps of a little they only suppose they know. We are most of us paid officials of corporations whose *raison d'être* is to make money, and whose

executive officers sometimes, not without some reason, consider their trade secrets as part of their capital. Some companies confide these secrets to the honor of their technical workers under as strict rules as those imposed on their cashier in the distribution of their money. Unless, therefore, our employers permit, we as employes are under pledge of secrecy. Many large



DR. JAMES DOUGLAS

manufacturers and mining and metallurgical concerns put no restriction upon the freedom of their technical staff, but some of our largest certainly impose on their employes absolute silence as to all that transpires within their laboratories or workshops.

If the question were left to ourselves, it would be easy of solution. Our reliance on one another as workmen in such distinct branches of engineering as civil, mechani-

cal, electrical and mining, is so close that we must cooperate in every large enterprise we undertake. We cannot succeed singly, for few of us claim to be so encyclopaedic in our knowledge or universal in our experience as to make it safe to rely on our own acquaintance with the practical details of every one of these important departments. We therefore seek each other's assistance, and consequently share in each other's secrets, for every man's special knowledge is to the other man, who is more ignorant or inexperienced a secret, or "a mystery," as old tradesmen and professional men used to call it.

Every industrial advance brings us closer together and makes it more impossible to act independently. Till very recently the civil engineer surveyed and located the line of railroad; the metallurgist made the rails and the iron and steel for the locomotives; the mechanical engineer designed the equipment, and what was left for the electrician to do was to string the telegraph wires. Now all this is changed. The electrical engineer is, in importance, springing into the first rank, and he requires such special acquaintance with the mysterious forces whose distribution and useful energy he handles with so much audacity, and yet safety, that few of us are particularly anxious to meddle with it.

Or take a mining instance—when called on to decide as to the adoption, in underground or overground haulage, of electricity or compressed air, even in metalliferous mines, the verdict must depend on so many delicate and purely technical considerations that few superintendents or general managers would consider themselves sufficiently informed to commit themselves, until their mechanical and electrical advisers had marshalled all the facts and arguments for and against each system. I need not cite other instances in which co-operation is demanded in the carrying out of almost every modern enterprise, or in the equipment of the complicated mechanisms which have replaced the simpler contrivances of our forefathers. The modern steamship exceeds Columbus' caravels in size and in complexity of construction as much as does a limited train an old stage coach. And in proportion to the multitude of their parts and the tremendous energy of the forces which must be called into play to move them, is the diversity of knowledge, talent and skill required to design, construct and operate them. As I have said, therefore, if it depended upon ourselves, there would be no difference of opinion as to the necessity of perfect open-mindedness, and as little backwardness in applying the principles to practice.

I think, moreover, that many of us are also convinced that open-mindedness to the suggestions of others is a useful quality to carry into our work, even after we and our scientific staff, in our wisdom, have co-operated in formulating and laying out our plans. Every draftsman in our office, every master mechanic in our shops, every foreman in our mines, is an expert in his particular line, and may be supposed to be familiar with minutiae which have escaped our observation, or, to put it frankly, may know more than we do ourselves on some of the innumerable details which make up the sum total of the questions on which we have ultimately to pass. The suggestions coming from such subordinate sources may not always be worthy of acceptance, but on the other hand it is never wise on our part to turn a deaf ear or a disdainful shoulder to them. In our own small way we feel sometimes almost ashamed at the credit accorded to ourselves, for ingenuity and foresight in devising either mechanical or industrial novelties, or in organizing large schemes when we recall the hints from others which

have suggested thoughts to ourselves. For though undoubtedly even in the most imposing cases the one inspiring mind may have conceived the idea, either of the invention or of the enterprise, only by the co-operation of a number of subordinate agents, who often belong to the multitude of the unknown and forgotten, could the idea have been worked out to the glory and the profit of the inventor or promoter. It is always difficult to decide how much of the result should be passed to the credit of the conspicuous man and how much to that of the hard-working, plodding, unimaginative grubber among details, or to the brilliant, erratic and because erratic, unsuccessful fellows who do so much of the world's work, and yet get so little of the credit or the gold. But this is certain that in our own work, whether it be conspicuous or not, we will always benefit by inviting suggestion from the humblest of our co-operators, and encouraging them to think independently and not to be afraid of expressing their thoughts. That this is already one of the prominent qualities of American industry is manifest from the large number of patents which are taken out by inconspicuous laborers in the field of engineering—especially in that of mechanics.

I recently went one Friday morning into our purchasing department, and found every desk empty, and all the clerks assembled in the manager's room. He had found it conducive to the most efficient conduct of his office to assemble all his staff once a week for free discussion as to the most economical distribution of work. The consequence was that instead of late hours and overtime, the result was obtained very easily within office hours, for suggestions from the men actually engaged were found to be worth more than from those merely superintending. The youngest were not snubbed, if they ventured to make a remark, and thus the spirit of pride and co-operation pervaded the whole group. We have all heard how Mr. Carnegie is said to have stimulated the rivalry of his superintendents and heads of departments by getting them to meet at intervals over an excellent lunch, where around the table all jealousy vanished, and all little technical secrets which are liable to exist even among friends were revealed. But good cheer is not, or should not be, necessary to make the great brotherhood of technical workers unfold their sympathy and unbosom their secrets to one another.

But to return to our main subject. How far and how completely should even corporations and industrial concerns permit and encourage the interchange of information? I am inclined to think that few limits should be set, for every limitation means the concealment of some fact or some principle which only if revealed can be developed to its full significance and utility. As a rule this can be done only by the action of many minds and many hands. Till developed it does not yield its full advantage to even the original discoverer, for he alone, unaided, in the solitude of his laboratory or behind the bars of his factory, without the practical assistance of his fellow-workers, rarely brings his original germinal idea into efficient, practical utility.

Were we free to appeal to purely altruistic motives, it would therefore be superfluous to argue in favor of complete knowledge and experience-sharing, but profit-sharing is after all the impelling motive of industrial advance to-day, as it has been in all ages, and to reconcile the admitted evils of secrecy with the admitted advantages of publicity, the patent laws have been framed. They have always given the patentee the right to use in either his person or through his agent his inventions or discoveries for a limited number of years, provided he

describes it so fully that it can be practiced by one skilled in the art. The publicity and knowledge conveyed by the specification stimulates the inventive faculties of others, and patented and unpatented improvements along the line of the original invention demonstrate both the value of publicity and the cupidity of men even of the technico-scientific class. Among the great inventors of our day was Sir Henry Bessemer. Before the Royal Commission, appointed to suggest revision of the British patent laws, he gave evidence, some of which he has embodied, with very suggestive comments, in his autobiography. Before he became famous he devised machinery for making bronze powder, and manufactured in secret. Of this he says:—

“While referring to patents for inventions, I cannot refrain from pointing to this particular invention of bronze powder as an example that may advantageously be borne in mind by those short-sighted persons who object to grants of letters patent. There can be no doubt of the fact that the security offered by the patent law to persons who expend large sums of money and valuable time in pursuing novel inventions, results in many new and important improvements in our manufactures, which otherwise it would be sheer madness for men to waste their energy and their money in attempting. But in this particular case the conditions were most unfavorable for patenting, owing to the fact that the article was only a powder and could not be identified as having been made by any particular form of mechanism. Therefore it could not be adequately protected by patent. Moreover, by my machinery, the cost of production, if only paid for at the ordinary rates of wages, did not exceed one-thirtieth of the selling price of the article. This fact alone offered an irresistible temptation to others to evade the inventor's claims, and so rendered the patent law a most inadequate protection. On the other hand, the great value of a small bulk of the material made it possible to carry on the manufacture in secret, and this method of manufacture was rendered the more feasible by making such different class of machine self-acting, and thereby dispensing entirely with a host of skilled manipulators. It may, therefore, be fairly considered, so far as this particular article was concerned, that there were, in effect, no patent laws in existence.

“Now let us see what the public has had to pay for not being able to give this security to the inventor. To illustrate this point, I may repeat the simple fact that the first order of bronze powder obtained by my traveller was for two pounds of pale gold, at eighty shillings per pound net, for the Coalbrookdale Iron Company. I may further state that, in consequence of the necessity for strict secrecy, I had made arrangements with three young men (my wife's brothers), to whom were paid salaries far beyond the cost of more manual labor (of which, indeed, but little was required). My friend, Mr. Young, desired to occupy the position of sleeping partner only; so I had entered into a contract with him to pay all salaries, find all raw materials, pay rent, engine power, and bring the whole produce of the manufactory into stock, in one ounce packages, ready for delivery, at a cost, for all qualities, of five shillings and sixpence per pound; after which he and I shared equally all profits of the sale. It is rather a curious coincidence that the one ounce bottles of gold paint were labelled five shillings and six pence, of which the retailer was allowed a liberal discount.

“Had the invention been patented, it would have become public property in fourteen years from the date of

the patent, after which period the public would have been able to buy bronze powder at its present market price, viz., from two shillings and three pence to two shillings and nine pence per pound. But this important secret was kept for about thirty-five years, and the public had to pay excessively high prices for twenty-one years longer than they would have done had the invention become public property in fourteen years, as it would have been if patented. Even this does not represent all the disadvantages resulting from secret manufactures. While every detail of production was a profound secret, there were no improvements by the outside public in any one of the machines employed during the whole thirty-five years, whereas during the fourteen years, if the invention had been patented and published, there would, in all probability, have been many improved machines invented, and many novel features applied to totally different manufactures.

“I have lingered long over this subject of bronze powder, because it is one which has had great influence on my career; it was taken up at a period when my energy and endurance, and my faith in my own powers, were at their highest; and as I look on all the incidents surrounding it, through the lapse of time and the many changes of the fifty years since it was undertaken, I wonder how I had the courage to attack a subject so complicated and so difficult, and one on which there were no data to assist me. There were not even the details of former failures to hold up the finger of warning, or point out a possible path to pursue, for no one had yet ventured to try and replace the delicate manipulation which experts had made their own, both in Japan and China, where texts and prayers printed in bronze were offered up at the shrine of Confucius two thousand years before I had ever seen a particle of bronze powder.”

He concludes this first reference to his powder in the following paragraph:—

“In closing these details of the bronze powder manufacture I may say that later on the handsome royalties paid by my steel licenses rendered the bronze powder business no longer necessary to me as a source of income; and I had then the extreme satisfaction of presenting the works to my brother-in-law, Richard Allen, who had, with so much caution, successfully kept, for more than thirty years, a secret for which, he perfectly well knew, some thousands of pounds would have been given him at any moment.”

But he returns to the subject of patents when discussing another invention of his life, that for making optical and plate glass, the value of which for some reason or other the trade has never appreciated. He says: “There is one point in connection with patented inventions upon which I have always felt strongly. I have maintained that the public derive a great advantage by useful inventions being patented because the invention so secured is valuable property, and the owner is necessarily desirous of turning that property to the greatest advantage; he either himself manufactures the patented article, or he grants licenses to others to do so. In either case the public reaps the advantage of being able to purchase a better or cheaper article than was before known to them, due to the inventor's perseverance in forcing his property upon the market. But if a novel article or manufacture is simply proposed by a writer and published in the technical press or in newspapers, as a rule (almost without a single exception) no manufacturer will go to the trouble and expense of trying to work out the proposed invention. He says to himself:

'I shall not risk the expense necessary to develop this new idea, for it may entirely fail; or even if I succeed, its development will cost me much more than it will cost other manufacturers, who will immediately avail themselves of it if I succeed; no, let some one else try it'; and so the invention is lost to the world in consequence of having been given away. This loss to the public is equally the case with patents that are not taken up; and one of the simplest and most effective inventions which I have ever made may be here cited as an example, as it formed part of the novel system of plate glass manufacture just referred to.'

After describing his plate glass invention and its public neglect, he says: "From what I have said I think I have shown that, however self-evident an invention may be or however advantageous it might be to a manufacturer, if it is public property he will not touch it."

Sir Henry was doubtless correct in asserting that under the impulse of self-interest inventions are pushed by the inventor more vigorously than if he had merely the scientific credit due and given to investigators to spur him on. But he really gives us an argument against patents when he describes the apathy of the public to his glass patents. His steel patents he worked out himself and brought to perfection after years of heavy expense and labor, and by adopting certain modifications to fit special cases. His plate glass patents he owns himself, but they would probably have been loaded down with royalties which the trade did not care to pay while taking the risk of applying them to practice. As to his bronze powder, he would probably have made far more out of it had he reduced the exorbitant prices and increased the demand, even while manufacturing it behind closed doors. But it is foreign to my purpose to discuss the patent laws, except casually as they bear upon the subject of secrecy in the arts. Sir Henry's

generalizations are substantially correct, but they are too sweeping, for there have been great inventions which the public has not been backward in using, though they were gratuitously offered to the world. One's thoughts pass with pleasure from the contemplation of the money-making inventors and investigators to such prophets and apostles of science as Sir Michael Faraday. Sir Michael's profound and original investigations into electricity and magnetism gave the world the dynamo. Though he did not work out the mechanical details of a practical generator, he undoubtedly invented appliances which might have been used for making a strong basis claim for a patent. But nothing could have been more repulsive to his spirit or foreign to his high aim in life than gauging his time and talents by a mere money standard. He lived contentedly on the small salary he received from the British Institution, preparing his lectures to children with as much care as he bestowed on those delivered before the Royal Institution which made him famous; turning his great learning and power of investigation to the nation's good in return for very scanty remuneration, for he had deliberately decided to devote his life to scientific research for truth's sake, rather than to use his vast attainments in the service of mammon. At the commencement of his career, Faraday added to his salary from the Royal Institution by what he called "commercial work." At first his average earnings from this source were £240 per year. They reached by 1831, £1,831. By 1838 this had shrunk to nothing, for in the meantime his great discovery of magneto-electricity was made, and his whole soul was so absorbed in his experimental work that neither time nor energy could be spared for money-making.

(To be continued.)

LE ROI MINING COMPANY, LIMITED, ROSSLAND, B.C.

BY GEO. A. OHREN.

Le Roi group, located on one of the richest portions of Red Mountain, and within the corporate limits of the City of Rossland, B.C., has had a rather varied career and history, since it was first staked, in July, 1890, but it is obvious at the present moment, even to the most casual observer, that the affairs of this concern are on the ascending side of the prodigious wave of prosperity that is now sweeping the country, and with good management, such as it would appear is in effect at present, is bound to attain the goal of successful mining.

Under the effective supervision of Mr. A. G. Larson, superintendent, a very extensive campaign of development work has been carried on during the past several months; the main five-compartment shaft has been deepened from the 1,050 foot station to the 1,650 foot level, and the work of opening up large known ore bodies from the 1,650 level will soon be in full progress. Owing to the sinking and retimbering of the main shaft, and to much diamond drill work and drifting being done, the mine management has had to work assiduously to make both ends meet. But working on this basis, that is, shipping an average quantity of ore and doing an extended amount of development work, is surely good mining practice, under the conditions that existed when this

work was inaugurated. The mine is in a position at the present time to hoist and ship a large tonnage of ore of good quality for some time to come, with average development work, which will no doubt result, in the impending months, in excellent profits, unless of course some now unforeseen factor creeps in. But this is hardly probably, as Le Roi is a gold mine, and a financial crisis or fall in the price of copper would hardly affect its operation, while as far as labor is concerned, it is on the most amicable terms here with the employer and wages have recently been advanced about 20 per cent., drill runners now getting \$4 per day of eight hours, and other labor in proportion.

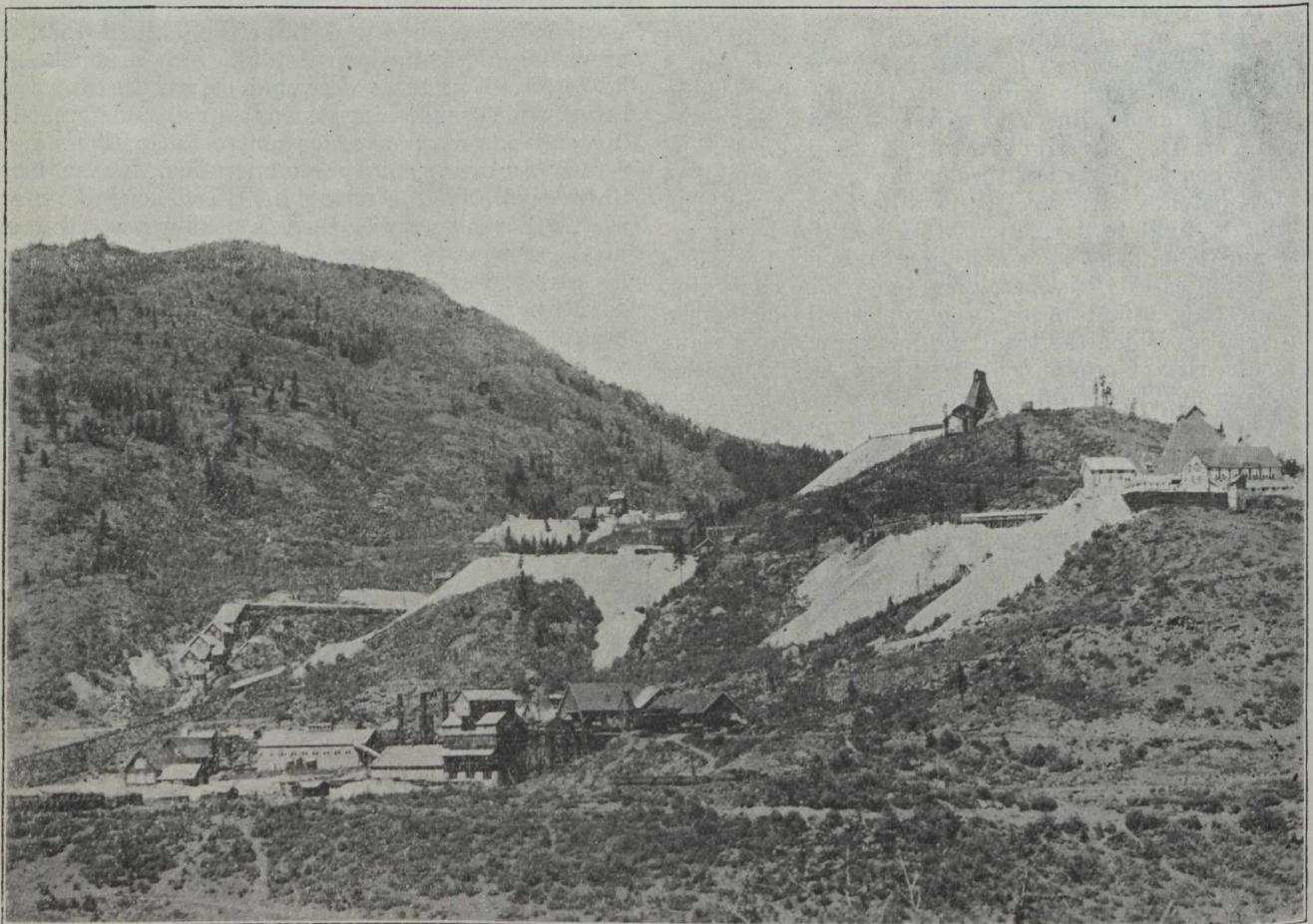
The mine is at present producing about 2,500 tons of first-class ore per week, but they are gradually getting additional furnaces into operation at the Northport smelter, lack of fuel and labor having held them back somewhat, up to the present, and the day is not far away when the above shipments will be greatly augmented. The principal development work now under way is the connecting of a winze, from the 1,050 to the 1,650 levels, with the main shaft by a drift on the 1,650 foot level. This work has been held back somewhat by the retimbering of the shaft, which was more of a task than a few words imply.

A short while ago the Le Roi Mining Company bonded the Spitzee group of claims, which adjoin Le Roi properties on the south, and they are now doing considerable work on this property. The rich Spitzee lead was discovered when the Canadian Pacific Railway Company cut through a knoll on that property. Some of the best ore in the camp has been found in the Spitzee workings, but not in very large bodies so far, which consist of a shaft, about 200 feet deep, with some drifting and upraising.

Impecuniosity has been the chief ailment of the Spitzee Company, and it is thought that the Le Roi Company can make a valuable property of this nascent mine with a small financial outlay to begin with. The Spitzee group includes the Spitzee Fr., Fool Hen, Darby, and

tribution of 2s. per share, less income tax, making 3 1-2 per cent. for the year and leaving the sum of £150,927 9s. 8d. carried forward. This was the first Le Roi dividend since 1899.

The above profit of £37,138 7s. 10d. was arrived at after writing off £28,628 10s. 5d. in respect of exploration and development; £18,163 19s. depreciation on machinery, plant, surface improvements, etc., at the mine and smelter; £3,727 10d. for special expense in connection with amalgamation scheme; paying £3,464 4s. 2d. to the British Columbia Government in full settlement of their claim in connection with revision of taxes, covering period July 1st, 1900, to October 17th, 1905; and deducting other sundry items of expense amounting to £6,315 1s. 10d.



Le Roi Headworks and Hoisting Plant on hill in foreground. Power and Air Compressing Plant in foreground.
Note Le Roi, No. 2, Properties and War Eagle Headworks in background.

Nelson No. 2, comprising about 110 acres. The properties controlled by Le Roi Company proper embrace Le Roi Claim, Le Roi Fraction, Black Bear, etc., containing approximately 100 acres, or 210 acres in all, if they take up the Spitzee bond. The Spitzee holdings include the surface rights of some of the claims, much of which is valuable city property.

In the company's report for the year ended June 30th, 1906, dated November 27th, 1906, it is shown that the balance in favor of profit and loss account at the end of the fiscal year was £37,138 7s. 10d. on the operations of the company for the year, which added to £150,539 1s. 10d. from last year totals £187,677 9s. 8d. Out of this an interim dividend of one shilling and sixpence was paid on the 28th February, 1906, absorbing the sum of £15,750. The directors recommended a final distri-

The liabilities, June 30th, 1906, were £15,282 7s.; liquid assets, £126,966 10s. 7d., showing a surplus of liquid assets over liabilities of £111,684 3s. 7d. Cash on hand at London and Rossland at that date was £90,097 1s. 7d.

On August 30th, 1905, the directors removed Mr. McMillan, managing director, at present writing, from the board, and entered into a contract with the Trail smelter to treat the output of the mine, asserting that a saving would be affected. But it would seem that this was not the case, and at the time of writing the Northport smelter is treating the entire output of the mine, the contract with the Trail smelter having been settled and cancelled.

The cost of ore production, 1906, was \$2.84; exploration and development written off, \$1.26; depreciation on

mine account, 36 cents; smelter and realization charges (direct and indirect, including first depreciation, interest, etc.), \$6.04; total, \$10.50.

During the year 110,042 dry tons of ore was shipped, valued at \$12.37 per ton, to Northport and Trail; 26,850 tons were smelted at Northport, and 83,192 at Trail. It cost the company \$312,615.29 to load this on the cars, equal to \$2.84, and \$1.25, as per above table. It will be noted that good management and strict economy are required to make the Le Roi mine pay, as the margin is so narrow between cost and realizing figures.

Ore smelted at Northport was 36,851 dry tons; matte and "clean-up" shipped was 1,489 tons, of a net value of \$505,002.13, equal to \$337.10 per ton.

Le Roi averaged:—Gold, per ton, .39 ounces; silver, .54; copper, 1.16 per cent.; average value, \$12.37. There were 7,180 feet of development work done during the year, the cost of which was \$127,616.38.

The cost per foot of upraising was \$33.75; winzing, \$45.85; crosscutting, \$16.18; drifting, \$15.76; diamond drilling, \$2.88.

The rock in Rossland camp is of a very hard and tough quality, and development work is costly. The above figures will give a very fair estimate of what the mines of this camp have to contend with. It would be almost impossible to mine here if the ore was not generally found in very large bodies.

As is generally known, Le Roi lead was discovered in July, 1890, by the two prospectors who located the Centre Star, War Eagle, Virginia and Idaho claims. They gave Le Roi claim to E. S. Topping, then of Trail, B.C., six miles from here on the Columbia River, and at that time the gateway to this camp, for having the five claims recorded, which cost him \$12.50. The first samples taken ran \$38 to \$40 per ton in gold alone. In November of the same year Topping bonded the claims to a syndicate of Spokane people, receiving \$16,000 in cash as a first payment. The Spokane men, subsequently acquiring the property from Topping, worked the mine until 1895, when it again changed hands. It paid for its own equipment and development from the grass roots. In 1896 the first dividend from the products of the mine was paid, amounting to \$25,000, and further dividends, which aggregated \$825,000, were paid up to the time the British American Corporation, of which Whittaker Wright was one of the promoters, took the property over. This corporation in 1898 paid about \$6 per share for the majority of the stock, or equivalent to \$3,000,000 approximately for the property; the minority interest was afterwards purchased for about \$8 per share, hence they paid in all about \$3,750,000 for the mine. Some of those who sold their stock at \$6 and \$8 had bought it as low as 10 cents per share, the rapid advance having been made by the discovery of prodigious bodies of ore in what is known as the Black Bear Tunnel, where the ore, which was only an ordinary showing on the surface, had widened out like an inverted funnel.

After the acquisition by exotic interests the mine produced another \$250,000 in dividends. This, with the dividends declared in 1906, would make a grand total of approximately \$1,245,000. This over and above a large expenditure for the very complete and up-to-date mining, hoisting, power and smelting equipment at Rossland and Northport.

The different members of the present management, and more especially the managing director, superintendent and business manager, are all votaries at the shrine of higher mining practice, and will no doubt in due time steer the good craft Le Roi into the harbor of affluence,

which is a consummation earnestly looked forward to by all those interested in the company, directly and indirectly, both in this district and abroad.

HOW LONDON VIEWS COBALT

Two years ago London casually considered Cobalt. That is, London superiorly accepted the haphazard statement, varied here and there by authentic data, that phenomenal argentiferous rocks had been definitely located in Northern Ontario—about which the average man in the city knows as much as he does about geological horizons. Reputable commissioners came here with something to sell, or something requiring research work in the laboratory; newspapers gave a little space to statements of values based on actual shipments; speculators were incredulous; technical men were curious if cautious; but London remained aloof because it prefers the yellow to the white metal. There is a glamour about gold that appeals to Throgmorton, Threadneedle and Lombard Streets, consequently Siberia, Korea, Rhodesia and the contact rocks in the vicinity of the mountains of the moon were given precedence to Cobalt's complex silver ores. It required considerable persuasion to establish the excellencies of the Cobalt country, silver contents exceeding Virginia City and Leadville records from surface development being sagely regarded as enrichments at outcrop likely to prove impoverishments at depth. Probably London technical experts are no exceptions in fortifying themselves behind "insufficient work." They reserved what judgment they had, at any rate, and their precaution was the more hastily exercised owing as much to metallurgical intricacies as to the indisposition of mining financiers to enter an untried field.

London is so constituted it will not confess error. Nevertheless, its inability to be sensible about mining in general is proverbial. If assured that Cobalt is less ephemeral than hopes as to Rhodesian banket, Witwatersrand revivals, Siberian lodes and Korean occurrences are known to have been, the section served by the Temiskaming & Northern Ontario Railway would be less askant to its glances. Leading Siberian promoters are luxuriating at fashionable hostels or are nursing their impaired balances, while the participating portion of the public would forget the experience if possible. Rhodesia's fiasco is now measured by a maximum of loss and minimum chance of recovery. Korea has its own troubles. The underwriting of public issues is something about which monied men are chary. London has the worst attack of "funks" the habitues of the "Devil's Kitchen"—in Bartholomew Lane, opposite the Bank of England—recall. The guaranteed South Manchurian loan, underwritten in sixty minutes, is thirty-five shillings below the issuing price the day following the closing of the lists. Witwatersrand—"Kaffirs"—shares are in the dumps. You would naturally suppose Cobalt would be taken seriously, though carefully; yet such is not the fact. Somehow there is a suspicion that the permanency of Ontario's infant prodigy—its longevity, rather—is too problematical to permit of the purchase of dollar shares at 25 or 50 cents, or of areas vouched for somewhat in this fashion:

"The favourable geological formation, large area and situation, make this property undoubtedly of great prospective value, and I am of opinion that *when it is prospected and developed important discoveries will be made.*"

It is all very well, and it may be comforting, to learn that \$1,000,000 will demonstrate the truth or falsity of the "opinion" herein expressed. There was a time in the "Woolly" West when it was painfully in evidence that "foxes have holes" in the ground, and that the venturesome "tenderfoot" had holes put in his purse when he went afield. Hundreds of millions have been stakes at the Witwatersrand upon bore-hole results, but all that is at an end, and Toronto's fields will not be supported upon such conjectures, or the "logic" of an F. G. S. and M. I. M. M. of London, who in this same connection writes:

"The geological trend of the lake (sic) is in a north-east and south-west direction, and is such that it cross-cuts the run on the east and west veins of the district for a distance of one mile, and any continuation of these veins from the adjoining properties will run into this company's property. For instance, the vein of the Company has a magnetic bearing that *must bring any* continuation of that vein into this property."

Another expert puts it that these "veins on adjoining territory, especially the, have a course which would indicate, *if they continued*, they would enter Lake, but as the entire ground is under water, this cannot be ascertained until the lakes are drained."

A Lieut.-Colonel, Bank Manager, Provincial Minister, Lieut.-General and a Baronet have subscribed to the prospectus of this company in embryo. They solemnly incorporate in their request for a million dollars on this description of a body of water, "geologically" almost at right angles with the "strike" of veins as disclosed in an adjoining property, which veins may be "discovered" under the lake when the "prospective value" has been established by prospecting and development!

American speculators profited by disposing of cheap acres afterwards ascertained to be under water, or swamp land. The gullible and overcredulous are domiciled universally. London, however, having a spasm of worldly wisdom, will not go diving and have promoters pump such air to its capitalists. Besides, there is greater need for facts as to silver contents at depths, away from lakes, before submarine mining is attempted. That this is pressingly so, I submit the following extract from the *Daily Mail*, appearing in to-day's issue:

[The danger is that Cobalt may "pinch out," as other silver fields like it have done in the past. There is so much precious ore right on the surface that there are places where you can rub your boot on the rock and see it shine like a bright new silver sixpence. But most geologists believe that the rich values lie only near the surface and will soon be exhausted. However, geologists, like other people, are as often wrong as right, and at present the man who should express a doubt on the spot as to Cobalt being a deep-level proposition would be well advised to leave camp by the next train. The camp speaks with lowered voice of truck loads which fetched their owners ten thousand, fifteen thousand, twenty thousand pounds. That three mines alone have made already £4,000,000 between them is an authentic fact. It is nothing out of the way for the ore to yield 75 per cent. of silver, and there are by-products too.

The pitiful part of it is that the small investor should be so fleeced. It may be the richest silver mine field in the world, but if it were capable of yielding a quarter of what the wild-cat prospectuses have promised, it would have to be four times richer than even the optimists

believe it to be. Already more money has been lost over worthless properties than has been made out of paying mines. A mania seized the Canadian public. The newspapers were filled with alluring baits for the get-rich-quick, who swallowed them with fatuous avidity. Now they are beginning to see what fools they were. Even if the production for 1907 totals up to £2,000,000, the figure predicted by the most hopeful, I have the authority of Mr. Nicholas, of the Canadian Geological Survey, for saying that this will not serve to pay a reasonable dividend on more than half the capital invested. And it was not "a reasonable dividend" which prospectuses promised—it was anything from 15 to 25 per cent.]

Of course the writer of the foregoing has mingled apprehension with optimism. The mining camp that returned dividends on *all* the money represented in prospectuses and promotions has yet to exist. Nor is it within the province of the Dominion Geologist to venture into high finance. At the same time, the case as presented, and as emphasized by excerpts from the prospectus quoted, suggests the necessity for a stricter sense of responsibility among those with most at stake in the Ontario mining fields. London has more scrip than it can digest. It is not inimical to Cobalt propositions. That it allowed Americans to obtain excellent Cobalt properties, it fully comprehends with regret. It was receptive toward Cobalt until recent fiascos reaffirmed the futility of buying reams of paper at 10 or 20 per cent. of its face value upon reports and estimates framed so recklessly. Undoubtedly Canadian mining districts could be made the basis of healthy speculation and exploitation, and THE CANADIAN MINING JOURNAL, it is anticipated, will contribute largely to that end. Mining company and syndicate regulations will not remedy the laxities. The very latitude essential in new districts makes it incumbent upon the technical and daily press to safeguard the meritorious and placard the unworthy.

ALEX. GRAY.

(Late Editor South African Mines, Commerce and Industries, Johannesburg.)

A "Foster" Specimen

Specimen from the Foster mine, in the southeast part of the north half of lot 4, concession 4, in the Township of Coleman, district of Nipissing, Ontario. Brought in by Mr. A. P. Low, July 30th, 1907. The dark steel-gray, lustrous mineral is stromeyrite, the normal composition of which as deduced by Dana is: Sulphur 15.8 per cent., silver 53.1 per cent, copper 31.1 per cent; this is the second occurrence of this mineral reported from Canada, the other being at the Silver King mine, Toad Mountain, West Kootenay, B.C. (Ann. Rep. G. S. C. vol. viii. 1895, pp. 12 and 13 R). The bronze-yellow mineral is argyropyrite, a sulphide of somewhat uncertain composition, commonly holding 25 to 30 per cent. of silver and 35 to 40 per cent. of iron, often with adventitious copper. With the stromeyrite and argyropyrite in this specimen there is also associated some native silver, the gangue being a grayish-white quartz.

Mr. Smith Curtis, in an interview with *The Rosland Miner*, last week, expressed a very favorable opinion of copper mining prospects in the Kamloops district, from which he had recently returned. Only one mine, however, is being worked at present, but good ore was being taken from this property, which had been developed to a depth of 600 feet.

A. P. LOW, DIRECTOR OF THE GEOLOGICAL SURVEY

BY THE EDITOR OF THE GEOLOGICAL SURVEY.

If one were to accept the views advocated by certain Canadian papers not at present enjoying the patronage of the Government, one would be disposed to believe that all positions in the Civil Service are filled by "pull," and that the recipients of such promotion have one common end in view—graft.

The Department of the Geological Survey—now officially designated the Department of Mines—has happily been practically free from political patronage, and the Minister, the nominal head of the Department, has honestly endeavoured to appoint as Director that man best fitted to fill the position.

Fortunately for the Survey, there have been few opportunities for the Minister to exercise his discretion. Logan created the Canadian Survey and raised it to a standard difficult for even such men as Selwyn and Dawson to maintain. After Dawson's death the Government determined that future Directors of the Canadian Geological Survey should themselves be Canadians. The time had gone by when we needed to send to England or Australia to find a competent Director. Scientists, Canada could supply in plenty, and scientists who, by reason of their special knowledge of Canadian conditions, were more fitted for the position than any stranger could possibly be. But a scientist—especially in these days when scientists adopt specialties—is not necessarily an administrator; indeed, it is more often the case that a scientist cannot administrate at all. When it is taken into consideration that the Director of the Survey is expected to successfully control fifty or sixty men, each of whom believes that his own brand of science ranks higher in importance than any other; and that one of the Director's principal duties is to so apportion their work over this huge Dominion as to extract the greatest benefit, both scientific and economic, while not clashing with the work being accomplished by the Provincial Surveys, it can be readily understood that a first-class Director must be not only a first-class scientist, but, above all, an able administrator.

Those who read Mr. Low's reports on his researches in Labrador or his voyage in the Neptune, were prepared to hear of his appointment to the Directorship. No one who has read these reports can fail to appreciate that Mr. Low has the two requisites that combine to make an able Director—a thorough knowledge of geology and a fine power of administration.

Mr. Low was born in Montreal on May 24th, 1861, and is believed to have succeeded in getting into more scrapes, as a youngster, than would make a good record for any two average Canadian school boys—which is a sufficiently large order. He was educated at the public schools and soon evinced so decided a taste for applied science that he was allowed to make it his specialty. He entered the Applied Science Faculty of McGill in 1878 and passed with first rank honours in Natural Science in 1882.

With his inborn love of knowledge was interwoven—as is so frequently the case—an inborn love of sports. Many of the Director's staunchest friends to-day were his friends or foes of the football field and hockey rink of many years ago. Indeed, hockey was not played at all in Ottawa until introduced by Mr. Low, and some of the most strenuous football matches ever witnessed in that town were won and lost by the Ottawa Football Club, which Mr. Low captained for many years.

In 1881 Mr. Low was appointed as a "student assistant" to an exploration party sent by the Geological Survey to the Gaspé peninsula, and from that time to the present day his work may be followed in the Survey's reports. His work—but not his life—for it has ever been an unwritten law with the Survey officers that as little as possible should be made of difficulties overcome or danger averted. In this respect Mr. Low has followed the Survey traditions with almost irritating fidelity, and only those who know the conditions of northern travel can read between the lines or suspect, from perusing Mr. Low's geological reports, what risks have been run, or



A. P. LOW.

Deputy Minister of Mines and Director of the Geological Survey of Canada

what suffering has been endured. His reports, like poets,
 " . . . lose half the praise they should have got,
 Could it be known what they discreetly blot."

A "student assistant" on his first expedition is very carefully watched; the Survey is always on the look-out for new material. Good field geologists are scarce, for the first essential in a budding field officer is observation, and the power of observation in this age of cram is becoming, as is well known, rarer and more rare. But in this Dominion, mostly unsurveyed—except in a very superficial manner—the field geologist is practically use-

less unless he combine with his knowledge and faculty for observation a splendid constitution, large powers of endurance and a spirit of determination that, when it fails, is called pig-headed obstinacy, or, when it succeeds, unswerving persistency.

That in Mr. Low these unusual factors were combined became apparent during his first field work in Gaspé, and, on the recommendation of Dr. Ells, who was in charge of the party, he was offered and accepted a permanent position on the Survey staff.

From that time it has always been recognized that Mr. Low was in the running for the Directorship, and it was pretty generally known that to be Director became, in after years, his chief ambition. So well was this recognized that, one Christmas, some wag on the staff brought out a Christmas card containing "quotations" for the Geological Survey, and apportioned the following lines to "A. P."

"Low was his name, but great was his desire."

—*Shakespeare.*

The hit was a fair one, though it was rather unkind to ascribe the lines to our national poet, who never perpetrated anything like them.

In 1884 an expedition was sent by the Quebec Government and the Geological Survey to make a report on the Mistassini district, and especially to survey those portions of Mistassini Lake that had been left uncompleted by McEwart and Richardson. A Quebec land surveyor was in charge of the party, to which Mr. Low was attached as a geologist. The methods employed by the expedition were not such as would recommend themselves to any officer of the Geological Survey, to whom "hustle" becomes the first essential directly the flight of winter makes field-work possible. Kicking his heels in Quebec, waiting for the expedition to move, was not Mr. Low's ideal of geological research, and he started on his own account up the Bersimis River, supposing that the main party—unhampered by field-work—would soon overtake him.

He reached Lake Pipmuakin, but no main party appeared and he was compelled to return for food. Delay after delay occurred, and it was actually not until late August that the expedition at last got away. The natural consequences ensued. Blizzards caused frozen faces, frozen hands, frozen feet; food ran short, and the game that had been counted on failed to appear. The party lived for some time on starvation rations, eked out with an occasional beaver, but for which the entire expedition would have suffered the same fate as befell the unfortunate Indians last month, whose skeleton bodies lined the same route, and whose fate was made known by one of the survivors, John Bastian, who acted as Mr. Low's guide on three trips in Labrador.

The exhausted expedition eventually reached the Hudson Bay Company's post on Mistassini Lake, where they arranged to winter. From Mr. Low's point of view, everything had been disappointment. Nearly a year gone by and practically nothing done. There was, however, time to think—weeks of leisure—and Mr. Low employed it in coming to a noteworthy decision. He left the post in February, arrived in Ottawa the first of March, and interviewed Dr. Selwyn, the Director. What passed is known only to Dr. Selwyn, Mr. Low and the Minister, but in a few days Mr. Low—with J. M. Macoun as assistant—set out once more for Lake Mistassini, armed with a letter giving him complete charge of the entire expedition. But it was more by good luck than good management that these two officers ever reached the lake. Untaught by previous experience, they counted on

making the average number of miles per day and on living largely on the country. Soft weather made travelling terribly slow, the game perversely refused to be accommodating, even the beavers kept away—and the two white men, with six Indians, found themselves half starved and fearfully weak at Lake Chibougamau, sixty miles from the nearest post.

It became evident that for the whole party to make a forced march meant death to some of them, and Mr. Low called for a couple of volunteers to hurry to the post with news of their plight. At the same time it was arranged that the party should move as quickly as possible along the trail, in the endeavour to save a few hours. The volunteers accomplished their mission admirably, but the starving party missed the trail when they had followed it for some twenty miles, and were obliged to camp, in view of the danger of missing the rescuers with food. Mr. Low describes the first twenty-four hours of absolute starvation as very painful, but adds, strangely enough, that during the subsequent four days he and the men suffered very little. What was worse than the starvation was the anxiety as to whether the volunteers would be able to reach the post. On the fifth day, food, supplied by the H. B. Co., arrived. It was only flour and lard, but to the starving men it was beefsteak and onions. They made a meal that Mr. Low describes in the words of the poet Young as "an elegant sufficiency," and immediately afterwards started for Lake Wakonichi, but soon encountered more food—bacon this time—sent from the same source—and encompassed another meal, whose proportions did not seem in the least handicapped by the previous Gargantuan repast.

Crossing Lake Wakonichi the party met with its first piece of good luck. In a net set by some trapper they found a lake trout weighing nearly twenty pounds, and it can be imagined what a meal this made, cooked with flour and bacon.

Early in May the Mistassini post was reached, and Mr. Low took over charge, the first of the many that have been entrusted to him, from which time he has been regarded as the standard authority on the geology of that huge tract commonly known as the Labrador peninsula.

Of his observations and experiences in the Mistassini district Mr. Low could fill a goodly sized book and still leave much untold. In the space of this short sketch it is impossible to do more than allude to the incidents of his travels, but one fact regarding Lake Mistassini it is difficult to refrain from mentioning. On the 24th May, an Indian attached to Cleary's trading camp, left the post and crossed the lake on his heavily-laden sled. At noon Low and Macoun were paddling ice blocks in the lake, and in the afternoon A. P. celebrated his birthday by enjoying quite a long swim. The temperature was 84 degrees in the shade, and proved to be the highest recorded that summer.

The survey of the lake was completed in July, after which the party surveyed the Rupert River to Rupert House, journeyed to Moose Factory, ascended the Moose River, and eventually reached Missinabie, where the Canadian Pacific Railway was in course of construction.

In 1886 Mr. Low was instructed to find the outlet of Favourable Lake, in Keewatin, to survey the Severn River, and to return via Oxford Lake and Norway House. Prof. Macoun's son was again appointed as assistant, and together they journeyed up the Berens River from Lake Winnipeg. They found the outlet of Favourable Lake, though, if the truth must be told, they found it by accident—and followed it to Severn Lake. The season was exceptionally dry; no rain fell for six weeks,

forest fires obscured the atmosphere, taking sights became difficult, and sometimes impossible, and the travellers once more found themselves on starvation rations. For 300 miles no human being was met nor any game near enough to be shot. At last an Indian and his squaw were sighted in a canoe trying to escape notice. When called upon they endeavoured to outdistance the party, and a long chase ensued, ending, after ten miles hard paddling, in the couple being caught. They had no food to spare—scarcely sufficient indeed, to take them to Trout Lake, the nearest H. B. C. post. They were, however, induced to act as guides, and, with their help, the party arrived at Trout Lake before the want of nourishment had caused any serious harm. The Hudson Bay agent was only able to supply them with fish pemmican, which, for the uninitiated, it may be explained consists of boiled fish, dried and pounded, stored in birch-bark baskets, with, generally, a rabbit-skin holding fish oil in which to cook the appetizing concoction. Furnished with what, after their privations, seemed to be luxury, the party continued down the Severn River, but in a reach of the stream what they thought was a rapid turned out to be a fall eight feet high, and trouble ensued. The first canoe actually rode the crest and fell into the river below without upsetting or sustaining any harm. It, however, displaced some loose rocks just before taking the plunge, and the second canoe, striking these, never had a fair chance. The canoe was so badly damaged that only with great difficulty did the party succeed in nursing it to Fort Severn, but the precious pemmican was unharmed, and in comparison to that, the rest mattered little.

At Fort Severn unsuccessful efforts were made to obtain another canoe. It was decided to repair the boat as much as was feasible, and coast westward to York Factory. During this westward trip, camp was pitched at night on the dreary mud flats that characterize this portion of Hudson Bay. On the second night a storm arose that played havoc, not only with Mr. Low's tent, but with his intentions. The wind picked up one of the canoes—they had been staked down as usual—blew it across the tent, which it tore down, and damaged both tent and boat beyond repair. Macoun returned to Fort Severn with instructions to procure a boat of some sort—honestly if he could, but to procure a boat. Here again good luck intervened, for, after some days, Macoun was sighted with four Indians in a flat-bottomed boat lent by the H. B. C. The boat had been made at Fort Churchill, had drifted away and had turned up at Severn post just in time to loan to Macoun.

Though the boat made good way before a fair wind, tacking with her was a tedious business, so much so indeed that when Mr. Low shot a polar bear he was unable to capture the prize owing to the difficulty of beating against the wind. Game, however, was plentiful. Ducks, geese and caribou were easily obtained, so that the loss of the bear was not a serious matter.

York Factory was safely reached, and a river boat was obtained. Mr. Low reached Norway House just as W. H. Gilder and his party were setting out on their search for the North Pole.

From 1887 to 1891 Mr. Low continued to add to our knowledge of Canadian geology. At first in James Bay and afterwards in the country north of the St. Lawrence he made extensive surveys, the results of which, are they not written in the chronicles of the Geological Survey?

In 1892 it was determined to map the new northern boundary of the Province of Quebec. It seemed taken as granted that the officer in charge would be Mr. Low, and Mr. Low was duly appointed. He travelled north

from Lake St. John to Mistassini, crossed from the Rupert River to the Eastmain River, and made the first instrumental survey on record of the western portion of that large stream. In the following year he travelled by the same route to the Eastmain River, which he surveyed to its head. Afterwards he began a series of geological explorations in Ungava, the results of which are embodied in a report officially known as Part L, Volume VIII. This publication has remained ever since, and seems likely to remain for some time, the standard geological work on the Labrador peninsula.

The party portaged to the head waters of Big River, and down it to Lake Nichikun. Thence a traverse was made to Kaniapiskau Lake; the Kaniapiskau River was followed, and subsequently the Larch and Koksoak Rivers, to Chimo on the coast.

No fuss was made about this journey, no bombast displayed, no magazines published illustrated articles with lurid head-lines. Had Mr. Low or his assistant (Captain—now Major—Eaton) died from privation, the newspaper reporters would have craved for copy and fought for photos, but as the exploring party happened to be in charge of an officer who understood the conditions, realized the difficulties, who went prepared for emergency and was fortified with experience, no lives were lost, no pathetic diaries were written, and the newspapers were too wise to fill their columns with dry geological details.

Mr. Low had intended wintering at Chimo, but a severe famine—to which nearly one hundred natives succumbed—induced him to alter his plans, and the party were conveyed by the H. B. Co.'s steamer to Rigolet. In the following March the survey of the Hamilton River was commenced. Twelve extra natives had been engaged, and each man—white and native—drew 200 pounds on a sled. Progress was necessarily slow, but after some days the spot to which canoes had been sent was reached, and the extra men were sent home. Though the Grand Falls are not the largest or the most powerful in the world, they run the Victoria Nyanza a close second, and, compared to them, Niagara is but a baby waterfall. Mr. Low first saw this magnificent accident of Nature from a cliff nearly 500 feet high. He had been warned of the irresistible desire the spectator feels to throw himself into the gorge, and had laughed. He describes his feelings, however, not as if he had any desire to throw himself over the cliff, but as if someone behind was pushing him, and, as happens to all who view this extraordinary sight, it was with difficulty he was prevented from precipitating himself into the gorge, under the belief that he was being violently shoved. The water has a sheer drop of 312 feet, but the total fall of the river here is over 700 feet, and it is estimated to give nine million horsepower. Mr. Low has pointed out the vast possibilities of this neglected power, which, there is little doubt, will some day supply the greater part of the Province of Quebec.

It was after having mapped the head waters of Hamilton River that Mr. Low reported large quantities of excellent iron ore along the valley of the Ashuanipi River and deposits of labradorite in Lake Nichikun. Labradorite is probably the most perfect and certainly the most beautiful building stone of which we have any knowledge, and in the days to come, when the valley of the Hamilton River is being worked for iron, this wonderfully streaked feldspar will be quarried in enormous quantities.

The expedition returned by way of the Romaine and St. John Rivers, having accomplished what was probably

the most interesting survey ever made by the Canadian or any other Government.

By this time Mr. Low had come to be recognized as the right man in the right place—the right place being Labrador—and he spent most of the following five years in mapping the least known portions of Ungava. As a welcome break in these desolate surveys he was sent in 1900 to the Paris Exhibition to superintend the Canadian mineral exhibit.

The continual mention in the Geological Survey reports of first-class magnetite and hematite in Labrador and on the islands of Hudson Bay had attracted the attention of American capitalists, and on Mr. Low's return from Paris he was approached by a Philadelphian Syndicate who endeavoured to procure his services in prospecting the Nastapoka Islands. Many years ago that sage observer, Hudibras, referred to

“ . . . the evils that do environ
The man that meddles with cold iron.”

In this case the evils were complicated, for difficult as it is to join the Geological Survey, it is almost impossible, once you play the prodigal, to be again embraced by those stony arms.

Mr. Low, however, took chances and made a detailed report on the iron deposits—he located 8,000 acres—of the Nastapoka Islands. His report has never been made public, but it is understood that though the ore was both plentiful and of first-class quality, he considered the economic conditions too unfavourable for profitable mining. Nothing, perhaps, is more to Mr. Low's credit than the fact that the Geological Survey jumped at his offer to rejoin the service, and he was immediately marked as one of the few possible candidates that could be put in charge of the expedition the Government intended to despatch to the Polar regions. Eventually Mr. Low received his commission as commander of the “Neptune,” and his report of the work performed by the expedition has become an Arctic classic.

It was in connection with that report that the present chronicler first met Mr. Low, and thereby hangs a tale so good that, though Rome fall, it must be told.

Mr. Low had made certain statements which the writer in his capacity as editor—and after having consulted the *Encyclopedia Britannica*—queried and altered. The Arctic explorer, exceedingly wroth, interviewed the editor and told him that he might alter the expression as much as he d— pleased, but he must not alter the facts. “Anyway,” said the irate geologist, “where did you get your information?” The editor meekly explained. “Oh, great heavens!” said Mr. Low, “why go to the *Encyclopedia*, why not consult a specialist?” The editor brooded over this melancholy incident for some days and then wrote the editor of the “*Times*,” asking why the information was not up-to-date. He received a letter to the effect that though the “*Times*” was not responsible for every sentence written, it endeavoured to ensure accuracy by inducing specialists to write, and, in this case the article was supplied by the well-known Labrador explorer, Mr. A. P. Low.

The report of the voyage of the *Neptune*, Blue Book though it was, differed so materially in style and manner from most other Blue Books that the Government decided to publish it in an *edition de luxe*. Seven thousand copies were issued, but the demand was so great that before the wholesale booksellers could be supplied the entire edition had run out.

Among the many conclusions arrived at in the “*Voyage of the Neptune*” the following are probably the most

important, and the reasons that led to their adoption are very forcibly argued by the author:

1. The discovery of the North Pole, except as a matter of sentiment, is absolutely useless.
2. With plenty of good luck, the North-West passage can be made, but will never be a commercial route.
3. The Hudson Bay route for wheat to Europe is not only practicable, but is bound to be adopted in the near future.
4. Unless the Government take strong measures, the Eskimos are a doomed race.

In 1905 the Quebec Government requested the Dominion Government to instruct the Geological Survey to make a report upon the mineral areas in the Lake Chibougamau district. Accompanying the request was a rider to the effect that of all the field officers in the survey, Mr. Low would be the most acceptable. Mr. Low, accordingly, was sent. His report could scarcely be considered a very comforting document for those deeply interested in Chibougamau mining, but the author expressed the opinion that further prospecting and cheaper transport may develop something really profitable in copper and asbestos.

In April, 1906, Mr. Low was appointed Director of the Survey, and immediately started on a stretch of hard work that came near to being his undoing, both physically and mentally. Late hours at the office and an attack of “grip” were the cause of the evil, and in January last Mr. Low was reported dying. But the constitution of a giant and the pluck that had pulled him through so many narrow escapes came to his rescue and after a month's anxious waiting the Survey heaved one big sigh of relief when the daily bulletin read “out of danger.”

The illness has left its mark. The remarkably youthful appearance that characterized the Director is no longer seen—

“ . . . middle age
Has slightly pressed its signet sage.”

But, fortunately, this is all. The clearness of thought is still there, the ability to decide quickly what line to take, and the determination to take it and stick to it are still there; above all, he still retains the friendship and respect of the staff—who, as one of them remarked the other day—would “work their fingers to the bone to do old Low a turn.”

“THE TRUTH ABOUT WABANA”

Shipped, in good order and condition, in and upon the good ship *Sommerstad*, now lying in the port of North Sydney, whereof Ellefsen is master for the present voyage, and bound for Wabana, the parcels, marked as in the margin, “(a) Perishable, handle with care; (b) irascible, handle gingerly, to avoid explosion.” Bills lading, in general, do not make provision for details, so it may here be explained that the so-called “parcels” were “valuable,” inasmuch as they consisted of the writer and his better half. Contrary to accepted, if not strictly correct rule, the first named, in the present case, will do all the talking.

Wabana, made famous by its iron ore, is the chief port of Bell Island, an island in Conception Bay, which in its turn is in Newfoundland. Wabana is in N. lat. 47° 37' and W. long. 53° 56'. It is distant from Sydney harbor about 400 miles; from Halifax, about a hundred more,

and from St. John's, Newfoundland, a very short distance. Leaving Sydney harbor, the course is straight south for Cape Race, then along the coast, past St. John, and then turning a corner, at Cape St. Francis, Bell Island, is visible; that is, when there is no fog, which I believe is seldom. This description as to the whereabouts of the famous isles should be comprehensive enough to satisfy the ordinary reader; the extraordinary may obtain fuller particulars in an admiralty chart.

I had heard some fearsome stories as to the difficulties attending a landing on the island—not on the pier, which can be reached by a land ladder—and so, as I had come with the intention of seeing the ore mines, I had made up my mind to “play the game,” no matter how many or how great the obstacles. Pshaw! It was dead easy. I had been told people were taken up in a basket on the sides of precipitous cliffs. The cliffs were there all right, but the basket was absent. Instead there was a platform, as in an elevator, only more original in design. If in an elevator an ascensionist happens to be a giddy person, he cannot well fall out, walls and bars prevent him. The platform at Wabana, not being ornamental, has on its sides two iron rails, while its ends are open. The ascent is easy and pleasant; the descent, as one sees the abyss below, may not be so cheerful. We went up on the elevator and down by the stairs—for there are these as well as the elevator, and by the time the bottom was reached one of the party was wet with sweat.

Of Bell Island it cannot be said that it is a lonely island. Before the Nova Scotia Steel & Coal Co. set foot there it was a well populated and a well cultivated island. There were some five hundred families on the island making a living by fishing and farming when the Nova Scotia Steel & Coal Co. set about the development of the island's iron ore. The population now is probably 3,500 to 4,000, as in addition to the original inhabitants there are employed in connection with the mines some 1,400 or 1,500 persons.

There are two popular impressions in regard to Bell Island which are erroneous. The first, that it is a much out of the way place, and the second, that the whole island is a mass of iron ore. With regard to the first-named, it may be stated that, when good connections can be made, St. John's can be reached in two hours. The distance is, say, thirteen miles, four by water to the mainland and nine by coach to the capital. As to the second wrong impression, Bell Island has less than a fifth of its surface laid or underlaid with ore. I use the two words advisedly, as one of the beds lies chiefly on the surface; the other underlies it some two hundred and thirty or forty feet. The island is, say, eight miles long by two wide, while the iron ore covers an area of three and a quarter square miles. As yet, if hopes do not fail, and if prospects are not foiled, the quantity of ore in these three odd square miles will form a small proportion only of the ore which will find an exit by way of the island, for, while both the steel companies may have between them thirty to forty million tons of ore available on the land areas, it is hoped that that is only a bagatelle in comparison with the quantity in the submarine areas.

Before leaving Nova Scotia, one indirectly interested in the Torbrook, or Nietaux, iron mines, said: “See now that you write a good article and head it, ‘The Truth About Wabana.’” Well, that's what I “lay out” to do, without entering into bonds as to the goodness of the article.

There are the principal seams of ore, marked the upper and the lower bed. The upper bed is the one so much has been heard about, owing to the facility with which

the ore was mined, as it lay largely on the surface, or with a slight covering of earth only, removable at some points by hand, at others by a steam shovel. Though a large quantity of the surface ore has been removed, much yet remains. Both companies, however, are developing to the deep by slopes, preparing for the future. The thickness of the beds is, say, nine feet, divided into two layers. The under layer of at least one of the seams is not quite so high in iron as the other. On the land areas of the Nova Scotia Steel & Coal Co. it is estimated there are twenty millions of tons. To be safe, let me say fifteen millions. But, as said, it is hoped that is only a patch in proportion to what is in the submarine areas. The outcrops of the seams run east and west, and the pitch is northerly. The angle or the dip of the seams is about eight, or say a foot in twelve or thirteen. To the north, between the island and the mainland, the distance is eight miles. It is not supposed that the submarine ore areas continue on to the mainland. Indeed, it may be said it is known they do not, but there is no reason why they should not continue under the water for four, five or six miles. It may be asked: “Beyond the fact that the seams pitch seaward, is there ground for the supposition that the ore underlies the water?” There is. Through a portion of the lower seam, owned by the Dominion Iron & Steel Co., the Nova Scotia Steel & Coal Co. are now driving, by mutual agreement between the companies, a slope to determine this point. The present length of the slope is some 1,600 feet through land ore and 1,200 feet through ore submarine. And the beauty of it all is that as the sinking progresses the thickness of the seam increases, and the quality of the ore improves. At the outcrop the ore is six feet in thickness; at the face of the slope the thickness is no less than 15 feet. At the outcrop the ore runs from 49 to 52 per cent. of iron; at the face analysis gives 56 per cent. In answer to a question put to Mr. R. Chambers, the best-known iron ore explorer in the Lower Provinces, and the indefatigable, it may be said enthusiastic, superintendent of operations at Wabana for the Nova Scotia Steel Co., as to whether faults or obstructions had been met in the sinking, the writer was informed that under the sea the seam was as regular as on land, and nothing had been encountered to indicate that the seam might not continue for miles under the water. “In that event,” said Mr. Chambers, “we will have to figure the quantity of ore out in the hundreds of millions of tons, instead of the millions merely. Of course,” said Mr. Chambers, “having examined the land on the other side, and having noticed a disturbance of the mineral, we do not suppose that the ore carries to the main island, and at just what point it stops short it is for the future to decide; but I am in high hopes that there is ore here for all possible requirements for many generations.” I did not ask—my memory slipped me—why it happens that the Nova Scotia Steel Co. were driving the slope through the Dominion Iron & Steel Company's area, but I presume the sufficient reason is that where the former company's upper seam enters the water there is no, or not sufficient cover. This may be apparent from the fact that the cover at the face of the lower seam is not much over 200 feet. Bye and bye there will be sufficient cover to justify tunneling to the upper seam.

Many people imagined that until very recently it was all surface shovelling, and not mining at Wabana, and some, one almost thought gleefully, declared that the companies, from this out, would have to “mine” their ore and pay higher for it. Well, there is still much ore on the surface, but the companies wisely are reserving

it for contingencies, while they are not proceeding to win the ore by way of slopes from the "deep." As to the increased cost of mining, the writer, from observation merely, would come to the conclusion that it is infinitesimal. The cost of pumping will be almost nil, if it will be anything, as water is the scarcest commodity in Wabana. It runs off into the sea. The cost of timber will be trifling, as there will be few levels or old places to keep up. In short, there will be few extra expenses in operating toward the deep, the chief one being haulage, and as the systems employed are modern, the cost is trifling. The ore which cannot be procured by quarrying is mined in much the same manner as coal. There is, of course, no undercutting or shearing; it is blown from the solid. The system of mining is modified board and pillar. The levels and the rooms may run uniformly, the modification consists in the lack of uniformity in the size of the pillars. Some are large and others are small. After the rooms in a section have been worked out, the pillars are drawn and the place abandoned. Numerous small engines are employed underground for haulage purposes. In proportion to the number of men employed, the tonnage produced in an ore mine is much larger than in a coal mine. For instance, the total number of men employed at Wabana by the N. S. S. & C. Co. is 671, and the quantity of ore produced is fourteen hundred tons per day.

At the slope mouth there is much of the machinery to be found at a coal mine—compressors, fan, tubular boilers, etc. All the ore on coming from the mine goes through a crusher. Though about fifty per cent. is in small pieces enough, all goes through, as all has to be picked just as carefully as is coal. The ore from the crusher is discharged on a very wide rubber belt, which

carries it up at a surprisingly heavy angle. At it passes up, the ore is cleaned by pickers stationed at the sides. In the winter time the ore is put on bank, at a very small cost. Only one man is employed on the bank—the man who operates the engine which hoists up the boxes containing the ore. Self-dumping boxes are therefore employed. On the property there are two mines, Nos. 1 and 2. Overground there is an excellent system of endless haulage for conveying the ore from the mine to the pocket at the pier. A tramway from each mine runs parallel with the outcrop, the main tramway at a right angle. The boxes are of iron, and their capacity close on two tons. The tramway can readily convey two thousand tons of ore daily to the pocket, of which fourteen hundred tons come from the mine and six hundred from the bank. The engine for operating this haulage is situated at the pier. There is only one pocket, but it is large enough to contain no less a quantity than twenty-four thousand tons of ore. In the construction of this big pocket nature played no secondary part. The floor only is artificial. The sides of the high cliffs form the sides of the pocket; the face is exposed. It is of great height. A door in the floor permits the ore to fall on the conveyor, by which it is carried to the chute at the pier and emptied into the vessel. The stream of ore into a vessel's hold is continuous. In twenty-four hours it would be an easy matter to empty the pocket of its twenty-four thousand tons. But for the delay in shifting the steamer, so that each hatch may come under the chute, a six thousand ton steamer could be loaded in about three hours. Wabana is a magnificent asset of the Nova Scotia Steel Company, and like the other branches of the company's undertakings, is splendidly managed.

R. D.

CORRESPONDENCE

To the Editor THE CANADIAN MINING JOURNAL:

Sir,—I have read the leading article in your issue of Aug. 1st, entitled "Another Suggestion," with astonishment, that THE CANADIAN MINING JOURNAL, which at the special request of its publishers was constituted this spring the official organ of the Canadian Mining Institute should be guilty of insinuations, which are not only largely unwarrantable, but are likely to be injurious to the organization whose interests you are expected to conserve. One would at least suppose that any editor of a publication of standing, in a matter such as this, would be careful to make sure of his ground before making what can only be construed as a criticism of the efficiency of the Institute's officers; while in the case of an "official organ" the neglect in this respect is the more to be wondered at—leaving the question of common courtesy out of the discussion altogether. I have no doubt, sir, that your intentions were excellent; but what an awful bull in a china shop is often the well meaning person! Please, meanwhile, believe that in replying to your article I have no desire nor intention of excusing or denying sins of omission or commission which may be laid at my door. I am perfectly well aware that they are many; and any man having to follow the lead of such a one as the late Secretary, poor B. T. A. Bell, must necessarily appear at a disadvantage. But as a member of this Institute of seven years' standing—very nearly constituting me an old-timer—I do protest against the tone

of the two editorial articles, in your issues of July 15th and Aug. 1st, respectively, wherein you to all intents and purposes insinuate that except for its annual meetings the Institute is ineffective and ineffectual. If I were not the Secretary I would go for you without gloves; but the trouble is in defending the Institute against this allegation, I must necessarily appear to be defending myself, for your statement to the contrary notwithstanding, the Secretary is the one responsible official. He is expected to do rather more than just "keep a true and correct record of all the proceedings of the Institute" (not to mention the seal); and the council, composed of busy men, look to him to initiate work and practically carry on the business of the Institute, subject, of course, to their confirmation and approval. So if things don't move it is no one but the Secretary's fault. But aren't they moving, or so very slowly as you would suggest? The best day's work ever done for the mining industry of this country was the establishment of a Federal Department of Mines, for which, I submit, this Institute was chiefly responsible—and that was an affair of national, not mere provincial importance. Then there have been, in the last two years, other deputations to Ottawa in connection with other important questions affecting the welfare of the mining industry; and in each instance the Institute has been fortunate in exerting a useful influence.

You, however, cite as an example of neglect the case of the "Mines Taxation Act in the Ontario Legis-

lature last winter," and remark that "the Government emphasized forcibly the fact that nothing had been heard from the Institute until the bill had been for many months before the House." As a matter of fact, a deputation did interview the Hon. the Minister of Mines, Mr. Cochrane, on the subject of the Bill several weeks before the Annual Meeting, and I believe, too, the Toronto Branch also took action; but knowing that the Bill would not pass the House until after the Annual Meeting, it was deemed best to postpone definite action till then, in order that a protest might come from the Institute as a body. The result was we got an association of representative and disinterested men a better hearing from the Ontario Government than was accorded any other body or deputation representing Boards of Trade or individual interests, and we have Mr. Cochrane's definite assurance that he will introduce an amendment to the Act in 1908, upon a certain understanding with the Institute, and for the carrying out of which condition the Institute has already and is now taking steps.

Now, on the score of membership. It is not the policy of the Institute to go into the by-ways and hedges to secure new members; on the contrary, the standard of membership has been raised. But the growth in this respect in the past two years is distinctly gratifying and all that could be reasonably expected. Thus if you will refer to the "Report of the Council for 1906" you will note that the increase of membership last year was over 20 per cent; and this year I have every reason to expect we shall do just about as well. Not so bad surely for an organization that "without doubt needs revivifying"?

Finally, I submit for your information as the "official organ" of the Institute a few facts of which at present you appear ignorant; although the first is readily ascertainable by reference to the published accounts of the Institute for the past few years. While the by-laws state that the Secretary shall be remunerated at the discretion of the Council, this does not, as you intimate, "render his position insecure and in certain matters weaken his hands," since the salary of the Secretary is definitely fixed at a certain figure, payable monthly, which he is entitled to draw so long as he performs his duties. The provision of the by-law is an admirable one, since it affords the only means by which the actions of the Secretary may be controlled by the Council. The Secretary, moreover, is not restricted, as you would appear to believe, in the matter of travelling expenses; but he travels at the expense of the Institute whenever the occasion warrants. Thus already this year visits have been paid to various mining centres in Nova Scotia, several of those in Ontario, one in the Province of Quebec, while this month the Secretary leaves for Alberta and British Columbia, expecting to be absent six weeks on the Institute's business, including attendance at a Sectional Meeting of the Institute in the West.

I trust, sir, that these explanations will enable you to somewhat modify your views. It might possibly be an advantage if the Secretary were in a position to devote his time exclusively to the work of the Institute, although he can conscientiously say that the interests of this organization are now and always his first thought and care. Meanwhile the Institute is growing in strength and influence; it is developing with the development of the mining industry, and I am sure there are many ways by which THE CANADIAN MINING JOURNAL may aid and stimulate present progress without

giving expression to ill-considered and undeserved criticism.

Yours sincerely,

H. MORTIMER LAMB,
Secretary.

Toronto, July 22nd, 1907.

To the Editor THE CANADIAN MINING JOURNAL:

Sir,—As a shareholder in the Cobalt Lake Mining Company I desire to thank you for your vigorous, fearless and outspoken leading editorial on the Cobalt Lake embroglio in your issue of July 1st.

The answer of one of the Directors given in your issue of the 15th is, at any rate to me, entirely unsatisfactory. Whoever the Director is, it is quite apparent he is not willing frankly to take the shareholders and the public into his confidence. The pertinent question is, "What explanation can be given of this extraordinary transaction?"

It seems to me unexplainable why these trustees, such as your Director mentioned, should pay such an enormous sum of money to the Government and not secure a good title to the property, but merely a lawsuit.

When adverse claims to the property were pressed in the court, a member of the Ontario Government stated to the Legislature that the Government had not guaranteed the title of our company to Cobalt Lake. Some explanation of this should be obtained, and also as to why it was necessary to pass a Special Act, which seems to have complicated matters worse than ever.

Can the Director in question truthfully say that shareholders like myself were made aware that one hundred and forty thousand shares were distributed amongst a number of men who did no more for the company than is usual in such cases.

The large amount of money which the stock they received represents demands very important services, and I would like to know what they did for the one hundred and forty thousand shares, and why they should have received stock for nothing, or at thirty cents, when unfortunate investors had to pay eighty-five. The fortunate Directors may well afford to look with complacency and contemplate a profit from the stock obtained at our expense, but the bulk of the investors are, I think, those who, like myself, are mourning without hope of ever getting our money back. I am,

Yours truly,

A SHAREHOLDER.

To the Editor THE CANADIAN MINING JOURNAL:

Dear Sir,—I noticed in your last issue a contribution from E. Percy Brown, S.B., on Nova Scotian gold mines, in which he gives much valuable information and corrects some erroneous ideas. For this I thank him, confirming as they do, my conclusions of several years ago on deep mining in Nova Scotia. I would have been glad had the whole article been devoted to such practical points as the direction and permanence of pay streaks. Though he refers to me in somewhat flattering terms, I feel it my duty to call attention to some references to gold stealing which I consider much exaggerated. He writes, "Miners have assured me that they believe," "I have reason to believe," "I

have been told," etc., thus showing the source and value of the assertions on this subject. The statement that more gold was stolen by the miners than obtained by the owners is without doubt an exaggeration by Mr. Brown's informant, as only by taking the most of their working hours is this possible in even a good mine. And when we think of a stream of water large enough to wash the ore piles in the stopes clean enough to make the gold visible in the candle light, it conjures up visions of immense pumps and mountains of machinery. A moment's thought should convince one that water would run under the ore, and not over it, and a mucker who used his time in washing ore, instead of working, would doubtless find his place vacant ere long. The deckman who sorts the ore in broad daylight is probably the chief offender in this respect.

He says that the phrase "Miners' rights" was commonly used, and meant that the miners thought they had a right to all visible gold and the owners to the rest. Now, I have spent 35 years of my life in Nova Scotia, working in every gold district except a few, and at all branches of gold mining, and have not yet heard the expression "Miners' rights." I must therefore conclude that this idea exists only, or chiefly, in a few mines in the extreme east of the province, where my experience has been limited. Mr. Brown should know that there has been for many years a gradual weeding out of the characters referred to, the most of whom are now scattered over the continent, from Klondyke to Mexico. Nova Scotia's unexampled record, a few years ago when prohibition was an issue, as well as the low criminal record of the province, should convince the most prejudiced that its moral standing is among the highest. The census reports should also contain figures available for comparison, and I would ask Mr. Brown, as a misinformed friend, to consult them before diving into generalities. Had I not spent nearly a lifetime of experience in all possible positions among the gold miners of Nova Scotia, I would not have attempted the slightest correction of his statements. The 1,000 or so of Nova Scotian miners in Cobalt district, with a few exceptions, are set down as an honest, hard working class, well used to wet mines and other hardships, and are eagerly sought for where once tried.

But much as this crime deserves the strictest laws for its suppression, it is an old-fashioned sin, doomed to dwindle under the scientific and systematic methods of our time. These poor guilty devils know not how to pad pay rolls, get rebates on machinery ordered for their employers or make false reports on mines they are commissioned to examine. They listen in unfeigned ignorance to tales of stock watering, misuse of reserve and depreciation funds, and intricate semi-legal plans for freezing out poor partners. When the financial giants of the continent cause ruin and suicide in their struggle for cold cash, these common old-time thieves are not in it, and their feeble and dishonest efforts are rewarded with contempt by the honored manipulator who has made a million by selling stock in a worthless mine.

Nevertheless, with Mr. Brown I would welcome the advent of laws making gold stealing in the old, old way more difficult; but we hope that this is a dying sin, and probably will not survive the introduction of more legal and enlightened methods in the same line.

Now, Mr. Brown may not, and probably did not, intend to blacken as a class the characters of the many small, quiet and orderly mining communities scattered over the province, but his outspoken opinion published

in such an influential journal as yours should, in fair play, be allowed an equally outspoken defense. The moral standing of these places can be ascertained by an examination of the county criminal records. These few lines are written in defense of a class, judged by exceptions, and who (as I know) feel deeply hurt by this unjust reference to them.

With an apology for the use of valuable space, I am,

Yours truly,

W. H. PREST,
Imperial Cobalt Mine, Cobalt.

To the Editor, CANADIAN MINING JOURNAL:

Sir,—In your editorial on the Canadian Mining Institute in the last number of THE JOURNAL, you aver that this Institute is, at the present time, not occupying the important position in the life of the country which it might be expected to occupy, considering the magnitude of Canada's mining interests.

While such may possibly seem to be the case, we must recognize that the Institute has done and is still doing a great amount of good work. At the meeting in the King Edward Hotel, Toronto, last March, a number of excellent papers were read. That these papers have been very generally appreciated is evident from the fact that a large number of them have since been reproduced in some of the leading mining journals in America and England. In this way the beneficial effect of the meeting is certainly being diffused throughout the whole mining population of the Dominion, perhaps more effectively than could be done by any other means, and many of the papers would probably never have been written but for the incentive offered by a gathering of sympathetic men who could be depended upon to appreciate the work of the writers.

Since the date of this meeting there is good reason for a period of quiescence, for in Canada the summer season must of necessity be the time when the busy mining engineers have the least leisure that their disposal to devote to the preparation of papers and plans descriptive and illustrative of the work that they may have been doing, or to the careful elaboration and logical deduction of general principles derived from their experiences.

The vitality of a society or institute depends largely on the opportunities which it affords for the comparison of notes and observations, and winter, rather than summer, is the season when these comparisons can most easily be made. It is also noticeable, too, that in years of special activity in mining the mining men have less time and thought to give to the general culture and elevation of their profession than in years of greater quietude.

In a country so extensive as Canada, it would seem to be quite impossible to get mining men together more than once a year, but at the annual meeting something more might be done to encourage acquaintance and good-fellowship among the members so collected together. An album might be formed each year with the photographs of all the members attending, or numbered buttons might be given out, as in many American societies, and printed or typewritten slips distributed which would give the names of the members opposite their respective numbers. Some such plan would be very useful in assisting in friendly intercourse.

Members living in Montreal doubtless derive great benefit from the library and rooms on Dorchester street

in that city. It is impossible that these rooms should be of very general interest to most of the members, scattered as they are from the Atlantic to Pacific, but the Institute must have some established home, and members living in other cities, such as Toronto, would be greatly benefited by the formation of local clubs, where opportunities for mutual intercourse and improvement would be afforded. I would suggest that the necessary steps be taken at once for the formation of such a club in this city.

The question raised by you of the amalgamation of the two offices of secretary and treasurer in one, and of the emoluments to be paid to one or both of these officers, hardly comes within the bounds of general discussion and might well be allowed to stand over until the next annual meeting of the Canadian Mining Institute.

Yours truly,

J. B. TYRRELL.

Toronto, August 8th, 1907.

EXCHANGES

The British Columbia Mining Record, June, notes the payment of dividends by five mining companies in British Columbia. *The Record* contains a very large amount of interesting information concerning the Province.

The *Journal* of the Franklin Institute, July, has a paper, interesting from both historical and technical points of view, on the Schuyler mine. The copper deposit was discovered by a negro slave in 1715, near Kingsland, new Jersey. Old records mention a shipment of ore in April, 1721, to Holland.

The *Proceedings* of the Cleveland Institution of Engineers, for March, is devoted entirely to a paper written by Mr. Robert Buchanan on "Principles and Practice of Foundry Work." In a section on liquid and solid contraction, the writer reaches the conclusion that both depend almost wholly upon the quantity of carbon which takes the graphitic form.

The South African Mines, Commerce and Industries, June 22nd, speaks of the Rand's poor return to investors. "After deducting from the dividends the amount of £3,728,363 due on amortisation account, there remains the sum of £1,837,609 as interest in the investment. This represents a small fraction over 3 per cent., and is totally inadequate as a mining return."

Ralph Stokes writes of "Mining in the Boundary Copper Field" in *The Mining World* of August 3rd. "There are different types of ore in the district, but infinitely the most important is that marked by the presence of magnetite, in association with chalcopyrite, pyrite and specular iron." In the same number Matt. W. Alderson begins a series of articles on "Practical Points for Prospectors."

"The Chemistry of the Iron Blast Furnace," by Bradley Strughton, a resume of the reactions which take place in reducing iron ore to pig iron, appears in *The Engineering and Mining Journal*, August 3rd. This article is an excellent example of condensation and clarity. Its acceptability accentuates the need, mentioned before in these columns, of a thoroughly complete and up-to-date text-book on the blast furnace.

"Coal and Wages" is the title of a leading editorial in *The Iron and Coal Trades Review* of July 26th. Pointing out the fact that the increase of the demand for British coals and their consequent jump in price may be but temporary conditions, superinduced by a growth in German domestic consumption and the conse-

quent failure of Germany to supply its neighbors' demands, *The Review* deprecates the demand of the miners for a further increase of wages.

The Colliery Guardian, July 26th, in an editorial on the annual report of His Majesty's Inspectors of Explosives, alludes to the absolutely reckless disregard shown by miners for the precautions as to thawing nitroglycerine. Note is made of the influence of traces of mercuric chloride upon the official heat test, and the conclusion is drawn that to the lack of chemical stability due to carelessness in manufacture many hitherto unexplained accidents may be attributable.

Mines and Minerals, July, presents a leading article on the "Lead-Silver Deposits of Mowry, Ariz." The caving system of mining is used at the Mowry, and 80 per cent. of the ore is won without timbering. One disadvantage is that only one level can be stoped at a time. "The Panel Retreating System" for mining thin seams of anthracite is the subject of another article. A comparison of costs shows that this system can be used at a cost of little more than a third of that of the pillar-and-chamber system.

A valuable and interesting paper, "The Systematic Treatment of Metalliferous Waste," by L. Parry, A.R.S.M., is given in *The Mining Journal* of August 6. Mr. Parry states that so far as he is aware there is no works in existence which treat any and every kind of metallic by-product and waste. There are establishments where certain special classes of waste are treated. But there is much waste of a very complex character, which, because of the lack of facilities for treating it, has a commercial value far below its intrinsic value. Mr. Parry then develops his scheme of treatment. Further articles are to follow. These should be of interest to smelters of Cobalt ores.

In *The Engineering Magazine* for August appears a well-illustrated article on "Copper Smelting Practice in the Boundary District, British Columbia," by Frederic Keffer, president of the Canadian Mining Institute. In describing the Boundary copper ores, Mr. Keffer states that they display a wide range in composition. Neutral ores, however, predominate, and neutral mixtures of divergent ores may be had without the addition of barren flux. As most of the Boundary ores contain lime as crystallized calcite, they break up readily in the furnace and thus obviate the necessity of crushing finer than 4 inch to 6 inch diameter. The Boundary ores run from 1 to 3 per cent. in copper, the average being about 1 1-2 per cent. They also carry from \$1 to \$3 per ton in gold and silver.

The editor of *The Mining and Scientific Press* concludes, in the July 20th number of that journal, his notes on "Guanajuato. For sheer readability, conjoined with technical interest, these editorial articles are unique. The last paragraph is musical: "But beyond the mental imprints that it has been my endeavor to transfer to the pages devoted to this account of a journey in the southern land, I brought other memories and experiences, which were never developed; they remain blurred, and to none but myself have they a meaning. I have recollections of multi-colored facades; of sunlit walls, and cool patios, the sound of bells, and the crackling of whips . . . a stream of chocolate-colored humanity, a politeness that gave dignity to the commonplace, a squalor that soiled romance, and a sunshine that glorified everything." Mr. Rickard's letters should assuredly be collected and published in book form. They are worthy of a permanent place in technical literature.

PERSONAL AND GENERAL

Mr. J. Burley Smith, of Montreal, sailed for England on July 20th.

A mining recorder's office has been opened at Larder, in charge of Mr. J. A. Hough.

Professor Woodman, of Dalhousie University, has been rusticated for a long time at No. 6 colliery.

Dr. James Bonar, of Ottawa, has been appointed deputy master of the Royal Mint at the Capital.

Mr. C. E. Star is acting as temporary general manager of the Letete Gold Copper Company, at Letete, N.B.

Messrs. Simonds & Burns, mining engineers of New York, recently opened an office at Haileybury, Ont.

Dr. S. Petersky has been appointed medical superintendent of the Miners' Union Hospital at Sandon, B.C.

Mr. Hugh Fletcher, of the Geological Survey, has been registered at the Glace Bay Hotel for the past few weeks.

Mr. F. C. Laird, manager of the Willow River Mines, Cariboo, B.C., has returned to Barkerville from a visit to the East.

Dr. H. S. Poole has returned to Halifax from a visit to the south of England, where he spent six months in geological research.

We regret to learn that Mr. G. Herrick Duggan, general manager of the Dominion Coal Company, is suffering from a severe attack of tonsillitis.

Dr. Frank D. Adams left for London last week to attend a meeting of the Royal Society, of which he was recently elected a Fellow.

Mr. Thos. Mills has resigned the mine management of the Western Fuel Company's No. 1 and Protection Island collieries at Nanaimo, B.C.

Mr. W. A. Aldridge is again visiting the East on the Consolidated Mining & Smelting Company's business, and expects to remain some weeks.

Mr. Chas. Rundberg, formerly of Salt Lake City, Utah, has been appointed superintendent of the Dominion Copper Company's mines at Phoenix, B.C.

The engagement is announced of Miss Florence Mary Fenwick, of Kingston, Ont., to Mr. DeLorme Donaldson Cairnes, M.Sc., of the staff of the Geological Survey of Canada.

Mr. P. Davison Ahier has been appointed superintendent of the Cariboo-McKinney mine, at Camp McKinney, B.C. This property is now being operated under lease.

Mr. A. J. MacMillan, managing director of the Le Roi Mining Company, Rossland, B.C., returned to British Columbia at the end of July from a visit to England on the company's business.

Mr. J. W. Astley, formerly manager of the Le Roi mine at Rossland, has decided to make Victoria his permanent headquarters, and has opened an office there as a consulting engineer.

The Hon. Robert Drummond is at present on a well-deserved holiday on the other side. He is visiting the Scottish Lowlands and seeing England, in addition to a short trip to the continent.

Col. John Weir, one of the principal members of the original syndicate who purchased the Mother Lode mine in the Boundary district, which was subsequently acquired by the British Columbia Copper Company, has resigned from the board of that company, and is succeeded by Mr. A. N. Brady, of New York.

Mr. W. C. Mitchell, of Chesterfield, England, has been appointed superintendent of the Dominion Iron & Steel Company, Sydney, C.B., in succession to Mr. C. H. MacMillan, who recently resigned.

Mr. W. Morley, of Sydney, has been elected president. Mr. W. F. Jennison vice-president, and Mr. A. N. MacLennan secretary-treasurer of the Cape Breton Prospecting, Mining & Development Company.

David Noble, B.Sc., a graduate of the Kingston School of Mining, was drowned in the Kootenay River on August, 4th. Mr. Noble was employed in the chemical department of the Consolidated Company at Trail.

Mr. J. H. McDonald, general superintendent of the West Kootenay Power & Light Company, reports that the company's new power building at Bonnington is now completed and the two units of 8,000 horse-power satisfactorily installed.

Mr. J. B. Hobson, the manager of the Guggenheim syndicate's hydraulic mine at Bullion, B.C., is on his way to New York to interview his principals. Mr. Hobson has refused to give the press any explanation for the suspension of operations at the mine.

Mr. W. Fleet Robertson, the Provincial Mineralogist of British Columbia, who has recently inspected the Nicola, Similkameen and other districts in Southern Yale, reports a strong revival of interest in mining in the Province. The Department is now receiving a very large number of letters of enquiry from prospective investors.

It is stated that a great deal of American capital is now being invested in copper mines in the Whitehorse district, Y.T. A number of properties have been recently examined by Mr. W. Thomas, formerly consulting engineer of the British Columbia Copper Company, and said to be at present representing the Standard Oil Company.

Mr. Hiram E. Donkin, C.E., has been appointed to the position of Deputy Commissioner of Public Works and Inspector of Mines for the Province of Nova Scotia. Mr. R. D. Anderson, of Glace Bay, will probably be appointed Mr. Donkin's assistant. Mr. Donkin has been fitted for his new duties by long experience in railway construction and mining in Nova Scotia.

Mr. J. C. Haas, one of the pioneer engineers of the Boundary district, but now practicing as a consulting engineer at Spokane, Wash, has gone north to examine a copper property at Bella Coola. In an interview Mr. Haas expressed the view that there was at present an inclination among capitalists in the United States to engage in mining undertakings in British Columbia, and he anticipated a revival of interest and activity in the Province's most important industry.

Mr. George Blake Walker is at present visiting the mines of the Dominion Coal Company. It will be remembered that, in conjunction with Mr. Emerson Bainbridge, he inspected the properties of the Coal Company in the summer of 1904, and again in 1905. Mr. Walker is recognized as eminent in his profession over in England, where he has always been known as a most progressive mining man. He has always taken a great interest in life-saving apparatus, and it was very largely owing to his exertions that the first Joint Rescue Station was erected at Tankersley, in the South Yorkshire coal field, and his name appears under the report of the South Yorkshire Coal Owners' Association on this matter in the first report of the Royal Commission on Mines, just published by the English Home Office.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Springhill.—In June of this year the employees of the Cumberland Railway Coal Co. made application to the Government for a Board of Arbitration and Investigation to investigate the causes of dispute between themselves and the Company. The Board, after patiently hearing the evidence pro and con, gave one, the most important case, against the Company. The other, or "local stone" question, against the men. The men, or a few at least, were dissatisfied with the finding of the Board. A further advance on current rates was demanded. It was promptly refused, as they must have known it would be. The men promptly applied for a further reference to the Board, which the Government granted. Meantime the lodge of the P. W. Association in connection with the collieries notified the management that unless they conceded that which the Board withheld they would strike on the first day of August. The second board was composed of R. B. Murray, representing the workmen, and E. C. Archibald for the Company, with Judge Patterson, an appointee of the Government. The two representatives failed to agree in choosing the third man, so the aid of the Government as per Disputes Act, was invoked, and the Judge was appointed chairman. The Judge called the court to order and the workmen's side of the case was heard, and all evidence taken. The court then adjourned till next day (Aug. 1). August first the strike was on. The Board met as per adjournment, but the Judge, whose dignity forbade participation in a farce, promptly dismissed the Board on finding the men were on strike. It is a very unfortunate situation. The Company has at last taken the stand long expected. The prevailing average wage where the demand for advance was made, is \$3.41 per day of ostensibly eight hours, but which is really earned in six hours. The Company thoroughly understand the conditions and will unquestionably concede nothing in the way of advance. The men have lost public sympathy through ignoring or repudiating the finding of the Board, formed on their own application. The situation is a most serious one for Springhill and its people.

Springhill mines were never in better or safer condition. The output from the collieries had attained normal condition and was steadily increasing, after the winter's experience of gob heating in No. 3 mine. This latter condition was overcome and the section cooled. The full force of men was again at work and doing well.

Springhill is a town with but one industry.

W. D. M.

Glace Bay, August 1st, 1907.

Dr. Ami, of the Geological Survey, is down here from Ottawa, and he is exciting much astonishment to the lay mind by his avidity for fossil remains. He says that the Glace Bay coal field is surprisingly rich in paleontological fauna and flora, and that in particular its wealth of animal remains is such as to rejoice the eyes and glad the heart of a paleontological geologist.

It is, of course, a well-known fact that the measures of the Cape Breton coal field afford a numerous variety of fossil impressions, but since Mr. Brown wrote his classical work on the coalfields of Cape Breton, we are not aware that any extensive collection or classification has been attempted. This is, of course, entirely apart from the routine work of the Geological Survey. Dr. Ami deplors the fact that there is no museum in Cape Breton, and from the way he is amassing specimens there may presently be need for one. The firm impressions to be found above the Emery Seam are perhaps not to be excelled in any coalfield, while the ripple marks, footprints and raindrops to be found in the finely laminated sandstones

running through the cliffs along the seaboard from Point Aconi to Mira Bay, have often been referred to in standard works on paleontology.

Apropos of this matter it may be mentioned that the English Institution of Mining Engineers is attempting to solve the long-debated problem of the correlation of the thick coal of Staffordshire with the coal seams of Lancashire and Yorkshire on either side of the Pennines by means of fossil "mussel beds" which have been found in this region to be very persistent in their distribution. The members of the Institution have been requested to send in specimens of fossil shells with particulars of their exact origin, and definite results tending to the more exact correlation of the now disputed measures are confidently hoped for. There can be no doubt that extended investigations of this nature in Cape Breton coalfields would yield valuable results.

We rather think Dr. Ami will need a box car to convey his specimens to Ottawa.

Glace Bay, August 1st, 1907.

It is reported on excellent authority, but as yet unofficially, that Mr. Hiram Donkin, at present the Chief Engineer of the Dominion Coal Company, has been appointed Deputy Commissioner of Public Works and Mines in Nova Scotia. It is understood that Mr. Donkin's duties will also include the supervision of roads and railways in the Province.

Mr. Donkin's connection with the Dominion Coal Company dates from 1893. From 1896 to 1901 he was the Resident Manager, and resigned his position when the Steel Company assumed the properties of the Coal Company under the lease which was afterwards cancelled. Mr. Donkin has held his present position since 1904.

The appointment has given much satisfaction in Cape Breton, where Mr. Donkin is deservedly popular, and it is generally conceded that he is a most suitable person for the post. His previous experience particularly fits him for the work of the Deputy Commissioner of Mines, and his sterling integrity ensures the careful safeguarding of the mineral interests of the Province, while his technical attainments are undoubted.

Mr. Donkin has given a good deal of his time to the advancement of the cause of technical education in Nova Scotia, particularly in the mining districts, and his labors in this direction were recognized when he was made a Master of Engineering of King's College. The status of technical education throughout Nova Scotia is such that the appointment of Mr. Donkin to this position will meet with the hearty approval of all the friends of this woefully neglected, but most important matter.

Altogether the appointment is regarded down here as a most happy one, and we congratulate the powers that be on their choice.

We understand that Mr. Donkin will commence his duties in Halifax on the 15th of August.

Glace Bay, 2nd August, 1907.

Work at the mines around Glace Bay has gone on without any serious interruption during the month of July, but the output is not by any means so large as required. This is altogether due to men staying off work, as there is really no scarcity of labor around the mines. The only trouble is the number of holidays taken by the men during the summer weather, and after pay day. The organization and equipment of the Dominion Coal Company's mines could easily have raised 360,000 tons for the month of July, but as a matter of fact they only hoisted 312,000 tons.

Work at the Hub Mine has gone on rapidly, and the management expect to raise coal by the end of this month. The water has been lowered to within 300 feet of the first level of the submarine workings, and as the volume of water is now much less it is being lowered more quickly. The head frame and bankhead is complete and the machinery is all in place. The pulleys will be hoisted this week.

The Drager life saving equipment has now all arrived, and the work of erecting the Rescue Station is being pushed. The equipment comprises ten helmet and ten mouth breathing apparatus, pneumatic smoke goggles, nose clips, oxygen refill pump, over two thousand potash cartridges, testing apparatus for CO₂, and about 1,500 feet of oxygen. The Company are arranging for the services of a competent instructor from the other side, and their Rescue Corps will presently be an accomplished fact. This innovation will cost the Coal Company between \$5,000 and \$6,000 for initial outlay, and the expenses of training and providing refills will not be inconsiderable. They will have the best Rescue Station outside of Germany, and although we fervently hope the occasion for its practical use will not arise, if ever it should the apparatus will prove of inestimable benefit, and will more than justify the expenditure. The citizens of Glace Bay will be able to boast that they have the only properly equipped Rescue Station on this side of the Atlantic. They do claim at present on picture postcards, that are printed, by the way, in Italy, that No. 2 is the "largest coal colliery" in the world.

This latest addition to the Coal Company's equipment is in line with their general policy during the past five years, a policy that is making their mines safer for the workmen every day. The abolition of the use of black powder, the introduction of "company shotfirers," in place of the pernicious system that formerly prevailed, the provision of the Ackroyd & Best electric relighting safety lamp, the attempts to introduce a safety explosive wherever possible, are a few of the things that might be named in this connection. None of these innovations but add to the general cost of mining, yet we venture to say the Company's policy is in line with all that is progressive in coal mining, and is justified and more than justified on the grounds of conservation of property and human life.

"Coal v. Steel" is about the sole topic of conversation in this neighborhood. Perhaps the only people who will benefit from the legal fraternity and the "fourth estate." Public opinion on the matter varies as the locality. Glace Bay is for Coal and Sydney for Steel. Perhaps never before has there been such an infliction of expert opinion on the newspaper readers of Cape Breton, and the old chestnut as to the three grades of liars is being trotted out afresh at every opportunity. No doubt by the time the Courts have decided the question the Caledonia workings will be drawing air from No. 6 Mine, and the surveyors will be wondering whether they have left sufficient coal in their barriers against No. 6 workings. All other matters in connection with this trial are sub judice and are better left alone—but No. 6 Mine not on the Phalen Seam? Ask a man from Schooner Pond and watch him smile! They have very fixed ideas at Schooner Pond.

QUEBEC.

Mr. A. O. Norton, Coaticook, Que., is preparing to develop the Suffield Mine at Suffield, Que., of which he is the proprietor, on a larger scale than has been hitherto done. Machinery to the value of \$20,000, including a new boiler, air compressor, and hoisting plant, has been purchased and is now being installed.

The Suffield is one of the numerous copper properties that were opened in the vicinity of Sherbrooke over forty years ago and that were subsequently closed during the long interval of low priced copper. It has long been known to contain a large body of ore generally estimated at 3 p.c. copper. But during the past year Mr. Norton has developed a large amount of ore of a higher grade said to average nearly 7 p.c.

No smelting facilities have as yet been provided. The mining work is under the direction of Capt. Wm. Jenkins.

ONTARIO.

Montreal River, July 22nd.—It was in the middle of last winter that the rush into the new Montreal River silver district began. From January on, the prospectors tramped up the Montreal River on snowshoes from Latchford, and overland from New Liskeard, to stake claims. Most of the claims in the district are "snowshoe staked," the object in most cases being to stake and record a claim and then sell it at a moderate price to some man with capital, who would prospect it in the spring. This involves, in ninety-nine out of one hundred instance, perjury in recording the claim, when one has to swear to the discovery of valuable mineral in place; but perhaps the law is defective on this point and there may be some excuse for the false oath under the circumstances. This seems to be the attitude of the government, as no action for perjury has been instituted even in the most evident and indisputable cases.

The district is swarming with prospectors at present, and on claims where valuable discoveries have been made, and in the vicinity of these claims, considerable stripping and blasting is being done.

Silver has been found, so far, in two places, at White's, about 7 miles north-west of Lady Evelyn Lake; and in the township of James and the adjoining township of Smyth, about 25 miles north of the former. At White's, which Prof. W. G. Miller visited last spring, the vein shows at one place a width of about three inches of native silver. There is an equally good, or perhaps, a better showing on Downey and Darragh's claim in James. In Smyth there are several veins showing an inch or so of native silver. In some of these veins in Smyth, the silver is in a crystallized form, having a beautiful arborescent or branching structure. The usual occurrence, so far as noted, is in nuggets, in wires forming a sort of filigree effect, or in flakes scattered through the gangue. The gangue minerals are calcite, quartz and barite. In some veins calcite and quartz occur together. In one place there has been found quartz with cavities from which have been weathered out crystals of calcite.

The veins in the Montreal River district, so far as they have been explored up to the present, show a marked difference from most of those found in Cobalt. The Cobalt veins have some degree of uniformity in their width and in their silver values, whereas the veins in the new district are extremely erratic in these respects. A light crack will develop into a vein of considerable width in a short distance, and a vein which in one place carries no silver, or almost none, will a few feet off be what is ordinarily called "solid silver." Keeping these facts in view, it will be seen that the value of the veins is extremely problematical. If the pockets containing silver are large enough and frequent enough, the properties will no doubt prove very valuable. There has not been enough development work done so far to determine anything as to this point.

The predominating rocks in the new silver area, so far as examined, are the Lower Huronian quartzite, and diabase. There is also Laurentian granite and a little Keewatin. The granite areas are, of course, rough. The quartzite areas are

level, the few hills in them being usually diabase. These hills seem to be the remainder of a huge sheet of diabase which at one time covered the country. Dykes of diabase are also common. It is in the diabase that all the silver has been found. There are limited areas of conglomerate, also, but unlike the conglomerate of the Cobalt district, no mineral has been discovered in it yet.

Last spring the government created the Montreal River special inspection district, which includes the new silver area. In this field, as at Cobalt, every claim must be examined and passed by an inspector before a patent for the mining rights is granted. This is meant to prevent the blanketing of claims (which occurred at first in Cobalt) and seems to work in a satisfactory way. There are now eight inspectors at work in the district. This system tends to hasten the development of the country, since the owners, or rather those who hope to be owners, of claims on which there has not been enough discovered to pass inspection, work hard to find something before the inspector comes round. The inspectors in their decisions give the real prospector, the man who wants to work, every possible chance.

There is now a line of boats, steam and gasoline, running from Latchford to Bear Creek in James Township, 40 miles up the Montreal River. At Bear Creek a post office has recently been established—Elk Lake P. O.—and there are stores and restaurants there and at other points along the line. There is quite a settlement already at Bear Creek, and it looks as if it were going to be the future town of the district.

ALBERTA.

COLEMAN, ALTA.

At Frank, Alberta, the zinc smelter of the Canadian Metal Company lies idle. The plant is extensive, entirely up-to-date, and represents an enormous investment. It is the only smelter of its kind in Canada and has a capacity sufficient to supply the home market. No sooner was it in working order than the American Government placed a tax of $1\frac{1}{2}$ cents a pound on spelter, thus shutting off the market of the Western States to the Canadian enterprise. At the same time the American producers retain the Canadian market, which is mostly in the Eastern Provinces, since they have no duty to pay on spelter coming into Canada and have the advantage of $\frac{1}{2}$ cent a pound in freight over their far-western competitor. As a result, zinc ore, which must be taken out with the lead in the British Columbia mines, is thrown on the dump. This is regrettable because the capital invested in lead mining might have an additional return from zinc and because the capital invested in the Frank Smelter has no return at all. Moreover the profitable production of spelter has proven to be more hazardous than the smelting of most other ores, and the initial attempt at Frank, so far removed from any similar plant, thus compelling the managers to educate their experts from recruits, called for all the safeguards Canada could lend to it. The sensible solution would be to tax spelter. If the Dominion Government wished further to encourage the industry, they might bonus spelter for a few years, as they do steel. The miner needs no bonus for extracting an ore which he mines now for nothing, since he would be benefitted sufficiently by having a market for his ore. Here is work for the Alberta, British Columbia and Dominion Governments. Meanwhile the Canadian consumer is paying to the American Trust \$5.90 for zinc that is quoted in London at \$5.18, because the Americans can uphold the price while they have the market on which to dump their surplus product.

Car Shortage.—Many of the Coal Mines along the Crow's Nest Railway are suffering for want of cars. They either have no place to store coal or cannot afford to handle it a second time. The companies that also make coke are further handicapped by not being able to get out enough slack for their ovens since they have no place for the screened coal. This again threatens the smelters up the line that are waiting for coke. Apart from this the operators, who install costly plants, calculate on working their full capacity, depending on daily profits to offset the wear and tear of machinery, mine repairs and wages of a permanent office and engineer force, not to mention a return on their investment. In these days, too, miners are scarce and operators cannot hold their men when steady work attracts them elsewhere. Thus one operator gains prestige in the market at the expense of a less fortunate competitor. Last, but not least, the miners lose "shifts," which are needed for bread and butter.

Strathcona, Alberta.—At Strathcona, Alberta, the Clark Dredging Co., of Chicago, manufacturers of the Clark Hydraulic Dredge, are installing a plant for the Northern Dredging Co. The latter has a concession from the Dominion Government for fifteen miles of territory along the Saskatchewan River. The ground was tested last fall for gold and platinum. The Clark Dredge is a combination between the bucket and suction dredges. It digs the gravel and the suction elevates it. The plant will be in operation in two weeks.

GENERAL MINING NEWS

NOVA SCOTIA.

Sydney.—The transfer of the Port Morien coal areas to the North Atlantic Collieries Company has been completed. The erection of houses will be started. The Government dredge is deepening the harbor.

The action of James T. Burchell against the Dominion Coal Company is reported to have been settled out of court. The amount involved was \$116,200, and the litigation arose over certain coal areas at Point Aconi.

Mr. F. W. Harbard, the English authority on the metallurgy of steel, is one of the witnesses called by the Dominion Iron and Steel Company in its suit against the Dominion Coal Company.

At Catalone near Louisburg, C.B., an asbestos mine is being opened. American capital is in control.

Londonderry.—It is reported that the Londonderry Iron and Mining Company is to erect a car-wheel foundry on its property at Londonderry. Here they will use the pig-iron from their own blast furnace and will supply car-wheels to the Silliker Car Works, a new concern being started in Halifax.

Chignecto.—On August 1st the Maritime Coal Railway and Power Company put in operation their Chignecto power plant, the only plant on the American continent where power is generated at the pit-mouth for distribution. The machinery includes a 800 h.p. Robb-Armstrong engine, and an alternating generator of 100 kilowatt capacity, manufactured by the Canadian Westinghouse. During the opening ceremonies, a telegram of congratulation was received from Thomas Edison, whose father, by the way, lived for some time in Nova Scotia.

Springhill, July 31.—Thirteen hundred employees of the Cumberland Coal and Railway Company quit work this evening. The men resented deeply the finding of the Conciliation Board, appointed under the provisions of the Lemieux Act, as regards "local stone." The Board, composed of Jus-

tice Patterson, chairman, P. S. Archibald, representative of the Company, and R. B. Murray, representative of the men, is continuing its sessions.

ONTARIO.

Cobalt.—The Coniagas is the leading shipper for the first six months of 1907. 1,448 tons is its record for that period. The shipments from the Nipissing were 1,269 tons and the O'Brien 1,144 tons. For the three months ending June 30th, the O'Brien paid \$145,000 as royalty to the Government. The royalty is set at 25 p.c. of the value of the ore at the shaft head.

The Rand-Jenckes Company on August 1st had eight cars of machinery under order and waiting to be unloaded at Cobalt station. To the Nipissing, two 125 h.p. boilers were consigned; Nova Scotia, the same; Rochester, the first half of a 12 drill compressor. The Big Ben mine in Bucke has an order for the first half of a 12-drill compressor, 80 horsepower boiler, drills and hoist.

The Western Federation is attempting to organize the T. & N. O. employees, with the avowed object of suspending traffic by declaring a strike. It is high time that the Government intervened.

Alexander McIsaac, a native of Dartmouth, N.S., slipped and fell down the shaft of the Temiscaming and Hudson Bay Mine on August 3rd. Death was instantaneous.

It is estimated that on the Tretheway dump alone, over \$175,000 of low grade ore is available for concentration.

Kenora.—The Bully Boy gold mine is to be re-opened. The shaft is now down 215 feet. About 200 feet of drifting has been done.

Port Arthur.—The Atikokan Iron Company's blast furnace was blown in on July 1th. The promoters of this new venture are Messrs. MacKenzie and Mann associated with whom are certain Duluth and Chicago gentlemen. The Company controls the Atikokan Iron Mines, 100 miles west of Port Arthur on the Canadian Northern Railway. In addition to the furnace and coke ovens a large roaster has been erected, and put in operation. The ore is a magnetite carrying over 1 per cent. of sulphur. Besides eliminating the sulphur the roasting renders the ore much more amenable to further treatment. The ore is transported to the plant in 35-ton cars. It is dumped into pockets and hoisted to the top of the roaster. The fuel in roasting is the waste gas from the furnace. The blast-furnace has a capacity of 100-tons of pig iron per day. Coke is supplied by 100 beehive coke ovens. The capital expenditure involved in the erection of this plant reached the sum of \$1,300,000. Three quarters of a mile of elevated track and three miles of other track have been laid around the plant. The major part of the pig-iron output has already been contracted for by the Canada Foundry Company.

The old Beaver silver mine will be unwatered as soon as possible. Machinery is being sent by rail to Silver Creek, thence by road to the mine. The Beaver was closed 16 years ago. There are buildings on the property.

BRITISH COLUMBIA.

Fernie.—An upheaval of the floor and an outbreak of gas in Room No. 11, No. 2 Mine, Coal Creek, one of the Crow's Nest Pass Mines, resulted in the death of an employee, Robert Bell.

W. C. Thomas, manager of the Dominion Copper Co., has had plans drawn for a two stand converter plant for the smelter. At present the matte from Boundary Falls is being

blown to blister copper by the converters of the B. C. Copper Co.

Ten stamps are now dropping steadily at the Cariboo-McKinney. In all likelihood ten stamps more will be put into commission in the near future.

The Diamond-Texas shaft is down 150 feet in quartzite.

At the Strathmore Mine, Greenwood, the shaft has been sunk to 150 feet. A 10-horse power electric hoist forms part of the equipment.

The Consolidated Mining and Smelting Company of Canada, Ltd., has secured control of the properties of the Phoenix Amalgamated Copper Mines, Ltd., by purchase and has also secured options on a number of other mineral claims near Phoenix. The Phoenix Amalgamated group consists of eleven claims, chief of which are those of the old War Eagle, operated seven years ago by the War Eagle Copper-Gold Mining Company. These claims adjoin the Granby group in the south. A 20-drill air compressor is to be installed on the War Eagle at once and men and supplies are being hurried to the mine.

The Granby Consolidated Company is contemplating increasing its smelter capacity from 3,000 to 4,000 tons per day.

Slocan.—The Hewitt mine, near Silverton, Slocan Lake, has been sold to New York parties. The price is reported to be about \$200,000. Discovered in 1892, the Hewitt was worked during 1900-1903. Since January 1904 it has shipped 1,000 tons of ore.

The drift on the 200-foot level of the Krao has been continued and the size of the ore body is reported constant.

The Payne, it is reported, has been reorganized with a capital of \$500,000.

Phoenix.—All three of the B. C. Copper Co's. large furnaces are in operation. An ore tonnage of nearly 2,000 tons daily is being smelted. This implies a monthly copper production of nearly 1,500,000 pounds.

Boundary.—Both the B. C. Copper Company and the Dominion Copper Company have made contracts with the Intercolonial Coal and Coke Company for coke supplies for their smelters.

The large crusher for the Granby's Gold Drop mine was shipped from Sherbrooke, Que., on August 1st. Ground has been broken for installation of the crusher and ore bins.

Alberta.—The International Coal & Coke Company has closed a contract with the C. P. R. for its entire coal output. A daily output of about 2,500 will soon be reached.

There are one hundred and thirty coal mines in Alberta. Seventy of these are producers, their output ranging from 5 to 500 tons per day. Nearly every mine in Southern Alberta is working a eight-hour day, many of them "bank to bank." The large Thorinville mine, in northern Alberta, although not a union mine, works an eight-hour day.

GREAT BRITAIN.

The first meeting of the Governing Body of the Imperial College of Science and Technology, was held in London in July. Lord Crewe was unanimously elected Chairman, and on taking the chair was handed by the President of the Board of Education, the Rt. Hon. R. McKenna, the Letters Patent containing the Grant of the Charter of the Imperial College.

In the House of Commons the other day the Home Secretary, Mr. Gladstone, said that he had come to the conclusion that there should be a distinct mines branch in the Home Office. It appeared to him that this was necessary, but the question was so intimately concerned with the organ-

ization and strength of the mines inspectorate throughout the country that he thought best to wait for the deliberate opinion of the Commission before anything was done.

In the recently issued report under the Explosives Act it appears that the number of accidents by fire or explosion in British coal mines last year was 379, which is considerably above the average of the last ten years. The greatest number of accidents were due to sparks, flame, etc., while next in order were accidents from ramming or stemming the charge, and striking unexploded charges in the removal of debris.

YUKON.

The Yukon Smelting and Power Company are planning the erection of a smelter and electrical power plant at White Horse. As the haul to the railway is now \$4 per ton and railway and steamer freightage and smelter charges \$7 per ton, when copper ore is sent to the Coast smelters, the new concern will keep a great deal of money in the district. The Puebla and Arctic Chief mines have many thousand tons of ore in sight. The Grafton and Arctic Chief are producing about 50 tons of ore per day.

FRANCE.

It is estimated that the new 8-hour law applicable to coal mines will cause a considerable reduction in the production of coal, and necessitate the provision of 16,000 additional miners to make up for this deficiency in the output.

SPAIN.

General interest has been aroused by the report of the existence of large deposits of iron and copper ore in Galicia, to which representatives from various syndicates both British and of other nationalities are now flocking.

INDIA.

The coal production of India (chiefly Bengal) for the year 1906 is estimated in the Administration Report on the Railways in India to have been 9,261,714 tons, or an increase of about 800,000 tons over the output for 1905. Of this, the Indian railways consumed 2,878,281 tons.

SOUTH AFRICA.

The gold production for May was 524,477 oz. valued at £2,227,838. The average value per ton milled was as follows: Rand, 33.68s.; Outside, 36.10s.; Transvaal, 33.76s.

Recent cablegrams state that there is at present a want of cohesion among the strikers, and other signs indicate that the strikers are anxious to terminate the struggle. There have been one or two outrages of late including the dynamiting of a house in Johannesburg, by which three persons were killed and several injured.

The Government of the Transvaal proposes to introduce legislation in line with the New Zealand Compulsory Arbitration Act, and commenting thereon the London Mining Journal remarks that in the light of the experience of the last two or three years such an addition to the statute law of the Transvaal can hardly be regarded as a measure of progress; and adds: "The institution of these obligatory courts of arbitration have not been able to prevent workmen from striking or compel them to return to work after an award has been given." At least recent attempts in Canada in the direction of Government interference in labor differences have not been attended with notable success.

UNITED STATES.

The output of pig-iron for the first half of the current year is estimated at 13,500,000.

The coal fields at Batan in the Phillipines are described in a report recently issued by the Mining Bureau. Both lignites and bituminous coals have been mined and are of good steaming quality. It is estimated that in one square mile investigated there are 15,360,000 tons of workable coal.

The American Census Bureau at Washington has issued a final report on the iron and steel industry of the United States, from which the following figures are taken: In 1890, the number of establishments was 719; in 1905 this had decreased to 606, but the capital invested had increased from \$414,014,844 to \$948,689,840; the salaries paid had more than trebled, the number of wage earners doubled, while production increased from 16,264,478 tons in 1890 to 34,844,933 tons in 1905.

A correspondent of "The Mining World" (Chicago) gives an interesting account of a trial run of a Heroult electric smelter on iron ores in California, which he pronounced a great success. It is thought that the Shasta county magnetite can be converted into pig iron of the best grade and sold in San Francisco at \$16 a ton. The present price of pig iron is that market is \$31 a ton, being chiefly imported from Europe. At Heroult where the experiments were conducted there is an extensive iron region and the ores can be mined and carried to the smelter at a very low cost.

Messrs. Allan, Whyte & Co. also made some little time ago three lengths for the Jupiter Gold Mining Co., Ltd., South Africa, on same principle and which weighed fully 6½ tons each.

Messrs. Allan, Whyte & Co., Clyde Patent Wire Rope Works, Rutherglen, Glasgow, have just completed the manufacture of three large Winding Ropes for the East Rand Proprietary Mines, Ltd., South Africa.

The Ropes, which in the aggregate measure 15,000 feet and weigh 20 tons, are made on the taper principle to meet the problem of winding heavy loads from great depths. They were inspected during manufacture by Mr. N. Wilson, Consulting Mechanical Engineer for the Group, who is at present in this country.

STATISTICS AND RETURNS

Shipments from the Cumberland Coal and Railway Company Springhill Collieries for the month of July were 37,057 tons.

Cobalt ore statement, period ending July 20th:—

July 16th, Coniagas Mine, American Smelting and Refining Co., Perth Amboy, N.J., 40,000 lbs.

July 16th, Coniagas Mine, American Smelting and Refining Co., Perth Amboy, N.J., 66,090 lbs.

July 18th, Coniagas Mine, Oxford Copper Co., Coppercliffe, Ont., 63,090 lbs.

July 19th, Coniagas Mine, American Smelting and Refining Co., Perth Amboy, N.J., 42,000 lbs.

July 19th, Coniagas Mine, American Smelting and Refining Co., Perth Amboy, N.J., 64,000 lbs.

July 18th, Silver Queen, Canada Copper Co., Coppercliffe, Ont., 87,000 lbs.

July 18th, Hudson Bay Mine, Canada Copper Co., Coppercliffe, Ont., 45,170 lbs.

July 18th, Silver Leaf, Canada Copper Co., Coppercliffe, Ont., 43,518 lbs.

July 19th, Nipissing Mine, Nipissing Mining Co., New York, N.Y., 63,550 lbs.

Grand Total—514,418 lbs. -

Cobalt ore statement, period July 22 to July 27, 1907:—

July 23rd, Coniagas Mine, American Smelting and Refining Co., Perth Amboy, N.J., 42,000 lbs.
 July 23rd, Coniagas Mine, American Smelting and Refining Co., Perth Amboy, N.J., 64,000 lbs.
 July 25th, Coniagas Mine, American Smelting and Refining Co., Perth Amboy, N.J., 62,000 lbs.
 July 27th, Coniagas Mine, American Smelting and Refining Co., Perth Amboy, N.J., 64,000 lbs.
 July 27th, Coniagas Mine, American Smelting and Refining Co., Perth Amboy, N.J., 80,000 lbs.
 July 25th, Buffalo Mine, Chas. L. Dennison, New York, 60,000 lbs.
 July 25th, LaRose Mine, American Smelting and Refining Co., Perth Amboy, N.J., 40,000 lbs.
 July 25th, LaRose Mine, American Smelting and Refining Co., Perth Amboy, N.J., 40,000 lbs.
 July 26th, Trethewey Mine, American Smelting and Refining Co., Perth Amboy, N.J., 50,300 lbs.
 July 26th, Nipissing Mine, Nipissing Mining Co., New York, N., 60,975 lbs.
 Grand Total—563,275 lbs.

Cobalt ore statement period July 29 to Aug. 3, 1907:—

July 20th, LaRose Mine, LaRose Mining Co., New York, N.Y., 63,155 lbs.
 Aug. 1st, LaRose Mine, American Smelting and Refining Co., Perth Amboy, N.J., 42,250 lbs.
 July 31st, Nipissing Mine, Nipissing Mining Co., New York, N.Y., 87,843 lbs.
 Aug. 1st, Nipissing Mine, Nipissing Mining Co., New York, N.Y., 63,710 lbs.
 Aug. 2nd, Nipissing Mine, Nipissing Mining Co., New York, N.Y., 43,165 lbs.
 Aug. 2nd Nipissing Mine, Nipissing Mining Co., New York, N.Y., 45,990 lbs.
 Aug. 3rd, Nipissing Mine, Nipissing Mining Co., New York, N.Y., 65,592 lbs.
 Aug. 3rd, Nipissing Mine, Nipissing Mining Co., New York, N.Y., 41,100 lbs.
 July 31st, Buffalo Mine, Canadian Copper Co., Coppercliffe, Ont., 40,000 lbs.
 Aug. 3rd, Buffalo Mine, Chas. L. Dennison, New York, N.Y., 60,000 lbs.
 Aug. 1st, Nova Scotia Mine, B. H. Stewdler, Perth Amboy, N.J., 66,000 lbs.
 Aug. 1st, O'Brien Mine Canadian Copper Co., Coppercliffe, Ont., 61,000 lbs.
 Grand Total—679,805 lbs.

L. Vogelstein & Co., New York, give the following figures of German consumption of foreign copper for the months of January to June, 1907:—

| | |
|-------------------------|-------------|
| Imports of copper | 59,637 tons |
| Exports of copper | 4,130 tons |
| Consumption | 55,507 |

As against consumption during the same period in 1906 of 61,115 tons. Of this amount 45,776 tons were imported from the United States.

DOMINION COAL COMPANY.

Outputs and Shipments July, 1906 and 1907:—

| | | |
|------------------|---------|---------|
| No. 1 | 45,266 | 44,160 |
| No. 2 | 51,701 | 55,510 |
| No. 3 | 34,876 | 34,210 |
| No. 4 | 49,751 | 45,350 |
| No. 5 | 55,603 | 54,050 |
| No. 6 | 6,005 | 16,760 |
| No. 7 | 11,381 | 23,400 |
| No. 8 | 25,052 | 23,400 |
| No. 9 | 33,961 | 30,300 |
| No. 10 | 3,695 | 9,080 |
| | 318,291 | 312,820 |
| Shipments | 353,247 | 353,738 |

Cobalt's Total production:—

| | Tons of Ore. | Value. |
|---------------------|--------------|------------|
| 1904 | \$ 158 | \$ 136,217 |
| 1905 | 2,144 | 1,273,196 |
| 1906 | 5,129 | 3,900,000 |
| 1907 (6 mos.) | 6,431 | 4,890,019 |

Total to date 13,862 10,000,000

Sydney Mines.—The total output of the four collieries of the Nova Scotia Coal & Steel Co. for the month of July amounted to over fifty-five thousand tons, the figures for the different collieries being as follows:

| | |
|-------------|-------------|
| No. 1 | 22,393 tons |
| No. 2 | 24,564 tons |
| No. 3 | 7,760 tons |
| No. 4 | 500 tons |

BRITISH COLUMBIA SHIPMENTS.

Rossland shipments for the week ending July 13th increased to 8,055 tons.

Shipments for the week were as follows: Centre Star, 5,010; Le Roi, 2,240; Le Roi No. 2, 595; White Bear, 210; total for week, 8,055, and for year to date, 146,147 tons.

At Trail smelter there was received during the week 5,781 tons, while the Le Roi smelter at Northport received 2,240 tons.

Shipments for the week ending July 20:—

| | Week. | Year. |
|-----------------------|--------|---------|
| Boundary | 30,537 | 675,234 |
| Rossland | 4,140 | 161,998 |
| Slocan-Kootenay | 3,025 | 76,746 |

The total shipments from the mines in the above districts for the past week were 44,472 tons, and for the year to date 828,898 tons.

METAL, ORE AND MINERAL MARKET.

Aluminium, No. 1 grade ingots—45 to 47 cents per lb.
 Antimony—10 to 14 cents per lb.
 Arsenic, white—7½ to 7¾ cents per lb.
 Barytes, crude—\$11.25 to \$1.75 per lb.
 Bismuth—\$1.50 to \$1.75 per lb.
 Cadmium—\$1.46 to \$1.50 per lb.
 Carbons for drills—\$78 to \$85 per carat.
 Carborundum, powdered—8 cents per lb.
 Chromium, metal pure—80 cents per lb.
 Cobalt, f.o.b. Cobalt, Ont., unrefined—35 to 50 cents per lb.
 Corundum—7 to 9½ cents per lb.
 Feldspar, ground—\$12 per short ton.
 Flourspar, lump—\$10 per short ton.
 Graphite, domestic—\$50 to \$150 per short ton.
 Gypsum, lump—\$4.50 per long ton.
 Infusorial earth, ground—\$25 to \$30 per ton.
 Lead—5.25 cents per lb.
 Manganese, pure metal—75 cents per lb.
 Mica, ground—\$80 per short ton.
 Mica, scrap—\$15 per short ton.
 Molybdenum, pure—\$1.70 per lb.
 Molybdenite ore, 95 per cent. pure—\$4.50 to \$5 per unit.
 Nickel—45 to 50 cents per lb.
 Platinum, ordinary metal—\$26 per ounce.
 Platinum, scrap—\$20 to \$21 per ounce.
 Pyrite, 38 per cent. to 45 per cent. sulphur, lump, 10¼ to 11½ cents per unit.

MARKET NOTES.

Spelter.—Market is still declining. New York 5.85 cents per lb.; London £23 2s.
 Lead.—New York steady at 5.25 cents per lb.; London, £19 10s. for Spanish lead.
 Tin.—Market is flat. New York, 40 cents per lb.; London, £18½ for spot.
 Copper.—Market stagnant; New York, Lake 21½ cents per lb.; electrolytic, 20½ cents per lb.; London, spot for standard, £86.
 Silver, per ounce.—July 18, 68¾ cents; July 19, 68¼; July 20, 68¾; July 22, 69¼; July 23, 68¾; July 24, 68¾; July 25, 68¾; July 26, 69; July 27, 69¼; July 29, 69¾; July 30, 69¾; July 31, 69¼.
 Pig Iron.—Pittsburg, Bessimer pig, \$22.50; No. 2, Foundry, \$23.50.
 Iron Ore.—Bessemer Old Range, \$5.00; Bessemer Mesali, \$4.75; Non-Bessemer Old Range, \$4.25; Silicious non-Bessemer, \$2.50.