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Vol. XXIV—No. 7.

MONTREAL, JULY, 1905.

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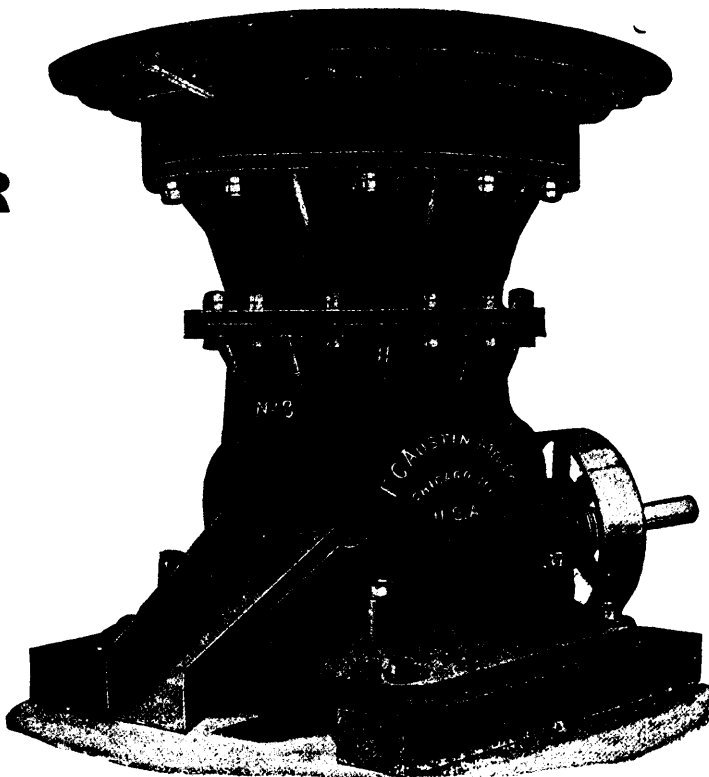


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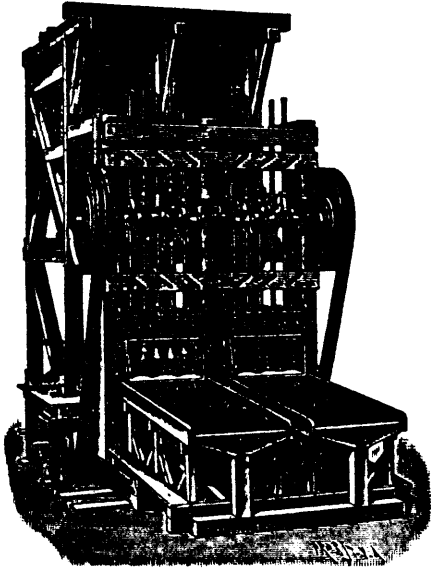
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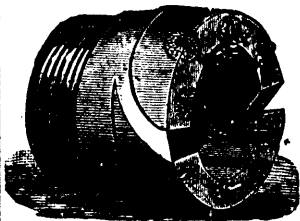
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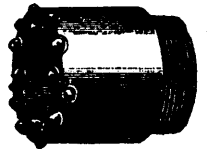
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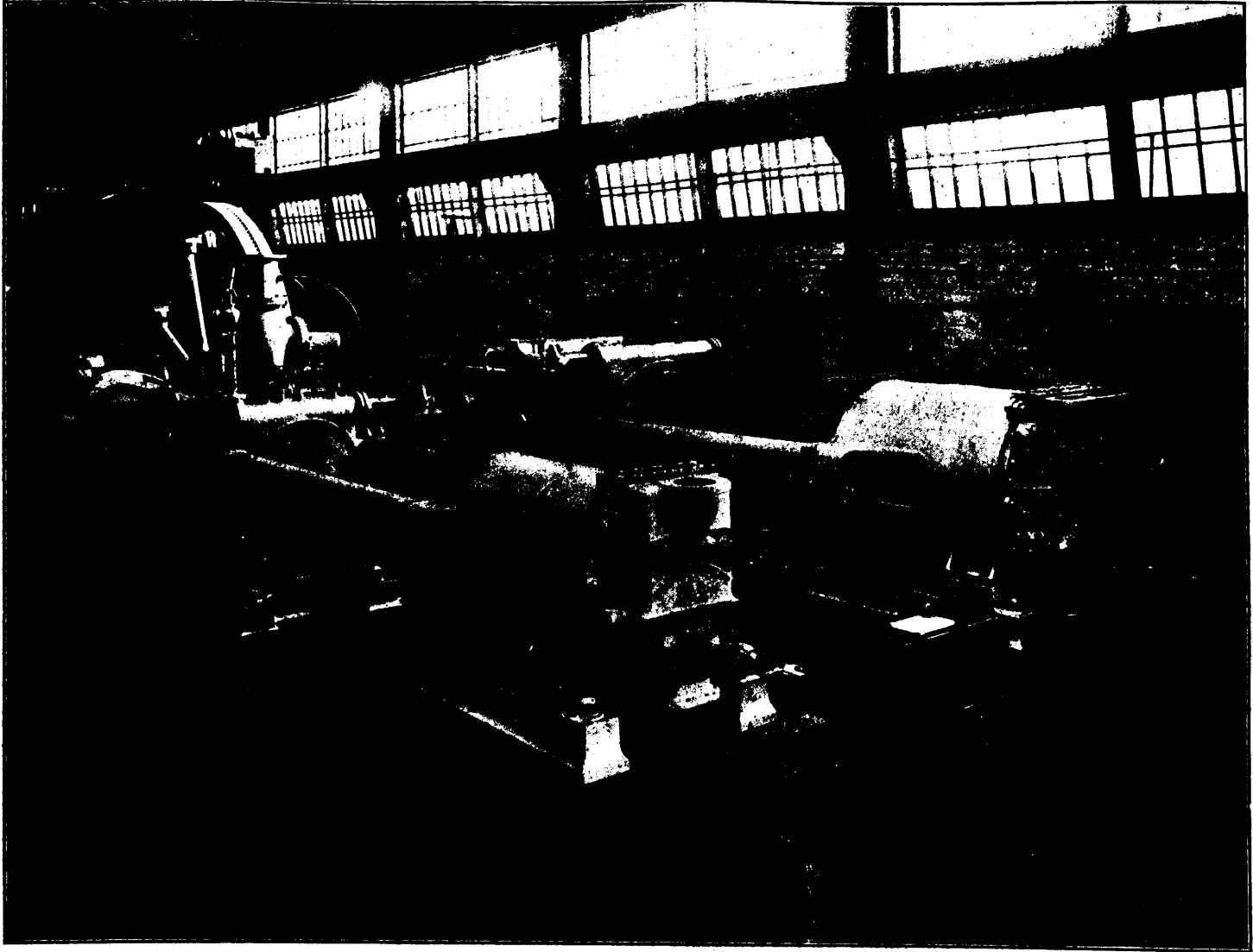
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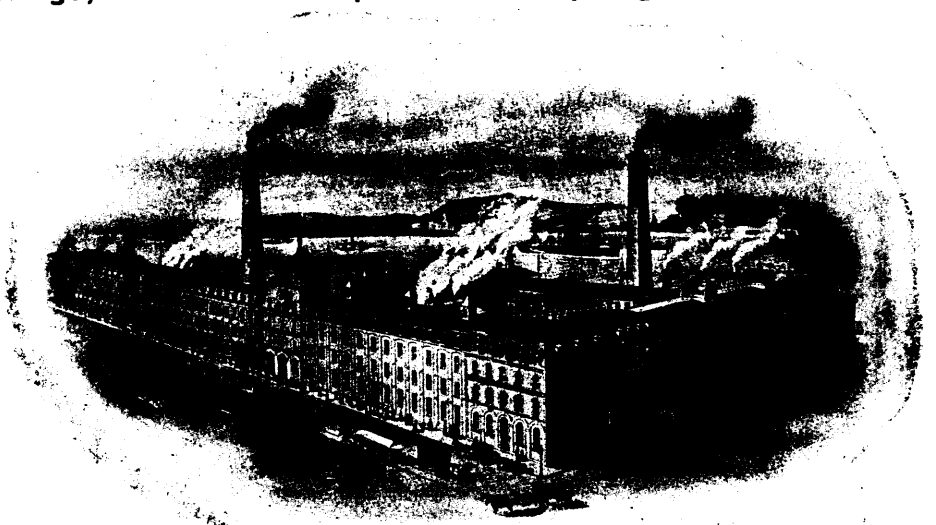
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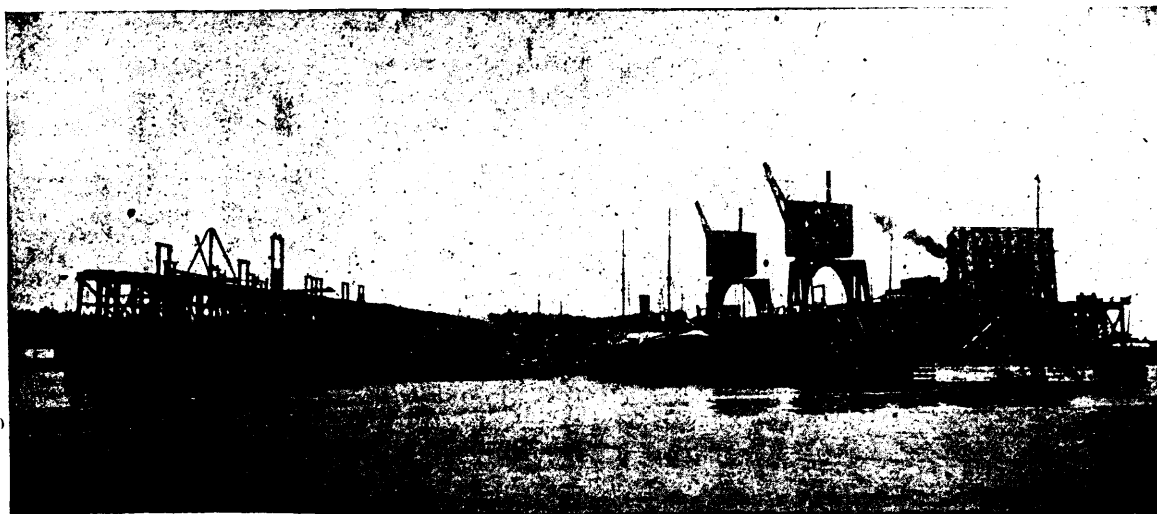
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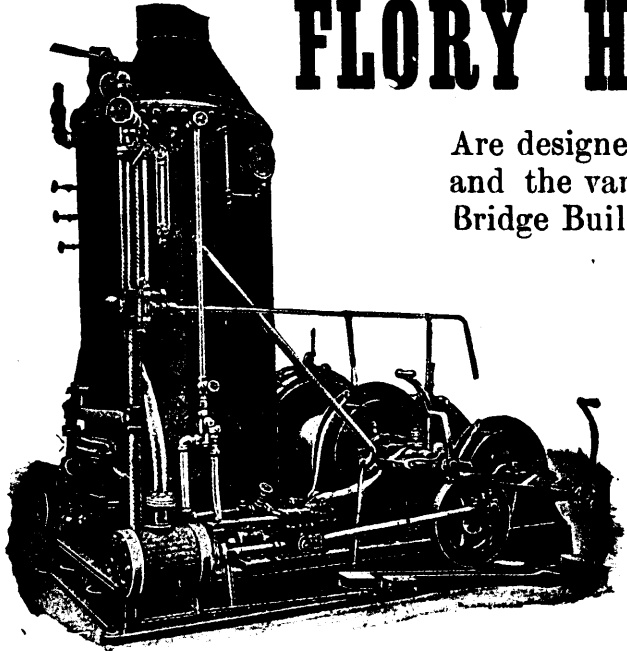
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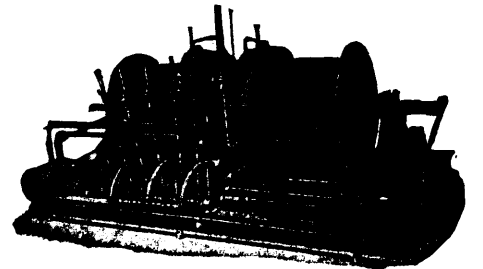


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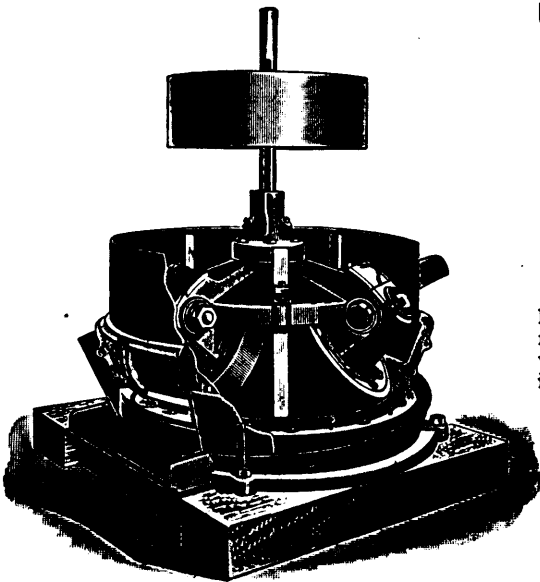
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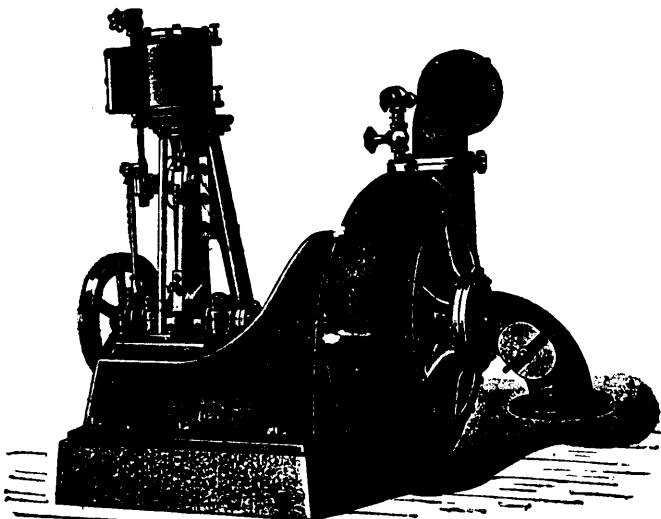
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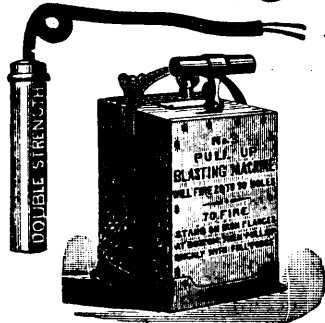
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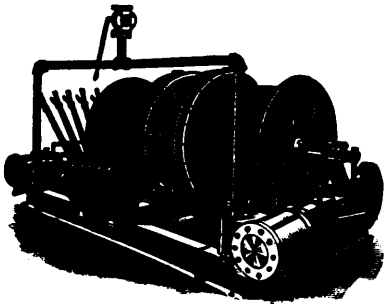
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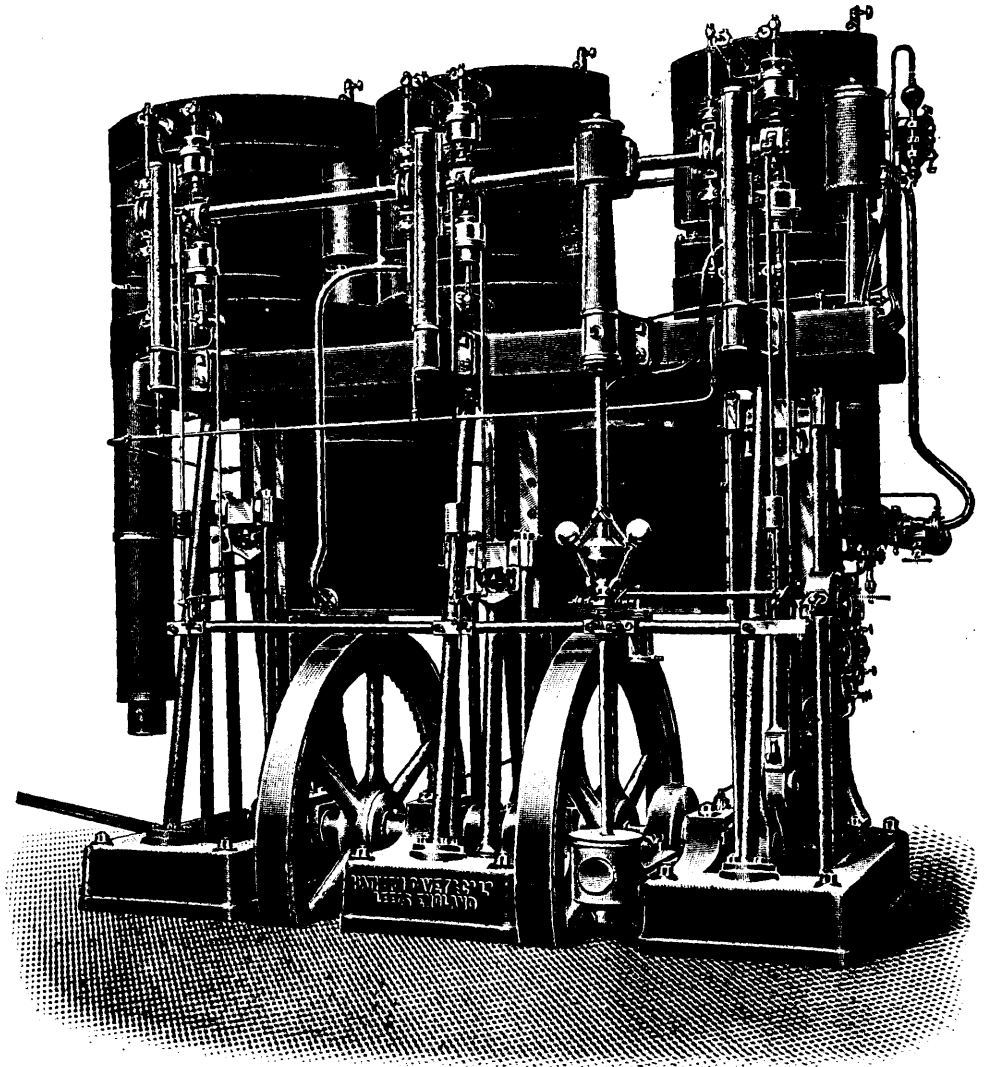
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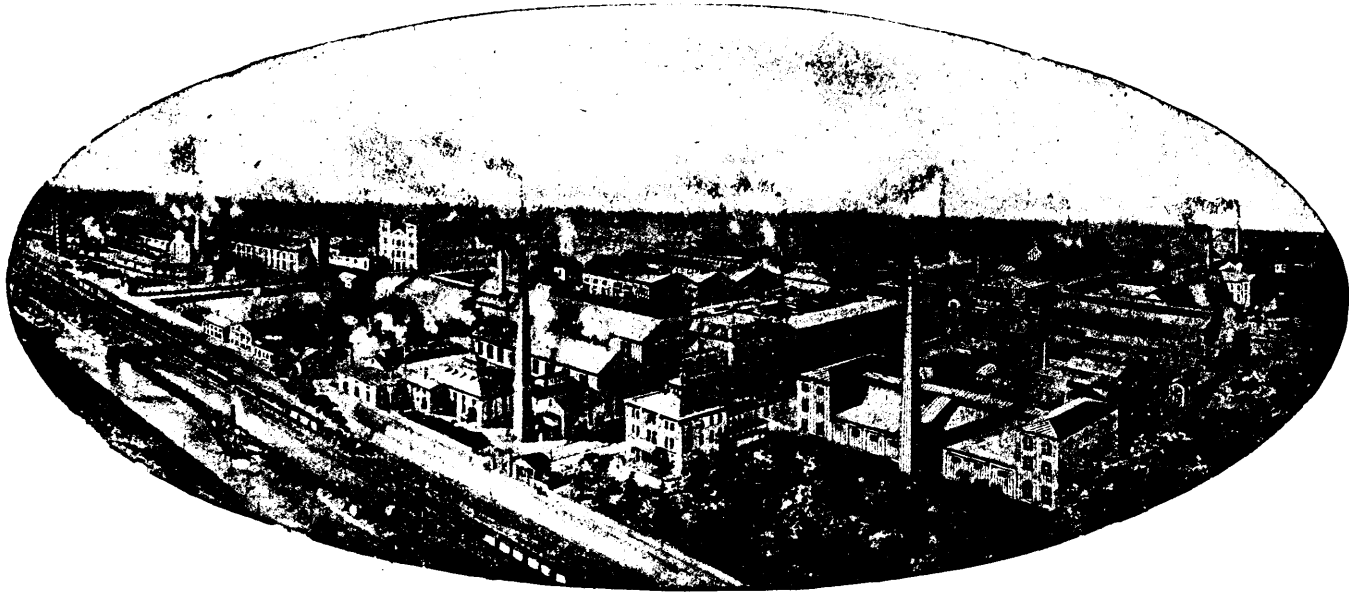
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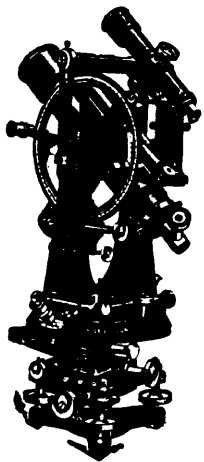
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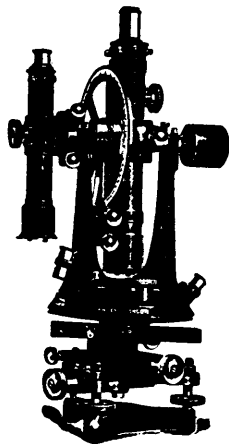
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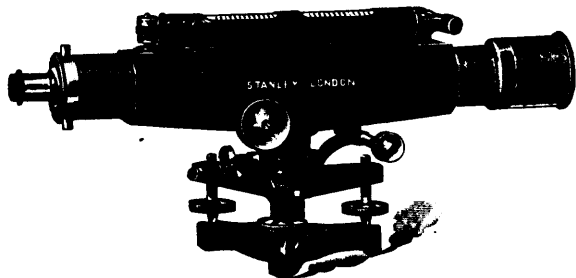
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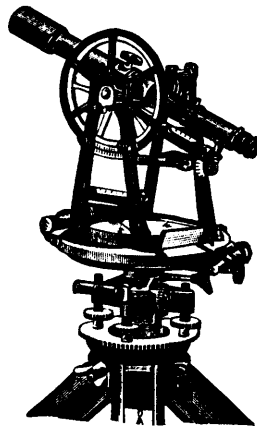
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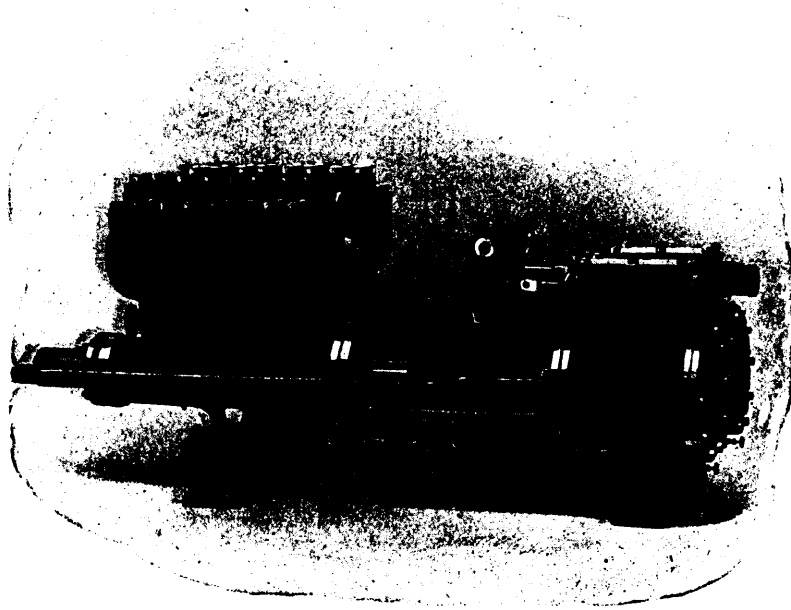
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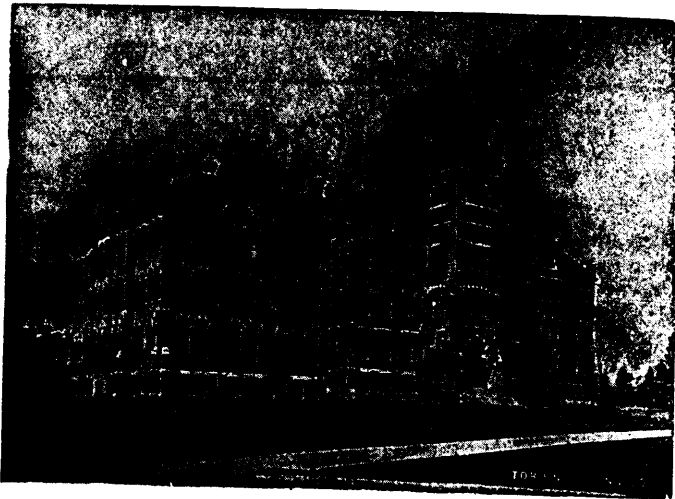
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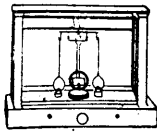
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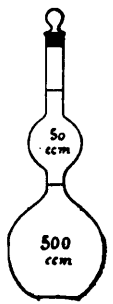
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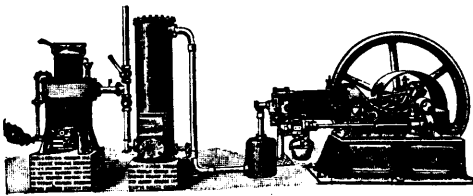
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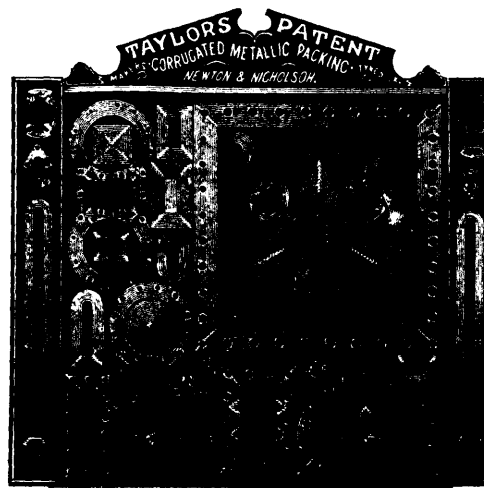


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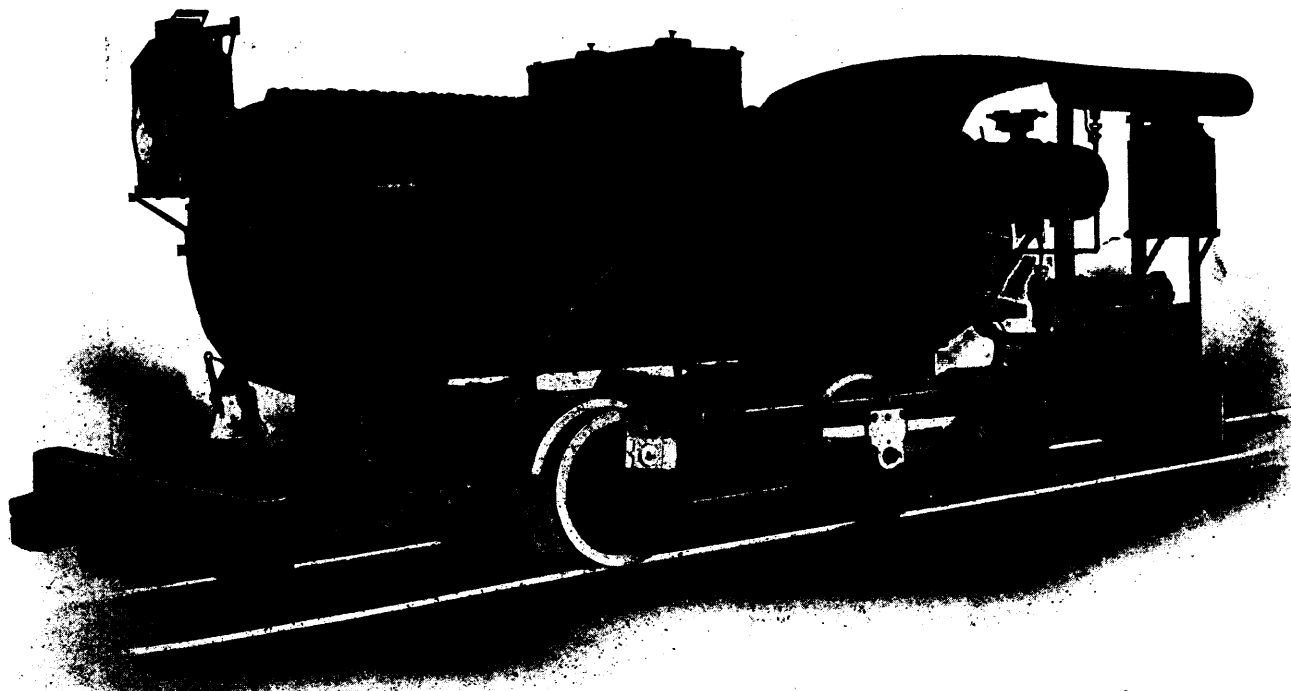
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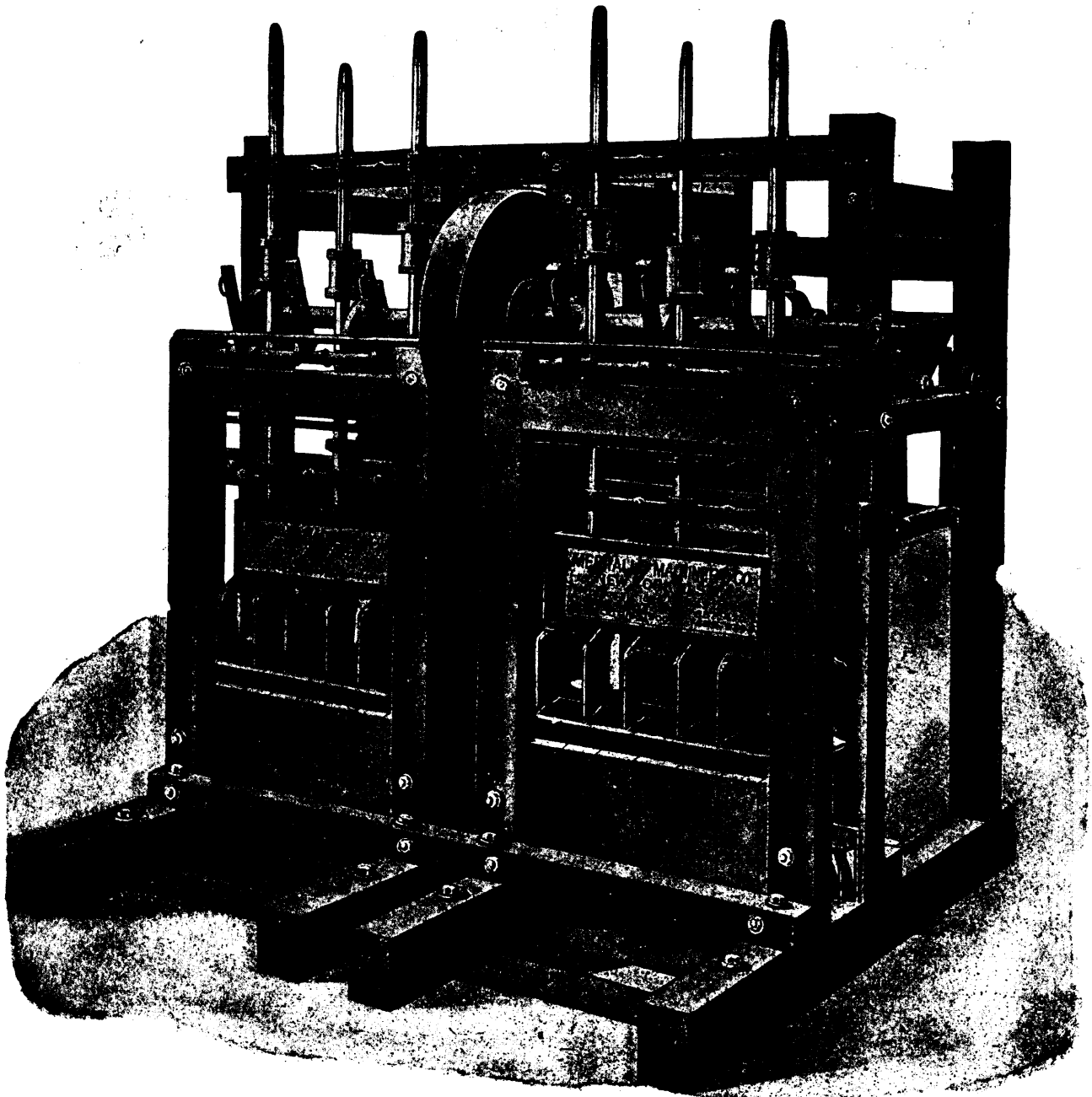
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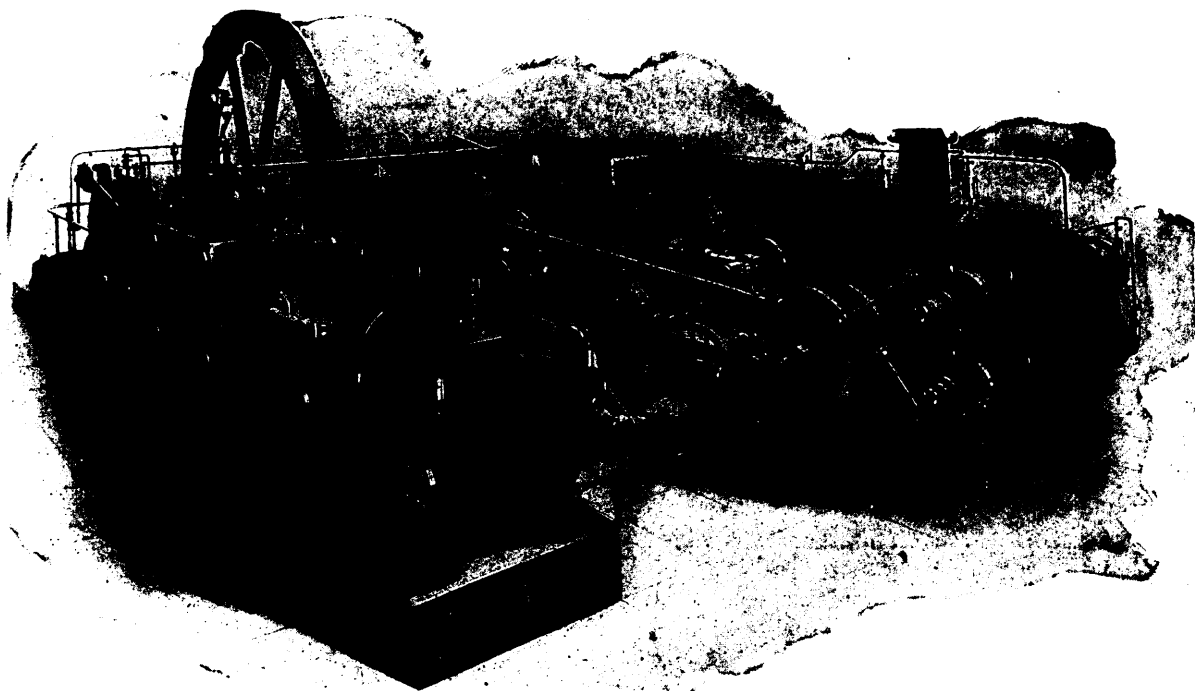
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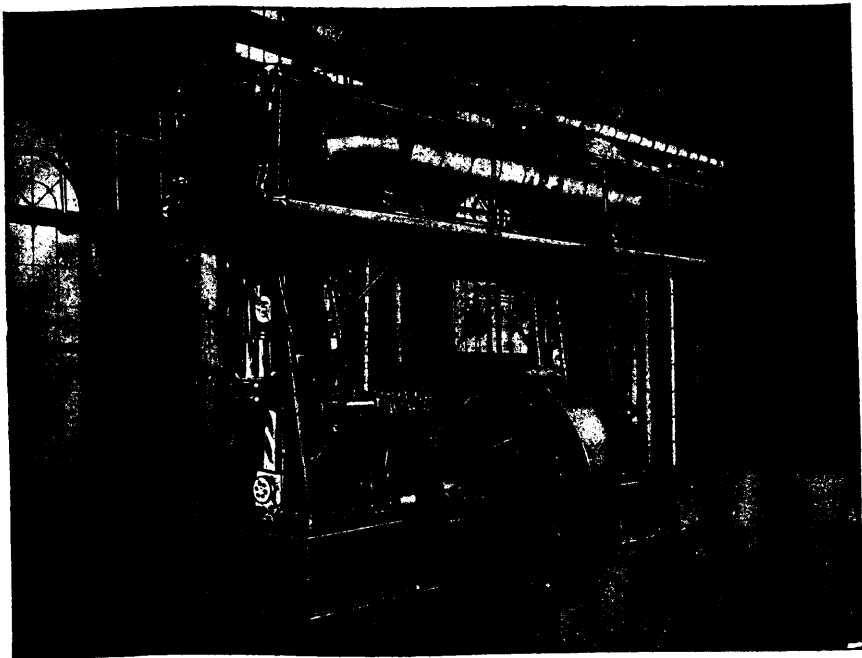
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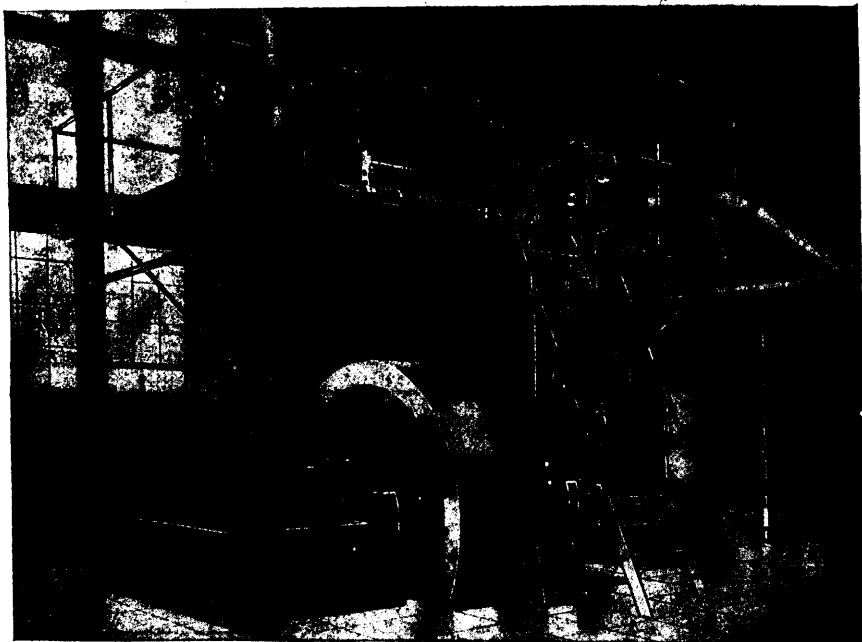
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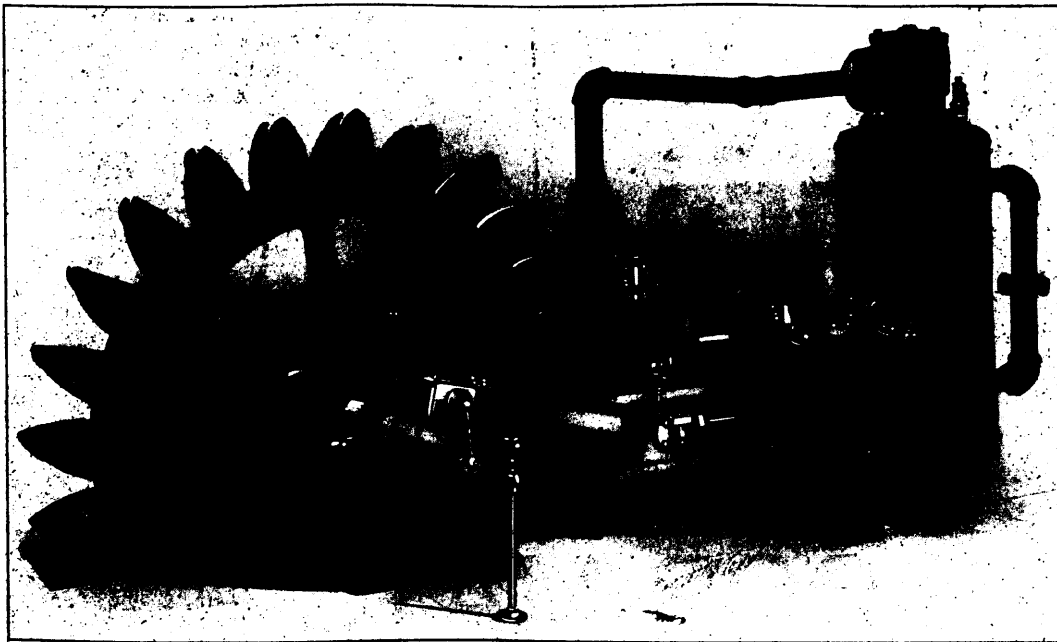
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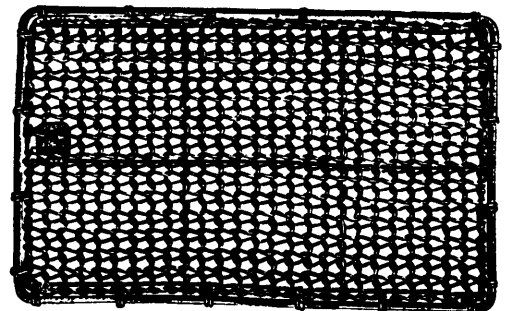
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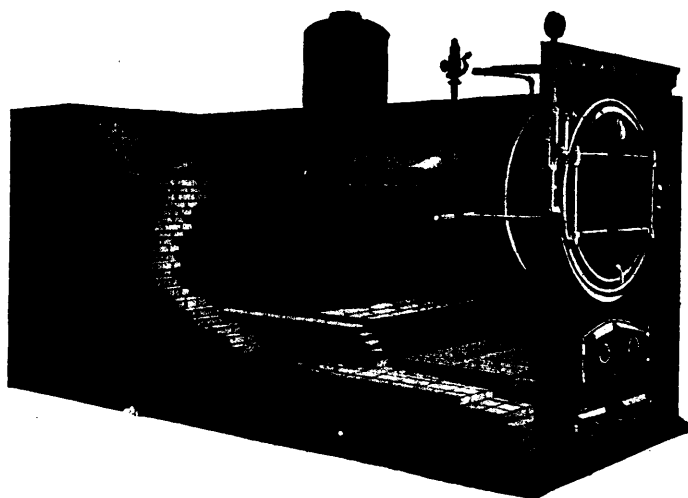
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In the last few issues of the REVIEW a good deal of attention and space has been devoted to the new Temiskamingue district of Ontario. If similar valuable discoveries had been found in British Columbia, the excitement would have been intense, and we should ere this have been bombarded with "boom" literature. As, however, these discoveries have been made in a province where mining is not taken too seriously, except, perhaps, in the case of the big industrial undertakings, of which the general public know little or nothing, the interest created is of the most trivial description, and one may scan in vain the columns of the influential daily press of such a city as Toronto to find even a passing allusion to the extraordinarily rich and promising finds which are now being made almost every week. In spite of this apathy, however, prospectors, largely from the United States, are flocking to the locality, while, too, capital is beginning to make investigations. It is,

of course, rather early to make predictions, but it certainly seems likely that the Temiskamingue district of Ontario, and presently the adjacent territory of Chibogamou in Quebec will prove one of the most important productive mineral areas in Eastern Canada.

It is to be hoped that we shall not now have much longer to wait ere the mint at Ottawa is ready to commence the coinage of Canadian metals into currency. During the month there has been several interesting discussions in respect to currency matters, precipitated in the one instance by Mr. Fielding's announcement of the Government's intention to deport, through the banks, who will receive a small commission for the service, American silver circulating in the Dominion. Apart from any question of sentiment, this step has to recommend it sound economic considerations, sufficiently obvious in themselves not to require enumeration. That they have been long recognized in the United States is attested by the fact that Canadian currency is not accepted in that country at its face value, while a Canadian Bank bill (though this is a digression from the point) is rarely if ever accepted as legal tender. Complaints have also been made of the quantity of worn and defaced Canadian silver in circulation, the withdrawal of which might be much more readily undertaken once the mint shall have been established. Again, the mintage of our own currency will naturally consume a respectable proportion of our precious metals output, and thus put a stop to the present large exportation of gold from the Yukon and other gold producing centres through United States channels, while the silver mining districts should experience a material benefit. The establishment of the mint, moreover, may be regarded as the only substantial reason for the maintenance of a Dominion Government Assay Office at Vancouver; since the volume of work there handled during the past year or so was, in relation to the expenditures, inconsiderable, and might have been looked after far more economically under an arrangement with the Provincial authorities. One has only to compare the costs of the two establishments at Victoria and Vancouver to recognize the force of this remark. The subject of the adoption of nickel for coinage purposes was recently mentioned through the columns of the *Toronto Star*, it being pointed out that Canada could not better advertise her valuable resources in this

respect, than by minting the Sudbury nickel for coinage of a low denomination. The present prejudice against the American "nickel" or five cent piece is largely due to its dirty and "counterfeit" appearance, which is attributable to the fact that the nickel is alloyed to such an extent with copper, that it really is not nickel at all, but a copper-nickel alloy. This proposal, meanwhile, finds a very warm advocate in Prof. Miller, Provincial Geologist of Ontario. The chief advantages in using pure nickel for coinage purposes are its wearing and untarnishable qualities, the high scrap value of the metal when finally taken out of circulation and the difficulties in the way of counterfeiting nickel coin.

When the exportation of zinc ores from British Columbia first commenced on anything like an important scale, that is to say two or three years ago, a question arose as to the duty required to be paid thereon, under the American Customs regulation. It appeared that the U. S. Tariff Act makes no specific reference to zinc ores, although in section 181, a special duty is provided for on lead, the section reading: "Lead bearing of all kinds shall be taxed 1½ cents per pound, on the lead contained therein" Now, the zinc ores shipped contained a certain percentage of lead, although it is true an inconsiderable proportion, and, on this ground, Mr. Armstrong, then acting as Assistant-Secretary of the U. S. Treasury Department, ruled, to the great satisfaction of B. C. producers, that the ore might be shipped to that country by paying the duty on the lead contents, the zinc not being considered. Under this arrangement it has been possible to market B.C. zinc ore in the United States upon a reasonably profitable margin. The controversy in respect to the matter, has been, however, again re-opened by Missouri zinc mine operators, who claim that Canadian exporters should be compelled to pay duty, not on the lead but on the zinc contents of the ore shipped, under section 183, which provides that "Metallic mineral substances in a crude state, and metals unwrought, not especially provided for in this Act, shall be taxed so *per centum ad valorem*." The Missouri-Kansas miners contend that Canadians are now their chief competitors and that the notably small duty at present paid on imported ores from this country, does not afford to them an adequate protection. Pressure is, therefore, being brought to bear on the authorities at Washington to rescind Mr. Armstrong's ruling. On the other hand, the American zinc smelting interests are opposed to any change from the existing regulation, as they are able to deal more advantageously with Canadian producers than with their American countrymen. Should the mine operators be successful in their suit, there can be little doubt that the imposition of a duty of 20 per cent. would exclude Canadian zinc from entering the American market and temporarily, at least, inflict a heavy blow on a young and promising industry. If we may judge, however, from the closely analogous circumstances appertaining to the development of the lead mining industry in British Columbia, the ultimate result of this antagonistic measure would be the establishment of plants in Canada for the treat-

ment and manufacture of zinc, while, in the meantime, no doubt, if the railway companies can be induced to lend their co-operation by a reduction in freight rates, the product will be largely marketed in Europe.

Commenting on the visit of the Canadian manufacturers to Great Britain, the *Iron and Coal Trades Review* remarks on the fact that Canadians are evidently desirous of establishing closer commercial intercourse with the Motherland, and refers to the effect of the new dumping clause which, it is thought, will be certain to increase Canadian imports and not least those of iron and steel from Great Britain. Our contemporary points out that "between the five-yearly period, 1889-1893, on the one hand, and the year 1902 on the other, the United States made extraordinary advances in Canadian markets. The proportions supplied during this interval under each principal head by the two countries varied as follows:—

	Great Britain.		United States.	
	%	%	%	%
Pig-iron	60	to 26.05	40.	to 73.66
Rails, etc.	80.9	to 35.87	9.1	to 49.47
Castings and forgings.....	32.9	to 3.55	60.8	to 96.07
Other iron and steel.....	72.3	to 34.31	27.7	to 56.80
Machinery	17.8	to 6.16	82.2	to 93.03
Hardware and cutlery.....	31.6	to 15.66	68.4	to 77.38
Interchangeable 'mechanism. .	10.8	to 1.65	89.2	to 96.51

"It will be observed that in every instance the proportion contributed by Great Britain has seriously declined, while that contributed by the United States has similarly advanced. Relatively, this country does not appear for many years to have cut much of a figure in supplying Canada with machinery, and the proportion of 6.16 per cent. furnished in 1902 is hardly a matter for pride or satisfaction. But in 1902 we had reached the low level of supplying only 26.05 of the Canadian imports of pig-iron, 35.87 per cent. of the Canadian imports of rails, and 34.31 per cent. of the imports of other forms of iron and steel."

Unless, however, British business methods are very radically changed, it is questionable whether preference in the matter of duties or other concessions will materially affect the situation, particularly so far as mining machinery is concerned. In too many cases the British manufacturer does not understand the meaning of the word, promptitude, while he is strangely deficient in enterprise. Moreover, American mining machinery is better adapted, as a rule, to requirements in Canada, and has the great advantage of being standardized, so that in the case of accident parts may always be readily replaced upon short notice. It may be mentioned in this connection that many of the leading mining manufacturers in the United States are now establishing businesses in Canada.

The mortality which has prevailed during the last three years amongst the wild-cats of B. C. has now taken a firm hold on the Ontario corporations whose origin lay in values that either never existed or were of a very temporary nature,

and the winding up of a number of these concerns this month is a matter worthy of note and congratulation. Ontario suffered less than B. C. by reason of the lesser value of its new fields and the smaller area available for the promotee. That the last of the pernicious brood which was bred in the boom times of '96, '97, and '98 is now in its death throes is a matter for rejoicing to every one interested in legitimate mining. Following this removal of the maimed, deformed and diseased amongst the mining corporations of B. C. has come a genuine, healthy but slow growth of legitimate undertakings in British Columbia and we have no doubt that the same sequence will be seen in Ontario. We have already noted the development of the latest field in Ontario, and, apropos of the second instalment of Mr. John E. Hardman's article on the new mineral area in Ontario, we learn that of all the new discoveries in the Temiskaming district only two have been organized as stock companies, and those two have named capitalizations that are reasonable and commensurate. The bringing into Ontario of men who have already had experience in other fields is another healthy sign; not only will this introduction tend to counterbalance any overestimates by local men, but it will also benefit the region by the experience which these men have had under diverse and different conditions in other parts of the world. The MINING REVIEW has never been accused of optimism, but it regards the present healthy clearing of the mining atmosphere with the greatest satisfaction, and looks upon the whole mining situation in Canada as healthier than it has been for ten years. That Ontario and Northern Quebec have, in common, a new mineral area which promises a great production is unquestioned.

In our next issue we shall begin the publication of an article from the pen of Mr. J. E. Hardman, who has returned from a somewhat lengthy investigation of the region beyond the Height of Land in Quebec. There is every reason to suppose that the new metalliferous belt of that region is continuous in a westerly direction to Lake Abitibi, and beyond, a distance of over 250 miles; and as it has a width of over 40 miles, there are something like 10,000 square miles of new metalliferous country available for ore prospecting, and results will not be long in arriving.

In a series of leading articles the Halifax *Chronicle* has recently been endeavouring to prove that the governmental assistance granted the iron and steel industries is responsible for the shrinkage of iron ore production in Nova Scotia, which has declined from 83,792 tons in 1895 to 50,000 tons in 1904, and the recommendations are made (1) that should the local iron and steel manufacturers ask for the renewal and extension of the bounties, at the expiration of the present time, their neglect of the local iron fields should be the subject of enquiry and the utilization to a great extent in future of Nova Scotian ore made a condition of any such renewal or extension of the grant; or (2) bounties might be paid directly to the iron ore miner. These contentions are, of course, very absurd to anyone conversant with the true state of affairs, and we entirely

agree with the eminently sensible remarks of our contemporary, the *Maritime Mining Record* in criticism of the *Chronicle's* position. The fact of the matter is that the search for iron ores of commercial grade in Nova Scotia has, so far, unfortunately, proved largely resultless. At Tarbrook, it is true, ore of good quality has been found, but the quantity is inconsiderable and the ore lies at such an angle as to render it too difficult to work. At Pictou, in the vicinity of Bridgeville, no iron of desirable quality has been discovered, all the ore there requiring to be washed; at Cape Breton there are no ore bodies of any size, while in the neighborhood of Londonderry, the iron which is low grade, only suitable for certain kinds of castings, notably pipe castings, is utilized by the Drummond works. If local ores were procurable, it is hardly likely that the iron and steel undertakings in Nova Scotia would go elsewhere for their supply, since, moreover, they would be entitled to an additional dollar per ton bonus in the case of products manufactured from local ores. We do not, of course, deny the existence of commercially marketable iron ore bodies in the Maritime Provinces, but they have yet to be discovered. The search in itself should be worthy of effort, but if further stimulation is necessary, the initiative surely rests with the Provincial and not the Dominion authorities.

Brief mention was made in our last issue to the fact that in consequence of the acquittal of the union miner Roberts, who had been tried on the charge of shooting with murderous intent at Mr. M. S. Davys, a well-known Kootenay mine operator, Mr. Davys had decided to "close down" the several properties he was working under lease rather than employ union labour. In the current number of the MINING REVIEW we print a letter from Mr. Leslie Hill very clearly setting forth the facts in connection with the assault on Mr. Davys, and commenting on the result of the trial, which he describes, not, we think, without reason, as a grave miscarriage of justice. A very considerable proportion of the miners employed in the Kootenay mines are Americans; many of them come from the Coeur d'Alene and other mining sections of the Western States, where the blowing up of mills and the shooting of managers are fashionable methods of protesting against real or imaginary grievances. It is, however, of very real importance that these gentry should be taught that in British territory anarchy and violence meet with instant reprisals. In this case, Roberts was probably given, in accordance with the customary practice of British Courts of Justice, the benefit of the doubt; but from Mr. Hill's account of the evidence, there was little room for doubt, and the Court therefore appears to have displayed a clemency, which, under the circumstances, can hardly be regarded as either just or wise. It is not the first time that union miners in British Columbia have undertaken to argue their cause by an appeal to force, for it is not so long ago that a mine-manager who had employed a Chinese cook whom he was accompanying to the mine, was ambushed on the way by a body of his men, who, after overturning the manager's carriage, drove off the

Chinaman with blows. That sort of thing is not to be tolerated for a moment, and it is distinctly to the interest of British Columbia that the sensible minded people resident in the province should discountenance doings of the kind in every way in their power.

The announcement that the Dominion Government has increased the duties on white lead and lead in oil from, in the one case, five to thirty per cent., subject to the British preference, and, in the other, from twenty-five to thirty per cent., has been received with general satisfaction. Up to the present time we have been content to mine our metals merely in order to supply other countries with raw material. It is a good sign of the times that a change is now taking place in more than one direction. Meanwhile, the first step towards the establishment of a lead manufacturing industry in Canada was the successful operation of a plant installed by Mr. W. H. Aldredge, for the refining of silver-lead ores by electrolytical methods, with the result that the Trail smelter has, for some time past, been turning out a very fine quality of pig lead. Following the introduction of lead refining in British Columbia, a leading industrial firm, engaged in the manufacture of white lead in Western America, recognizing the Canadian market possibilities in this regard, in October last organized a company in Canada to commence the production of white lead in Montreal, and during the past few months the work of equipping a factory for this purpose has been in progress, manufacturing operations having commenced last month. The present consumption of white lead in Canada is between six and seven thousand tons per annum, but with the developments that are now taking place in the West, this consumption is certain ere long to show a considerable increase. The increase in tariff will, to this extent, conserve the Canadian market for Canadian lead, with a consequent improvement of lead mining conditions in the West. At the same time, as the annual production of British Columbia lead mines is more than double the Canadian consumption of manufactured lead, the final solution of the problem has yet to be sought.

It has been the policy of the Ontario governments during past years to do everything that was possible to encourage mining effort in that province, and it may almost be questioned whether in pursuance of this policy the industry has not been injured by overpampering; at any rate, there are a number of mining men who have arrived at that conclusion, and in view of the dissatisfaction expressed in regard to the mining law as it now stands, the new Minister of Mines, the Hon. Frank Cochrane, has decided to introduce amendments to the Ontario Mines Act, proposing first to visit the various mining sections to ascertain the views of the mining communities, who will thus become responsible for any changes that may be made. The time is, we would suggest, opportune for the establishment in Ontario of local branches of the Canadian Mining Institute, under whose auspices the subject of the proposed revision of the mining laws might be thoroughly canvassed and discussed, with a result that probably present conflicting opin-

ion would be largely reconciled, and the final presentment of recommendations to the Minister have some appearance of unanimity of view.

The members of the American Institute of Mining Engineers who, last month, took part in the excursion to Western Canada in order to attend the summer meeting in Victoria appear to have enjoyed themselves thoroughly, thanks to the warm and hearty hospitality shown them by our British Columbian friends, and the carefully thought-out arrangements made for the reception and entertainment of the visitors by the local committees of which Mr. W. F. Robertson acted as chairman, and Mr. W. M. Brewer as secretary. At Nelson the Canadian Mining Institute was represented by Messrs. S. S. Fowler and R. Hedley, both of whom are members of this year's Council. From the reports that have so far reached us, the visitors have been more than all else impressed with the inspiring scenic magnificence of the Western Province, but at the same time the mineral potentialities of the country will not have been overlooked and doubtless this visit of the American Institute will be the indirect cause of inducing the further investment of American capital in British Columbian mining undertakings.

Our special correspondent in British Columbia sends us the interesting intelligence that the Huntingdon-Heberlein process for the desulphurization of lead ore is likely to be employed shortly by both the Trail and Nelson smelters, the process being already in use and, it is said, giving excellent results at Marysville, E. Kootenay. In a recent issue the *Engineering and Mining Journal* announces that the American Smelting & Refining Company is also preparing to adopt this process, not only in the desulphurization of all classes of lead ore, but also of lead matte, while recently the utilization of the process in Australia, has resulted in a very considerable reduction in smelting costs. The process appears to offer many advantages over existing roasting methods, in so much as the silver and lead losses are practically nil and sulphur is more thoroughly eliminated, while the form into which the ore is reduced increases the smelting speed of the blast-furnace. It is stated that the adoption of the process in the Kootenays, would effect a saving of nearly twenty-five per cent. a ton in lead treatment costs.

According to a recent report of the manager there is still some prospect of the re-habilitation of the North Star at Kimberley, E. Kootenay, owned by the North Star Mining Company of Montreal. It will be remembered that last year it was practically decided to discontinue operations, after extracting the little remaining ore, but in the interval not only has "clean" ore from the old ore-body been shipped at a profit, but a considerable tonnage of second class material has also been successfully marketed, in so much so that a net profit of about \$40,000 has been realized and the directors have been enabled during the year, to make two cash distributions to shareholders, amounting to ten cents per share. In view of this

excellent showing, the manager, Mr. N. McL. Curran has been sanctioned by the board to carry out his programme of exploiting the ground adjacent to the Kellog shaft. Until this shall have been done, the property, in Mr. Curran's opinion, cannot be regarded as having been thoroughly prospected. All of which is good news.

With the advance of nickel plating in Japan and the use of the metal as an amalgam, it is believed that Canada should be able to secure a considerable share of this trade in the Japanese market, and recently a number of enquiries have been received by the Dominion Government's commercial agent in Japan from several merchants, with regard to Canada's capabilities in this direction. According to the Department of Trade and Commerce reports, the amount of nickel exported from Canada during the fiscal year of 1904, is valued at \$1,200,000. During the past five years Japan has imported nickel to the value of between approximately \$60,000 and \$145,000. In 1904, however, the importations reached but \$62,424, in consequence of the production of the free coinage of Korean nickel coins in Japan and the suspension of the minting of nickel currency by the Korean government. At present nickel is chiefly imported through British, German and French channels.

A NEW MINERAL AREA IN ONTARIO.

By JOHN E. HARDMAN.

Part II.

Since the first of May development in the silver-cobalt section of Coleman township has been rapid and many new discoveries have been made. The areas within which profitable ores have been found has not materially increased, and may still be roughly defined as covering about five square miles, extending easterly from the Trethewey property for about two miles and southerly from the Timmins mine for two and a half miles. Reputed discoveries on the Gillies Timber Limit can not be confirmed by the writer, as such are covered as soon as found, and as the government refuses to grant licenses on discoveries applied for which are within the limit. It is, however, altogether probable that such discoveries have been made, and that the areas will be prolonged in a north and south line. The reputed discoveries of cobalt bloom are numerous, but credible evidence of silver contents is lacking.

The principal discoveries upon new lots are the following:

A five inch vein on the eastern shore of Glen Lake, in the 4th lot of concession IV. This is known as the "Foster" property, and is rich enough to keep up the credit of the district for high grade shipments. Within two weeks from discovery Mr. Foster shipped out his first car load of ore, and is rapidly extracting ore from a very rich vein. Besides the original discovery two other veins have since been found both of which carry shipping ore.

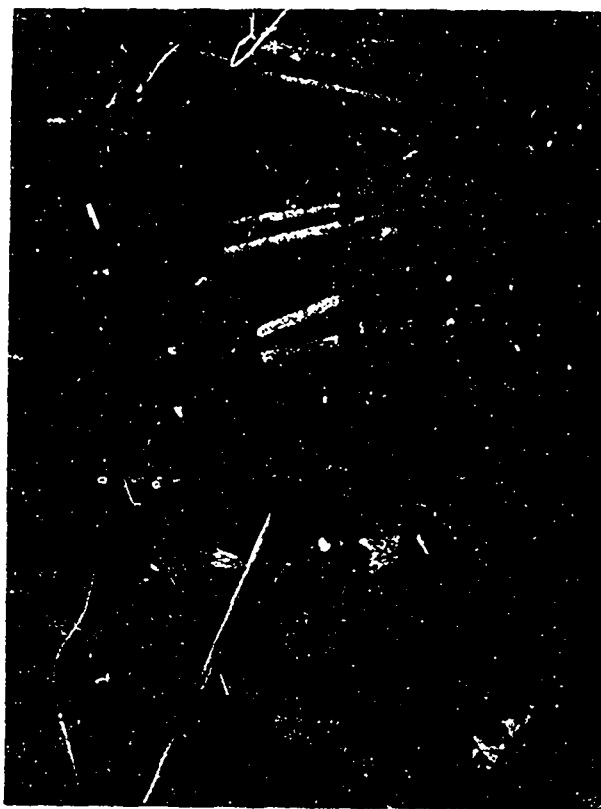
Mr. Herbert E. Lawson, an English gentleman of experience in mining, has also made a very rich discovery in the location lying immediately west of the Jacobs property (269). An irregular vein varying from 2 to 5 inches in width, has been opened from which a shipment is now being made. This discovery is, as yet, comparatively undeveloped; the vein is from

2½ to 4 inches in width, with numerous veinlets or branches ramifying from it; its outcrop, in places, shows a large amount of free metallic silver in small leaf and flakes. One peculiarity is the occurrence of a crystalline calcite in portions of the filling with flakes of metallic silver apparently occurring on one plane of the room bohedron.

A shipment is now sacking at the mine, from which phenomenal returns are expected. The smaltite of the vein presents no unusual features.

On the R. L. 402 Mr. M. P. O'Brien and associates have found several veins, one of which, about seven inches wide, is above the average richness of the region. In connection with all of these discoveries there are numerous disputes as to titles, ownerships, etc., and the land office has much work ahead of it in the way of hearings between the disputants. For some of the controversies suits-at-law are already begun, and a waste of good money in the courts is inevitable.

On the olden properties new veins have been uncovered. The Timmins property, probably the most valuable of the region, began work with two known veins, it now has over a dozen. The main shaft has now reached a vertical depth of 100 feet, and carries a total of 42 inches of ore at the bottom. Two of the veins, separate at the surface, have united into one which has a width of 22 inches; the two other veins are still



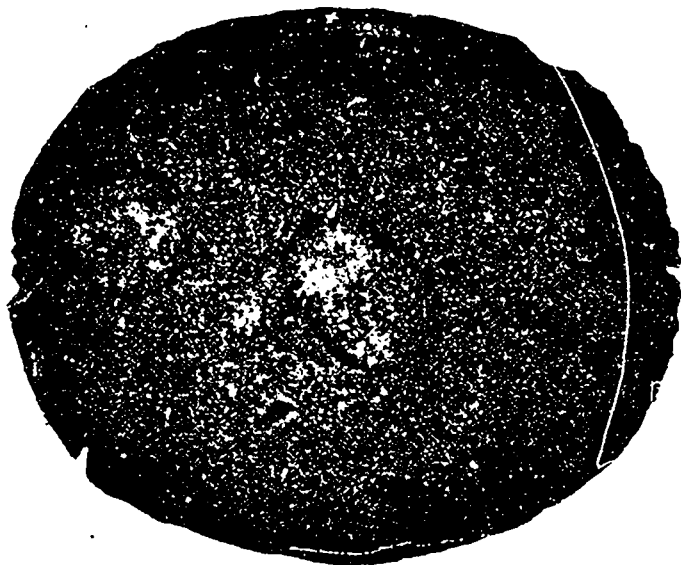
Bottom of Trethewey Shaft, from a Photograph taken at the end of June.

separate though converging, and, together, afford 20 inches of stoping ore. The value of the ore is reported by Mr. Henry Timmins to be higher than it was at the surface, and the fine grained "slate" or tuff (referred to in a previous article) still remain in the shaft. The shipments from the Timmins mine now exceed those of the Earle property (Nipissing Mining Company) and it ranks as the largest producer of the region.

The Drummond property has been incorporated under Dominion Charter as "The Drummond Mines, Ltd," and wonderful new discoveries have been made there. In April there were two known veins, there are now eight. The new discoveries are about 200 feet to the east of the old vein, and four

veins have been found within a width of 11 feet. One of these ranges from 5 inches to 22 inches in width, another of 7 inches and the other two are from $1\frac{1}{2}$ to 2 inches wide. The average aggregate width of ore in the eleven feet is from 17 to 18 inches. Another vein over 2 inches wide is known as the "Blue Jay." All of these discoveries are yielding ore of the value of \$1,000 per ton or better.

On the adjoining lot (269) owned by Jacobs, Steindler *et al.*, a unique discovery has been made in the south boundary of the lot. Here Mr. Robt. Jacobs, the superintendent, has a five to six inch vein, running north and south, which occurs in the diabase or gabbro. The northern end of the present opening near the contact of the gabbro and slate afforded magnificent slabs and nuggets of silver on the surface. No depth has yet been reached, the force being utilized to ship the outcrop to the boundary line. Whether a vein in the gabbro will contain silver minerals to the extent that it does in the slate is a question the answer to which is awaited with anxiety by many mine owners in the district. The occurrence of chalcopyrite and galena in this new vein may have no special significance, but the best informed believe it signifies the disappearance of the silver. A fissure in this eruptive will, in all probability, be of greater lateral and vertical dimensions than one in the overlying slates. The southerly extension of the Jacobs vein has been located by a Mr. Harsgraves, who at once began shipping the outcrop. At the time of inspection no valuable mineral had been exposed by this work. So far as the writer knows,



Microscopic Section Characteristic of the Silver-Bearing Rock of the Temiskaming District.

this vein is the only one in the gabbro which is being worked; its development will afford most valuable information.

Altogether the new mineral area in Coleman township has made a wonderful showing in 1905. Many experienced men from all over the country have been attracted to the region and their varied knowledge will undoubtedly keep forward its development. British Columbia has sent Messrs. Empey, Hamilton and Brigstocke; Michigan has contributed Mr. Foster; England, Mr. Lawson, and other countries other men. It is to be regretted that the local authorities and capitalists of the town of Haileybury and New Liskeard do not recognize the new conditions and meet them.

In summer the pleasantest way to reach the new district is to go via C.P.R. to Mattawa and there take the train for Temiskaming on the lake of that name. Here one finds a very good boat, built and equipped by the late Alexander Lumsden

(of Ottawa), whose estate owns the fleet of steamers which run from Temiskaming to New Liskeard. The S.S. "Meteor" is commodious, clean and well handled; its dining room supplies a good meal, and its waitress is an agreeable change from the abominations of the Haileybury Hotel. On the "Meteor," the fresh young waitress (whose name is Agnes, but should have been Hebe), serves you well cooked food with clean hands and clean table ware, but when you land at Haileybury and go to the "Vendome Hotel," you find the "lumber-jack" paramount. He who patronizes the bar, spending his money over a dirty slab of wood is taken care of while his money lasts, but the temperance man who cares more for a clean room and a place where he can sit without being trodden upon by drunken louts, had better pass by the Vendome and go elsewhere.

In contrast to the Hebe, already mentioned, one meets in the dining-room with a female in a pink blouse, who has dark hair, whose quantum of conceit is unmeasurable by any unknown unit, and whose hands—but that may be imagined. To the innocent request for "boiled eggs,"—this dark beauty (?) replies by shouting aloud to the kitchen, "This man wants eggs," whence comes the reply, "Tell him he can't have no eggs." There is no need to tell "him"—everybody in the room who is not deaf has been told already.

A new hotel is nearing completion, and the writer trusts it will have someone of intelligence in charge of it. Haileybury should have profited largely by the new mining industry, but it has refused to recognize its opportunity and much business has therefore gone to New Liskeard.

The writer also regrets to note that the Temiskaming and Northern Ontario Railway officials are increasing the freight rates on ore shipments by 33 1-3 per cent. If ore can be sent to New Jersey, from North Bay for \$5.00 per ton, it is nothing short of robbery on the part of the Ontario Government's Railway to ask \$3.00 to \$3.20 per ton from Cobalt to North Bay. The industry is too strong to be throttled by railway rates, but the Ontario voter has a loud voice and sooner or later makes the public hear him.

CORUNDUM MINING IN ONTARIO.

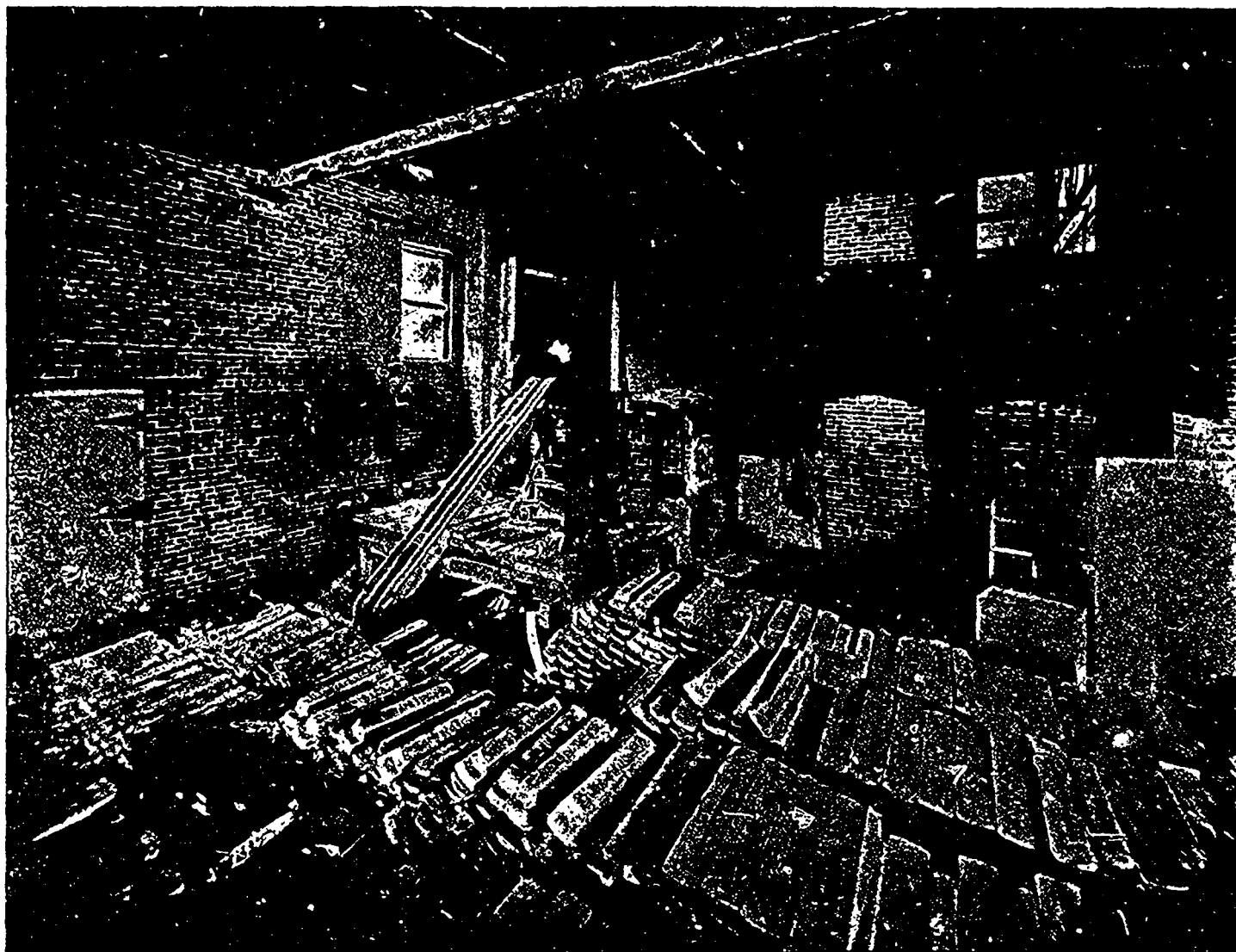
Some important improvements and addition to plant have recently been made by the Canada Corundum Company. The property was recently visited by Prof. R. Richards, the well-known authority on separation, who had been retained by the company to make a special report and advise as to the condition of the plant. The company having found that ore crushed fine to three millimeters, to free the corundum from the gangue, would not pass through the trommels. Prof. Richards informed the management that much the same difficulty had been experienced at the Calumet and Hecla mine, and he proposed overcoming it in the same way by designing classifiers which would replace the trommels. These classifiers will crush the ore to a fineness of three millimeters instead of six. The company has also installed new additional pumps, magnetic separators, additional graders and a dynamo. The mill has also been thoroughly overhauled, and its capacity increased from 100 to 215 tons a day, while the percentage of recovery has been also increased from between 55 to 60 per cent. to from 80 to 85 per cent. Milling operations were resumed during the first week of July. We expect to publish a complete set of photographs showing the new machinery at the company's mill in an early issue of the REVIEW.

THE RECENT ESTABLISHMENT OF LEAD-CORRODING WORKS IN MONTREAL.

Several months ago mention was made in the *MINING REVIEW* of a proposal to establish, in Montreal, lead corroding works, which would utilize pig lead produced in British Columbia, and supply the Canadian demand for the finished product, which heretofore had been imported. The first steps in the direction of establishing this industry were taken last October, when a company, incorporated under Dominion laws, was organized. The corporation is known as the Carter White Lead Company of Canada, Limited, the stock being largely owned by the shareholders of the Carter White Lead Company of Chicago. After the organization of the company, a portion of the old C. P. R. shops on Delorimier

granted, and our representative, accompanied by Mr. Carter and Mr. Board, the superintendent of the Carter White Lead Company of Chicago (and who also occupies the position of consulting engineer of the Canadian company), visited the works during the past month, spending a couple of hours or more in inspecting the various departments, and watching the process in operation.

The factory occupies a brick building extending from the corner of Craig and Delorimier Avenue northwesterly along Delorimier Avenue for a distance of something over 400 feet, the interior dimensions thereof being 400 feet long by 120 feet wide. The first section of the works is at present occupied by 80 corroding cylinders, arranged in four ranks of 20 cylinders each. These cylinders are built entirely of wood,



The New Lead-Corroding Works at Montreal.—Pig Lead from the Trail Smelter ready for "atomizing" in Melting Room.

Avenue was selected for factory purposes, and in October last the work of remodelling these shops and adapting them to the requirements of the new industry was commenced. The installation of machinery and plant was continued throughout the winter months, and, at length, in June, matters were sufficiently advanced to admit of the commencement of corroding operations. In view of the importance of the establishment of this industry, which may well be regarded as significant of the progress that is being made in connection with mining developments in Canada, permission was sought by a representative of the *REVIEW*, from Mr. P. M. Carter, the manager of the works, for the privilege of inspecting the company's plant. This permission was very courteously

and are 10 feet in length by 6 feet in diameter. They are rotated by means of a spur-wheel and worm gearing, and make four revolutions per hour. Each tank or cylinder is charged with 4,000 lbs. of metallic lead, making a total quantity of lead in process of corrosion, when the 80 tanks are filled, of 320,000 lbs., or 160 tons. These 80 tanks at the present time take up but one-half of the available floor area of the building, and the company intends, as soon as it is possible, to complete the plant by the installation of another 80 tanks, which will put the maximum corroding capacity of the works at 320 tons. The average length of time required for the conversion of the metallic lead into the mixture of carbonate and hydrate, which is desirable, is twelve days,

to which must be added two additional days, which are required, as will be noted in the following description of the corroding process. This makes a total of fourteen days as the average length of time between the filling of one corroding cylinder and the next filling.

The first step in the process is the "atomizing" of the metallic lead. The lead is received in the form of pigs, weighing about 100 lbs. each, and consisting of practically pure lead, the average analysis of the pigs being in excess of 99.7 metallic lead. These pigs are put into a large iron melting kettle, of particular construction, which holds 16,000 lbs., or 8 tons at one melting. This lead is brought into a molten condition in the kettle, and is then discharged from the kettle by means of a jet of steam under pressure. The melted lead

very appreciable amount of oxy-hydrates on the surface. This lead, thus subdivided, is raised in cars to a track running over the corroding cylinders, and each cylinder takes a charge of 4,000 lbs. of this atomized lead. After charging the cylinders with the lead, each 4,000 lbs. is treated with a solution which contains 14 lbs. of 28 per cent. acetic acid to about 40 lbs. of water. This solution is prepared separately in a small cask, or tank, running on a trolley on rails between the various tiers of tanks, and connected by a flexible hose to an air-pipe coming from the air compressor, from which tank it is spread over the lead in the cylinders in quantities sufficient to make the whole mass thoroughly moist, and to an extent which has been found by experience to be sufficient. The hand-hole doors are then fastened on the front end of



The New Lead-Corroding Works at Montreal.—The corroding tanks or cylinders. These are arranged in ranks of twenty, and are rotated by means of a spur-wheel and worm-gearing.

flows through a pipe connected with the bottom of the kettle, and the stream of lead, approximately three-eighths of an inch to one-half inch in diameter, in its passage through this pipe is atomized. There is connected to this pipe, in the manner of an inspirator, another pipe connected with the boiler, and through which is blown a jet of steam. The action of this steam on the molten lead is to atomize it, or blow it into minute particles, ranging from dust to perhaps 1-64 of an inch in diameter, and which are carried by the force of the steam jet into a condensing chamber, where the fumes and dust are both collected. The effect of this atomizing is not alone mechanical, but to a certain extent is chemical and oxidizing in its action, the resulting atomized lead showing a

the tank, and rotation is commenced. At the same time carbonic acid gas (CO_2) is blown through the revolving cylinders, to convert the acetate and oxide of lead into carbonate of lead. The generation of the carbonic acid gas, and its method of application is interesting. For the purpose of making as clean carbonic acid gas as possible, Connellsville coke is burned beneath the boilers of the plant, and burned as completely as possible to CO_2 . The products of combustion, instead of passing at once into a chimney-stack, and being sent into the air, are exhausted from the boiler setting by an exhaust fan, and passed over bog iron ore or oxide of iron in the form of Fe_2O_3 , either hydrated or dry, preferably hydrated. This passing of the gas over the oxide of iron re-

moves any sulphur in the combustion productions which is partially oxidized into SO_2 or SO_3 , and also serves to cleanse generally the carbonic acid from impurities. The exhaust fan forces, as it were, this cleansed CO_2 through pipes which run the whole length of the corroding house, and from these larger pipes the gas is distributed through $2\frac{1}{2}$ -inch pipes to the corroding cylinders. The pipe carrying carbonic acid gas enters the axial line of the horizontal cylinder through the front head. The gas traverses the 10 ft. length of the cylinder, and finds its way out to the tall brick stack, through a pipe axially located on the rear head of the cylinder. In this manner the interior of the wooden corroding cylinders is always filled with an atmosphere containing at least 10

of the foreman in charge, the hand-holes are opened, and the quality of the mixture inside is observed, and, if too dry, additional water is introduced and the doors again fastened on and the process continued. As a general rule, the heat generated by the chemical action is sufficient to dissipate a large portion of the moisture in the mass, so that the lead requires to be frequently sprinkled with water in order to make the chemical action uniform and speedy. After about 6 days the carbonate and hydrates of lead formed in the cylinder, through the agency of the acetic acid, begin to "lump up," or to make lumps or concretions of considerable size, varying from that of a marble to the size of a hen's egg. The rotation of the machine is then stopped, the contents dis-



The New Lead-Corroding Works at Montreal.—Moistening the atomized lead with a solution of weak acetic acid.

per cent. of CO_2 . It is particularly undesirable that this CO_2 gas should be mixed with carbon monoxide (CO), and it is one of the trade secrets or manipulations of the process to prevent this as much as possible, and also to get not more than 10 per cent. of CO_2 in the atmosphere which is found in the corroding chamber. Mr. Boand, the expert of the company, was most kind and frank in his explanations of the processes used, but it would be an unpardonable breach of courtesy to lay these details before the public in a printed article.

Inside of 24 hours a very considerable amount of heat is generated by the chemical action of the acetic acid upon the metallic lead. From time to time, according to the judgment

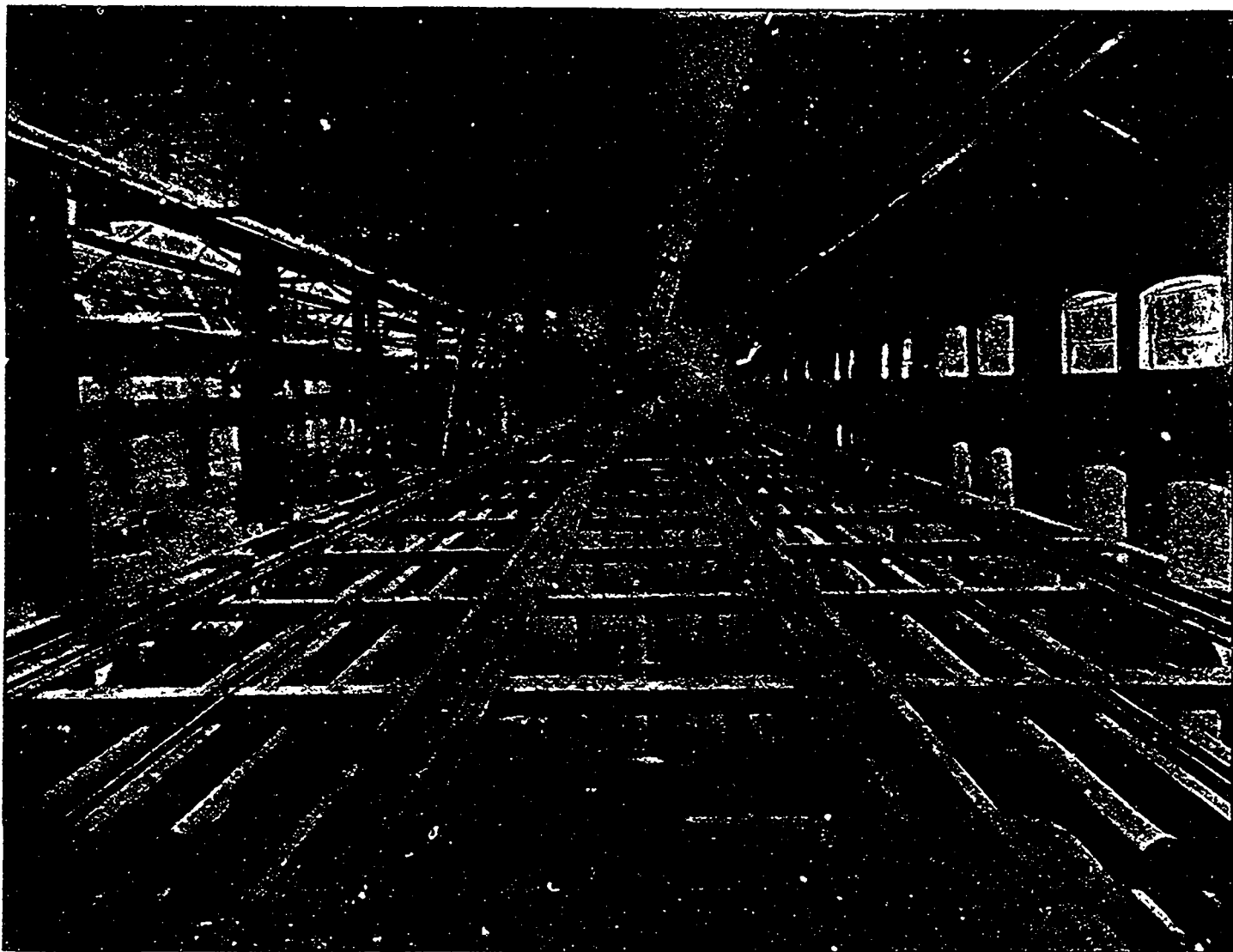
charged and taken to an attrition mill or pulverizer, fashioned very much like the old Whelpley & Storer mills of twenty years ago, which breaks up the lumps which have been formed and again converts the whole mass into a granular powder. The charge is again put into the cylinder with a fresh batch of acetic acid solution, and the rotation and carbonization continued for another six days on the average, by which time the lead has been converted from metallic lead into a product which consists (practically) of about 70 per cent. of carbonate of lead and 30 per cent. of hydrate of lead. The time of corrosion thus averages 12 days, to which must be added the one day in the middle of the process required for discharging and breaking up the lumps, and one more day re-

quired for the final discharging of the completed product. The average consumption of acid liquor is about $1\frac{1}{4}$ lbs. of the 26 per cent. solution of glacial acetic acid to each 100 lbs. of metallic lead corroded. It may be of interest to our readers to know that the acetic acid used by these works all comes from the Canada Paint Company.

After corrosion is finished, the discharged carbonated products are taken to a wash mill, where the excess of acetic acid is mostly taken out, and the uncarbonated portion of the metallic lead falls to the bottom of the washers through superior gravity and denser physical structure. The white lead which is in satisfactory condition is held, in suspension, in the wash water, and is discharged by overflows to circular

quality. The capacity of these three sets of dry pans is 35 tons per week for the three, or about 3 tons per week for each pan. Here the moisture is thoroughly driven off by the heat of the steam, and when the tanks are dry the circular frame work in which each set of four tanks is mounted is slowly revolved on friction wheels, and the whole mass of dry white lead is discharged by gravity into a large tank beneath the drying pans, from which it is taken and passed automatically through a weighing machine, and packed in barrels, which contain from 550 to 600 lbs. of the best quality of white lead which is found on any market to-day.

In the working up of metallic lead into white lead, there is a remarkably small loss, and we say this having full knowl-



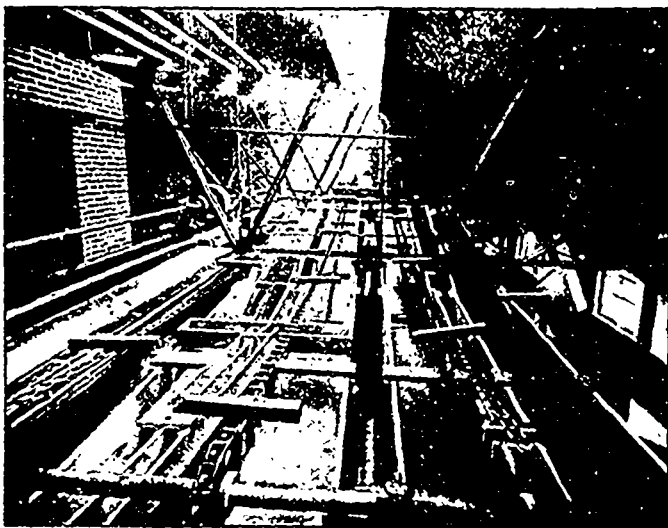
The New Lead-Corroding Works at Montréal.—View of the corroding department, showing system of tracks above cylinders.

tanks in which a reciprocating arm is moved back and forth by machinery, so as to produce an agitation. This agitation is kept up for a longer or shorter period to complete the discharge or washing out of any free acetic acid which may still remain in the product. After the washing has been completed, the agitation is stopped, and the lead and water pumped by means of a centrifugal pump to the highest floor of the factory, to tanks just beneath the roof, from which it is discharged into a series of drying pans, made of very heavy metallic copper, jacketed underneath with live steam from the boilers, and ranged in rows of four pans in three sets of dryers. These copper pans are each 25 feet long, 8 feet wide and 10 inches deep, and are made of 5-32 in. copper of best

edge of the increase of weight which occurs on converting metallic lead into the mixture of carbonate and hydroxide, which constitute the commercial white lead.

The engine room is equipped with a 300 h.p. Brown engine; a battery of two Lawrie boilers, equipped with automatic stokers, and two gas boilers; an Ingersoll-Sargeant air compressor, and a plant for generating electric light. Adjoining the engine room, a large store room is now being made ready, workmen being engaged in laying cement for the floors. The pig lead will be discharged here from the cars, which come direct by C. P. R. from Trail, and are run into the yard over a spur. When the works are in complete operation, the handling of both the raw material and the finished

product will be largely automatic, and in this regard mention should be made of the very ingenious device utilized for packing the white lead in barrels ready for the market.



The New Lead-Corroding Works at Montreal.—The elevator system by which the discharged carbonated products are conveyed to the waste-mill.

The present consumption of white lead in Canada is about 7,000 tons per annum, and it is the intention of the Carter



The New Lead-Corroding Works at Montreal.—The tanks in which any remaining acetic acid in the lead is freed.

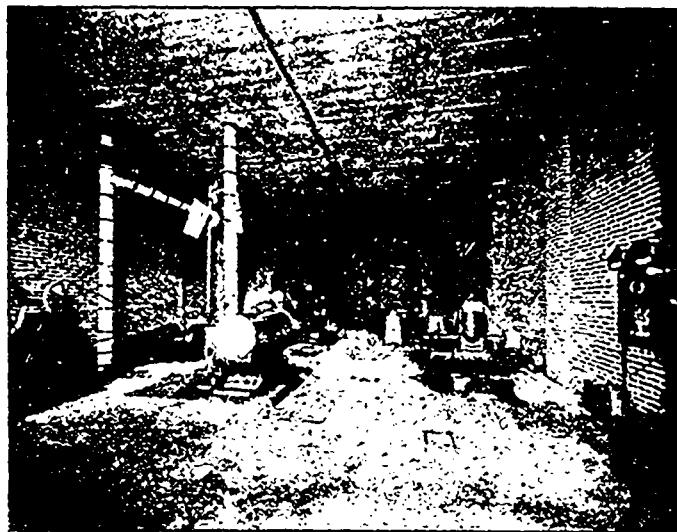
Company to lose no time in equipping the works to enable them to fully supply all Canadian market requirements. The



The New Lead-Corroding Works at Montreal.—The copper drying-pans.

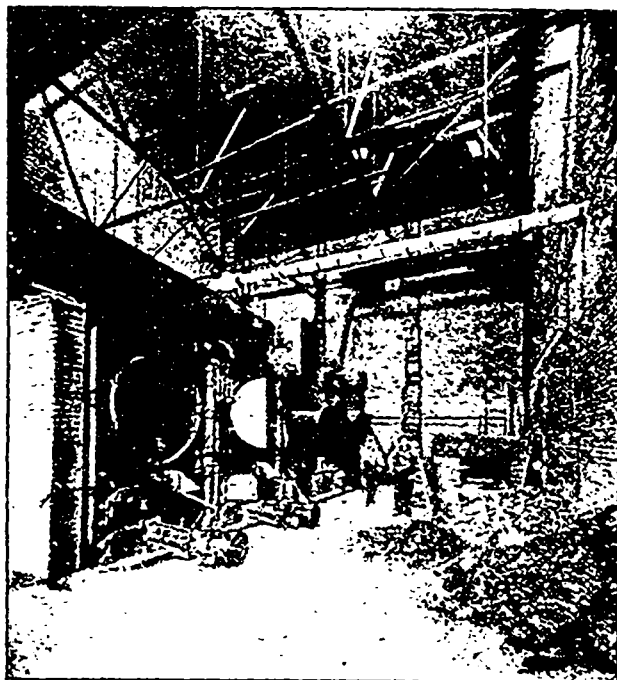
plant, in fact, has been so designed that it will be no difficult matter, when required, to increase the equipment so that a production up to 15,000 tons per annum may be easily maintained.

The works actually began corroding in the latter part of June of this year, so that the plant has not yet been a full month at work. Our illustrations give views of the corroding house, of the settling tanks, and of the wash mill apparatus and other departments, to which allusion has been made. The industry began under tariff conditions which imposed a duty



The New Lead-Corroding Works at Montreal.—The Engine Room.

of only 5 per cent. on dry imported white lead. As these lines are written, we are glad to note that the Dominion Government has duly recognized the importance of this new Canadian



The New Lead-Corroding Works at Montreal.—The Boiler Room.

industry, and has granted adequate protection thereto by raising the duty on imported white lead to 30 per cent. With the excellent quality of the product now turned out by the Carter White Lead Works, and the abundant supply of pure metallic lead furnished by the refinery at Trail, B.C., Canadian lead users and consumers may be satisfied that they are getting the best article known to the world under the designation "white lead."

MINE SURVEYING AS CARRIED ON AT CENTRE STAR MINE, ROSSLAND, B.C.*

(By L. HEBER COLK, McGill University, Montreal.)

INTRODUCTION.

The methods as described in this paper are those employed by the Engineering Staff of the War Eagle and Centre Star Mining Companies, as observed by the writer who was a member of the staff during the summer of 1904.

The manifest difficulties in the way of using the actual mine surveys for illustrating the paper, have led the author to assume an imaginary mine having but a general resemblance to the Centre Star. All of the maps in the present paper and the detailed references in the text refer to this imaginary mine, which may be briefly described as follows:—

Ore body consisting of two intersecting veins A. and B.

A. striking N. 80°E. dip 67° to N.

B. " N. 80°W. " 67° " N.

Both veins are cut by a reversed fault which strikes

N. 25°E.—dip 90°—throw 25 ft. to North.

The mine is assumed to have been sunk to the 5th level, with stopes on 1st, 2nd and 3rd. The shaft is located in the centre of outcrop of vein No. 1 and dips 65° bearing N. 10° W. This comprises a very simple mine but serves as a means of illustrating the methods employed.

I.—SURFACE WORK.

Since the surveying work carried on in connection with the mine is principally underground, the methods used in surface surveys will only be lightly dealt with.

For location work, a transit, with stadia cross-hairs is used. By this stadia method all buildings, etc., are located for plotting on the surface map. When a point is required to be located with any degree of accuracy, or when it is only a short distance from a station, as at the mouth of a tunnel, the work is carried on with a transit taking both horizontal and vertical angles and by measuring the distance on the slope with a steel tape.

As the prospecting was commenced by a tunnel, the surface workings were easily connected with the underground surveys. These were checked by sights down the shaft, which is at an angle of 70°.

The levelling is done with an ordinary Y level with a target rod or else a telescoping rod reading to 1/16ths of a foot. The line is generally levelled back to insure accuracy. All level notes are reduced to sea level.

Accurate bench marks were established at the mine by running a line of levels from the mine to the bench mark on corner of Bank of Montreal, in Rossland, which has been accurately located above sea level by the Canadian Pacific Railway.

II.—UNDERGROUND WORK.

The transit used in ordinary work has a horizontal and a vertical cross hair and complete vertical circle. (Two transits are used, both Buff and Berger,—one with and one without stadia. The one without stadia is preferable as there is no chance then of getting mixed on centre wire.) The compass needle is attached but is never used except as a rough approximate check. The transit telescope is never plunged. The rod used for contour work is five feet long and is brass shod at each end and graduated at every foot. The tapes are 50 and 100 feet tapes of steel ribbon, graduated to feet and 10ths of feet.

All bearings are worked out from the azimuth of the back sight, thus doing away with the use of the needle. Sights are taken on plumb-bob lines or on nails, and the transit read to minutes. Each angle is doubled so as to check reading.

Date	ADVANCE						Dist. from station	Dist. from	MEASURED FROM.		M	by
	Dist. from station	Dist. from	Dist. from	Dist. from	Dist. from	Dist. from			feet	feet		
Jan 10	0.00		0.00		0.00		0.00	0.78			X/11	Brass
" 13	12.00		12.00		12.00	1/4	12.00	"			X/10	"
" 20	12.00		24.00		24.00		24.00	"			X/9	South
" 26	80.00		78.00		68.00	1/2	74.00	"	6.00	0.79	X/8	Brass

Notes are kept up in a standard x-section book 5x8"x5" (6x8x10/10/15 inch)
 Conc = men working on Contract DP = men working on Day's Pay.
 Note book ruled to above form as required.
 FORM I
 Measurement of Advance

The stations are placed in back of drifts or in caps of square sets of timbers. When placed in backs, a hole about one inch in diameter is drilled at the spot where the station is required and a wooden plug is driven in flush with the back. This plug is from two to three in. in length. Into this is driven a horse-shoe nail with a tag on which is stamped the number of the station. The horse-shoe nail head is pierced so that a wire can be passed through it. A copper wire is then hung so that it can be conveniently reached from the floor of the drift.

(FORM II.)

Advance in _____ Mine.

For _____ Ending _____ 190__

PLACE	FROM	TOTAL SINCE COMMENCEMENT	ADVANCE	REMARKS

* Student's paper, presented for prize competition. and awarded first place by the judges. Transactions Canadian Mining Institute.

To illuminate the plumb-bob string, a piece of tracing cloth about four by three inches, mounted on a wire frame is held between candle flame and string. To illuminate the cross-hairs in the telescope, a candle is held a few inches in front of object glass and a little to one side. The plumb-bobs used are ordinary brass plummet with long tapering ends. No plumb-bobs with lamps are employed.

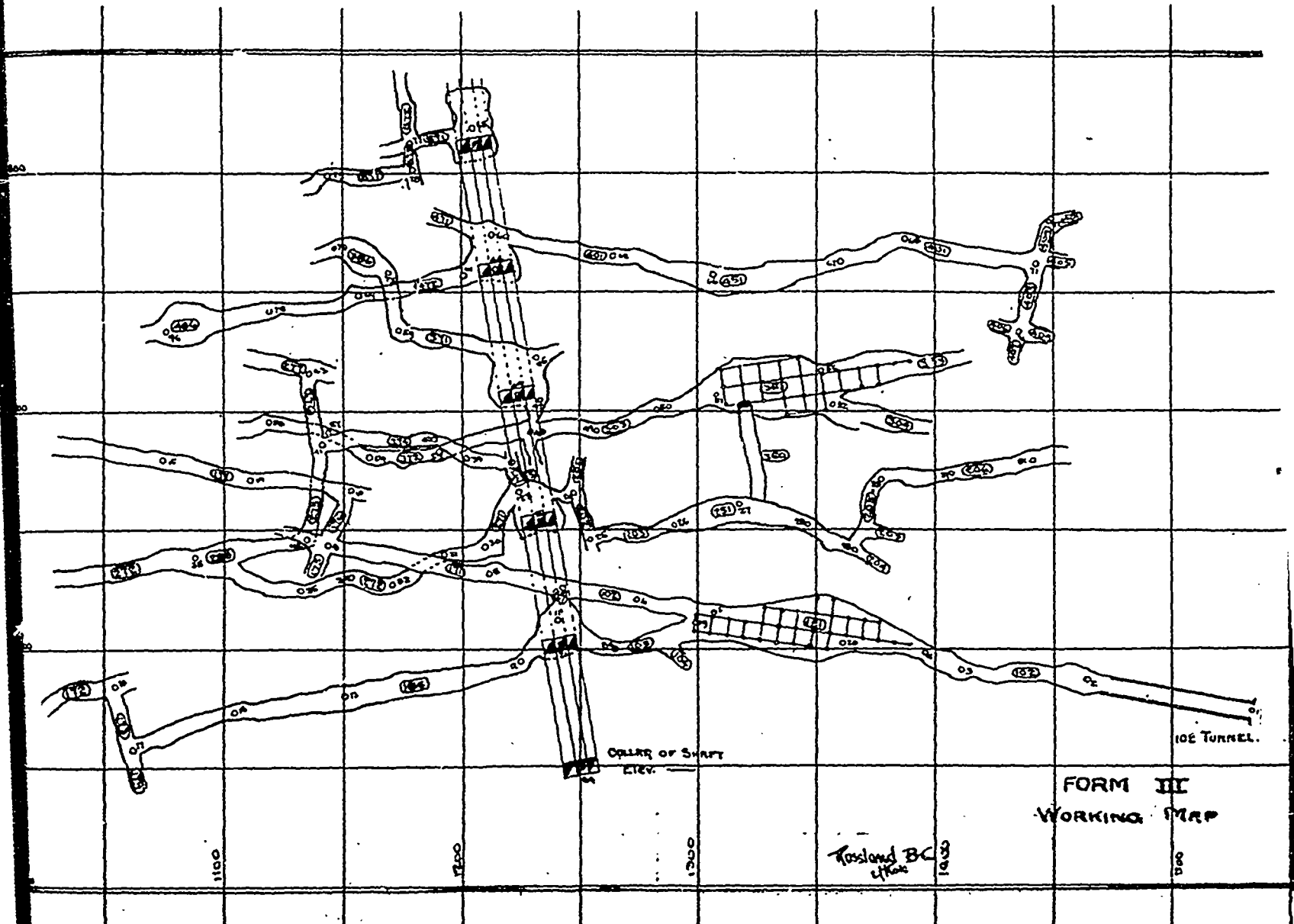
The transit tripod has telescope legs and is firmly built to withstand underground use.

When moving from one level to another the transit telescope is covered with a canvas bag.

A button is put on each plumb-bob string, which will slide up and down, and which can be set at any height required.

month. It is carried out as follows. (See Form III, working map, 4th level west of shaft.) The transit, tape, plumb-bobs and rod are used. The instrument is set up under station °75.

Station °76 having been put in and plumb-bob hung, the horizontal plate of transit is placed to read 0° and clamped to vernier. A back sight is then taken on the plumb-bob string on Station °69. The vertical axis is then clamped to plate and vernier let loose. A fore sight on Station °76 is taken and vernier clamped and read. The vertical axis is then loosened and the operation is repeated, thus doubling the former reading, if work is correct. If these do not agree, the angle is read a third time. The vertical vernier is set to read 0° , thus making



Measurements of Advance.—The progress made in drifts, winzes and raises is measured on the 1st, 11th and 21st of each month. This is done roughly with the steel band tape. The distance is measured parallel to sides of drift. Measurements are generally taken from some station if possible, or else some mark located on a previous measurement. This measurement is taken in connection with the calculation of the pay given to men when working on contract. Form I shows the method of noting these measurements. Reports are made out each month and handed into the general office. (See Form II).

Survey of Advance.—The advance made in the mine is the progress made in the drifts, cross-cuts, etc. The advance is surveyed accurately for plotting on the 1st and 15th of each

telescope line horizontal. The button on plumb-bob string is set in this horizontal line. The horizontal distance between the centre of the telescope and button is then measured and checked two or three times. The height of instrument above or below Station °75 is measured, as is also the height of the button below Station °76. This gives a means of obtaining the elevation of Station °76. If button cannot conveniently be set on the horizontal line, it is set in plain view from telescope and the angle of inclination is measured and the distance on a slope is determined. Height of instrument and height of button are taken as before and from these the H.D. and V.D. are calculated. The sides or contours between Stations °75 and °76 are next determined. The telescope is still sighted on Sta-

tion °76 and the rodman holding o inch end of tape and rod advances to instrument. Where irregularities in drift occur, he has his candle lined in by transit and he gives distances to L. and R. to the nearest ½ foot. At the same time, distance from instrument is read from tape by instrument man. The L. and R. given are always the L. and R. of instrument man.

The instrument is then set up under Station °76 and B. S. taken on Station °75, similar to preceding work. The F. S. is taken on candle flame held in centre of drift. The angle is not doubled since sight is not on the station. The height of instrument is not measured. If, as in this case, the drift widens out, extra sights are taken on the sides of the drift and distances measured to locate contours and H. angles are read. When work is required to be surveyed up to date, and a station in the proper place would be blown out by next blast, a sub-station or temporary nail is placed in ties or in board and this is used to survey to face. These are not numbered. For method of keeping the Notes, see Form IV.

position, and the rods are in the hole, these have a direction the same as the hole. They are extended as far as possible back into the drift. A sub-station, or mark on the free end of the rods, is located from the nearest convenient station. For illustration take location of D.D. No. 1, 1st level East No. 102 drift. The sub-station on the rod is located from Station 3 since Station 2 is too close. The instrument is then set up over the mark on the rod and sight taken to centre of collar of hole. The bearing of this sight is the bearing of the hole. When the inclination is required, the vertical angle of inclination to collar is read as is also the height of instrument above sub-station. The holes are generally horizontal. When surveyed, when drill is not in position, a long rod is placed in hole. Notes for this hole are to be seen on Form V.

Location of Square Sets.—The survey of square set in the stopes is carried out in the following manner. Form III. (Working Map) 1st Level East, Stope No. 151.

Transit is set up at Station 5. Back sight taken from Station °6 and Station °19 is located in ordinary way. Station °19 is placed in centre of a cap of one of the square sets at a measured distance from post on hanging wall side of it. This measurement is made from centre of post. Station °20 is then placed similarly in cap of square set as many sets away as possible. Transit is then moved to Station °19 and Station °20 is located. The bearing thus obtained of line from Station °19 to Station °20 is the bearing of the square sets in that scope. A rough sketch is taken of the square sets and the distances to walls taken so that contours may be obtained. The form of notes and method of keeping them is given, in Form VI.

486 Drift			Jan'y - /05				Surveyed by —		REMARKS
Station	Angle	Bearing	Dist	Stops	Vert Dist	HP	Hor Dist		
75	118° 00'	S 78° 00' W				34	109.5	To station °76 Plug in back 486 drift	
85.6	356° 00'						62.0	L - R	
							48.5	2.0 4.0	
							20.2	6.0 3.5	
								4.0 2.0	
76	179° 00'	S 77° 00' W					20.3	To face 486 Drift 2.0 2.0	
82.75							7.2	2.0 4.5	
	27° 00'	S 75° 00' E					30.0	To point ground	
	46° 00'	S 57° 00' E					27.7	do	
	96° 00'	S 7° 00' E					9.2	do	
	300° 00'	N 18° 00' E					22.7	do	
	230° 00'	N 49° 00' E					25.5	do FORM IV	

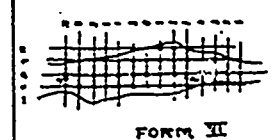
Setting Directions for Drifting, etc.—When the direction of a drift is required to be changed or a direction is needed for a diamond drill hole, a course is laid out by the survey department for miners to work from. This course generally consists of a couple of plugs in back of the drift from which strings can be hung to obtain line. The plugs are located by the transit. The plug nearest the station is located like a sub-station and the other plug is placed in line when telescope is set with the bearing required.

The Notes (calculations and bearings for the above sights) are worked out beforehand.

D.D. Hole.			102 D.D.H.				Jan'y - /05.		Surveyed by —		REMARKS
Station	Angle	Bearing	Dist	Stops	Vert Dist	HP	Hor Dist				
3	136° 00'	S 86° 00' W	4.25		14.7			To sub-station on end of drill rod			
86.4	170° 00'							To collar of hole			
Sub.	75° 00'	N 10° 00' W	10.5		18.3			(Station of hole)			
82.3											

Location of Bearing of Diamond Drill Holes.—The bearing and inclination (if any) of the diamond drill holes are determined accurately by means of the transit. When the drill is in

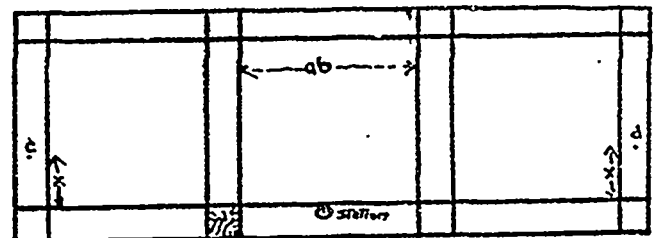
151 Stope (Location of sq sets)			Jan'y - /05.				Surveyed by —		REMARKS
Station	Angle	Bearing	Dist	Stops	Vert Dist	HP	Hor Dist		
5	320° 00'	S 20° 00' W				125	373	To station °19 nail in cap 2' horizontal from centre of post Q 27	
82.6	280° 00'								
19	30° 00'	S 70° 00' E				241	620	To station °20 nail in cap 2' horizontal from centre of post Q 46	
82.5	60° 00'								



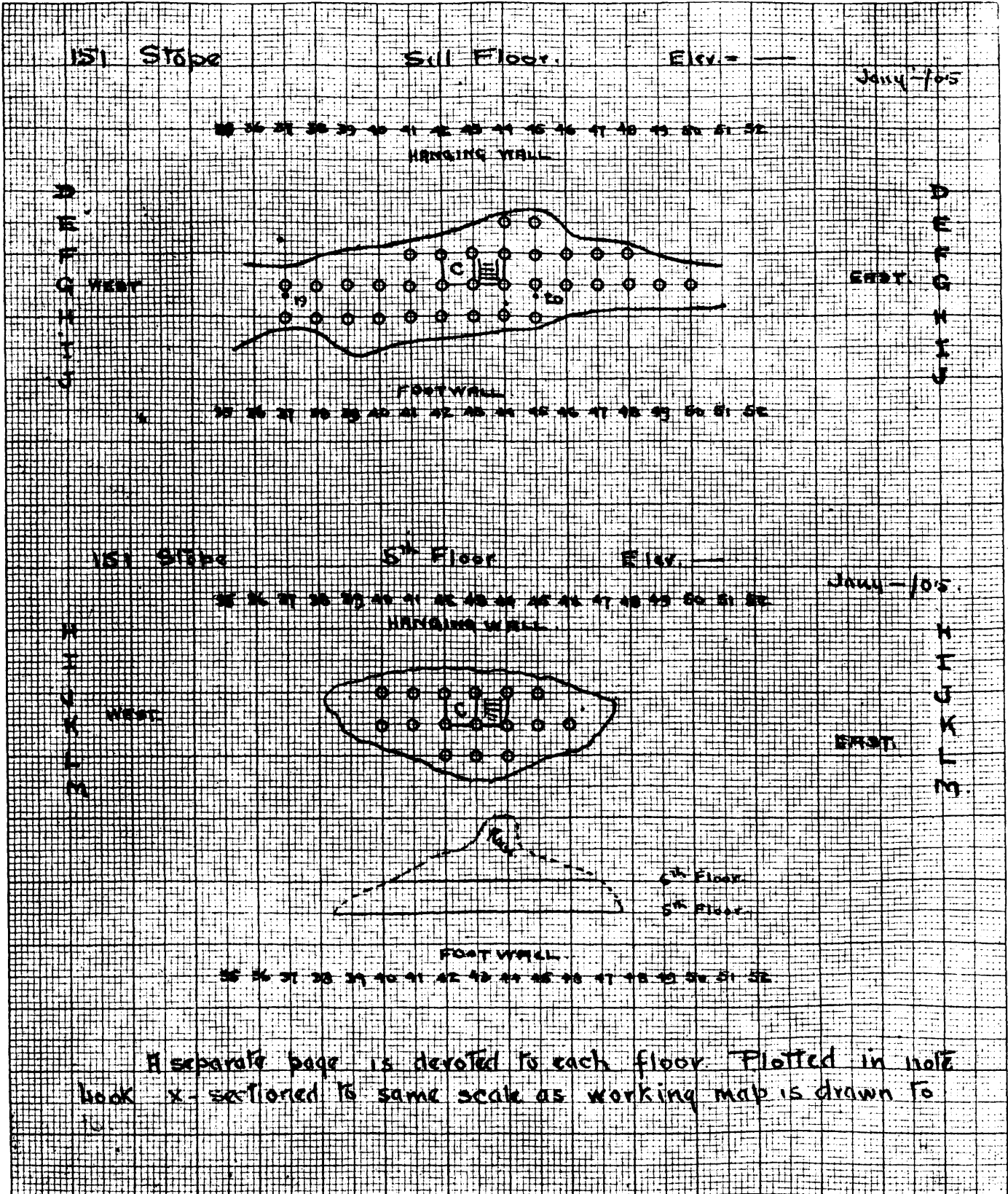
FORM II

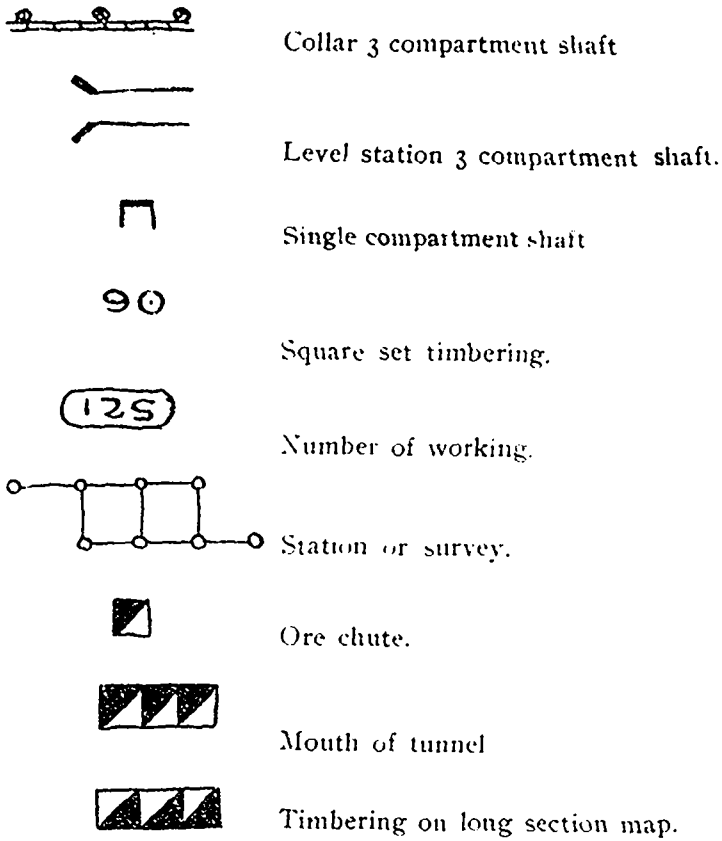
Survey of Stopes.—When stopes are of a width of 15 feet and over square set timbers are used; the stope is then surveyed as described under Section 2 of square sets.

Survey of Narrow Stopes.—The contours of these are located in the manner of a drift or cross-cut. A longer contour rod is used. For the long section map, the highest point in the back is located.



Shaft Surveys.—A station is fixed in football plate on centre line of compartment, centre compartment if there are three. (Centre is obtained by halving ab.)





Station Indexes.—An index is kept of all survey stations located in the mine and on the surface in connection with it. This index gives the place and date of location, N. and E. co-ords, the elevation, the reference to note book in which notes

Surface Map.—A map is kept of surface work and on it are plotted all the surface stations and boundaries of the claim. The lines of contour are plotted from the detailed levels taken of the claim. All mine buildings and roads and all tracks of C. P. R. are shown on this map as are also the mouths of the tunnels. This map is plotted on scale smaller than that of the underground workings. Ordinary conventional colours are used for the buildings, etc.

The Working Map. (Form III). This is the most important map in the whole mine. On it are plotted all the underground workings in plan.

This plan is drawn to a conveniently large scale. Each level is coloured a different colour so as to be readily distinguished. Every survey station is plotted and all the working places are numbered to facilitate reference. The sill floors of square set stopes are plotted. Only horizontal workings are represented, except raises. The plotting is carried on with a parallel ruler and the protractor before mentioned.

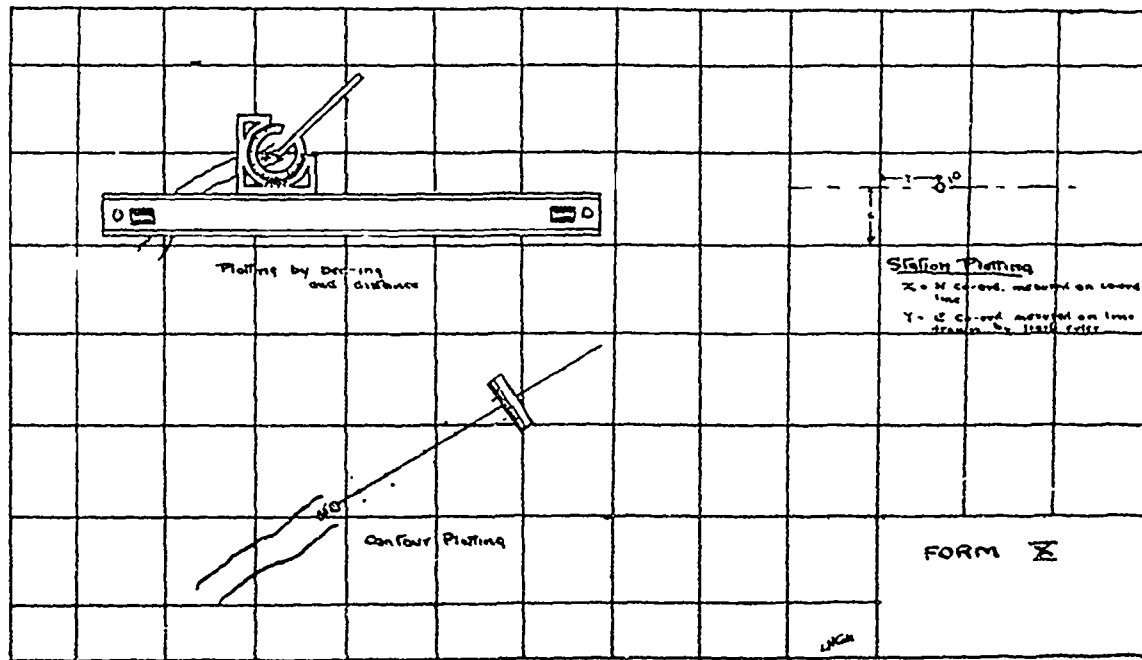
The map is ruled into 100 inch squares, with sides N and S., and E. and W. All plottings are made from these lines. These co-ord lines are numbered; the intersection of the two lines 0—0 being taken off the claim to S. W. so that no difficulty will arise by the co-ords of a point being negative. These numbers increase to the North and to the East.

The notes are plotted as in Form X.

Long Section Maps. (Form XI.—These are made in two ways:—(1) On the dip or (2) Vertical.

I.—On the Dip—

For this section a plane is generally chosen parallel to the average dip of the vein. The advantages of this are



of location are to be found and what kind of station it is; whether it is a plug in back or cap of square set, etc. If a question arises about any station it is looked up in this index and all particulars are at hand.

Conventions.—The usual appliances and instruments of a draughting-room are used. The protractor is one with a vernier reading to minutes made by Gurley.

Several 6 foot steel straight edges are employed. Ruling pens made by Altneder are used. Higgins' Inks and Winsor & Newton water colours are made use of. The conventions used on all the maps are as follows:—

(1). The actual slope measurements taken in the mine can be plotted on the section map without reduction.

(2). In calculating the cubical contents of stopes, etc., measurements can be taken direct by scale from this section.

II.—Vertical—

This is a vertical plane generally through the strike of the vein.

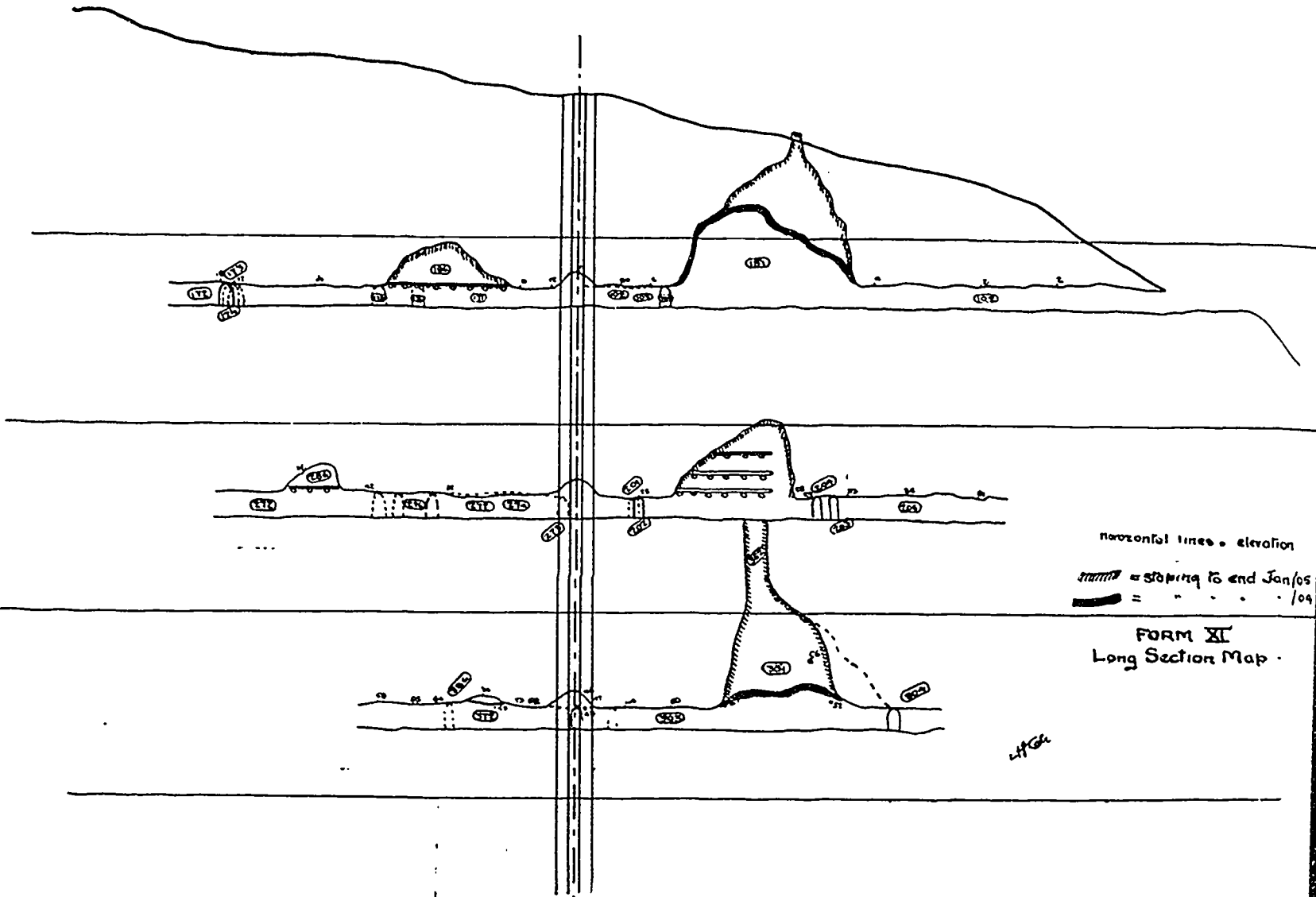
(1) If the vein is very irregular in dip, the above advantages do not hold and then the vertical plane is used.

(2). If there be more than one vein and these at differ...

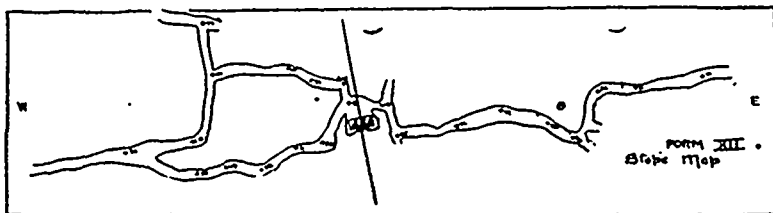
dips, by plotting these on the vertical, a direct means of comparison is established as actual elevations are here indicated.

For purposes of illustration three levels of a long section map on a vertical plane along strike of Vein No. 1 have been worked up. On this map all elevations can be plotted directly without change. For the horizontal distances, these are projected from distances on main map. Tracings are made for each level. These tracings are called stope maps (see Form XII). On these are located the bearings and H. D. of all points plotted in the stope. This is done in pencil so as to easily erase it. Then the tracing is lined up by central line on long

colour and when one projection falls on another, the one further away is put in dotted lines and a different colour. The cross-cuts projecting towards the vertical plane, i.e., into foot wall of vein are put in heavy continuous lines while those into the hanging wall are dotted. All stations are marked on this map in the colour of the drift in which they are located. The number of the working is also put in in same colour as that working. A line is put down centre of shaft in red to line up stope maps on. At end of each year the outline of stopes are put in ink (a different colour for each year) so that the amount of stoping done during the year may be seen at a glance.



section map either above or below the stope on which you are working. Parallel lines are drawn through the plotted points to the line of the shaft. The elevation of each point is located on its corresponding line and points so obtained are joined. The stope is thus completed.



In the case where stopes are located from the square sets the work is much easier. The distances are measured perpendicular and located.

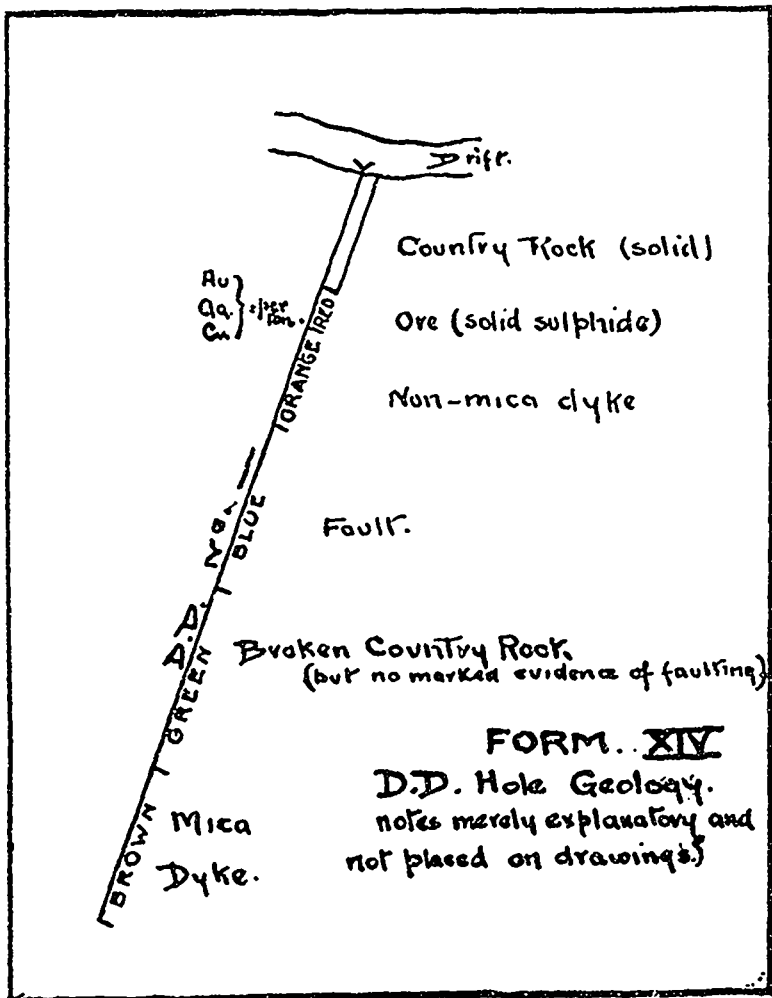
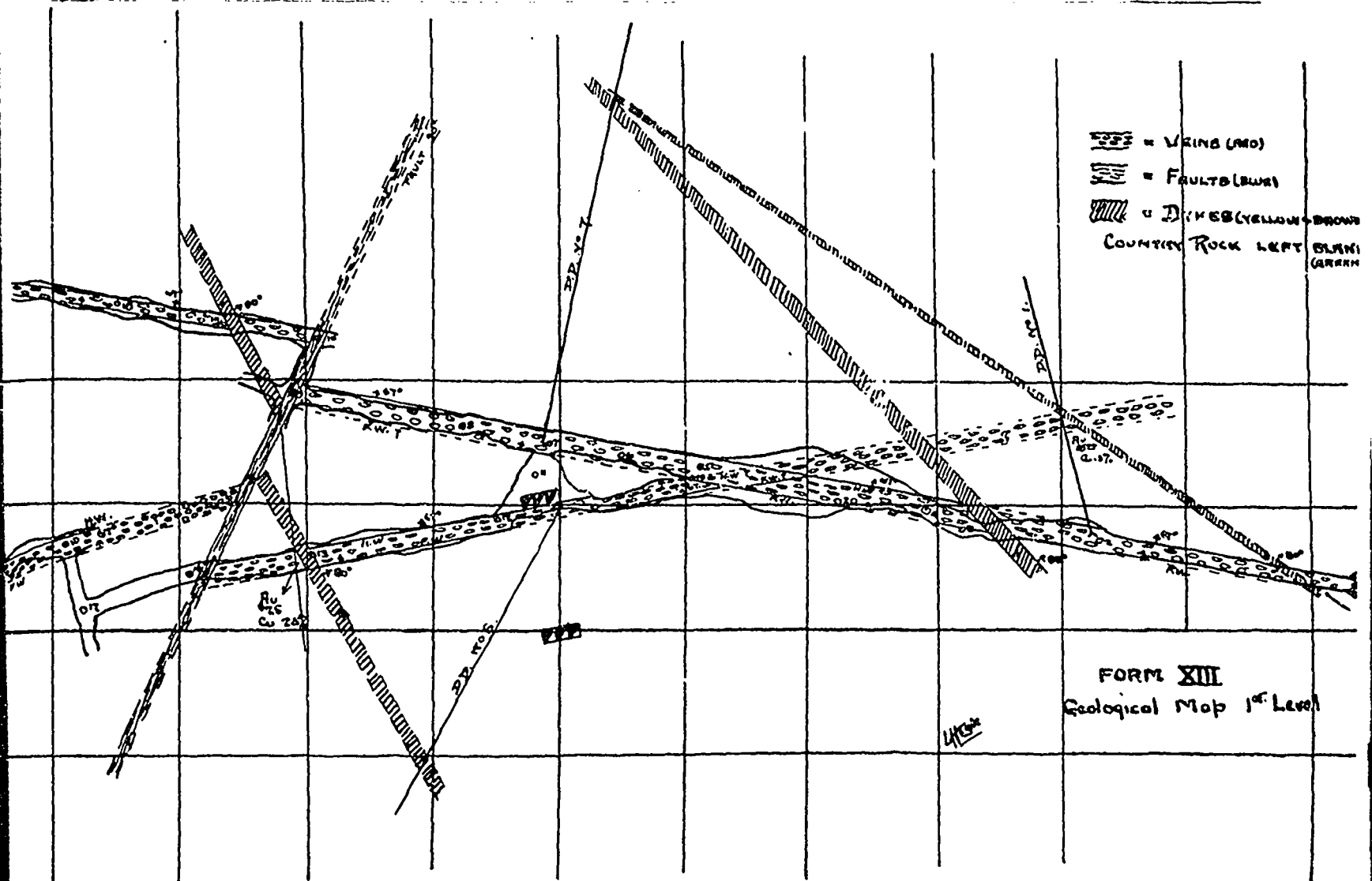
On the long section map certain colours are given to certain levels. The main drift on each level is given a certain

Lines of elevation are ruled across the map in yellow or purple ink at every 100 feet of elevation for facility in working.

When the long section is taken on the dip or plane of the dip of the vein, a table is worked out for values from 1-100 ft. on the vertical and their equivalent values on the plane chosen. This means the saving of a lot of time in reduction of elevation of points.

Geological Maps.—The particular geology of each level is worked up by the engineers and is plotted on tracings from the working map. Each level has a separate sheet. The work underground is plotted to scale on small vellum sheets about 10 by 8 inches. Each of these has traced on it a portion of the level. Thus there are a number of these sheets to each level. They are made to overlap each other. This is worked up twice a month.

When a small sheet is completed it is placed under big tracing and geology is traced through. When level is completed it is carefully examined and details are filled in where



intervening geology is obvious. The geology is put in with coloured pencils. Certain colours are used to represent the different geological structures, thus the [red] = veins, the [yellow] = non-mica dykes, the [brown] = the mica dykes, the [green] = the country rock, the [blue] = the faults. The hanging walls and foot walls of the veins are always marked H. W. and F. W. The dip of veins, dykes, etc., are indicated by \rightarrow and degree of dip thus $\rightarrow 85^\circ$ the \rightarrow always pointing in the direction of the dip.

The diamond drill holes are plotted on these geological sheets and their geology plotted on them. By help of these, many difficult problems of structure are often simplified. When a diamond drill core assays above a certain value the amount of Au, etc., is stated in small figures at that point. The geology of the diamond drill holes is plotted in similar coloured inks to the veins, dykes, etc. The plotting is done by drawing a parallel line close to line of hole and the geology is plotted between these lines. Each change is separated by a black line. When the core is greatly broken the space is dotted. Geological map of first level is shown in Form XIII. and Form XIV. gives method of plotting D. D. Holes.

The stations are marked on this map as is also the collar of shaft.

Assay Sheets.—Every assay is plotted on tracings. These tracings are enlarged three or four times by a pantograph from the working map. Their value in gold, etc., is given and width of sample taken in feet. Thus $\frac{5.5}{50.00}$ represents \$50 in gold in a sample 5.5 feet wide. The smelter's gross assay value is used. This is gross assay value less indirect charges. (Form XV.) gives method of plotting.

MINING IN THE YUKON.

By F. T. CONGDON.

The following is an excerpt from an interesting address recently delivered by Mr. Fred. T. Congdon:

Gold mining and the Yukon are inseparably connected and it is difficult to attract attention to the other great mineral resources of that country or to persuade men that the gold resources are not about exhausted. I should accomplish something for the Yukon if I were able to convince sensible men that its wealth of gold has only been scratched and that the future will see greater fortunes produced from that country than have been and that the coal fields, but more particularly the copper deposits of the Yukon are worthy of the attention of capitalists.

The mistaken idea generally prevails that the Yukon was practically discovered in 1896 and that mining was unknown there until that year. I think I am correct in saying that there was mining more than twenty years ago upon the shores of the Stewart River, a tributary entering the Yukon River, on its right limit, about seventy miles up stream from Dawson. There was also a mining camp at Forty Mile on the Yukon River near the western boundary of the Yukon, the 141st parallel of longitude, many years ago. When the discovery was made on the creeks near Dawson the miners from Forty Mile were among the first to stampede to the new district.

It will be interesting to sketch the evolution in mining methods in the Yukon since 1896. First, however, a word as to the formation of the country. There can be no doubt that the present level of the rivers is very much lower than formerly. On the hills in the vicinity of Dawson is found the clearest evidences. It was expected by the early miners in the country that gold would only be found in the creek bottoms. Later the discovery, on the benches and still later higher up on the hills, of gold, surprised the best miners probably more than it did the inexperienced. The wash gravel on the benches and hills displays as clearly as possible in many places the former levels of the river system. The White Channel, as it is called, appears at a level high above the present water, as well as beneath it, and exhibits most unmistakable evidence of the action of a large body of water flowing much higher than at present. On the surface of the land was found at first forests of spruce, bushes, moss, weeds and grasses. The woods and the moss in particular, prevented the land from thawing to any depth even in warm weather. At the roots of the moss would be found ice in mid-summer.

If Agricola (Mr. George Young) was correct, the same was true in many parts of Nova Scotia seventy or more years ago. The removal of wood, moss and the other covering of the ground has wrought a change in many places in the Yukon, and wherever the land is cleared the permanent frost line retreats many feet farther down from the surface than formerly. Most of the ground is frozen to an unknown depth except near the surface in warm weather. This is an advantage in mining chiefly in respect to the safety of the ground without much timbering. The top of the ground is usually muck, often very rich. This varies in depth from a few inches up to twenty feet or even more. It is a disadvantage to almost any form of mining, but more particularly in hydraulic mining. Beneath the muck in mining ground is usually found a depth of wash gravel of all degrees of fineness. In extent this varies from a few feet up to eighty feet or more in depth. Sometimes the pay is scattered throughout a considerable depth of this gravel, but generally it is not found more than from three to five feet above bed rock.

In former days the usual manner of mining was to sink a

shaft until bed-rock was struck. From the bottom of the shaft tunnels were driven following the pay ore on bed rock. The ground was thawed by burning cordwood in the mine and removing the thawed ground as long as it contained pay. It needs no imagination to appreciate how unpleasant and unhealthy was this mode of mining. The tunnels having been run to the limit of pay or of the claim, chambers were worked from the tunnels and the endeavor was first only to move pay dirt, and second to begin removing it as far from the shaft as possible, so that as the ground caved in it would not hinder carrying out to the shaft the remaining pay dirt. In those days the Dawson District was chiefly a winter camp. As the winter's frost helped to keep the ground up without timbering and stopped the flow of water it was cheaper mining in winter than in summer. The pay dirt was brought to the shaft and hoisted and placed in a dump near the shaft's mouth.

The first marked improvement was in the mode of thawing the ground. What are known as steam points were introduced; at intervals of, say, four or five feet, holes were drilled to a depth of two or three feet on the side wall or face of the drift in the pay dirt. Long iron tubes, steam points, were inserted in these holes and steam was forced into the ground through rubber tubes connected with the steam points at one end, and the engine at the other. The points were left in for four or five hours and then taken out and the thawed ground removed. While the ground was being removed the points were, of course, available for thawing ground on another face. The chief extra expense of winter work was occasioned by the necessity of handling the dump a second time in the spring when the water was running.

In summer mining, the pay dirt hoisted from the shaft can be dumped at once into the sluice boxes and the gold recovered. In winter work the dump required to be thawed and was shovelled into the sluice boxes after being loosened by the pick. This mode has been cheapened lately by placing the sluice box so that the dump is piled around and above it and using water to wash the dump into the sluice box. The richest pay is almost invariably near the bed rock, and the bed rock, which is generally soft, is removed to a depth of six inches or thereabouts, and frequently contains more gold even than the gravel.

For a time it was thought that the frozen ground rendered working by hydraulic methods difficult, if not impossible. Experience has proved that what was deemed a disadvantage is quite the contrary. All that is necessary is to make an open cut from the surface to bed rock, and as the exposed ground thaws, turn on the water. As the opening thus increases, the area of thawing ground constantly increases. The process of thawing disintegrates and makes the ground easier to move when the water is turned on than in dry ground. The water from the ice in the thawed ground helps the water supply.

When it is remembered that the ordinary wages in the Yukon are five dollars a day and board, it will be appreciated what a saving can be effected by water. By ordinary placer methods it is impossible in the Yukon to work ground yielding less than two dollars to the cubic yard of pay dirt.

In California, ground, I believe, is hydraulicked, which yields five cents to the cubic yard. The same methods will certainly work successfully twenty-five cent ground in the Yukon, and there are vast tracts of ground in the country that will average over fifty cents to the cubic yard. The hills back of Dawson which cover a large area average much higher than fifty cents per cubic yard. The greater part of

Bonanza, Eldorado, Hunker, Dominion, Gold Run, Sulphur, Quartz, and All Gold, for a distance on each of not less than ten miles and for an average distance of fifteen miles, with their benches, hills, tributaries, and gulches of vast extent, would yield most magnificent profits, if worked by the hydraulic method,

Even in the portions which have been worked by ordinary placer methods, if they were re-worked, by hydraulic method, splendid returns would result. There are more fortunes to be made by companies acquiring good extents of auriferous ground and bringing on water, than have been made by individuals in the past, and fortunes of much greater volume. The gold output of the Yukon fell to \$10,000,000 last year. It will probably still further decline for a year or two, but as soon as capitalists make the large necessary investments and supply water, the output will jump up even beyond the old figures of twenty and twenty-five millions. I have not enumerated one-half the known auriferous creeks of the Territory. Hydraulic propositions of splendid character are so numerous as to make choice difficult. The only trouble is getting water and here is where capital is required, and where capital will undoubtedly reap rich returns. Ground that will not pay wages when worked as at present will produce rich returns for its owners when worked by hydraulic method.

In some instances pumping plants have been installed to provide water.

At Chechako Hill, by means of an engine of about 300 horse power, water is pumped to a height of 300 feet and still has force enough when it reaches that elevation to tear out the ground. Others have similar plants. The first mentioned probably cost when installed, \$350,000; others cost nearly as much. But in addition to the larger original cost, the difficulty is the cost of operation. To run such an engine as the one at Chechako Hill, takes fifteen or twenty cords of wood per day and wood costs \$15 or more per cord. And \$450 or \$500 per day will not more than cover operating expenses. On the other hand, water provided for hydraulic work by gravity may involve much capital for original work, but current expenses are small.

Last summer a ditch to bring water to a reservoir on the Hill in the rear of Dawson was built. Running to the left and round the hill was a water sluice, which continued for a distance of eight or nine miles and to the right about three-fifths of a mile to a large natural reservoir which required only slight work to make it capable of holding many millions of gallons of water. This ditch crosses what is called "The Slide." The ditch and the reservoir are 600 feet above Dawson. The hill back of the slide, and to the right rises to the Dome, a height of about 2,000 feet above Dawson.

Now, the construction of the ditch and reservoir cost probably not over \$40,000. The ditch has a capacity of 2,500 miners' inches. With its elevation it can furnish ten better streams than the one furnished by the plant at Chechako Hill, and each stream can be handled at about one-thirtieth the cost of that.

Bonanza Creek is about a third or half a mile wide at its entrance. It extends for a distance of over twenty miles, and probably averages one-third of a mile or perhaps a little more in width.

In the gravel the pay is found throughout from a few feet below the muck to bed rock. Where the men work is about 350 or 400 feet above the Klondike, and the reservoir mentioned above is about 200 or 250 feet still higher and in a straight line from the Klondike. The Dawson is about half a mile

to the left. The reservoir is just to the right. All the ground to the height of land on the left and higher on the right for a distance of about a mile, will pay handsomely for hydraulicking. After this is finished, which will take years, the water from the reservoir can be syphoned across the Klondike and used to work the hill to the left or the Bonanza. There is in that vicinity one of the greatest deposits of pay gravel to be found in the world. Formerly the channel apparently crossed from the level of that hill to where the men are working and at about the level they are or a little higher. On the side of the Klondike opposite Dawson are benches which also carry pay, not rich enough for ordinary placer mining, but most profitable for hydraulicking. These can also be worked by syphoning water from this reservoir.

But this ditch is only a beginning. A contract is about to be let for a ditch to bring water from Twelve Mile River, a tributary of the Yukon River about eighteen miles north of Dawson and called Twelve Mile River, because, *lucus a non lucendo*, it is not twelve miles from any place, that anyone knows of. This ditch, with the flumes, and pipes which must be used in places, will be over forty miles in length. It will bring the water to a reservoir about 600 feet above the reservoir of which I have been writing above and therefore 1,200 feet above Dawson. Its capacity will be 10,000 miners' inches. To construct this ditch with the reservoir named, and several others in its course, and syphon the water across Bonanza and carry it up that creek for eleven miles will cost, it is estimated, about \$2,500,000. It will be carried up Bonanza to the mouth of Eldorado and will there have an elevation of over 500 feet. The whole of Bonanza with Gold Hill and the other rich hills can be worked with this water and it can easily be later carried up Eldorado for miles and afford water for working that creek.

Water is now supplied to small operators at the price of nine dollars per sluice-head per hour, and even a higher price is often paid. There are 40 inches in a sluice head. Nine dollars, therefore, equals 22½ cents per inch per hour. If the company had 10,000 inches to deliver at the mouth of Eldorado as described it could easily dispose of it at five cents per inch, which for a day averaging say 20 hours would mean one dollar per day for every inch of the 10,000. The season for hydraulic working is of about 125 days' duration. The possible income of the company from the sale of water may be easily estimated from these figures, although, of course, some deduction must be made for accidents and emergencies.

But in addition to the first sale, the company can easily recover a first and even a second time a large portion of the water sold and resell it. The later sales will, of course, be at a lower figure, because of the lesser pressure, but it is considered that a second sale of 10,000 inches of water recovered can easily be made at say 2½ cents per inch.

When all possible allowance is made, it will easily be seen that the company is likely to receive back its capital investment in very brief time. Not only will this work be most profitable to the company that constructs it, but it will be of the greatest possible profit to mine owners, who will be enabled to get water, and can, after paying the price named, work their grounds at only a fraction of the present cost.

Of course 10,000 inches does not supply all the water needed. There is ample work and good returns awaiting half a dozen companies each supplying that quantity of water.

The dredge is a feature in the Klondike, and I had intended to give some descriptions of its operations and of the great area of ground in the Yukon fit for dredging. There are

hundreds of acres in the basin of the Klondike, near Dawson, that are now known to be profitable ground for dredging.

There is as yet practically no quartz mining. On the Violet Hill group of quartz claims, on the left limit of Eldorado, and about three miles from that creek, a lead has been prospected to the depth of a couple of hundred feet, with tunnels as long, and all in solid ore. Whether the property will pay for milling will shortly be demonstrated. Many other leads are known to exist and are now also being proved. Considering the wide distribution of quartz in places, the excellent quality of the ore, and the fine showing from small development work, I have very great confidence in the ultimate establishment of a great quartz mining industry. The best ore has been found at a considerable distance from Dawson, and in a region in which quick development can only result from large expenditure. Once the profitable value of a deposit is established, cost of freight will quickly be reduced by construction of good Government roads; but, in the interval, the high cost of freight, etc., makes large sums go a very short way in development.

It is too early to speak more than the language of hope with regard to this branch of mining, but I shall be greatly surprised if the disclosures of a brief time do not astonish the world. It is to be hoped that if the results justify these expectations, that Canadian manufacturers will be able to meet the demand for machinery and other supplies that is certain to ensue.

Many seams of coal have been located, and several quite extensively worked in the Territory. The works of the Dawson Electric Light and Power Company, which not only furnishes light and power in Dawson but also on the creeks to a distance of many miles from Dawson, are operated by steam generated by coal. The coal is brought from Coal Creek, a tributary of the Yukon River, 30 or 40 miles below Dawson. Twelve miles of railway have been constructed from the coal mine to the Yukon, and several hundred thousand dollars expended upon the whole undertaking. About three hundred miles above Dawson is another coal mine, which has the great advantage of having its pit head just by the river. The coal from this can be mined and shipped very cheaply, and the seam is probably the best coal yet developed in the Territory. The different coals vary from lignite to anthracite, a seam of the latter having been located near White Horse.

The mention of White Horse brings me, in conclusion, to the splendid copper deposits that are being developed there. The copper belt extends in a crescent shape for a distance of sixteen or more miles around White Horse, at a distance in the nearest place of about three miles from the town. On this belt development work has been done in many places, costing in the aggregate not less than \$100,000.

The greatest amount of work has been done on the Copper King. A shaft has been sunk for 200 feet, and tunnels driven for 400 feet. The ore is of splendid grade, averaging over 23 per cent. copper, with gold and silver values. It almost furnishes its own fluxes, and is highly thought of by the smelters to which it has been shipped to the amount of many hundred tons. A smelter will doubtless soon be erected at White Horse, as the near vicinity of the copper ore, of fluxes and coking coal furnishes all the requisites for a great industry. When it is remembered that less than nine years have passed since the rush to the Yukon in 1896, and that in the interval the rich placer deposits have naturally occupied the greater part of the attention of every one within and without the country, it will be seen that quartz, copper and coal mining have made fair progress.

THE LATE DR. A. R. C. SELWYN, C.M.G.—HIS WORK IN CANADA.

By H. M. AMI, M.A., D.Sc., F.G.S.

It was on the first day of December, 1869, that Selwyn took charge of the Geological Survey of Canada, which had from its inception, in 1841, been carried on by Sir W. E. Logan. Selwyn had arrived in Canada in October of the same year, and vigorously set himself to the task of studying and revising the reports which had been received from the various assistants, who included the following well-known geologists:—Sir Wm. E. Logan, Edward Hartley, T. Sterry Hunt, Robert Bell, James Richardson, Charles Robb, and H. G. Vennor. Besides the above, Robert Barlow and his son, Scott Barlow, had charge of the topographical and cartographical part of the Survey, whilst Elkanah Billings was the palaeontologist, with Messrs. Horace Smith and Thomas C. Weston as assistants, one as an artist, and the other in charge of the museum work, skilled lapidary, préparateur, etc.

When Selwyn became Director of the Geological Survey of Canada, and deputy head of the same, the confederation of some of the British Provinces had only just been effected, and accordingly there was now open to him a much wider field of investigation than to his predecessor. As one after another the different provinces became part and parcel of the Dominion of Canada, the work increased correspondingly, and to such an extent was this the case that the staff of geologists and assistants had to be materially increased, and at the same time men had to be trained to pursue the good work of the old *regime*. It can be safely said that the staff of the Geological Survey of Canada has never been, and even now, is altogether inadequate to cope with the immense field open in the mineral resources of Canada as the Dominion is constituted to-day.

This period was one of great activity in the Canadian Survey. The first copies of Logan's large "Map of the Geology of Canada and adjacent parts of the United States," prepared for the engraver by Robert Barlow, were received during the first month of Selwyn's administration, from Edward Stanford, the publisher, Charing Cross, London.

As an instance of the great activity and energy displayed by the second director of the Geological Survey of Canada at the outset of his career in Canada, it may be remarked that he not only proposed to Hon. Joseph Howe, as Minister or Head of the Department under which the Geological Survey of Canada was placed, various points bearing on the usefulness of a geological survey from a practical standpoint, but also presented the annual "Summary" report of the geological investigations made by the staff during the previous year.

He further impressed upon the Government the advisability of placing a special appropriation in the estimates of the year for the distribution of Logan's large map just received, submitting at the same time a list of public institutions, libraries, etc., where the said map would do a great deal of good to Canada.

In 1870 he investigated the gold fields of Nova Scotia, and prepared an important report giving the result of his work there. (See "Report of Progress, Geol. Surv. Canada, 1870-71," pp. 352-82, Ottawa, 1870).

In the following year, under special instructions from Hon. Joseph Howe, he undertook an exploration in the remote province of British Columbia, "on and in proximity to the several lines which will be explained by the engineering parties (of which Mr. Fleming, now Sir Sandford Fleming,

was engineer-in-chief), and on one or the other of which the future Pacific Railroad will be located." In the "Report of Progress," 1871-72, is given an account of the results achieved during these explorations. The route selected by Selwyn took him from Hope on the Fraser via Fort Colville, the Kootenay River and the Columbia to the Howse Pass, and afforded facilities for returning later by waggon road, 378 miles, from Cariboo to Yale. Not only the coal fields, gold fields and other occurrences of economic value, but timber, soil, water power, agricultural and numerous other features of special value and interest were recorded, together with systematic descriptions of the various geological formations met and their relation to one another in the stratigraphical series, from the oldest up.

Then, in 1872, we find him journeying from Lake Superior to Fort Garry (now Winnipeg) and in the "Report of Progress," 1872-73, we find no less than three special reports on the silver mining localities of Thunder Bay, on the geological investigations from Lake Superior to Fort Garry and on the Acadia iron ore deposits. In the following "Report of Progress," he gives the result of his investigations on the geological exploration in the Northwest Territories from Fort Garry to Rocky Mountain House. (Loc. cit., pp. 17-62.)

In the following year Dr. Selwyn remained for the most part of the year in the office, attending to the numerous and onerous duties incumbent upon him as director, and preparing for the extra work imposed upon him in connection with the Canadian exhibit at the Centennial Exhibition held in Philadelphia. In the "Report of Progress," 1875-76, pp. 28-31, he gives the summary of his own explorations in British Columbia, and on pp. 31-69 presents his "Journal of the Expedition through the Peace River Pass." On pp. 292-293 he adds an important note on a boring made in 1875 on the Swan River, in the territory now within the Province of Manitoba. He also prepared a map of the region from Quesnel, British Columbia, to the junction of the Peace and Smoky Rivers. In 1876-77 ("Report of Progress" for those years), "Notes on the Quebec Group" appear, a subject to which he gave considerable attention, and in which he did much to differentiate from that series those rock formations of volcanic origin. In the report of 1877-78, pp. 1-5, further notes are given "On the Stratigraphy of the Quebec Group" (of Logan) and older crystalline rocks of Canada. This is said to be one of the best attempts ever made at a systematic classification of the most ancient and difficult rock masses. The following year's report (1878-79), Selwyn's work in the Eastern Townships and other portions of Quebec is given, and a "Note on the origin of granite treated as metamorphosed strata, not intrusions" occurs in the "Report of Progress" for 1879-80, pp. 5-6. The same report contains also an account of boring operations in the Souris Valley in Assiniboia (pp. 1-11). On pp. 51-55a, the fossil plants collected by Dr. A. C. R. Selwyn at Roche Percée and determined by Sir J. W. Dawson are recorded and described. His work on Lake Superior Region during 1882 is embodied in the report for 1880-82, pp. 16-17, together with a report on an exploration in Manitoba during the same year on the White Mud and Souris Rivers.

"On the geological nomenclature and colouring and notation of maps" forms the topic of an important contribution from his pen, pp. 47-51, of the "Report of Progress" for 1888, followed by additional notes on the geology of the south-eastern portion of Quebec, pp. 1-7a, and followed later in the report by a note on the accuracy of the plan of the mouth of the Moose River surveyed by R. Bell in 1883-84, besides a summary of the work of Selwyn during 1883 on Lake Su-

perior, on the Souris coal district in Assiniboia and in the Cascade coal basin of British Columbia.

Selwyn leaves behind him a career full of usefulness to the Empire. His work was truly of an Imperial nature, for it extended not only into various portions of Great Britain, but also of the distant colonies of the Mother Country, to the Island Continent of Australia and to the Dominion of Canada.

There is little doubt that the state of efficiency of the Canadian Survey grew apace with Selwyn. Having had for many years closely associated with him as chief adviser and assistant the late and lamented Dr. George M. Dawson, Selwyn led the ship through thick and thin successfully. It cannot be denied that it was under Dr. Selwyn that the Survey reached the height of its career and efficiency in carrying out the objects and aims for which it was instituted.

Selwyn's aim from the first was to make the Geological Survey of Canada an eminently practical department in which the records of mines and mineral statistics would be kept for the use and information of parliament and the public.

A "MISCARRIAGE OF JUSTICE"—THE ROBERTS ASSAULT CASE.

To the Editor:

Sir:—What would appear to be a grave miscarriage of justice, and one that will have very serious and far-reaching effects on the mining industry of this province, occurred at the May sitting of the Supreme Court of British Columbia, in Nelson.

The circumstances were as follows: Mr. M. S. Davys, who is one of the oldest and best known mining engineers and mine managers in the Kootenays, was operating some mines in the Slocan, near the town of Silverton, on Slocan Lake. Finding it impossible to satisfactorily run the boarding houses with white cooks, Mr. Davys decided to employ Chinese cooks. This was resented by the Miners' Union at Silverton; Mr. Davys was threatened, and, finally, a shot was fired and the bullet passed very close to Mr. Davys' head. John Roberts, the president of the Silverton branch of the Miners' Union, was arrested and tried for attempted murder. The evidence seemed to be unusually clear and direct, but the judge summed up strongly in the prisoner's favour, and he was acquitted.

In order to clearly understand the circumstances, it is necessary to trace the history of the Silverton branch of the Miners' Union. During the labour troubles in the Slocan, in 1899, the Silverton branch of the Miners' Union passed certain resolutions. The printed account of these resolutions contains, among others, the following:—

"Resolved,—That we do not consider ourselves any better than the miners of the Coeur d'Alenes. Outrages and arrogant wrongs have ever provoked and should provoke violence. The history of no country needs to be closely searched to find records of violent resistance to tyrants. . . . The Coeur d'Alenes blew up the Bunker Hill mill. Let tyrants take warning."

These resolutions were rescinded and expunged from the minutes after the arrest of Roberts, and before his trial.

The evidence at the trial was as follows:—

- (a) Mr. Davys testified that Roberts had threatened him.
- (b) A witness testified to having seen the prisoner fire the shot and then move away in the direction of his cabin with the gun in his hand.

(c) A witness testified to having seen the prisoner directly after the shot was fired leaving the spot described by the previous witness, and going in the direction of the prisoner's cabin, with a gun in his hands.

(d) A constable and a special constable testified to having found footprints in the snow at the point described by the previous witnesses. They followed these tracks to the door of prisoner's cabin; that they entered and secured prisoner's rubbers; that these rubbers exactly corresponded with the tracks. Also that on a shelf at the head of prisoner's bed they found three cartridges for a 44.40 rifle, having a metal patch, and being similar to the bullet fired.

(e) A witness testified to the prisoner owning a 44.40 rifle, and using cartridges with a metal patch.

The witnesses for the defence did not disprove any of these statements, but testified to the general good conduct of the prisoner. The prisoner, in his evidence, denied the statements of each witness for the Crown; accused the constables of having manufactured evidence against him; testified to having seen the constable place an empty cartridge behind a stump near his (prisoner's) cabin; denied having ever possessed bullets of the kind produced, namely, with a metal patch.

The evidence of the prisoner's guilt would seem to a man of ordinary intelligence to be complete and conclusive. The judge refused to allow the prosecuting attorney to call evidence in rebuttal, and after summing up in the prisoner's favour, said (as reported in the *Nelson Tribune*, of May 13th): "If it was inconceivable to think that Constable Black concocted evidence, wasn't it monstrous to think that Roberts should fire into a roomful of men?" Apparently the prisoner was acquitted because the crime, if committed, would have been "monstrous," but the constables are to be deemed guilty of having "concocted evidence," and the other witnesses of having committed deliberate perjury, simply on the evidence of the prisoner.

The Provincial Police of British Columbia are an exceedingly fine body of men, and it is largely due to them that this province has been so free from crimes of violence; and it seems extraordinary that a judge should so lightly brand them with "concocting evidence," when to the ordinary man they seem to have done their duty in a most creditable manner. This will hardly encourage them to use their best efforts to bring criminals to justice.

One of the most favorable features of the mining industry in British Columbia, and one that has been recognized and appreciated by both capitalists and miners of the United States, as well as by Canadians and Englishmen, has been the security of life and property, and the immunity from crimes of violence. It has been recognized that the law was enforced without fear or favour, and that punishment quickly and surely followed crime. Such a decision as this in the Roberts case will go far to destroy this confidence and to encourage the lawless element which is always to be found in new and sparsely settled districts.

A mining engineer is bound to take into consideration all matters which may affect the interests of those who employ him, and who invest their capital on his recommendation, and in future he will not be able to include among the favour-

able conditions in this province the security of life and property and the certain punishment of crimes of violence.

I am, Sir, your obedient servant,

LESLIE HILL.

Nelson, B.C.

THE ELMORE PROCESS IN ROSSLAND.

To the Editor:

Sir:—I beg to enclose a cutting from the *Sandon Mining Standard*, of May 20th, concerning the Elmore Process, and its application to the Slocan dry ores, a copy of a letter from Mr. Elmore, dated June 7th, in reply to this article, addressed to the Editor of the *Sandon* paper, and a copy of a letter received from Messrs. Alexander Hill and Stewart, dated May 18th, retracting certain statements which appeared in their annual report, and which caused a lot of comment by the press.

In your issue of January last, in an article on the Rossland Power Company's new plant, there was reference made to "the now discredited Elmore Process," but I hope that after having looked into these enclosed particulars, that you will see that the temporary failure for us to make money in this camp has not been the fault of the process, but on account of the absurdly low grade material we have had so far had to work on.

Our plant at the Massey Mines, Ontario, is doing very well, and I think that in the course of the next year there will be quite a lot of copper mines in Eastern Canada having enough value to treat by the Elmore Process although not rich enough to smelt direct, and not suitable for any other treatment, that will adopt our process.

I am, yours very truly,

H. H. CLAUDET.

EXTRACT FROM CUTTING.

"The Elmore oil process has had a more or less checkered career in British Columbia. So much was promised and so little apparently fulfilled, that although its people persistently claim it did not receive a fair show, still on account of the poor success attained the process has been condemned.

"It appears that the process is well enough, but that its application to such low grade ores as the Rossland camp affords, has given it a 'bad black eye.'

"The company is therefore recommended to make a thorough examination and test of the dry ore districts along the North Fork of Carpenter Creek, the Bear Lake district and along Slocan Lake.

"In all our experiments with the oil treatment, on slightly different lines to the Elmore method, it is found that the selective action of oil is strongly marked in these ores. In the Bear Lake district the minerals are grey copper, brittle and native silver, black sulphurets and antimonial silver. In the grey copper, instead of sulphur, we find selenium: in this case the ore being a selenide of silver and copper. The minerals are sometimes disseminated through the quartz gangue, the quartz being very hard, the mineral soft and friable, and it is doubtful if any system of water concentration would give extraction values enough to warrant putting up a plant.

"Here is where the Elmore Process would do great work. By locating the plant at a central point near the mines, so that several of them can easily and handily reach it, with a minimum of transportation expense, it would be possible to cut out nearly all the waste matter, thus saving the large amount

of charges now incurred in shipping the ore to the smelter. When it is known that probably less than 5 per cent. of the ore now shipped is the valuable bulk, and that this 5 per cent. has to stand charges in packing and freight and treatment of the 95 per cent. waste, it will readily be seen that a process which can cut out this expense will be a large factor in making these districts rich mining camps.

"On the North Fork of Carpenter Creek the ores are similar in character to the Bear Lake ores. There are good places for mill sites with water power, and it would be necessary to install small plants on each side of the divide to accommodate the mines and prospects.

"The ores of the Slocan Lake district are not as well suited to the process to deal direct with oil, as they contain more or less percentages of lead and zinc blende. Water concentration, with the oil process as an auxiliary treatment, would, we believe, solve the troublesome problem of concentration.

"It is quite safe to say, that if the Elmore people had spent one-tenth of the money in this field that was spent in the Rosslund camp, they would have had a good business, and the process would have received a boom. Our dry ore districts would have been benefited and would now be turning out a large output of silver and other metals."

LETTER FROM MR. ELMORE.

In the beginning of your article you say: "So much was promised and so little apparently fulfilled" in regard to the Elmore Process at the Rosslund camp.

May I point out to you that, as a matter of fact, more has been accomplished in the actual working of the Elmore Process Plants in the Rosslund camp than was ever claimed for them.

In the case of the Le Roi No. 2, for instance, they sent to this country a bulky parcel of their ore for the purpose of being tested. The value of that ore was about \$8.25 per ton for gold, silver and copper. The trials were carried out under the immediate supervision of a consulting engineer appointed by the Le Roi No. 2 Co. The results were considered eminently satisfactory, and it was decided that a small plant should be erected on the mine, with a view to ascertaining if under local conditions as good results could be obtained as had been secured in our testing works in London.

It was pointed out by us and by the engineers of the Le Roi No. 2 Co., that no profit was to be expected from the operation of so small a plant, under the particularly unfavorable conditions of expensive labour, expensive power, and high cost of oil in Rosslund.

The Le Roi No. 2 Co. quite recognized this obvious fact, and we contemplated the erection of a very much larger mill if the technical results achieved by the small plant warranted it.

The two unit—50 tons per day—plant was in due course erected, but instead of the ore on the dumps averaging \$8.25 per ton, as the sample sent to London indicated, the values were found on milling considerable quantities to be in the neighborhood of \$2 or \$3, and notwithstanding every effort on the part of the Le Roi No. 2 Co. to even mine ore of a milling grade, as a matter of fact they never succeeded for any considerable length of time in supplying the mill with ore of much more than \$4.50 per ton; but perhaps the most serious difficulty was the evident utter impossibility of supplying ore in sufficient quantity to even keep this small mill continuously in operation.

It is manifest that if one's labour bill and establishment charges are going on continuously when a plant is only work-

ing for about half its normal working time, that costs per ton must necessarily be high. This is precisely what took place at the Le Roi No. 2. I think it is safe to say without actually referring to the figures, that the mill never ran more than about half its rated time, because the management were incapable of supplying the necessary quantity of ore to run it night and day full time.

We feel that the unfortunate over-valuation of the quantity and quality of the ore on the dumps by the Le Roi No. 2 people has done us an infinite amount of harm, but when in the actual report of the Le Roi No. 2 Company there appeared figures which we knew to be absolutely incorrect, we naturally took strong exception to them.

All the monthly reports which were received from the mine, which were agreed between our representative, Mr. Claudet, and the then management of the Le Roi No. 2, showed that the final tailings from the oil plant had a value of about \$1.25 for gold, silver and copper.

This undoubtedly proved excellent work on the part of our plant, but later on the Le Roi No. 2's Annual Report stated that the final tailings from the oil plant assayed \$2.10 per ton, and we naturally sought an explanation of this discrepancy.

Mr. Couldrey, the late manager, happened to be in London recently, and I had an interview with Messrs. Alexander Hill and Stewart, consulting engineers to the Le Roi No. 2 Company, and with Mr. Couldrey.

The explanation of the discrepancy between these figures is that whilst the agreed monthly reports gave the actual assay of samples properly taken with automatic samplers, the figures quoted in the Annual Report were the result of mere calculation.

Mr. Couldrey admitted this, and Messrs. Alex. Hill and Stewart, recognizing the injury that had resulted to us, were good enough to write a very frank letter of explanation, a copy of which I enclose herewith.

I think you will accept this letter of Messrs. Alex. Hill and Stewart's as being an authoritative statement as to the real cause of the shutting down of the Le Roi No. 2 plant. It disposes once and for all of any suggestion of a failure of the Elmore Process on that mine, and we are naturally desirous that the real facts in the matter should be known.

If the Le Roi No. 2 Company had supplied the mill with the ore of the same grade as they sent us to make our trials upon, a handsome profit would have resulted, even when working the small plant, and under the particularly disadvantageous conditions prevailing in Rosslund.

In regard to the oil plant erected on the White Bear mine, at Rosslund, here again the plant gave every possible satisfaction in working, the grades of concentrates produced was excellent, the extraction of values secured was all that could be desired, and the one and only difficulty which existed was the failure of the ore supply. As a matter of fact, the value of the ore sent to the concentrator at the White Bear did not exceed the cost of mining it, to say nothing of the cost of crushing, concentration, smelting of concentrates, etc.

We naturally feel it a gross injustice to us to condemn our process or plant because of the failure of the mines to produce ore with any reasonable value in it. We have never claimed to create values. All that we have claimed is that we have an excellent economical process for recovering the values where they exist.

You will doubtless be interested to hear that our plant erected on the Massey mine, in Ontario, is doing most excellent work. We have several other plants under construc-

tion, some of them about to start, in different parts of the world.

In regard to your suggestion as to the treatment of the dry ores of the Slocan district, doubtless Mr. Claudet, our representative in Rossland, will be happy to tell you what he has so far accomplished in this connection, and I am writing him on this matter by same mail.

Perhaps you saw the letter on page 958 of the *Engineering & Mining Journal*, of New York, for May 18th, 1905, in which are stated results obtained by the Elmore Process on a silver-bearing galena with a heavy baryta gangue.

I beg to remain, yours faithfully,

For the Ore Concentration Syndicate, Ltd.,

(Signed) A. STANLEY ELMORE.

LETTER FROM MESSRS. ALEXANDER HILL AND STEWART.

We much regret to learn from Mr. Stanley Elmore that wrong conclusions appear to have been drawn from the figures published in our report regarding the working of the Oil Concentration Process at the Le Roi No. 2 Mine.

This being so, it is only right we should say at once that our report was not intended in the least to condemn the Elmore Process.

The operation of the oil concentration plant at the Le Roi No. 2 was suspended chiefly because the grade and the quantity of the ore on the dumps had been over-estimated, and, as it was found on further development of the mine that it was entirely a "shipping proposition," it became impossible to find even enough concentrating ore to keep the small trial mill at work at full capacity.

Owing to the particularly unfavourable conditions prevailing in Rossland when your mill was started, it was essential to commercial success that the Elmore Process should be worked on a large scale, which the Le Roi No. 2 Company were unable to do for reasons above stated.

The difference in the figures of tailings values quoted in the earlier and later reports, to which attention has been drawn, is easily accounted for, because those in the earlier reports were the result of actual agreed assays, when the automatic samplers were working, whereas those in the later reports were calculated figures only. The method of arriving at tailings values by calculation had to be resorted to in this case because of the subsequent failure of the automatic samplers during cold weather.

The agreed results of actual assays during January and February, 1904, viz., \$1.30 per ton (total gold, silver and copper) as the value of the tailings for these months can therefore be safely quoted as correct.

We need hardly add that we still have a high opinion of your interesting process, and we trust to hear that the greatly improved conditions in Rossland have enabled you to find a large extension of its application in that camp.

Yours faithfully,

(Signed) ALEX. HILL & STEWART.

THE RECENT INCREASE OF DUTY ON WHITE LEAD.

The Nelson Daily News, in a recent issue publishes an interesting interview with Mr. James Cronin, of the St. Eugene Mining Company, on the above subject. We quote as follows:—

"The prompt action of the Liberal Government has done much towards helping the mining situation in the Kootenay. We have now something solid, and what is more, something permanent. Its results should be seen immediately and its results will be more and more apparent as the time goes on.

"For the last year, according to the figures given by Mr. G. O. Buchanan, and published recently in your paper, the output of the province, on which a bounty was paid by the federal government, was 27,000 tons. Of this amount 11,000 tons were sold in Europe and 16,000 tons marketed through the local smelters. This year there will be no such 11,000 tons of bounty ore sold in Europe. The bounty on export ore has ceased. Then it is the province of the smelters to dispose of, to market, the whole production. That is to say at least 27,000 tons.

"That is the problem, indeed. Now the total amount of lead used in Canada is about 16,000 tons. The new duties, which cover practically the whole of this Canadian market, will allow the Trill smelter and the other smelters to dispose of in the Dominion, about 13,000 tons. There remains a difference of 3,000 tons. Perhaps I am too conservative in saying that the new duties, one way or another, will only cover 13,000 tons, but I like to be on the safe side. There are numberless ways in which the products of lead may and do yet come into Canada. Speaking as one of the outside public I put down that leakage at 3,000 tons.

"Last year, therefore, there were marketed in Europe 11,000 tons, in Canada 7,000 tons, and in the Orient, China and Japan, 9,000 tons. The new duties will give an added market in the Dominion of about 6,000 tons. Very well, then, it is apparent that during the year to come the marketer has to dispose of 27,000 tons, putting the production of lead at the same figure as that of last year. For this he has a market in Canada of 13,000 tons, in the Orient 9,000 tons and then there still remains a surplus of 5,000 tons which have to be disposed of, in Canada, in Europe, or in the Orient.

"Now, I have already explained that in the Orient the market was for 9,000 tons, and in Canada 7,000 tons, to which may now be added the additional 6,000 which is coming to us through the effect of the lead duties which are now being imposed. The European market, available to us during the last fiscal year, because of the bounty is now apparently cut off. The problem seems, therefore, to be insoluble. But this is by no means the case.

"It must be remembered that the Orient market is something new to us. Not long since we had no share in it. Now we have. That market is due to the energy and acumen of Mr. W. H. Aldridge. Why, I do not know, but it is true, nevertheless, that the chief competitor of the British Columbia lead ores in the Orient market, Australia, is apparently dropping out of the competition and Mr. W. H. Aldridge is evidently the master of the situation. Australia is shipping to Europe and elsewhere. Therefore, we may look to an increased market in the Orient. Whether it will absorb the extra 5,000 tons, of which we have to dispose this year, remains to be seen. Mr. Aldridge could probably answer that question better than I. But you may remain secure upon this point, which is, that the St. Eugene will not curtail its shipments of ore because of the new duty or because of the cessation of the bounty upon exported lead ore. It is far more likely to increase the output.

"And this leads us into the question of the European market. But, be it remembered, before entering in upon this complicated phase of an intricate subject, that when the Orient is considered it must be regarded as the natural market of this country. Canada is nearer to the Orient than is any other country of the hemisphere in which we are living. The only possible competitor is the United States. But the United States is not a competitor. Its production of lead is about equal to the demand. In fact, it is slightly short and some lead has to be imported. Europe cannot compete. It is too far away. We can market our lead more advantageously than can Europe. Australia can be a competitor but, as I have already said, Australia is finding markets for its shipments other than the Orient.

"Now, European smelters are getting from all over the world much high grade silver ore. Any smelter man will tell you that in order to profitably smelt this, lead ore is wanted. But it must be lead ore of a high grade, 60 per cent, or over, otherwise the shipper is paying for much silica in his transportation rates. Lead ore of the description alluded to is favorably quoted by the European smelters. It is the dry ores that have to pay the high rates, just the reverse of the condition that obtains in this country. Hence the European smelters are giving a much more favorable rate than is paid by the local smelters. Again the price of lead is climbing up. Four years ago the price was around £11 and £12. Now it is higher than it has been for years past and is near £14, consequently mines which possess high grade lead ores might find it more profitable to ship to Europe than to ship locally.

"When the mines can make \$5 to \$6 better profit by shipping abroad than in having the output treated at home patriotism is liable to have to take a back seat.

"On the other hand, it is to be remembered that the bounty on lead obtains up to nearly £16. When lead has gone over £12 10s. it is the same to the lead producer because of the sliding scale of the bounty, as far as his pocket is concerned, up till the time it reaches £15 16s. 3d. Still the whole thing is a matter of figuring. The smelters here will have to come down in their prices. The Huntington-Heberlein process, the ability of getting a constant and regular supply of ore, may help them in doing this. Probably it will. The market, as I have shown you, will take care of itself. On the whole, the imposition of the duty will result in a permanent good to the lead mining industry of the Dominion.

"As to the other phase of the subject, that of fluxing of dry ores, that also is important. The ore of the Centre Star and of the War Eagle will run about 1 per cent in copper, the War Eagle probably a little better than that figure, the Le Roi probably better still. But to get clean slags it is necessary that the copper contents of the ore should be at least two per cent. If that is not there, then there is necessary the admixture of either more copper or of lead. Hence the greater production of lead in the Trill and other smelters will permit of the cheaper reduction of dry ores, whether those are gold-copper or silver-lead ores heavily intermixed with silica. For the reduction of lead a certain amount of silica is necessary. Hence the Rossland siliceous ores will find that it is to their advantage to be smelted in a reduction works that is handling lead especially such siliceous ores as are low in copper percentages.

"So it will be perceived that the question has an infinite number of ramifications and cannot be considered alone from any one point of view. But you may take this as a summary: The St. Eugene is more likely to increase than to decrease its output, that the War Eagle and Centre Star will ship just as usual, that I, as a layman, have no doubt as to the market being found, and that the increased price of lead will open the European market, possibly merely temporarily, and that the duties on the imported products of lead will give a permanent advantage, which cannot be lost, as long as they remain in force, to the mining industry."

MINING IN THE KOOTENAYS.

(From a Special Correspondent.)

There have been two events in the Kootenay during the past month which will leave their mark upon the history of mining in this province. The one is the transfer of the Goderham interests in the Rossland camp and in the St. Eugene, and the other the successful demonstration at the Sullivan Smelter in Marysville of the practicability and economy of the Huntington-Heberlein roasting process.

It is probable that the former will settle all idea of an amalgamation of the Le Roi with the other interests for the present, although noted by the officials of the Le Roi. It would seem to be probable that the mines and smelter will be under the general management of Mr. W. H. Aldridge of the Trail smelter, while Mr. James Cronin will remain in charge of the mining operations proper. As, however, the idea of the Trail smelter is to get as large a tonnage as possible, and as the Le Roi seems to be shut out from participating in that tonnage, it is more than probable that the War Eagle and Centre Star, especially the latter, will be provided in the near future with a better hoisting plant and equipped with a workmanlike shaft; for, until this is done, the mines cannot ship that quantity of ore which the smelter needs in order to manage the reduction of the ores on a more economical basis. A larger output of ore will necessarily mean a larger staff of men, and, as otherwise, Rossland is prospering fairly well with its properties and some new shippers are coming into the field, a period of prosperity seems to be ahead of that camp.

The Trail smelter, regarded as a copper producer, will be favoured by acquiring the ore of the St. Eugene, which will serve as a flux for some of the siliceous ores of the War Eagle and Centre Star. The lead production, however, is not so large as to make this use of silica very heavy, but what is used will help out the problem of the reduction of the gold-copper ores of Rossland.

Whether there will be any use made of the costly concentration works erected near Trail by the late management of the War Eagle and Centre Star is more than doubtful. In the first place it is claimed that with sufficient ore concentration is not necessary as smelting can be done so cheaply as to make the aid of concentration of doubtful value. Whether this will prove to be the case is a question that will be watched with interest, as the great problem is the getting rid of the silica in the ore. This could be washed out by water concentration, but in Rossland the problem is complicated by the apparent lack of water near the camp. Were all the mines and the city to combine, sufficient water would be brought in, but the undertaking would finally cost over half a million dollars, though a fifth of the amount would probably suffice for immediate needs. That is one reason why the Kirby concentrator was built 14 miles away from the mine at Trail. The advantage is doubtful, as it is undoubtedly cheaper to bring the water to the ore than vice versa. Of course the new combine is so favourably situated with regard to the Canadian Pacific Railway, that this disadvantage is modified in practice. Further, the concentrator is built on the level site type, with the consequence that all the ore has to be twice hoisted, which is uneconomical. Moreover, the machinery and process used is entirely unfit for the ores to be treated. Hence the concentrator is of little or no value to the smelter.

Other intelligence of importance is that the Huntington-Heberlein process seems likely to be adopted by the Nelson and Trail smelters. It is claimed by Mr. Max Heberlein that the roasting process does twice the work with half the labour, and that its effect upon the charging of the blast furnaces is such as to increase their capacity one-half more, at the same time reducing the amount of flux and of fuel wanted. A further advantage is that at least 50 per cent. more zinc may be admitted into the lead ores without penalizing the shipper. What this means to many mines in the Slocan whose ore carry from 5 to 15 per cent. in zinc—insufficient perhaps to justify separate treatment for the recovery of the zinc, but sufficient to justify serious deductions by the smelter—is self-evident. The general effect should be to reduce the charges at least 25 per cent., depending, of course, upon the character of the ore to be smelted, sometimes more, sometimes less.

This should settle the question of shipping ores locally. The complaint has been that the local charges are too high, and that the freight charges are too heavy, although there has been no satisfactory evidence adduced to show this anything like conclusively. The fact of the matter would seem to be that the Slocan has run ahead of its development. Mining is too often conducted upon too small a scale, and rarely has a mine shown sufficient ore ahead to enable it to make satisfactory terms with either railroad or smelter. Both railroad and smelter want a guarantee of a certain amount of ore to be delivered regularly, and just so long as the mines are being worked, as it were, from hand to mouth, just so long will there be complaints and recriminations between the parties. However, with cheaper smelting rates, it is probable that the working of these mines will now be undertaken on a larger and therefore more businesslike scale, and heavy profits will be reaped by the shareholders.

IRON AND STEEL PRODUCTION IN CANADA.

The production of steel ingots and castings in Canada in 1904 was 148,784 gross tons, against 181,514 tons in 1903, a decrease of 32,730 tons. Bessemer and open-hearth steel ingots and castings were made in each year. Almost all the open-hearth steel reported in 1903 and 1904 was made by the basic process. The direct steel castings made in 1904 amounted to 6,505 tons. Canada has not made crucible steel prior to the present year.

The production of Bessemer and open-hearth steel rails in 1904 amounted to 36,216 gross tons, against 1,243 tons in 1903; structural shapes, 447 tons, against 1,983 tons in 1903; cut nails made by rolling mills and steel works having cut-nail factories connected with their plants, 99,000 kegs of 100 lbs., against 118,686 kegs in 1903; plates and sheets, 3,102 tons, against 2,450 tons in 1903; all other finished rolled products, excluding muck and scrap bars, blooms, billets, sheet bars, and other unfinished forms, 135,243 tons, against 118,541 tons in 1903. The total quantity of all kinds of iron and steel rolled into finished forms in Canada in 1904 amounted to 180,038 tons, against 129,516 tons in 1903. Of the 180,038 tons of finished iron and steel reported for 1904 about 126,850 tons were steel and 53,188 tons were iron.

On December 31, 1904, there were 18 completed rolling mills and steel works in Canada. In addition, three plants were being built and two plants were projected. Of the completed plants, two were equipped for the manufacture of steel castings only, five for the manufacture of Bessemer or open-hearth steel ingots and rolled products, and eleven for the

manufacture of steel castings by a special process, one for the manufacture of open-hearth steel ingots only, and one for the manufacture of merchant bar iron, railway spikes, etc. One of the projected plants is to be equipped for the manufacture of skelp and bar iron, and the other for the manufacture of wire rods.

Of the eighteen completed rolling mills and steel works in Canada on December 31, 1904, three were located in Nova Scotia, five in Quebec, nine in Ontario, and one in New Brunswick. The building plants are in Nova Scotia, Ontario and Manitoba, and the projected plants in Ontario.

The production of iron ore in Canada in 1904 amounted to 312,286 gross tons, against 235,977 tons in 1903, and the production of coal in Canada in 1904 amounted to 6,704,232 gross tons, against 6,824,999 tons in 1903.

IRON MINING IN NOVA SCOTIA.

Replying to the leading article from the Halifax Chronicle, on the subject of Nova Scotian Iron Ore, the Maritime Mining Record remarks: "Twenty or less years ago, before thousands of dollars, reaching up into a hundred thousand, had been spent in searches for large or moderately large bodies of good ore, the popular belief that these deposits existed might have been justified, but of late years, after large expenditures and diligent search, one is scarcely justified in jumping to the belief that Nova Scotia possesses ore in rich abundance. Much prospecting and exploratory work has been done in the past fifteen years, and it has to be confessed that results have not been encouraging. Six years ago, because the Record called for proof of the existence of large bodies of ore, it was rapped sharply upon the knuckles. But time brings its revenge, and one of the Record's former assailants, the Eastern Chronicle, now accepts the view which it scolded the Record for holding. Indeed, it goes further than the Record went, further than the Record is willing to go. We still hope that Nova Scotia may be proved to be rich in iron. The Record does not agree with the Chronicle in its theory that bounties on iron produced is the best way of encouraging ore mining. Such a policy would be utterly ineffective. Suppose the Government offered fifty dollars a ton bonus on billets made from native ore, not a billet would be made by the two big companies, for the reason that their patience in the hunt for native ores has all but been exhausted. The Record has assurances that the two big steel companies have during the past five years been most assiduous in their efforts to come across large bodies,—bodies of commercial value—of ore and have failed. It is asserted that the Dominion Iron & Steel Co. have expended a hundred thousand dollars in the search, and it is generally known that at Brookfield, Arisaig, and other points, it cost the N. S. Steel & Coal Co. a pretty penny. When operations began at Brookfield, the belief was that there was abundance of ore. It proved to be a pocket of just twenty thousand tons. The Arisaig deposit fell far short of Brookfield. Everybody admits there is ore at Nictaux, but to-day it is not believed to be of the great value and extent as held to be thirty years ago. Outside of Annapolis, where there is a deposit of great extent, not one at this present time can be named, and in saying so, the Mining Record is not forgetful that it is supposed to exist in large quantity near Londonderry. One interested in the progress of the steel and iron industry says that the local government would be safe in offering a bonus of fifty thousand dollars for the first fifty thousand tons of ore taken out of an ore mine in Nova Scotia, Annapolis excepted. The Record for a time thought the Steel companies having large deposits in Newfoundland were not honest in their search for native ore. We do not think so now, being convinced that the companies are really desirous of securing ores in the province. And in proof that the companies are honest in this respect, the Record is in a position to say that five cents a unit will be paid by them for suitable ore landed at the port nearest their works. We believe if the ore contains as low as forty-five per cent. of iron, and has not too much sulphur, phosphorus, or silica, it will be bought by either of the two big companies. If then, there is iron in the province, and holders of the ore areas are assured of from \$2.25 to \$2.75 per ton, why is mining not actively prosecuted. The Record regrets to say it is afraid there can be but one answer, viz., the ore has not yet been struck."

ONTARIO MINING INTELLIGENCE.

(From our own Correspondent.)

The Ontario Government is considering the building of another government railway, through the North nickel and Hutton iron ranges, to extend through the Vermillion Valley to the Grand Trunk Pacific, and to connect at Sudbury with the Canadian Pacific, the James Bay (Canadian Northern) and the Manitoulin and North State railways. They also contemplate assisting a large custom smelter at the junction. Such a railway would open up a vast mineral region. The success of the Temiskaming and Northern Ontario Railway affords encouragement to the undertaking of further government railways.

The Tharsis Sulphur and Copper Co., of which Sir Charles Tennant, Bart., the wealthy chemical manufacturer, of Glasgow, is chairman, has decided to extend operations in Ontario. It has been working under an option on a property in Northern Ontario which promises so well as to warrant the company in extending its operations. It will operate for copper, and is considering the manufacture of sulphuric acid, being on the lookout for pyrites for that purpose. The company has large resources at its disposal, and works mines in Spain. It has during its existence paid 733 per cent. of its capital in dividends, besides accumulating larger resources. The operations of such a company means much for the province.

There is a report current at Kenora that the Sultana, Ophir and Coronation gold mines are to be amalgamated and worked with a 100-stamp mill. Winnipeg and English capitalists are said to be back of the arrangement. Negotiations are being carried on with the Keewatin Company, for electric power from their development four miles from Kenora.

Information has reached us from London, England, that the Monde Nickel Co., operating the Victoria mine property, in the Sudbury district, has declared a dividend of 7 per cent. on its preference stock, and 6 per cent on its common stock, after wiping out its preliminary expense account. This is the first dividend which has been paid on the common stocks, and the Monde is one of the few English mining companies operating in Canada which have been successful. Sir George Drummond and Mr. James Ross, of Montreal, are the two Canadian directors of the company.

COPPER MARKET CONDITIONS.

In their last circular, Messrs. D. Houston & Co. report as follows:— Demand for copper was in heavy volume during the past month, and both domestic consumers and European buyers purchased liberal quantities. Recent active business covers deliveries extending over the next three or four months, and the importance of these transactions furnishes a new element to the tone and strength of the market. Much of the business was at 15 cents for lake and electrolytic. An occasional shading of these figures was made although for quick delivery or metal laid down at foreign ports, a premium was a condition required.

The extensive export movement is the most impressive feature of the copper situation, and this is the main factor in the preservation of market firmness. The foreign absorbing power is astonishingly great for volume and persistency. Shipments to Europe and China are taking regularly much more than half the production of the United States, and it is fortunate for foreign consumers that the exportable surplus of this country is sufficient to permit these monster shipments. Exports of copper for the first six months of his year amount to 127,817 tons, and if continued at the same rate for the balance of the year the total exports for the twelve months of 1905 would exceed the entire United States production six years ago.

Consumption of England and France for the first five months of this year is returned at 41,284 tons, against 51,858 tons for the same months in 1904. The consumption of foreign copper in Germany for the first four months of this year is stated at 27,759 tons, compared with 38,208 tons for same period last year.

Exports of copper from the United States, in tons of 2240 pounds fine, as per Metal Exchange returns, were as follows:—

	1905.	1904.	1903.
January	21,245	29,085	10,478
February	17,508	17,073	8,935
March	21,073	22,852	12,941
April	24,121	13,983	13,670
May	23,758	14,772	9,207
June	20,112	16,279	8,606
Total, six months	127,817	114,044	63,837

Imports of copper into The United States during the first five months of this year were 36,300 tons, against 32,775 tons for the first five months of 1904.

Total visible supply of copper in England and France and afloat thereto from Chili and Australia on July 1 was 18,050 tons, against 17,250 tons on June 1. Supplies for the month of June were 26,500 tons and deliveries 25,700 tons.

The following statement, taken from the original documents published by the Chinese imperial customs authorities give the net imports of copper in slabs, ingots and unclassified copper during the period 1901-1904, in pounds:—

	1901.	1902.	1903.	1904.
Ingots, slabs	1,364,800	3,069,266	10,014,800	32,383,600
Unclassified	152,800	147,334	129,866	2,082,400
Total	1,517,600	3,216,600	10,144,666	34,466,000

The exports of copper from the United States to China during 1904 amounted to 10,403,034 pounds. The first four months of 1905 were as follows:—

	Pounds
January	1,124,017
February	9,169,222
March	6,973,871
April	18,301,055

THE LIEGE EXHIBITION AND MINING CONGRESS.

Our special correspondent writes: The Canadian Mineral Exhibition is displayed in a manner similar to that adopted at St. Louis. There are several large piles of British Columbian ores of copper, galena, coal, etc., while in addition there is a good display of nickel, cobalt, silver, iron, graphite, and building material. Another feature of this exhibit is the excellent display of alluvial gold and quartz. In addition, there are numerous cases containing the different varieties of these minerals, and others of minor importance. The exhibit is attracting a great deal of attention, and especially of mining men and metallurgists, who are numerous in the Liege district. The International Congress of Mines, Metallurgy, Applied Geology and Mechanics opened last week, and was attended by over a thousand specialists in these respective branches of science, including some of the most prominent scientific men and engineers from almost every country on the globe, several countries being officially represented. This however was, unfortunately, not so in the case of Canada. The session continued throughout the week, and a number of valuable papers were read and discussed, while there were numerous excursions and local functions. Many of the members of the Congress have visited the Canadian Pavilion, and all expressed admiration of the mineral potentialities of the Dominion, as signified by our display. The Canadian Exhibit is in charge of Mr. L. Broadbent, of the Geological Survey, and Mr. J. Obalski, M.E., of Quebec, who are kept busy replying to the numerous enquiries. Canada is the only country showing a representative exhibit of minerals, and consequently this exceptionally fine advertisement of our mineral wealth is likely to be productive of most valuable results.

ASBESTOS IN BRITISH COLUMBIA.

Mr. A. M. Evans, M.E., who was recently retained to report on an alleged discovery of asbestos in the Lardeau district, reports that the formation in the locality is favourable, and that he found good specimens of mineral, of which there was sufficient in sight to justify the conclusion that the property might be profitably worked to supply the coast markets. The claims, which are situated about 300 feet above Kootenay Lake, behind the town of Gerard, comprises two locations, which were originally staked as silver-lead mines.

MINING NOTES.

NOVA SCOTIA.

A meeting was held in Sydney, early in July, between representatives of the Cape Breton Coal, Iron & Railway Co., and committees from the City Council and Board of Trade, in order to discuss matters in which the Company and the City of Sydney are jointly interested. The company is asking the City Corporation for running rights over the Inter-colonial Railway from Coxheath to Barrack Point, where it is proposed to construct a shipping pier. The company is also asking for free site at Vancouver Park, for cheap water and exemption from taxation, for a term of twenty years. It is said that this company, which is in a very strong financial position, contemplates expending \$20,000,000 in the establishment of shipbuilding plant, and other works at Sydney. At a subsequent meeting of the City Corporation it was decided to grant the company exemption from taxation for twenty years and to provide water at the usual rates charged to such industries. The other concessions asked for, however, were not voted upon.

The mine employees of the Cumberland Railway and Coal Co., at Springhill, went out on strike during July.

The Nova Scotia Steel & Coal Co. has in contemplation the project of moving the plant from New Glasgow to Sydney, it being thought that economy might be effected by the centralization of the company's works.

The first clean-up of the Beaver Hat Gold Mining Co.'s mill, Guysboro County, was made on July 8th, and resulted in the production of a 41 oz. gold brick. The property is said to be looking extremely well, and the result of this first test run is regarded as highly satisfactory.

The first Portland Cement Works to be established east of Montreal are now in operation at Sydney. The works are owned by the Sydney Cement Co., the plant having a capacity of 500 barrels every twenty-four hours.

It is estimated that the Dominion Steel Co. will produce 100,000 tons of steel rails this year, upon which a profit of \$14 per ton—\$7 on the manufacture and \$7 for the bounty—is expected to be realized.

The new steel plant of the Nova Scotia Steel Company at Sydney includes 5 hearth furnaces. The cost of building has been \$78,000; while each furnace cost in the neighborhood of \$100,000.

Since operations were commenced at the Dominion Iron & Steel Company's mill, shipments of steel rails have been steadily made, and one day during July a shipment of over 500 tons of rails, in addition to a considerable tonnage of pig iron and wire rods was consigned to Montreal.

QUEBEC.

Mr. J. E. Hardman, who recently spent several weeks in the new Chibogamoo district of Quebec, speaks very enthusiastically of the mining potentialities of that region. There have already been found deposits of gold, asbestos, copper and iron ore, and Mr. Hardman states that, in his opinion, the asbestos found is superior in quantity and quality to that existing at Thetford and Black Lake. On Asbestos Island he counted between 70 and 100 distinct veins these ranging in width from half an inch to five and one-half inches. There is, he states, sufficient asbestos on the island (which is but three-quarters by a quarter of a mile in extent) to supply the whole world, at the present rate of consumption, for many years. The Chibogamoo Mining Company has here opened, within the space of half a mile, six pits, in which there are fine showings of asbestos. Beyond Lake Obatogoman the rock formation is very similar to that obtained in the Temiskaming district of Ontario, where valuable deposits of cobalt and silver have been found during recent months, and Mr. Hardman brought back with him some good specimens of these minerals. A deposit of quartz, 40 feet wide, which was exposed for a distance of over 400 feet, and yielded values of \$10.00 per ton, was also discovered on the Chibogamoo Company's property. Mr. Hardman has kindly consented to prepare for the Mining Review a comprehensive article describing this region and its mineral possibilities, which will be published, we hope, in our next month's issue.

A strike of the mill hands employed by the Bell Asbestos Company, and by those employed at the Johnstone Mine at Thetford was declared on the 4th of July, this being occasioned by the fact that while the men in the pit had received an increase in wages from \$1.25 to \$1.50 per day, while an increase of only 10 per cent. had been granted to the mill hands. The management of these properties have since secured other labourers to take the place of the strikers.

ONTARIO.

For the past two years mining in the vicinity of Belleville has been in a somewhat depressed condition, owing to the suspension of operations at the plants of the Canadian Gold Fields, at Deloro, and the Cordova Exploration Company in Belmont Township. Recently, however, prospects have materially improved, and it is believed that by the adoption of more modern methods of working, a number of new properties will be opened, while operations will also be resumed at the older mines. In Barrie Township, the Star of the East, which has been productive for several months past, is being extensively worked, and in the near future the capacity of the plant is likely to be increased. At the Bannockburn, the Craig Gold Mining & Reduction Company are employing some 80 men. The first Merrill mill in Ontario has been installed at this property, and by the first of September it is expected that from between 125 to 150 tons of ore a day will be crushed. This ore is said to average \$5.50 per ton in value. The property is developed by five shafts, sunk to a distance of from 150 to 200 feet on the main vein. Negotiations are meanwhile pending for the acquisition of the Cordova mine, under a consolidation arrangement with the Canadian Gold Fields at Deloro. The Richardson property, too, which is the first property at which gold was discovered in Hastings, has been acquired by Mr. W. A. Hungerford, who proposes to thoroughly exploit it.

The regulations governing mining in the new Temiskaming mining division are closely similar to those in force in the Michipicoten mining division. The territory comprised in the district is bounded on the east by Lake Temiskaming, and the Ontario and Quebec boundary as far as Lake Abitibi. The northern limit runs from Lake Abitibi due west from a point eight miles north of the outlet of the Abitibi River to the Nipissing and Algoma boundary, then jogs east to the Great Northern bend of the Montreal River, whence it follows the stream to the southern limit of the Township of Coleman. From this point the southern

boundary runs eastward to the boundary of the Lumsden and Booth timber limit, and thence to the third and fourth concessions of the Township of Lorrain.

A petition for the winding up of another Ontario Mining Company has been filed at Osgoode Hall. This concern, The North Shore Copper & Smelting Co., was incorporated in 1903, with a capital of \$250,000, of which \$113,000 was paid up. The petitioners state that the company has now no assets except certain mining properties near the Bruce Mines, which, it is alleged, were purchased for \$5,000, and are now mortgaged for \$3,500.

A writ has been issued on behalf of Mr. W. H. Garvey, of Toronto, to set aside the judgment obtained by Mr. W. G. Pollock, of Cleveland, Ohio, against the New York Canadian Copper Co. for money alleged to have been advanced. Under these judgments the assets and properties of the Company in Thunder Bay were recently sold. Mr. Garvey advances the claim that the sale was fraudulent and illegal.

In the Temiskaming mining district new discoveries continue to be made almost daily. Prof. Miller, the Provincial Geologist, who recently returned from a three weeks' visit of inspection to the district, reports that the new silver-cobalt mines at Kerr Lake, promise exceptionally well, the ore yielding \$3,000 per ton. New rich veins are also being constantly uncovered, both at Kerr Lake and at Cobalt, and in view of these numerous favorable reports a large influx of prospectors to the district is taking place.

Preparations are now well under way for the erection of the plant of the Canadian Tin-plate and Sheet Steel Co. at Morrisburg. The company is arranging, it is said, to bring out from South Wales 200 skilled tin plate and sheet steel workers. Meanwhile, capital is being invited to invest in the venture with a view to placing the company in a stronger financial position than was originally contemplated, with a capital of \$1,500,000.

Mr. L. C. Kerr, chief geologist of the party sent to make the explorations in New Ontario, reports the discovery of a large new tract of clay land in the great bend of the Mattagami River, some 200 miles north of Sudbury. Mr. Kerr also reports having met a prospector returning from the Porcupine River, who carried with him promising samples of gold-bearing quartz and hematite.

Owing to the demand for iron properties in Northwestern Ontario, prospecting for this class of property is now very active. At Atikokan the plant is being installed for the extraction of ore for a Port Arthur blast furnace, while prospecting by diamond drilling is being carried on by two separate undertakings in this field.

A winding-up order has been granted to the applicants in the case of the National Share Copper & Smelting Co., subject to a week's delay. The applicants claimed that they could get no information as to operations, the personnel of the directors not even being known.

The Hollindia Lead Mine, near Bannockburn, is also yielding good results, while a sulphide mine, employing 60 men, is in operation near Bogart, shipments being made at the rate of from 12 to 15 cars per week. Copper sulphides affording excellent assay results have been discovered on the Coe property, near Eldorado, and an option has been secured thereon by an American company.

At Copper Cliff a site has been cleared for a new smelting plant to be shortly erected. The buildings will be frame timber, covered with galvanized iron, the contract having been let to Mr. J. Laberge. All mill machinery has, meanwhile, been purchased, and it is expected that the plant will be in operation within three months' time.

The Detola Development Company, of Toledo, recently organized to operate in the Manitou district, is negotiating for the purchase of the Paymaster claim, adjoining their property.

The Elmore Oil Concentrating Plant at the Massey mine is now treating about 35 tons of 4½ per cent. copper ore every 24 hours. The mill is producing from 7½ to 8 tons of concentrates, averaging 21 per cent., daily.

At the Sultana mine about thirty men are now being employed. The mill is only being run by day shift, the mine being full of water to the fourth level. On the 2nd and 4th levels there are at present five air drills working.

A promising discovery of gold is reported from the township of Barrie, Fontenac County, near Kingston, on the property of the Big Dipper Mining Co., a body of quartz having been uncovered showing much visible gold.

The Western Canada Cement & Coal Co. was incorporated during the month with a capital of \$1,250,000, and headquarters at Ottawa.

It is reported that the Hamilton Nickel Company contemplate the early erection of a smelter in the iron range.

BRITISH COLUMBIA.

The Coast.—It is reported from Victoria that the Tye Copper Co. at Mount Sicker, proposes to sink to a depth of 1,000 feet, if necessary, to endeavour to locate the main ore body. The programme has, meanwhile, been prepared for the prosecution of extensive development work.

It is reported that the iron mines of Texada Island are to be reopened this summer. These mines were worked some years ago, and shipments of ore made to San Francisco. The ore will now be shipped to the Irondale smelter in Washington.

Kamloops.—The small smelter plant at the Iron Mask mine was completed during the month, and operations commenced. There has been some activity in this district of late.

Atlin.—The first clean-up of the Northern Mines, Ltd., resulted in the recovery of 40 oz. Four shifts are now being worked at the property, and the gravel is said to be proving extremely rich. The new steam shovel has been shipped, and will doubtless be in position and ready for operations by the 15th of July.

Dredging operations in this district are now well under way. The British American Dredging Co., it is said, contemplate enlarging the plant at Pine Creek up to 1,000 H.P. It is also proposed to install a shovel and two electrical locomotives to draw the dirt to the sluices at Tar Flats. The British Columbia Dredging Co. are completing the construction of a dredge on Spruce Creek.

The Atlin Claim, in a recent leading article, discussing the prospects of the district for the year, states as follows:—"The output is increasing and, not only that, but there promises to be very little litigation, for which we are truly thankful. Prospecting will be prosecuted in the O'Donnell valley on a large scale, and the results will prove whether

that territory, which is three times as large as our present gold producing area will be workable or not. There are thousands of acres in that valley which have never been touched. Some prospecting has been done on Bull Creek and further down the O'Donnell Valley with satisfactory results, but these are only fly specks on a valley over fifty miles long and all virgin soil.

Slocan.—More interest now appears to be taken in mining in the vicinity of New Denver, where negotiations are in progress for the purchase of the Mollie Hughes and California properties, while also New York investors contemplate the purchase of the Hewitt mine, near Silverton. On this latter property some four miles of development work has been done and a large body of ore blocked out.

The American Boy recently commenced the shipment of zinc ore, which was produced in the course of development work. It is said, however, that there is a large available tonnage of this ore on the property, which may presently be turned to profitable account. Zinc concentrates continue to be shipped by the Slocan Star mine at the rate of 750 tons per month. These concentrates are said to average 35 per cent. zinc and 45 oz. silver.

East Kootenay.—The Aurora, a promising property in the Moyie District, has been acquired under an eighteen months' option by Messrs. McKay & Wilson, of Portland, and development work is to be undertaken immediately. The Aurora claims were discovered in 1894, but relatively little development work has yet been done.

Nelson.—Operations have been resumed at the Crawford Bay Iron Mines, on Kootenay Lake. As yet, however, these properties have not been productive.

In an interview with the Nelson Daily News, Mr. T. H. Tretheway, manager of the Molly Gibson mine, stated that the company had provided the sum of \$70,000 for the development of the mine, which is to be resumed at once. The re-organization of the company was effected on the 30th of June.

Lardeau.—Referring to the close-down of the combination silver mill of the Ferguson Mines, Limited, the Kootenay Mail, published at Revelstoke, remarks as follows:—

"The worst piece of news the Lardeau district has experienced for some time came as a thunderbolt, when it was announced that the mill and chloridising plant of the Ferguson Mines, Ltd., operating the Nettie L. and Silver Cup mines, had been shut down and 120 men thrown out of employment. Nor does it appear to be a merely temporary affair, as the telephone lines were taken down and other signs of a long shut-down are evident. The reason ostensibly given is that the reserves of milling ore have been exhausted, but that is all nonsense, as, although the second grade dumps have been pretty well worked out, the workings are full of that class of ore which was not taken out of the mine by the Sunshine, Ltd., when it was mining only the shipping grade of ore. It is feared the true reason is that the company found itself unable with the plant installed to make a profit and will be pushed on and modifications made to the mill plant with on the ore it handled in the mill. Other reports say further development to view to ensure better results."

A very rich strike of ore is reported to have been made on the Smith & Rogers property, which is under bond to the American Eagle Mining Co. About 200 pounds of ore taken from this find showed, after roasting, much visible gold. There have been several deals in this district lately, the "Morning," "Homestake" and "Pauline" claims on Rapid Creek having been bonded to Spokane investors, while Messrs. Marquise & Gilbert recently received a cash offer of \$10,000 for their property at Poplar Creek.

Machinery for the Silver Dollar mine recently arrived at this property, and the construction of the new compressor and mill building is now in progress.

The Lardeau Review states that work is being vigorously prosecuted on the Sunshine tunnel of the "Silver Cup" and that a promising ore body was recently encountered.

Rossland.—A remarkable story is reported from Rossland, by the Miner. During a recent thunderstorm, it is said, the lightning penetrated to the 500-ft. level of the Josie mine, giving a miner who was working in the drift, some 2,000 feet from the shaft, so severe a shock that the man was rendered almost unconscious. At the 900-ft. level a carman was at the same time rendered insensible, while three other miners in different parts of the mine also felt the shock. It is supposed that the lightning, after striking the head works, passed down the iron air line which branches off at the various levels.

Atlin.—The first clean-up of the season of the McKee Creek Hydraulic resulted in a yield of 480 oz. Large quantities of dirt are also being moved on the North Columbia Gold Mining Co.'s property, and at the Columbia Hydraulic Co.'s property on Spruce Creek. The sluicing of the winter dumps on Spruce Creek has, meanwhile, been completed.

Slocan.—According to the returns of Mr. G. O. Buchanan, the lead bounty commissioner, for the fiscal year ending June 30th, the total lead production for the Kootenays for this period was £55,752,019. Of this, 11,000 tons were exported, and the remainder, nearly 17,000 tons, smelted in British Columbia. Under the act, the total bounty earned is estimated at \$340,000.

The Cork mill on the south fork of Kaslo Creek, is now in steady operation, employing a force of twenty men. Recently, in the lower workings of the mine, a strike of two feet of concentrating ore was encountered. The ore body is now 20 feet wide.

Referring to the success of the "leasing" system, which has been more general during the last year or so in the Slocan district, the Sandom Mining Review calls attention to another successful result in connection with the Flint mine, on the south fork of Kaslo Creek. A number of Sandom residents contributing monthly sums to keep two miners working at this property, under lease, the ore body was encountered some time ago, and recently, while sinking in the tunnel, a parallel ore shoot was encountered. The original ore body was about 18 inches wide, and yielded 71 per cent. lead and 100 oz. silver, while the new shoot is 2½ feet wide, and assays 350 oz. silver and 65 per cent. lead, while grey copper is also present. Already some shipments of rich ore from this mine have been made.

At Hammil Creek, the Argenta Mine, Limited, contemplate the early installation of a compressor plant and mill.

Boundary District.—An interesting struggle has been in progress for the last few months between the Chicago and local interests to secure control of the Providence mine. Among other incidents, the fore-

man placed in charge of the property by the representatives of the Chicago shareholders, was last month imprisoned, on the charge of trespass, by the Greenwood directors, and a number of injunctions have been served on both parties. An action is now to be shortly tried to set aside the purchase of the Diamond fraction, for which stock was issued without the consent of the Chicago directors. If this stock was legally issued, it is understood that the Greenwood shareholders will have a majority interest in the property, but not otherwise.

The Granby Co is now passing through the most prosperous period of its career, and it is estimated that profits are at present being made at the rate of \$75,000 per month. The company is said to have a large cash surplus, and it is expected that dividends at the rate of 4 per cent. per annum will be resumed at an early date.

At the Seattle mine, in the Grand Forks division, which is now being developed by tunnelling by the bondholders, Messrs. Pemberton & Hunter, an ore body of 3 feet wide and carrying a considerable percentage of copper, has been encountered at a distance in of 340 feet.

East Kootenay.—At the St. Eugene mine profits are now being made at the rate of between \$70,000 and \$80,000 a month. A new 30-drill air compressor was originally installed at the property.

Steady production is being made by the Sullivan mine from which 140 tons daily is being extracted, and, in addition, development work is being prosecuted.

Rosslund.—The Rosslund Miner states that "the payrolls for the month of June for the mines, smelters, saw mills and for those working on the pole lines of the West Kootenay Power & Light Company at Rosslund, aggregate the very large sum of \$144,200. The pay-rolls for the mines for June aggregated \$83,200, or at the rate of \$998,400 per annum. The Centre Star is increasing its pay-roll considerably for while the amount expended by that company in April was \$19,400, for June it reaches the sum of \$21,000. From the way in which the mine is developing the pay-roll of this mine is to be still further increased. This will be particularly the case when the work of deepening the shaft from the ninth level is commenced. The Le Roi should also materially increase its pay-roll when it begins to deepen its shaft from the 1,250 foot level to the 1,550 foot level, which will soon be necessary in order to develop its new ore shoot. The same will be the case with the Le Roi 2 when it begins to deepen its shaft from the 900 foot level."

The first shipment of concentrates has been made to the Northport smelter from the Le Roi experimental concentrator plant, which it is expected will now be kept in steady operation.

Satisfactory reports continue to be received of developments at depth in the Centre Star mine, where ore of good grade is being opened up at a depth of 1,550 feet.

The lead stack at the Trail smelter is to be put in operation this month, using St. Eugene ores. It is also proposed to increase the capacity of the lead refinery to 50 tons a day, the product being shipped to the corrodng works in Montreal.

The West Kootenay Power & Light Co. have ordered 25 carloads of cable, to be used in transmitting electrical energy from Upper Bonnington Falls to the Boundary district. The cable to be used will be about half an inch in diameter, and contain six No. B. & S. wires wound round a jute centre.

Lardeau.—It is reported that a rich strike has been made on the Swede group, one of the properties of the Great Northern Mines Co., operating at Poplar Creek. A quartz lead of between 20 and 24 inches in width, and carrying some gold values, have been uncovered for 50 feet. At a meeting of directors of this company, held in Nelson during the month, it was decided to organize a new company to take over the Swede, and possibly the Lucky Jack groups.

In the tunnel being run on the Silver Cup mine, a promising vein was crosscut, the ore from which was found to carry higher values than had yet been obtained in this mine.

Cariboo District.—The first clean-up of the Consolidated Cariboo Hydraulic mines, at Bullion, resulted in the production of a gold ingot the value of which is estimated at \$25,000. Operations at the mine have been carried on for one month only this season, with but one shift working. The driving of the rock tunnel, however, is being prosecuted, and the work it is thought will be completed before the winter sets in.

Nelson District.—The announcement made by the local press that the Hunter V. mine had been closed down indefinitely is incorrect, as operations will be resumed when the necessary additional capital required shall have been subscribed.

The Coast.—The discovery of a free milling quartz is reported to have been made near Usulet, on the west coast of Vancouver Island.

YUKON.

News was recently received at White Horse of new gold discoveries on Willow Creek in the Nisulin district, nuggets having been found to the value of as high as \$7.50, and it is believed that this locality will afford another promising class of mining area. Directly the news of these discoveries became known, a rush of miners took place to the localities, and 83 applications were made to the mining reporter for claims. Willow Creek is about 100 miles east of White Horse, and is reachable by way of the Hootalinqua River route.

On the Anderson concession, on Hunker Creek, five self dumpers are now at work, and a force of 100 miners employed. It was the intention to install a dredger upon the property this season, but the order was unfortunately delayed until too late.

Since the installation of the new holsting engines at the Trendwell mine, some record achievements in the matter of daily output are reported to have been made. Thus in one day of ten hours 3,000 tons of rock was hoisted, exceeding any previous daily production made by 300 tons.

A dredger, with a capacity of 1,000 yards a day, has been ordered for the Bonanza Basin Gold Dredging Co. This dredge, which was supplied by a Chicago firm, is said to be one of the largest of the kind in the north.

In the Alseck district some 300 miners are now at work, but the only important undertaking is that on Bullion Creek, where hydraulicing on a large scale is being undertaken by Mr. J. D. Breeze, of New York, who last year secured by purchase and lease 80 claims on Bullion Creek.

NOVA SCOTIA COAL SHIPMENTS, JUNE.

DOMINION COAL COMPANY, LIMITED.

Output	Shipments
Dominion No. 1	53,259
Dominion No. 2	44,423
Dominion No. 3	35,949
Dominion No. 4	53,707
Dominion No. 5	74,700
Dominion No. 6	3,971
Dominion No. 7	16,038
Dominion No. 8	20,447
Dominion No. 9	34,403
Shipments, June, 1904	336,897
Shipments, June, 1905	332,256
Decrease, June, 1905	4,641
Shipments to United States, June, 1905	49,600
Total shipments, 6 months, 1904	1,218,525
Total shipments, 6 months, 1905	1,156,686
Decrease, 6 months, 1905	61,839

CUMBERLAND RAILWAY & COAL CO.

Shipments for June, 1904	39,365
Shipments for June, 1905	31,183
Decrease for June, 1905	8,182
Total shipments, 6 months, 1904	204,543
Total shipments, 6 months, 1905	187,675
Decrease, 6 months, 1905	16,868

NOVA SCOTIA STEEL & COAL CO.

Sydney Mines.

Shipments for June, 1905	65,443
Shipments for June, 1904	60,549
Increase for June, 1905	4,894

Marsh Mine.

Shipments for June, 1905	4,299
Shipments for June, 1904	4,584
Decrease for June, 1905	285
Total shipments, 6 months, 1905	206,376
Total shipments, 6 months, 1904	196,653
Increase, 6 months, 1905	9,723

INVERNESS RAILWAY & COAL CO.

Shipments for June, 1905	16,357
Shipments for June, 1904	25,576
Decrease for June, 1905	9,219
Total shipments, 6 months, 1905	56,081
Total shipments, 6 months, 1904	71,669
Decrease, 6 months, 1905	15,588

INTERCOLONIAL COAL CO.

Shipments for June, 1905	16,693
Shipments for June, 1904	23,531
Decrease for June, 1905	6,838
Total shipments, 6 months, 1905	88,089
Total shipments, 6 months, 1904	121,368
Decrease, 6 months, 1905	34,279

ACADIA COAL CO.

Shipments for June, 1905	24,326
Shipments for June, 1904	23,624
Increase for June, 1905	702
Total shipments, 6 months, 1904	123,097
Total shipments, 6 months, 1905	115,291
Decrease, 6 months, 1905	7,806

COAL MINING NOTES.

NOVA SCOTIA.

Operations have been resumed on a small scale at the Port Hood colliery, Cape Breton.

The Dominion Coal Company has declared a dividend, at the rate of 7 per cent. on the company's preferred stock, for the quarter ending July 31st.

Production is about to commence from Dominion No. 6, one of the Dominion Coal Company's collieries, six miles east of Glace Bay. The last slope has now reached a depth of 1,400 feet, and the northern slope about 1300 feet, or in each case below the second levels. Up to the present time the operations have been confined to development work; no rooms have yet been broken off, nor is it the intention to do so until two more lifts are gained, or until 2,600 feet in each case has been reached. The colliery will then have a producing capacity of 2,800 tons daily, or the equivalent of reserve if night shifts are worked. The colliery will be ready to produce that quantity by May 1, 1906.

BRITISH COLUMBIA.

It is reported that Mr. D. C. Corbin has secured an option on a very valuable coal property, consisting of five or six partially developed locations north of Michel Creek, East Kootenay.

The Crow's Nest Pass Coal Co. recently shipped a trial consignment of 2,000 tons of coal from No. 2 mine at Coal Creek, for use on board the steamer *Dakota* on her maiden trip to the Orient. Should the coal prove satisfactory, a large bunker is to be built at the Great Northern Company's wharves at Seattle, from which the company's steamers will be regularly supplied with fuel from these collieries.

A very fine specimen of coal from the Crow's Nest Pass Coal Co.'s No. 2 mine, Coal Creek, measuring 3 x 4 x 7 feet, has been placed on exhibition at the Lewis & Clark Exposition at Portland.

It is reported that the use of loose blasting powder is to be discontinued in the Crow's Nest Pass Co.'s mines, and one of the explosives sanctioned by the Provincial Government—probably roburite—substituted therefor.

The situation at the Western Fuel Company's collieries at Nanaimo remains practically unchanged, the feud between the United Mine Workers and the Western Federation of Miners showing no abatement. The local members of the United Mine Workers recently attempted to call out the men working at the Brechin and Northfield Colliery if the company still refused to officially recognize this labour organization. The Western Federation, however, have issued a notice stating that this organization has no grievance with the company in respect to the Brechin workings, and the miners of these collieries have decided by vote to continue working.

At the Wellington Extension collieries, on Vancouver Island, production is now being made at the rate of about 1,200 tons per day. It is probable that the company will shortly increase the working force at these mines if the San Francisco market holds good, as, owing to the trouble at Nanaimo, only about 800 tons of coal daily is being produced there.

An improved system of ventilation is being installed at the Departure Bay coal mine, Vancouver Island, while other changes are also being made to enable the loading of ships at the wharf by the use of automatic screening and loading machinery to displace manual labour. It is intended to equip the mine with German coal-cutting machinery, and the coal will be mined so that there will be no waste.

A recent despatch from British Columbia states that the United Mine Workers have succeeded, in spite of the opposition of the Western Confederation of Miners, in closing down the Western Fuel Co.'s Brechin colliery, thus all the coal mines at Nanaimo are now inoperative.

Mr. W. H. Hall, who is superintending the development work on the coal properties at Quilchena, owned by the Diamond Vale Coal Company, states that the seams uncovered aggregate some 60 feet of workable coal. The company is now exploring the property with a diamond drill.

MINING MEN AND AFFAIRS.

Mr. S. Davis, of Butte, Montana, has assumed charge of the Cork mill in the Slokan district, B.C.

Mr. W. B. McInnes, the new Commissioner of the Yukon, has arrived at Dawson, where he received a very hearty reception.

Col. H. M. Pellatt, the well-known stockbroker of Toronto, was elected a director of the Dominion Iron & Steel Co., at a meeting of directors held in Montreal on July 11th.

Professors McKay and Murray, of Dalhousie University, visited Sydney during the month to make arrangements for the establishment of classes in mining and civil engineering at Glace Bay and Sydney.

Mr. Burdette G. Elliott has assumed charge of the Northern Development Company's "Paymaster" property at Manitou. The shaft at this mine is now down 198 feet, and reported to be in good ore.

Mr. J. N. Patton has resigned the superintendentship of the Creighton mine, Copper Cliff, having left during the month for New York. The property will, in future, be in charge of Captain Travers.

Dr. Frank D. Adams, Professor of Geology, McGill University, Montreal, who has been spending the summer holidays in Italy, expects to reach Montreal by the first of August.

Col. Geoffrey Porter, R.E., Director of the Calcutta Mint, India, is, it is announced, shortly to visit the Sudbury nickel mines on official business, the Indian Government having recently passed an Act authorizing the issuance of nickel coins.

Mr. B. F. Pearson, who has been prominently identified with the Dominion Iron & Steel and the Dominion Coal Companies since their inception, recently resigned his directorship on the Boards of these companies.

The Canadian Government recently appropriated \$5,000 to be expended in the entertainment of the Institute of American Engineers in the Yukon. The money will be spent under the direction of Major Wood, Acting Governor.

Mr. Gustave Loeb, of the firm of Kuhn, Loeb & Co., of New York, spent, last month, several days in the Boundary district of British Columbia, visiting the Mother Lode mine, operated by the British Columbia Copper Company.

At the recent quarterly meeting of the Halifax Board of Trade, Mr. A. A. Hayward was elected chairman of the mine committee. At this committee's recommendation, the local government have now under consideration the appointment of a mining engineer to investigate the occurrences of iron ore in the province.

At a meeting of the Paint Section of the Canadian Manufacturers, it was decided to petition the Dominion Government to allow existing contracts up to June 30th, for white lead and lead in oil, to be carried out under the previous Customs regulations. This concession has since been granted by the Government.

Mr. R. H. Batty, who has acted as managing director of the Triune mine, near Ferguson, B.C., has resigned from his duties, on the ground that he is tired of the inconsistent actions of the board of directors. Mr. Batty's successor is a gentleman named Morton, who is said to have been a successful farmer.

Mr. A. C. Garde, who recently visited the valleys of the Upper Kootenay and Upper Columbia Rivers, in a recent interview expressed a very optimistic opinion concerning the future of the Windermere district. Mining developments here, however, are at present not making great headway, owing to the inaccessibility of the district.

In an interview, Mr. L. Pratt, of Sandon, who was largely instrumental, or rather who took a leading part in securing from the Dominion Government a bounty on lead produced in Canada, now expresses himself as opposed to any renewal of the bounty on lead ores exported.

Mr. Russell, the new manager of the Slough Creek Gravel Gold, at Cariboo, arrived at the mine last month from England, and in a cablegram to the London office states that he found the property in excellent order, and is satisfied with the general outlook. The company is now pumping 1,100,000 gallons of water every 24 hours.

The death occurred in Nelson, on July 7th, of Mrs. Blakemore, the wife of Mr. W. Blakemore, the well-known mining engineer. Mrs. Blakemore was a lady of charming personality and many accomplishments, and much sympathy is felt for Mr. Blakemore in the great loss which he has sustained.

The Brown Alaska Co.'s smelter, at Hadley, Prince of Wales Island, Alaska, the construction of which has been carried on under the direction of Mr. Paul Johnson, will, it is stated, be blown in in September. Mr. J. L. Parker, who was formerly in charge of the Brookllyn group in the Boundary district, and of the North Star mine at Kimberley, is now acting as this company's mine superintendent.

In consequence of the retirement of Mr. Longley, Attorney-General of the Nova Scotia Legislature, who was recently elevated to the Supreme Court Bench, the Hon. Arthur Drysdale, Commissioner of Works and Mines, has been appointed Attorney-General for the province, while the Hon. W. T. Pipes has accepted the portfolio of Works and Mines.

The Rossland Miner states that Prof. Brock, of the Canadian Geological Survey, is making good progress with the structural survey of that district. A reconnaissance has been made of the area to be mapped, in order that an idea of the areal distribution of the different rocks may be more readily formulated. The bases for the triangulation work have been fixed, and preparations have been made in other respects.

The Dominion Coal Company is to be congratulated on having secured the services of Mr. Chas. Fergie, as superintendent of mines. Mr. Fergie is one of the most experienced and well informed authorities on coal mining in North America, and for the past sixteen years has acted as general manager of the Intercolonial Coal Company, of Westfield, N.S. Mr. Fergie's predecessor was Mr. Austin King, of Pittsburg, Pa.

Mr. W. Fleet Robertson, Provincial Mineralogist, British Columbia, is officially visiting the Bulkley Valley section in Northern British Columbia this season. This section is supposed to be rich in coal and mineral, but no authentic information is at present available concerning these resources. Mr. Robertson's report on the district will therefore be awaited with much interest, particularly as in the next few years the country will be opened up by the Grand Trunk Pacific.

Mr. R. W. Brigstocke, formerly manager of the Hunter V. and Fern mines, in the Nelson division of British Columbia, has been offered, and has accepted, the management of the Timmis property, in the Temiskaming district of Ontario. This property was recently described by Mr. Hardman in a recent article contributed to the Mining Review. Mr. Brigstocke arrived from the west during July and is now at the mine.

Mr. A. De Romeau, an eminent French geologist, bearing with him letters of introduction from the French Cabinet, is about to visit Canada with a view to studying the geological conditions of this country. Mr. De Romeau, who will, on his arrival, be the guest of Mr. B. A. C. Craig, of the Canada Corundum Company, is especially interested in corundum deposits, of which he has made a special study, and arrangements have been made to enable him to join parties of both the Dominion and Provincial geologists employed in field work in Ontario this year.

The spirit of conciliation and compromise which has characterized the attitude of the new management of the War Eagle and Centre Star mines towards its employees, is undoubtedly appreciated by the local Union, whose executive recently addressed a letter to Mr. T. G. Blackstock, of Toronto, thanking him on behalf of the Union for the friendly and generous settlement made in respect to the judgment the company had obtained against the Western Federation of Miners and the local Union, and expressing the belief that there would in future be industrial peace at the mine.

Mr. W. A. Stadelman, eastern agent of the Wellman-Seaver-Morgan Company, and who has been in charge of the eastern office at 42 Broadway, New York City, has been appointed general sales agent of the same company, with headquarters at Cleveland, O., taking effect July 1st. Mr. Fred Stadelman has been appointed assistant manager of the New York offices of the Wellman-Seaver-Morgan Company. Mr. Harry V. Croll, M.E., for the past eight years with the E. P. Allis Co., and their successors, Allis-Chalmers Co., of Chicago, has resigned and accepted a position with the Wellman-Seaver-Morgan Company, of Cleveland, O.

The Alumni of King's College, Windsor, have voted the sum of \$3,000 towards the erection of a brick building in the town of Sydney, to be used as a new school of engineering. The report of the executive committee of the Alumni, concerning the college's efforts in the direction of establishing a college of engineering and school of mining in Cape Breton, was presented at a meeting held on June 21st. Mr. Hiram Donkin, in a speech, referred to the school of mining at Glace Bay, and stated that there were 7,000 men employed at the mines here within a radius of three miles. He anticipated that there would be a regular attendance at the school of 200 students. The establishment of a college of engineering and school of mining in Cape Breton is a new development. The advantages within reach at Sydney and Glace Bay make it possible to extend the engineering course so as to include not only civil engineering, but mechanical, electric and coal mining engineering. The work will be in charge of Prof. Dahl, who will reside at Sydney.

The Canadian Westinghouse Company, Limited, had a neat and attractive exhibit at the recent meeting of the Canadian Electrical Association. The headquarters were in Room No. 4 of the Hotel Windsor. Distributed at various places in the hotel were reproductions of the company's trade mark formed by electric light combinations. The company had on exhibition a line of their induction motors, direct current motors, OD transformers, series and multiple AC arc lamps, lightning arresters fuse blocks, portable testing instruments, etc. Distribution was made of a complete line of the company's literature illustrating and describing

ing their products. A striking souvenir folder, prepared for the occasion, was given out to all the attendants of the convention. The following officials and representatives of the company were in attendance at the convention: Mr. Paul J. Myler, general manager; Mr. N. S. Braden, general sales manager; Mr. H. D. Bayne, manager, Montreal office; Mr. R. J. Dunlop, attache Toronto office; Mr. T. F. Dryden, manager Toronto office. Mr. Wm. Bradshaw, engineer, from Westinghouse Electric & Mfg. Co., East Pittsburg, Pa.

Mr. H. H. Claudet, the British Columbian representative of the Canadian Ore Concentration Company, recently visited the Slovan district. In Mr. Claudet's opinion, there are large quantities of ore in this section which might be advantageously treated by means of oil concentration. In this connection it is a well-known fact that in the Slovan much of the ore requires to be sorted by hand, which is an expensive operation, while, too, certain valuable constituents of these ores cannot be efficiently recovered by water concentration but would be amenable to oil. The company have already made a number of experiments on some of the concentrating ores of the Slovan district, and very satisfactory results were obtained in the saving of zinc and silver values. The company has, however, already expended a large sum of money in establishing plants at Rossland, and is therefore not in a position to install a mill in the Slovan as a speculative venture. Mr. Claudet, however, urges local men to form a syndicate, with a capital of \$20,000, wherewith to install a 50-ton plant, which he is confident might be most profitably operated as a custom mill.

COMPANY NOTES.

Le Roi No. 2.—The manager's report for May contains the following information:—Output—11 cars of ore were shipped, making a total of 440 tons. Development—300 ft. level—The ore exposed in diamond drill hole No. 67, supposed to be the upward continuation of stope H ore, was opened up by a cross-cut. We drifted on the vein, first east until the fault was reached, then west, but in each case the showing was too poor to justify further working. In all, 91.6 feet were driven. 500 ft. level—The west drift from the north cross-cut was continued for a distance of 84.9 feet. The country is still broken up. Nothing of importance had been met with. May Day tunnel—81.5 feet have been driven. The ore encountered at this point is very promising, being 5 feet in width and assaying:—(1) .10 au. ozs. per ton, 2.0 cu. per cent., equal to \$7.60 value; (2) .12 au. ozs. per ton, 3.5 cu. per cent., equal to \$12.20 value; (3) .44 au. ozs. per ton, 4.7 cu. per cent., equal to \$21.96 value. (N.B.—A cable has since been received stating that the tunnel has been extended to 100 feet, at which point it assays \$44.) From the 100-ft. level, by means of the diamond drill, we shall, in the near future, explore for the downward continuation of this vein.

Le Roi No. 2.—The following report for June was cabled by the manager to the London office:—"Shipped to Trail 287 tons. The net receipts from Trail are \$6,208, being payment for 362 tons shipped, and \$1,248, being payment for 33 tons concentrates shipped. The net receipts from Greenwood are \$2,889, being deferred payment on 984 tons previously shipped. Total receipts from both smelters, \$10,381."

Fraser River Gold-Dredging Co. (1905) Limited.—This company was registered last month, with a capital of £40,000, to acquire the undertaking of the Fraser River Gold-Dredging Co., Limited (in liquidation). Head office, 39 Lombard Street, London, Eng.

Leamington Oil Syndicate, Limited.—This company has been formed in London, with a capital of £5,000, to acquire petroleum or oil-bearing lands in Canada or elsewhere.

Spyglass (Nelson).—At the annual meeting of this company, held in Nelson, on July 11th, the directors were re-elected. Mr. Bruce White was elected president; Mr. J. A. Magee, vice-president; and Mr. R. G. McLeod, secretary-treasurer.

COMPANY MEETINGS.

Kamloops Mines, Limited.—The first ordinary meeting of this company was held in London last month. The chairman stated that the debenture holders of the old company had agreed to accept similar debentures in the new organization. Liabilities taken over as at February 1st from the old company amounted to about £13,800, excluding debentures, and mine creditors, £3,400. Of the former amount £8,718 have been paid off; £3,272 have been remitted to the mine for the purpose of paying off the liabilities for plant machinery, while a further £1,000 has been since remitted.

At the mine, the new jigs have been added to the concentrating plant, and the whole of the machinery has been thoroughly overhauled and various additions and improvements made. Mr. Argall expects to treat 160 tons of ore per day. The board decided to add a smelting plant, the first unit to have a capacity of 50 tons per day. This was ordered and is now in course of erection, and the mine manager expects to have it in working order by the end of July. This smelting plant will save all the rail charges and smelter charges on the ore it treats. The saving on this plant alone is expected to be £800 per month. The latest news received by mail from the manager is to the effect that they have opened large additional bodies of ore at the 200-ft. level and the 500-ft. level, and that the 600-ft. level shows up equally well, the manager being of opinion that this level will produce more ore than any two of the upper levels. He further states that he was never more pleased with developments than at present. Mr. Morrish, who has gone very carefully over the ore developments, reports that there were \$900,000 worth of high grade ore on February 11th, and sufficient low grade ore developed to keep the mill going at the rate of 160 tons per day for three years. The total footage at that date was 4,023 feet, as against 3,000 feet when Mr. Wm. Jones inspected the mine.

The North Star Mining Company, Limited.—At the Sixth Annual Meeting of this company, held in Montreal on the 28th of June, the directors reported that the operations for the year had resulted in a net profit of about \$23,000, which, together with the Government bounty on the lead ores extracted, amounting to \$17,000, gave a total of approximately \$40,000. The directors speak in very high terms regarding the management of the property by Mr. M. McL. Curran, to whom they attribute these successful results. During the year small beds of ore from the old workings have been economically extracted, while, owing to advantageous freight and treatment rates, a

quantity of low grade ore on hand was sold. About the end of February last, however, these small deposits became exhausted, and the mine was closed. Acting on the strong recommendation of Mr. Curran, the directors placed at his disposal a sum of money to continue prospecting operations in that section of the property adjacent to the Kellogg Shaft, but at the time his report was submitted, the work was not sufficiently advanced to show results, although the prospects were reported as favourable. During the year two cash distributions were made to shareholders, amounting to ten cents per share. Mr. Curran, the manager, submitted the following report:—

It is not necessary to draw your attention to the very depressing state of affairs in connection with this property at the opening of the year; but, in face of such, I feel much gratification at being able to show you a net profit for that period of about \$48,000.

My instructions with regard to the handling of the property were very closely defined, and were as closely followed. But during the year there has been many feet of development work added to the property in the legitimate work of "Mining Ore," and at the same time every favourable showing has been carefully examined and worked on, with the hope of extending the old ore body.

Your company was fortunate in being able to get a market for second class ore, this ore being mined at excellent profit, and at the same time allowing the working out "clean" of the old ore body.

While in Montreal I had the honor of waiting on your Board, and I pointed out that there was a portion of the property that was practically unprospected. I refer to the ground adjacent to the Kellogg Shaft. I pointed out to your directors that till this area had been carefully worked the North Star property could not be said to be thoroughly prospected.

Your directors showed sufficient confidence in my judgment to ask me to undertake the work, and, acting on such instructions as I then received, I returned to the property and have had for about two weeks four or five men at work, and the favourable indications confirm my already expressed opinion as to the value of this ground.

Standard Explosives, Ltd.—This company was incorporated in May last with a capital of \$300,000. Their head office is in the Board of Trade Building, Montreal, and the works are situated on "Ile Perrot," near Vaudreuil, P. Q., with excellent shipping facilities. The Canadian Pacific and Grand Trunk roads run through the property, and there is also water connection. The first meeting of the shareholders was held on June 13th, at which the following named were elected as directors for the ensuing year:—Messrs. W. T. Rodden and J. F. Johnson, of Montreal; S. H. C. Miner, of Granby; James W. Woods, of Ottawa; and Chas. W. Dimick, of Boston.

At a directors' meeting held subsequent to the above, Mr. W. T. Rodden was appointed managing director, and Mr. J. F. Johnson, secretary-treasurer. The two latter gentlemen have had a number of years' experience in the explosive business.

The plant will be modern in every respect, and of sufficient capacity to enable the company to contract with the largest mining concerns and railway contractors for their requirements.

INDUSTRIAL NOTES.

The Canadian White Co., Limited, with headquarters in the Sovereign Bank Building, Montreal, have recently been granted letters patent to carry on in Canada a general contracting and engineering business, on similar lines to the "J. G. White & Company, Incorporated," of New York; "J. G. White & Company, Limited," of London, England, and the "Waring-White Building Company, Limited," London, England. This corporation will be fully equipped to handle large construction contracts for steam and electric railways, and to design, build, equip and operate electric lighting plants and power installations, gas works, water supply, sewage systems, piers, docks, harbor works, office buildings, apartment houses, etc. It will have upon its Board and as shareholders, strong and representative business men, well known throughout Canada. The general manager of the company will be a prominent civil engineer, with large experience in railway construction, etc., and one who has held executive positions. Mr. H. P. Douglas, formerly vice-president and general manager of the Canadian Otis Elevator Company, Limited, will be its treasurer. Mr. H. P. Hitch, who has been for several years connected with the Thompson-Starrett Company, of New York, as superintendent, and who had full charge of the erection of the Union Bank Building at Winnipeg, will be superintendent of building construction. The contracting and engineering staff will be composed of competent engineers, who have had long and thorough experience. The Canadian White Company will have the advantage at all times of the services and experience of the New York and London kindred corporations, insuring all the benefits and advantages which accrue from a long and successful experience in the business of contracting and engineering. An organization like the above, with its allied interests, is of advantage to Canada, and will doubtless give prompt attention to any contracting or engineering matter with which it may be entrusted.

In connection with the transfer of the business of the Fairbanks Co. in Canada to the Canadian Fairbanks Co., Limited, of which latter concern Mr. Henry J. Fuller, late manager of the Fairbanks Company of Canada, is president, it may be mentioned that the company has moved to new quarters at 444 St. James Street, as the old premises were entirely inadequate for the rapidly increasing business. The new warehouse has been fitted up very elaborately. The first floor contains general offices, show rooms and shipping department, and by means of a travelling trolley, large pieces of machinery and heavy material can be easily handled and moved from one place to another. The executive offices of the company and the advertising and publishing department are on the second floor, the rest of the building being occupied with the large stock carried. The growth of this company in Canada is phenomenal, the business having been started by Mr. Fuller, six years ago, as a small sales office in Montreal. It now consists of the executive offices and warehouse at Montreal, and branch warehouses at Toronto, Winnipeg and Vancouver. Fairbanks-Morse & Co., of Chicago, for whom the Canadian Fairbanks Co. are sole sales agents in Canada, have completed arrangements for the erection of a large factory at Toronto for the manufacture of gas and gasoline engines, machinery and mining, mill and railway supplies. This concern manufactures all kinds of conveying apparatus for mines and quarries, also hoisting engines, steam pumps, ore cars, etc., etc. The selling staff of the company will at once be enlarged to take care of additional lines which they now handle.

The Canadian Rubber Company, of Montreal, Limited, have issued some handsome catalogues during the past few weeks. Catalogue "C" deals comprehensively with Interlocking Rubber Tiling and other unique rubber floor coverings. The catalogue is printed in several colors, and all the illustrations are in half-tone. Catalogue "D" is devoted exclusively to Rubber Belting and Rubber Covered Rolls. The book comprises 90 pages, with a handsome embossed cover in gold and black. A quantity of valuable information concerning the care and use of rubber belting is here given, and the illustrations, of which there are a great number, are all in half-tone. This belting catalogue will no doubt be keenly sought after by the trade. Catalogue "E" (60 pages, with cover) describes the principal lines of rubber and special hose manufactured. Much valuable information is given as to the care of hose, and many half-tone illustrations accompany the text. This catalogue is in keeping with the other high-grade trade catalogues of the Canadian Rubber Company. Any of the catalogues issued can be obtained from the sales branches of the company throughout Canada, or direct from the head office, Montreal.

Messrs. Wayland, Williams & Dadson, who are making a specialty of gas engines and gas-producing plants, have removed their offices from the Board of Trade Building to 321 St James Street, Montreal. This is a young but progressive firm. They already have a couple of suction gas plants installed in Montreal, and their new location should bring them more prominently before the public.

The Robb Engineering Company has received an order for two 100 horse-power Robb-Mumford boilers from the Western Canadian Collieries, Blairmore, Alberta. This company has also received an order from the Dominion Coal Company for two 100 horse-power Robb-Mumford boilers.

The Canadian Westinghouse Co., Limited, Hamilton, Ont., have issued a well printed and handsomely illustrated catalogue of electrical apparatus manufactured at the Canadian works. Copies of this catalogue may be obtained by applying to the general office of the company at Hamilton.

The Locomotive & Machine Company, of Montreal, Limited, publish a catalogue descriptive of the Atlantic Shovel designed by Mr. A. W. Robinson, M.A.Sc.E. The catalogue contains an interesting preface relating to the requirements of the modern shovel.

We have received from the Wellman-Seaver-Morgan Company, Cleveland, Ohio, a catalogue descriptive of mine cages, skips or cars, and sheaves. The catalogue contains upwards of 40 pages, and is illustrated throughout.

DIGEST OF RECENT PATENTS—MINING AND METALLURGICAL.

Specially reported for the Canadian Mining Review.

June 13, 1905.

792,440.—Apparatus for treating ferruginous ore for the manufacture of iron and steel therefrom. Montague Moore, Melbourne, and Thomas J. Heskett, Brunswick, Victoria, Australia. The combination of a gas-furnace, an inclined revolving cylindrical deoxidizing-chamber, and a vertical chamber connecting the lower end of the former with the upper end of the latter chamber, said vertical chamber being provided with air-inlets, and said chamber with means such as for supplying gas thereto.

792,223.—Metallurgical Furnace. Jacob Lansing, San Francisco, Cal. The combination of a furnace having a plurality of upright inter-connected furnaces, each having a normally closed ore-chamber and a fire-box beneath the ore charge, a water-containing receptacle, a connection between each ore-chamber and the receptacle, a stack separate from and devoid of connection with the water-containing receptacle, connections between the fire-boxes of the furnaces and said stack and valves in the connections by which the heat of the furnace-fires may be diverted from the ore-chambers, means for inducing a draft through the receptacle, and the ore-chambers and intermediate connections, and means for maintaining a continued circulation of cooling fluid through the receptacle.

792,022.—Electric Furnace. Ernst Haagn, Hanau, Germany, assignor to the firm of W. C. Herasus, Hanau, Germany. The combination with a recess in the wall of the furnace and reaching to near its heating or melting chamber, of a conductor-piece leading to said heating or melting chamber, and engaging in said recess, and a metal indicator connecting the ends of said conductor-piece and said conductor in said recess and being so disposed that it can be watched from without and indicate by its commencing red heat the correct strength of the current.

June 20, 1905.

792,642.—Melting Furnace. William E. Williams, Chicago, Ill. A furnace provided with a single opening and mounted to be revolved in two planes, combined with a set of fixed concentric flues for supplying air and fuel for discharging furnace-gases, respectively, and means for connecting the furnace and flues and otherwise closing the former, and means for rotating the furnace while so connected.

792,776.—Magnetic Separator.—Elwin C. Kavanaugh, Holyoke, Mass. In a magnetic separator, an enclosed magnetic cylinder rotatably mounted in a pulp receptacle, or conduit, having pole-pieces and magnet-coils therein, and having a hollow endwise extending journal, combined with a receptacle connected with the hollow journal, and a quantity of oil in part contained in said receptacle and filling the space within the magnetic cylinder.

792,729.—Briquetting or Moulding Machine. Grant W. Rigby, Pittsburg, Pa. The combination with a machine-frame, a reciprocating feed-box provided with mould-recesses therein, reciprocating plungers adapted to enter said mould-recesses, a rod within said feed-box, agitator-bars on said rod, a bracket on said frame having a slot therein, and a crank-lever connected to said rod and engaging with said slot for moving said rod to agitate the material within said feed-box during the movement of the latter.

792,619.—Portable Furnace for melting steel or other metals. Louis Rousseau, Argenteuil, France. The combination with a combustion-chamber of a juxtaposed circular chamber, conduits or flues connecting the two chambers, supports fixed in the second chamber, a crucible resting on said supports, a conduit divided into two branches leading respectively under the combustion-chamber and into the space around said chamber, a vertical rod crossing the two branches, a valve in each branch mounted upon the said vertical rod, the two valves being located at right angles to each other, a removable cover upon the combustion chamber, a tube projecting through this cover, and means for tilting the furnace.

792,660.—Dumping-Car. Daniel King, Pinkney, Tenn. A dumping-car, a truck-frame having transverse truck-beams near each end, a rock-shaft having bearings on said beams, a body-beam near each end of the car and firmly attached to said shaft, outside the truck beams, and a body supported thereby, and means for holding the body-beams to prevent rocking save when the car is dumped, all combined.

792,682.—Coal or Grain Distributing Apparatus. Charles A. Turner, Norfolk, Va.—The combination with a vertical shaft, a table thereon, and radial wings or vanes secured to the upper face of the table, of a bracket engaging the under side of the table, means for suspending said bracket from a support above the same, and means for rotating the shaft.

June 27, 1905.

793,392.—Furnace for Limekilns or other Structures. John D. Owens, Marion Ohio. An upper main combustion-chamber having a flame outlet and a charging-door, the floor of said chamber being formed of grate-bars spaced as described, a lower auxiliary combustion-chamber having an imperforate floor to receive the partly-burned fuel falling from the upper chamber, a passage extending upward from the lower chamber to a point below the grate of the upper chamber, and an air-supply conduit arranged to conduct the air from the exterior over the fuel in the lower chamber to the upwardly-extending passage, whereby said upwardly-extending passage conducts the air and the gases from the lower chamber and constitutes the air-supplying means for the upper chamber, and means located within said passage below the grate for controlling the amount and equalizing the delivery to the grate of the air and partially-consumed gases.

793,150.—Dump-Car. Spencer Otis, Chicago, Ill., and George B. Maltby, Cleveland, Ohio, assignors to National Coal Dump-Car Company, Rapid City, S.D., a corporation of South Dakota. The combination of a supporting-frame portion provided with centre sills, a body-bolster for each end of the car arranged underneath the centre sills and extending transversely of the same, discontinuous sub-bolsters arranged between the body-bolster and the floor level of the car and extending out from each side of the centre sills, and truss-rods extending from end to end of the car and passed over the inner ends of the sub body-bolsters.

793,238.—Discharge for Coke-Ovens. Carl Schroeter, Chicago, Ill. A discharger for coke-ovens and retorts adapted to remain in the coking-chamber during the coking operation, and comprising a metal plate equal in width to the oven and bent at substantially right angles to form a horizontal member lying upon the sole of the retort and a vertical member of substantially the height of the charge, a similarly-bent bar constituting a reinforcing-rib secured to said plate longitudinally and substantially centrally thereof, and a pair of tie-rods uniting the free ends of said horizontal and vertical members.

July 4, 1905.

793,816.—Ore-Treating Furnace. Aaron M. Beam, Denver, Colo. In an ore-treating furnace, a rotary flue-cylinder, one end of which connects with a smoke-stack, while its other extremity projects into a combustion-chamber, a stationary conduit extending through said combustion-chamber, an ore-cylinder concentrically located inside and attached to said rotary flue-cylinder, its extremity extending into and being covered by said stationary conduit, suitable means for feeding ore into and through said ore-cylinder into said conduit, and means for conveying the ore through said conduit.

793,668.—Coke-Oven Attachment. Daniel F. Lepley, Connellsville, Pa. In an apparatus for the utilization of waste gases from coke-ovens, a gas-conduit and an adjustable flue member movable to a position to place the charging-hole of the coke-oven in communication with said conduit, or to open the same to the outer air.

793,926.—Conveyor for Metal Bars. Victor E. Edwards, Worcester, Mass., assignor to Morgan Construction Company, Worcester, Mass., a corporation of Massachusetts. The combination of a series of conveyor-bars, teeth projecting from said bars, and having inclined sides and arranged in alternating rows or series, with the inclined sides of the teeth in one series overlapping the inclined sides of the teeth in the next adjacent series, and means for bringing the different series successively into supporting relation to a metal bar held thereon.

793,795.—Briquet, and Process for making same. Edward E. Marsh, Los Angeles, Cal., assignor to William P. Wagy, Los Angeles, Cal. A briquet comprising coal and lime or gypsum thoroughly intermingled and moistened by a solution of gelatin and bichromate of potash in substantially equal parts.

793,720.—Apparatus for Separating Slimes, etc., from Metal-bearing Solutions. Ernest L. Godbe, Salt Lake City, Utah. An apparatus comprising a tank, a revoluble drum working therein, a filtering medium fixed to the periphery of the drum, suction mechanism coacting with the interior of the drum, a scraping device coacting with its exterior, and an apron depending from the scraper adjacent to the face of the filtering medium and entering the tank to maintain a vacuum within the drum.

PROVINCE OF QUEBEC

The attention of Miners and Capitalists in the United States
and in Europe is invited to the

GREAT MINERAL TERRITORY

Open for investment in the Province of Quebec.

Gold, Silver, Copper, Iron, Asbestos, Mica, Plumbago, Phosphate,
Chromic Iron, Galena, Etc.

ORNAMENTAL AND STRUCTURAL MATERIALS IN ABUNDANT VARIETY.

**The Mining Law gives absolute security to Title, and has been
specially framed for the encouragement of Mining.**

Mining concessions are divided into three classes :—

1. In unsurveyed territory (a) the first class contains 400 acres, (b) the second, 200 acres, and (c) the third, 100 acres.

2. In surveyed townships the three classes respectively comprise one, two and four lots.

All lands supposed to contain mines or ores belonging to the Crown may be acquired from the Commissioner of Colonization and Mines (a) as a mining concession by purchase, or (b) be occupied and worked under a mining license.

No sale of mining concessions containing more than 400 acres in superficies can be made by the Commissioner to the same person. The Governor-in-Council may, however, grant a larger extent of territory up to 1,000 acres under special circumstances.

The rates charged and to be paid in full at the time of the purchase are \$5 and \$10 per acre for mining lands containing the superior metals* ; the first named price being for lands situated more than 12 miles and the last named for lands situated less than 12 miles from the railway.

If containing the inferior metal, \$2 and \$4 according to distance from railway

Unless stipulated to the contrary in the letters patent in concessions for the mining of superior metals, the purchaser has the right to mine for all metals found therein ; in concessions for the mining of the inferior metals, those only may be mined for.

*The superior metals include the ores of gold, silver, lead, copper, nickel, graphite, asbestos, mica, and phosphate of lime. The words inferior metals include all other minerals, and coal.

Mining lands are sold on the express condition that the purchaser shall commence *bona fide* to mine within two years from the date of purchase, and shall not spend less than \$500 if mining for the superior metals ; and not less than \$200 if for inferior metals. In default, cancellation of sale of mining lands

(b) Licenses may be obtained from the Commissioner on the following terms :—Application for an exploration and prospecting license, if the mine is on private land, \$2 for every 100 acres or fraction of 100 ; if the mine is on Crown lands (1) in surveyed territory, \$5 for every 100 acres, and (2) in unsurveyed territory, \$5 for each square mile, the license to be valid for three months and renewable. The holder of such license may afterwards purchase the mine, paying the prices mentioned.

Licenses for mining are of two kinds: Private lands licenses where the mining rights belong to the Crown, and public lands licenses. These licenses are granted on payment of a fee of \$5 and an annual rental of \$1 per acre. Each license is granted for 200 acres or less, but not for more ; is valid for one year, and is renewable on the same terms as those on which it was originally granted. The Governor-in-Council may at any time require the payment of the royalty in lieu of fees for a mining license and the annual rental—such royalties, unless otherwise determined by letters patent or other title from the Crown, being fixed at a rate not to exceed three per cent. of the value at the mine of the mineral extracted after deducting the cost of mining it.

The fullest information will be cheerfully given on application to

**THE MINISTER OF LANDS, MINES AND FISHERIES,
PARLIAMENT BUILDINGS, QUEBEC.**

Ontario's Mining Lands..

THE Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals and extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and sulphides; zincblende, galena, pyrites, mica, graphite, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places, and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. Recent discoveries of corundum in Eastern Ontario are believed to be the most extensive in existence.

The output of iron, copper and nickel in 1903 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province salt, petroleum and natural gas are important products.

The mining laws of Ontario are liberal, and the prices of mineral lands low. Title by freehold or lease, on working conditions for seven years. There are no royalties.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific Railway runs through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,

Commissioner of Lands and Mines.

or

THOS. W. GIBSON,

Director Bureau of Mines,

Toronto, Ontario.



Dominion of Canada

SYNOPSIS OF REGULATIONS

For disposal of Minerals on Dominion Lands in Manitoba, the North-west Territories and the Yukon Territory.

COAL.

Coal lands may be purchased at \$10 per acre for soft coal and \$20 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at the rate of ten cents per ton of 2,000 pounds shall be collected on the gross output.

QUARTZ.

Persons of eighteen years and over and joint stock companies holding free miner's certificates may obtain entry for a mining location.

A free miner's certificate is granted for one or more years, not exceeding five, upon payment in advance of \$7.50 per annum for an individual, and from \$50 to \$100 per annum for a company, according to capital.

A free miner, having discovered mineral in place, may locate a claim 1500 x 1500 feet by marking out the same with two legal posts, bearing location notices, one at each end on the line of the lode or vein.

The claim shall be recorded within 15 days if located within ten miles of a mining recorder's office, one additional day allowed for every additional ten miles or fraction. The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, purchase the land at \$1.00 an acre.

Permission may be granted by the Minister of the Interior to locate claims containing iron and mica, also copper, in the Yukon Territory of an area not extending 160 acres.

The patent for a mining location shall provide for the payment of a Royalty of 2½ per cent. of the sales of the products of the location.

PLACER MINING.

Manitoba and the N. W. T., excepting the Yukon Territory.—Placer mining claims generally are 100 feet square; entry fee \$5, renewable yearly. On the North Saskatchewan River claims are either bar or bench, the former being 100 feet long and extending between high and low water mark. The latter includes bar diggings, but extends back to the base of the hill or bank, but not exceeding 1,000 feet. Where steam power is used, claims 200 feet wide may be obtained.

Dredging in the rivers of Manitoba and the N. W. T., excepting the Yukon Territory.—A free miner may obtain only two leases of five miles each for a term of twenty years, renewable in the discretion of the Minister of the Interior.

The lessee's right is confined to the submerged bed or bars of the river below low water mark, and subject to the rights of all persons who have, or who may receive entries for bar diggings or bench claims, except on the Saskatchewan River, where the lessee may dredge to high water mark on each alternate leasehold.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles, but where a person or company has obtained more than one lease one dredge for each fifteen miles or fraction is sufficient. Rental, \$10 per annum for each mile of river leased. Royalty at the rate of two and a half per cent. collected on the output after it exceeds \$10,000.

DREDGING IN THE YUKON TERRITORY.

Six leases of five miles each may be granted to a free miner for a term of twenty years, also renewable.

The lessee's right is confined to the submerged bed or bars in the river below low water mark, that boundary to be fixed by its position on the 1st day of August in the year of the date of the lease.

The lessee shall have one dredge in operation within two years from the date of the lease, and one dredge for each five miles within six years from such date. Rental, \$100 per mile for first year and \$10 per mile for each subsequent year. Royalty, same as placer mining.

PLACER MINING IN THE YUKON TERRITORY.

Creek, gulch, river and hill claims shall not exceed 250 feet in length, measured on the base line or general direction of the creek or gulch, the width being from 1,000 to 2,000 feet. All other placer claims shall be 250 feet square.

Claims are marked by two legal posts, one at each end, bearing notices. Entry must be made within ten days, if the claim is within ten miles of mining recorder's office. One extra day allowed for each additional ten miles or fraction.

The person or company staking a claim must hold a free miner's certificate.

The discoverer of a new mine is entitled to a claim of 1,000 feet in length, and if the party consists of two, 1,500 feet altogether, on the output of which no royalty shall be charged, the rest of the party ordinary claims only.

Entry fee, \$10. Royalty at the rate of two and one-half per cent. on the value of the gold shipped from the Yukon Territory to be paid to the Comptroller.

No free miner shall receive a grant of more than one mining claim on each separate river, creek or gulch, but the same miner may hold any number of claims by purchase, and free miners may work their claims in partnership by filing notice and paying fee of \$2. A claim may be abandoned, and another obtained on the same creek, gulch or river, by giving notice and paying a fee.

Work must be done on a claim each year to the value of at least \$200. A certificate that work has been done must be obtained each year; if not, the claim shall be deemed to be abandoned, and open to occupation and entry by a free miner.

The boundaries of a claim may be defined absolutely by having a survey made and publishing notices in the Yukon Official Gazette.

PETROLEUM.

All unappropriated Dominion Lands in Manitoba, the North-West Territories and within the Yukon Territory are open to prospecting for petroleum, and the Minister may reserve for an individual or company having machinery on the land to be prospected, an area of 640 acres. Should the prospector discover oil in paying quantities, and satisfactorily establish such discovery, an area not exceeding 640 acres, including the oil well and such other land as may be determined, will be sold to the discoverer at the rate of \$1.00 an acre subject to royalty at such rate as may be specified by order-in-council.



PROVINCE OF NOVA SCOTIA.

Leases for Mines of Gold, Silver, Coal, Iron, Copper, Lead, Tin

—AND—

PRECIOUS STONES.

TITLES GIVEN DIRECT FROM THE CROWN, ROYALTIES AND RENTALS MODERATE.

GOLD AND SILVER.

Under the provisions of Chap. 1, Acts of 1892, of Mines and Minerals, Licenses are issued for prospecting Gold and Silver for a term of twelve months. Mines of Gold and Silver are laid off in areas of 150 by 250 feet, any number of which up to one hundred can be included in one License, provided that the length of the block does not exceed twice its width. The cost is 50 cents per area. Leases of any number of areas are granted for a term of 40 years at \$2.00 per area. These leases are forfeitable if not worked, but advantage can be taken of a recent Act by which on payment of 50 cents annually for each area contained in the lease it becomes non-forfeitable if the labor be not performed.

Licenses are issued to owners of quartz crushing mills, who are required

to pay Royalty on all the Gold they extract at the rate of two per cent. on smelted Gold valued at \$19 an ounce, and on smelted Gold valued at \$18 an ounce.

Applications for Licenses or Leases are receivable at the office of the Commissioner of Public Works and Mines each week day from 10 a.m. to 4 p.m., except Saturday, when the hours are from 10 to 1. Licenses are issued in the order of application according to priority. If a person discovers Gold in any part of the Province, he may stake out the boundaries of the areas he desires to obtain, and this gives him one week and twenty-four hours for every 15 miles from Halifax in which to make application at the Department for his ground.

MINES OTHER THAN GOLD AND SILVER.

Licenses to search for eighteen months are issued, at a cost of thirty dollars, for minerals other than Gold and Silver, out of which areas can be selected for mining under lease. These leases are for four renewable terms of twenty years each. The cost for the first year is fifty dollars, and an annual rental of thirty dollars secures each lease from liability to forfeiture for non-working.

All rentals are refunded if afterwards the areas are worked and pay royalties. All titles, transfers, etc., of minerals are registered by the Mines Department for a nominal fee, and provision is made for lessees and licensees whereby they can acquire promptly, either by arrangement with the owner or by arbitration, all land required for their mining works.

The Government as a security for the payment of royalties, makes the royalties first lien on the plant and fixtures of the mine.

The unusually generous conditions under which the Government of Nova Scotia grants its minerals have introduced many outside capitalists, who have always stated that the Mining laws of the Province were the best they had had experience of.

The royalties on the remaining minerals are : Copper, four cents on every unit ; Lead, two cents upon every unit ; Iron, five cents on every ton ; Tin and Precious Stones, five per cent. ; Coal, 10 cents on every ton sold.

The Gold district of the Province extends along its entire Atlantic coast, and varies in width from 10 to 40 miles, and embraces an area of over three thousand miles, and is traversed by good roads and accessible at all points by water. Coal is known in the Counties of Cumberland, Colchester, Pictou and Antigonish, and at numerous points in the Island of Cape Breton. The ores of Iron, Copper, etc., are met at numerous points, and are being rapidly secured by miners and investors.

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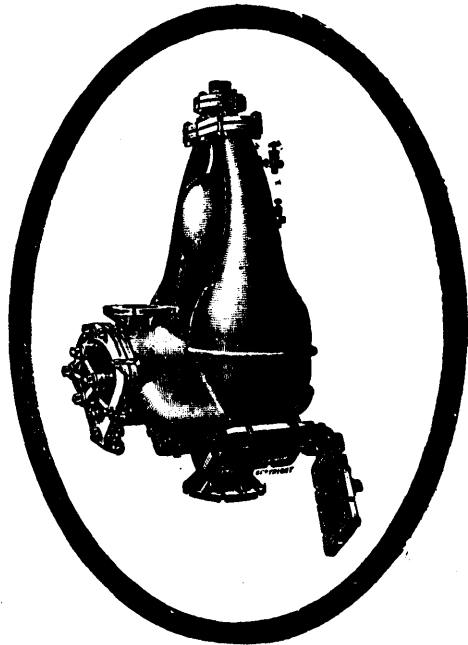
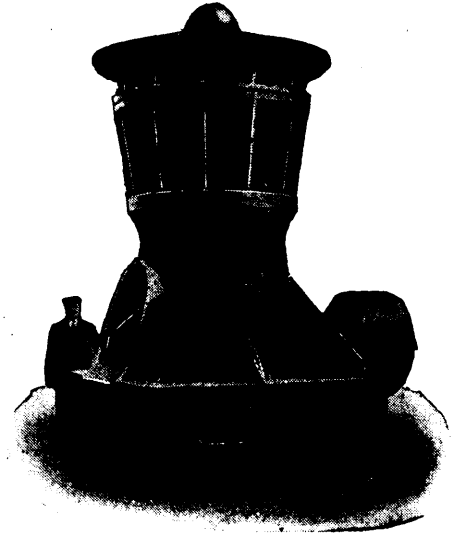
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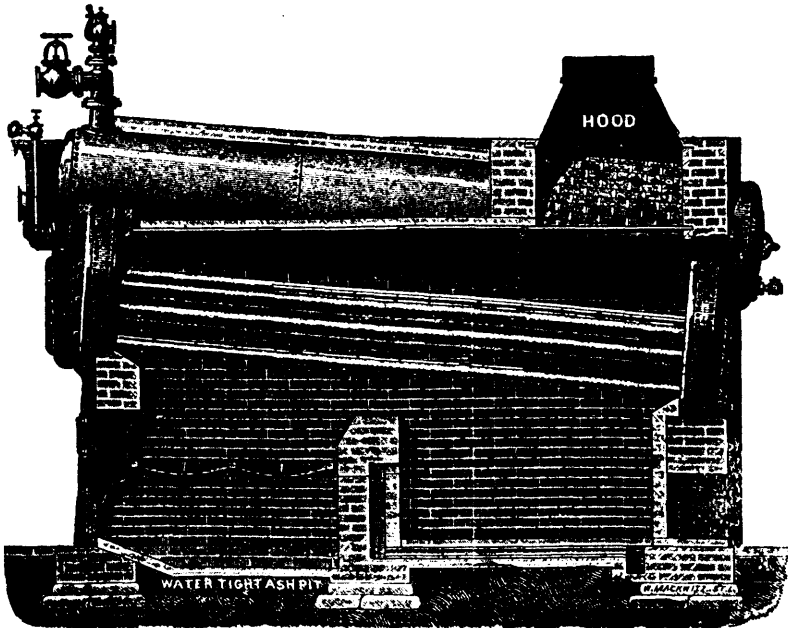
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