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Established 1882

Vol. XIX—No. VIII.

OTTAWA, AUGUST 31st, 1900.

Vol. XIX--No. VIII.

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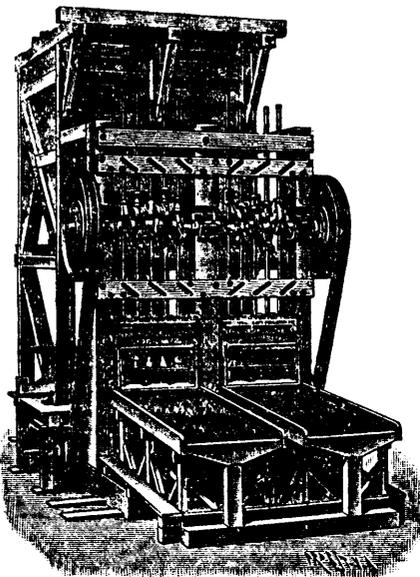
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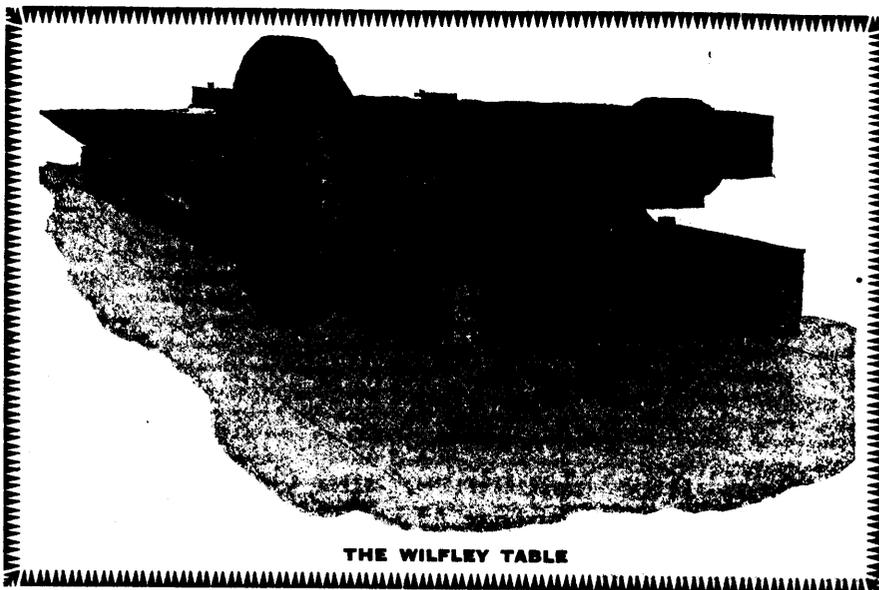
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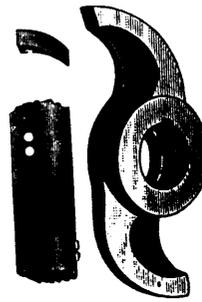
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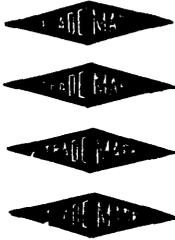
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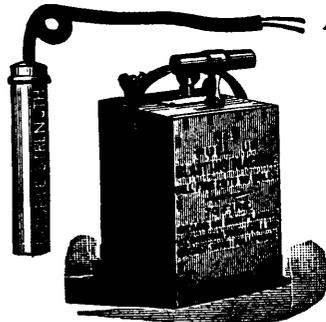
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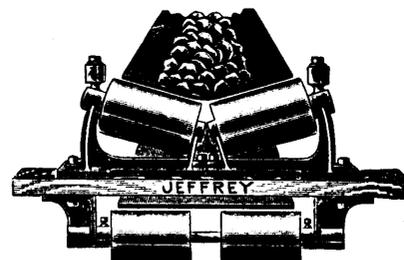
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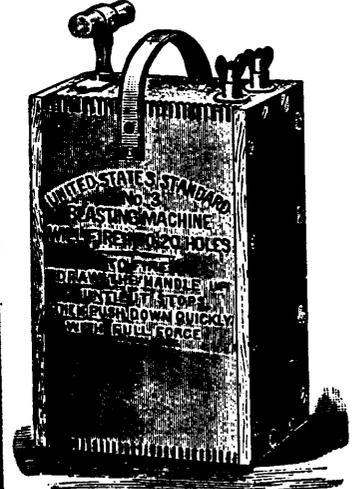
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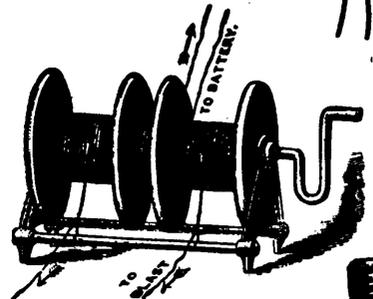
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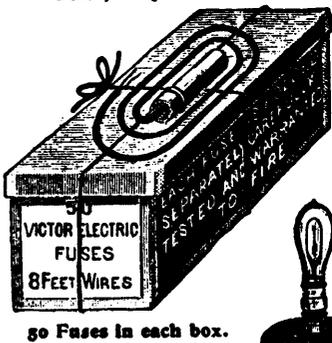
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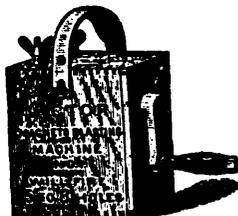
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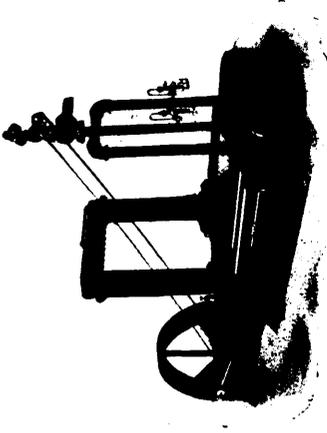
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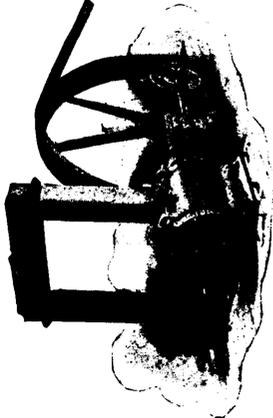
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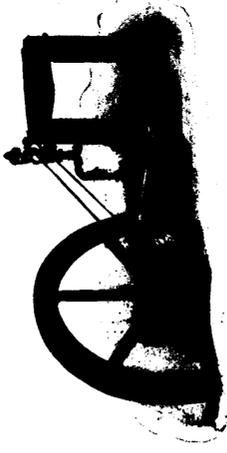
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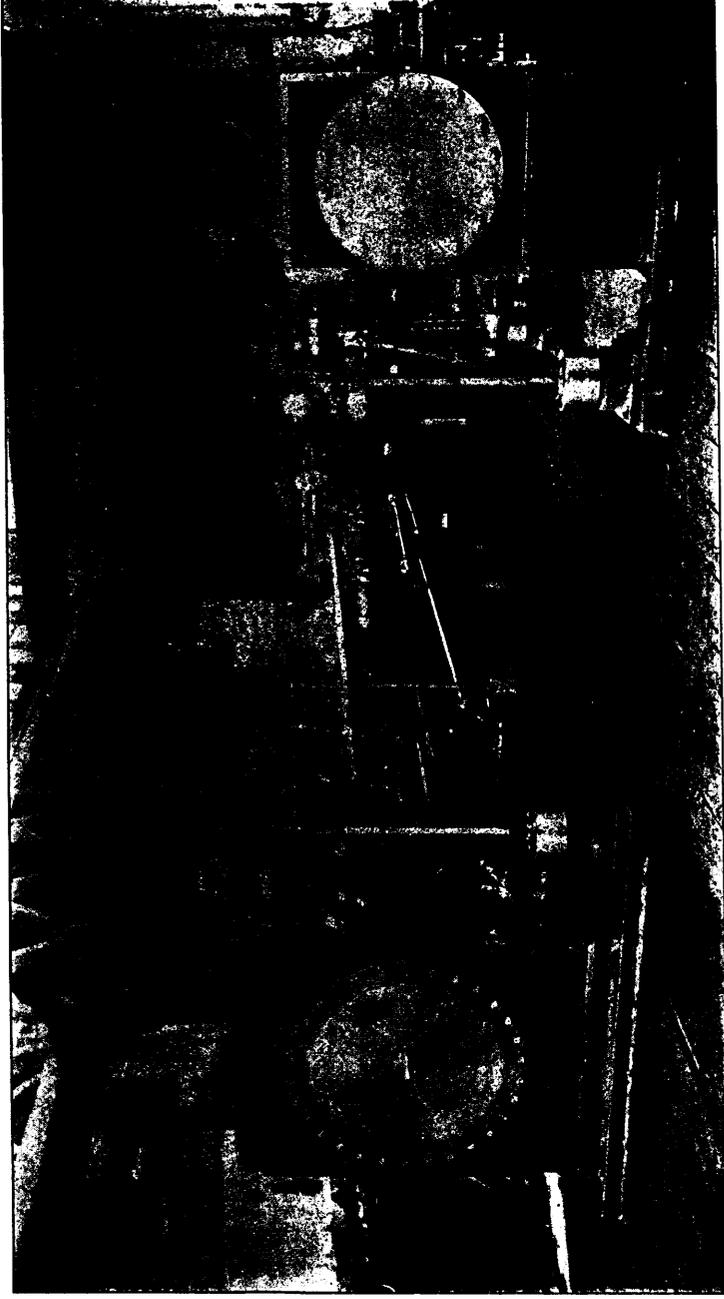
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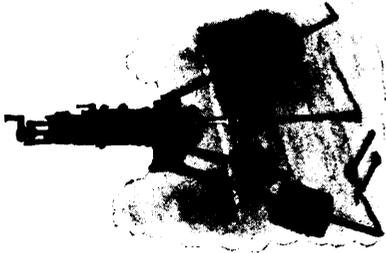
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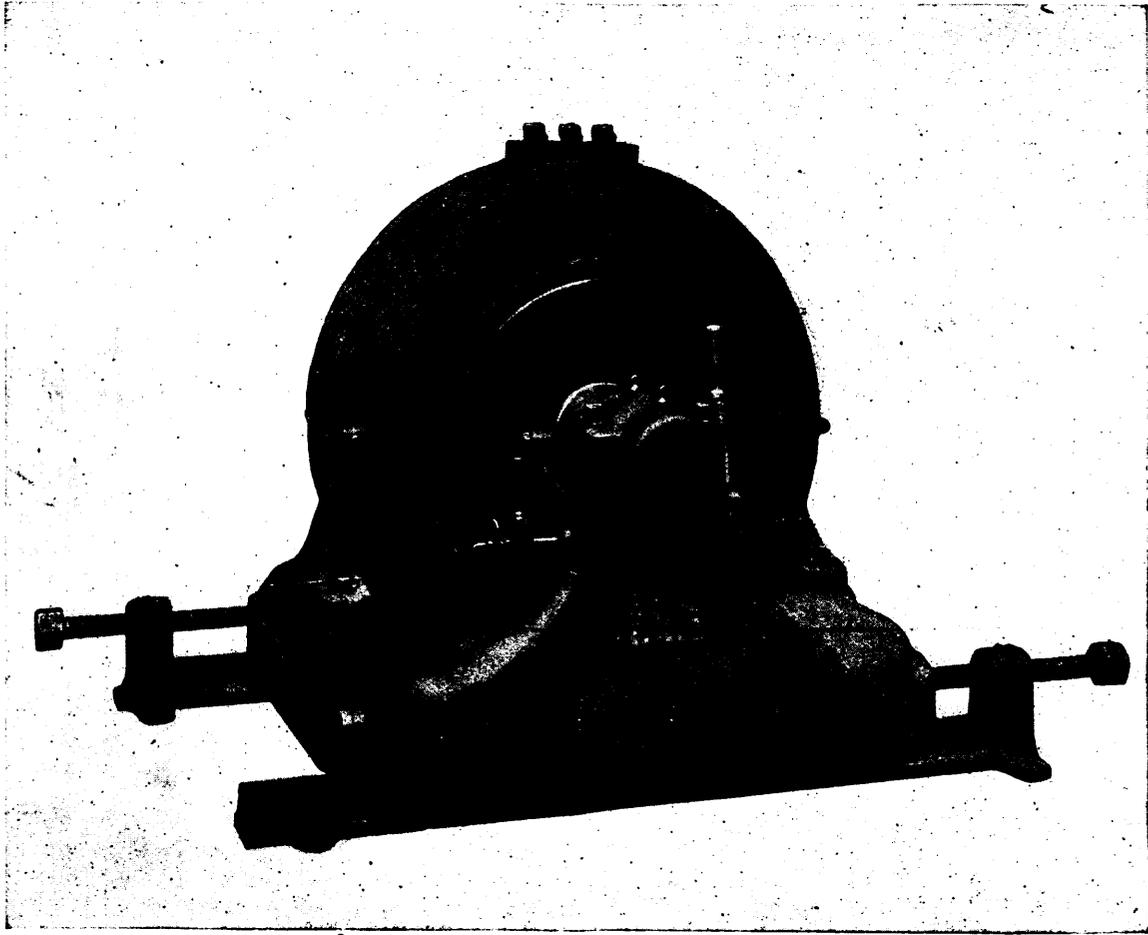
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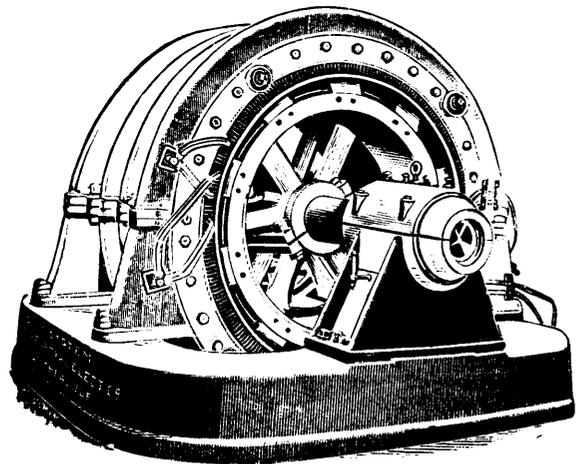
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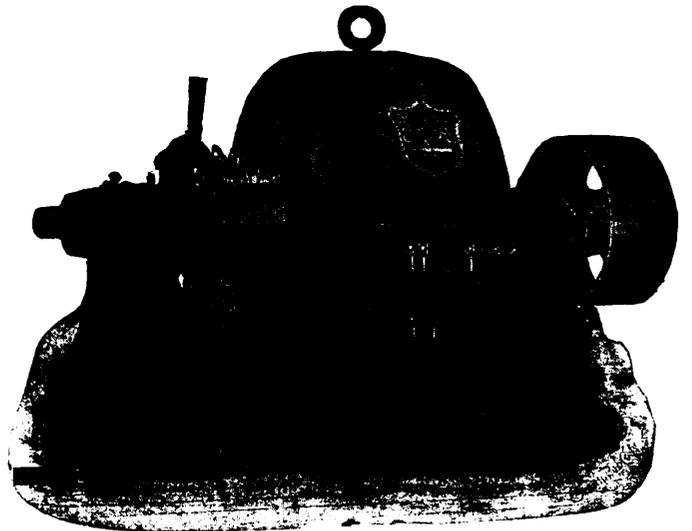


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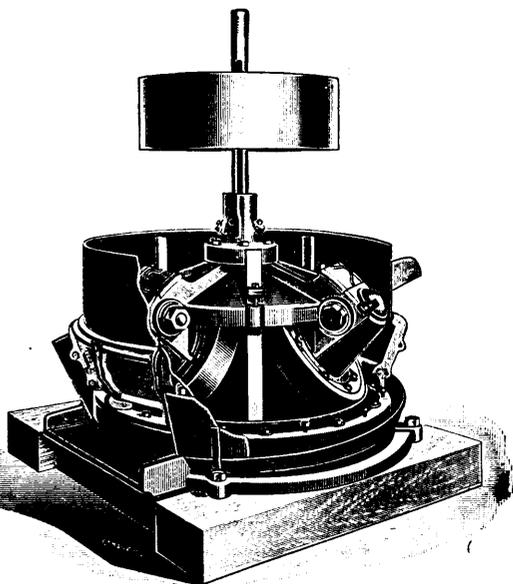
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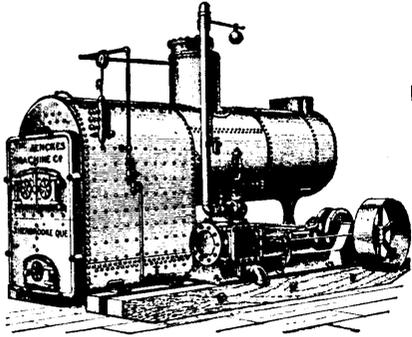
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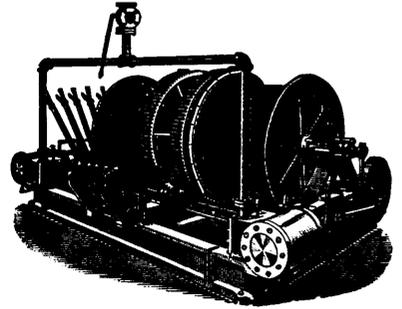
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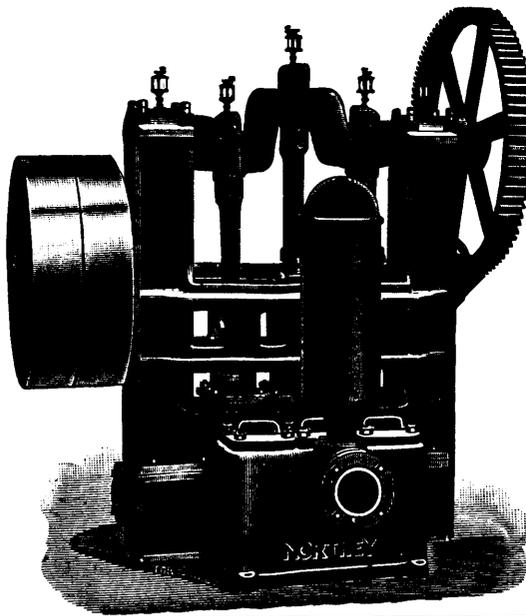
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OFFICES {Slater Building, Ottawa;
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VOL. XIX., No. 8.

AUGUST, 1900.

VOL. XIX., No. 8.

Provincial Mining Bureaus, the Geological Survey and their Respective Uses.

"There will," says Bacon in his *Advancement of Learning*, "hardly be any main proficience in the disclosing of nature, except there be some allowance for expenses about experiments, whether they may be experiments appertaining to Vulcanus or Daedalus, furnace or engine, or any other kind; and therefore as secretaries and spials of princes and states bring in bills for intelligence, so you must allow the spials and intelligencers of nature to bring in their bills: or else you shall be ill advertised. And if Alexander made such a liberal assignation to Aristotle of treasure for the allowance of hunters, fowlers, fishers and the like, that he might compile an history of nature, much better do they deserve it that travail in acts of nature."

These words of the Wisest of Mankind would be the needless preface to a demand for the occupation of a wilder field of research and greater activity in its investigation by the Ontario Bureau of Mines was it not the case that the worst features of our constitutional system are seen in the present ill arranged division of labor between the Dominion Geological Survey, the Ontario Bureau of Mines and the Ontario Department of Crown Lands. It is expected, incidental to our system of party politics, that the latter office will administer the people's domain, commonly known as the Crown Lands, with the double purpose in view of selling enough to help the Provincial Exchequer and mainly upon terms and conditions for winning the aid of buyers of mines, land or timber at election time.

Until stock-jobbing in insurance and loan companies and banks came to the front in the past two decades as the means of making magnates, the lumber trade was the easiest road not only to fortune but to influence voters with whom the patronage of a dispenser of money counted, here as everywhere, for those public virtues which deserve esteem. This state of affairs has deprived the Crown Lands Department of any traditions of initiative for the benefit of the country. Indeed, the fate of Sandfield Macdonald's administration in the early history of provincial autonomy was a warning to which the Mowat regime has given heed, namely that in the present state of development of the popular temperament it is safer to exploit the resources of the country for immediate revenue than to promulgate plans, however wise, for ensuring the maintenance of forest wealth or for preventing the self-destruction of mining enterprise by insane speculation in extensive areas instead of making such laws as will confine its activity to the actual operations of mines.

Much was hoped from the organisation of a Provincial Bureau of Mines. The Department along the line of policy above sketched was

adequate for all purposes of the land grabbers and speculators in areas. But if it was necessary that the Department should have information of the nature, extent and locality of our mineral resources and the best method of making these a source of national wealth, the means at command of the Crown Lands Commissioner were inadequate. The work of provincial land surveyors was required to merely meet the demand for information necessary to enable the Department to sell timber limits, and the surveys were made at a rate which prevented the acquisition of any information of the mineral resources of the surveyed areas had the surveyors been competent to obtain it, which the majority were not. In fact the unnecessary expenditures for township surveys within the past thirty years have been the least reasonable of all Government outlays. The money so unwisely laid out would have been better used in drill boring and analytical investigations and in providing the enterprise of the country with information to guide its mining and metallurgical activity. The Mining Bureau in giving the public the results of the labors of Professors Coleman and Miller has contributed much useful information to guide miners of gold and corundum. Nothing has however been done to obtain any substantial information respecting the iron ore deposits of either eastern or western Ontario. In the latter region no effort has until very recently been made to trace the horizon of the hematite iron deposits which are supposed to exist in equal richness on this side of the provincial boundary as south of it in the great Minnesota mines. Now Prof. Miller is at work tracing from Lake Superior to Lake Temiscaming the jasper formation. In eastern Ontario the Geological Survey compiled for a local purpose some five years ago a statement respecting the magnetic iron mines showing their productive capacity. The map begun about twenty-five years ago by Mr. Vennor showing the distribution of various mineral ranges in part of this district remains in an embryonic stage. In fact since Vennor's day—now a quarter of a century past—no original investigation of any practical value has been conducted in eastern Ontario by the Geological Survey. Mines of magnetite and hematite iron ores, phosphate of lime, all the micas, steatite, gold and silver bearing arsenical pyrites, gold bearing quartz, iron pyrites, galena and copper pyrites have been opened between the western boundary of Hastings and the Ottawa River, without any effort on the part of the Provincial Bureau or the Geological Survey to guide mining enterprises or to correct methods of exploration or ore dressing. Corundum should be excepted from this indictment. For some special reason the Provincial Bureau has set itself the definite task of making the localities of this mineral and the results of milling the ore known to the public, we may believe, with considerable benefit to the Province. The continuity and locality of corundum deposits have been well made out. But why has not the

same been done for mica, now, in some of its larger forms, worth three thousand dollars a ton? Why not investigate and report on the great phosphate bearing schists, at the same time, intimately related as they are to the mica deposits? There is a field for experimental work to reduce the cost of cobbling phosphate ore. The galena veins of Hastings and Frontenac have been merely catalogued by the Geological Survey. The work of the drill is required to determine the continuity and extent of our galena deposits, and the work of the mill to show the best method of up-to-date ore dressing. The Mining Bureau will be worthless and its offices sinecures if it can do no other work than record passing mining events and compile papers from foreign sources. The work of inspection might be for the sake of economy committed to the Provincial Board of Health. But the public desire some "spials and intelligencers of nature" from the Bureau: some effort to take up the work the Geological Survey was designed to do and more: some results of exploration that will enable investors to bank on the reports and obtain a fair reward for their faith in the scientific skill and intelligence of the experts employed by the Bureau. There is no need at present for distant voyages of adventure into New Ontario. In easy distance from eastern and western cities accessible at little cost for workmen and machines, there are mineral areas wholly unexplored, concerning which no word from the expert and his boring drill has been spoken. The work of the Bureau and of the Geological Survey seems largely concerned with hunting for fair fields and pastures new where amid pathless solitudes the prospector and speculator may safely find those mineral scenes to which distance lends enchantment for the benefit of brokers. There are some millions of acres in eastern Ontario over which the mineral rights belong to the Province. Instead of yearly votes to remote railways in order to put values in large areas for the benefit of railway contractors and their heirs forever, why should not the merchants, manufacturers and farmers in the eastern and western sections of Ontario derive some substantial and present benefit from the opening up of mines of iron ores, lead, gold, silver and other minerals by the Bureau to such extent that the further development and operation of them could be safely undertaken by capitalists on terms which would repay well the initial outlay of the Government? The people are paying \$2 on every ton of pig iron made from Minnesota ore for no other reason than that although the Ontario Assembly had the courage to vote \$125,000 to encourage iron miners to open up their properties, the popular representatives lacked intelligence to see that the Government itself could employ the best skill obtainable and for less than half the sum voted could at any one of a score of mining deposits open a mine sufficient to supply all the furnaces in operation west of Nova Scotia. Canada has educated more than one Girouard who could build a Government railway on economic lines, honestly and well. Is it incapable to educate mining engineers for public service. There are already scores of them, in some degree educated at public expense, who are serving with distinction and success in helping private persons to make fortunes in speculation in public lands. Let there be an end to this folly. The Bureau of Mines must no longer look to the Geological Survey. It is time the people entered into possession of their heritage, and from the Bureau of Mines and the Government of the day receive that devotion to the interests of the community in the provincial mineral domain which will always command approval and liberal reward.

It is useless to look to the Geological Survey for further work in any of its subjects within the Province. The immense scope of the organized districts and unexplored areas within the territories is a field large enough for a larger staff than that under Dr. Dawson. At the rate of what is called "progress" maintained during several years past the skill and contract labor of the Survey may be trusted to find petro-

icum in the north-west territory about twenty-five years hence. The exploration of the Yukon district should not be left to alien miners to pursue with the result before us that whatsoever mines they find and develop will with ceaseless political clamor during their operation be stocked by foreign capital, will be run with foreign machinery and the dividends paid to foreign shareholders. The Geological Survey is scantily equipped for its proper work as are the Provincial Bureaus.

This Dominion is betimes a Rachel weeping for her children. Thousands of active young men from the high schools and colleges of the country, the most expensive of our products and the least desirable to export, are compelled to seek employment in regions southward from our limits. It is true they cannot all be miners or mining engineers. But it is of the nature of mining industry to set a-going the foundry and machine shop, saw mills, carpenters and railways, while it draws around mining centres pioneer farmers and gardeners. Of late the country has been orating "in memoriam" over brave youth who found honor in dying for the country. Is it necessary to remark that the foreign legion (Canadians at home) who in the arts of peace are building up the industries and commerce of the United States might win no less honor than battle-stricken heroes while occupied in the industries of this country if a wisely energetic and progressive policy were permitted to rule the councils of the Provinces and the Dominion in the development of the enormous mineral resources under their respective territorial rule.

The country expects work and "spials and intelligencers of nature." To this end a practical mining engineer of wide experience should be placed in the direction of the Bureau, or in an advising relation to the director. There should be within the disposal of the Commissioner of Crown Lands under the advice of the Mining Bureau a liberal yearly appropriation for opening and developing mines to be sold or leased, for mill-work, and for experimental research. With such powers and proper equipment a Provincial Mining Bureau in any part of the Dominion would soon become a valuable promoter of scientifically-conducted and successful mining industries. It is reported that a Canadian who has recently spent his vacation in visiting mines in several of the western and south-western States found Canadians in every one of them for the most part in places of trust. The Bureau of Mines, more than any other agency under the direction of the provincial governments, can repatriate our sons, and set in motion the industries which will give them the means of prosperous livelihood and establish a rational trade in minerals and their manufactures upon enduring foundations.

The Summary Report of the Geological Survey and the Reports of the Bureau of Mines may be much improved by omitting the "personal equations" spread over their pages. "I may here express my entire satisfaction with the efficient manner in which every member of my party performed his duty," reports one official. "I have to thank many gentlemen for information, assistance and hospitality," followed by a list of names, is a complimentary formula found in many reports. Why not send the official acknowledgment of the Director of the Survey, without encumbering the reports for the public with these and other personal details? Something would be gained to the education of the public in the knowledge of our mineral resources by making the reports less technical in style, and less encumbered with references. For example, in the report of 1898, we are referred for an explanation of the nature of autoclastic rocks or dynamic breccias to a paper of Mr. Barlow published in the *Ottawa Naturalist*. A sentence or two would probably summarize Mr. Barlow's observations, and thus enlighten the public. In fact these reports should be revised to make them of popular interest, and less encumbered with official jottings and memoranda of no interest whatever to any but the officers of the Survey or Bureau.

Mr. Archibald Blue, Late Director of Mines for Ontario.

By appointing Mr Archibald Blue, late Director of the Bureau of Mines, to take charge of the Census, the Dominion Government has deprived the Ontario Civil Service of one of its most competent members.

Mr. Blue is a native Canadian, having been born in the Township of Orford, Kent County, Ontario, in the year 1840. He is of pure Celtic lineage, his parents being natives of Argyleshire, who emigrated to Canada in 1820 and took up a bush farm in Orford. Receiving a common school education, a country school-house was the scene of Mr. Blue's first assumption of the duties of life. Two years of teaching were followed by five years of enforced leisure, due to impaired health, which were spent on his father's farm, but which were improved by an enormous amount of reading, that laid the foundation of the wide and accurate knowledge now characteristic of the man. In 1867 he entered the newspaper field on the *St. Thomas Home Journal*, then owned by the late Archibald McLachlin. Mr Blue subsequently became editor of this newspaper, then as now one of the most important of Western Ontario weeklies, and so remained until 1879 when he joined the editorial staff of *The Toronto Globe*, of which Hon. George Brown was then the chief editor and leading spirit. After a year and a half's service on *The Globe*, Mr. Blue assisted Albert Horton and W. F. McLean (now M.P. for East York) in establishing *The Toronto World*. Shortly afterwards, the Ontario Government commissioned him to organize the Bureau of Industries in connection with the Department of Agriculture, of which Hon. S. C. Wood was head. Mr. Blue created



MR. ARCHIBALD BLUE,

Who has resigned from the Ontario Bureau of Mines.

and perfected the Bureau, and his work in the collection and publication of statistical information, especially with respect to agriculture, earned for him a solid reputation as a statistician. On the death of the late Prof. Buckland, he was raised to the rank of deputy head of the Department of Agriculture.

In 1888 the Government appointed a Commission to enquire into the mineral resources of Ontario, of which Mr. Blue was made a member and also the secretary. The report of this Commission, published in 1890, was largely Mr. Blue's work, and is a model of comprehensiveness and accuracy. The other members of the Commission were John

Charlton, M.P., Prof. Robert Bell, William Hamilton Merritt, and William Coe. The Commission was instructed to consider and suggest means for promoting the development of Ontario's mining industry, and in their report the Commissioners recommended the establishment of a Bureau of Mines which should devote itself to this work. The Government approved the recommendation, and in 1891 Mr. Blue himself was invited to leave his post as Deputy Minister of Agriculture and assume that of the first Director of Bureau.

The career of the Bureau so far has been fairly creditable. Mr. Blue's style of writing is direct and trenchant, and the annual reports of the Bureau have been got up in readable and attractive form, the consequence being that they have been very much in demand not only in Canada but in the United States and Great Britain as well. The earlier volumes are now out of print and unobtainable. Besides giving the statistics of the annual mineral output of the Province from year to year, the reports have dealt with almost every subject of mineralogical interest to the people of Ontario, and have included important monographs on nickel, iron, carbide of calcium, peat, corundum, and other mineral topics. A feature of the Bureau's reports has been the explorations carried on by geological experts, such as Dr. Coleman, Prof. Miller, Prof. Willmott and others in various portions of new Ontario, especially where promising discoveries of minerals had been made. It was sought to place at the disposal of prospectors and explorers geological and mineralogical information, embodied in maps and reports, which would be of use to them in their work, both by way of indicating those parts of the country where minerals might hopefully be looked for, and those parts where the chances were against finding them. In this way much has been done in the direction of defining and developing the gold, iron and nickel districts of the Province. A



T. W. GINSON,

Secretary of the Bureau who is likely to succeed Mr. Blue as Director.

diamond drill purchased by the Bureau has been operating for years in the interests of parties wishing to explore their mineral deposits, and in such demand has it been that a second plant has been recently bought. In short, the aims of the Bureau under Mr. Blue's direction, have been practical rather than purely scientific, and the methods of achieving those aims have been of a most practical kind.

Mr. Blue has long been a diligent student of economic questions, and recently served one term as Secretary of the Economic Section of the American Association for the Advancement of Science, and a subsequent term as Chairman of the same section. He is now a Fellow of the Association. He has been Vice-President of the Canadian Mining

Institute and also of the Canadian Institute, as well as a member of the Royal Commission which recommended the establishment of the Algonquin National Park of Ontario, and is a member of the American Institute of Mining Engineers.

Mr. Blue is a tireless worker, and of a brisk and genial temperament. Though turning gray, he is in the prime of his powers. In build he is "a big little man, thick-set and strong. He comes of vigorous and long-lived stock, for his father recently died at the patriarchal age of 100 years, good till the last for a day's work in the harvest field. Hon. Mr. Fisher has made no mistake in placing the important work of the census in Mr. Blue's hands. His past record, both in private and official life, offers the best guarantee that the census of 1901 will be carefully planned and accurately taken, and the results promptly given to the public in modern and well considered form.

While no appointment has yet been made, it is generally understood that Mr. Thomas W. Gibson, who has officiated in the Bureau for a number of years, latterly as its secretary, will succeed to the position of Director. Mr. Gibson is a very popular officer and, while not in the strictest sense a mining man, he possesses an intimate knowledge of the mineral resources and mining conditions in Ontario; moreover, he is a gentleman of judgment and tact, and we may be assured he will do his utmost to promote the best interests of the mining fraternity in Ontario.

The Visit of The American Institute of Mining Engineers.

In October, 1889, the American Institute held its fall meeting at Ottawa, and again in February, 1893, its annual meeting in Montreal. In August, 1900, it once more joins hands with its kindred Canadian Institute in a summer meeting at the "Ancient Capital" of Quebec, and a tour through the coal and iron mines of Nova Scotia and Newfoundland. To our visitors, the members, officers and their friends we extend a cordial greeting and confidently express the hope that this gathering may result in an increase in the goodwill and sympathy which have always characterized our relations with them.

Whilst Canada has never failed to reward the visits of scientific societies in providing an unrivalled display of natural resources, we have not hitherto been able to compete with the great country to the south in the layout, equipment, or extent of our operations; but everything has a beginning, and we feel sure our visitors will be the first to recognize and acknowledge the vast strides that have been made in this direction, both on the mainland and in the island of Cape Breton since 1893. Our only regret is that it was not practicable for them to come next year, by which time the extensive works of the Dominion Iron and Steel Co. at Sydney will be in operation, promising, if the best authorities are to be relied on, an object lesson worthy to be compared with anything in the United States.

The American Institute of Mining Engineers has had an interesting record, and has achieved a brilliant success. It was founded in 1871, less than 30 years ago, and to-day counts nearly 3000 members. It is as cosmopolitan as the great country which gave it birth, for there is not a country in the civilized, and not many in the uncivilized, world that does not contribute to its membership. In addition to every State in the Union, it has a footing in Canada, Newfoundland, Mexico, Central America, South America, England, Scotland, Ireland, Wales, Austria, Belgium, France, Germany, Russia, Norway, Sweden, Spain, Switzerland, China, India, Japan, Java, South Africa, Australia, New Zealand and Tasmania.

Much of its success is due to the elasticity of its constitution. Not in the direction of lowering the standard, but in adapting its regulations to the varied conditions with which it has to contend. Ordinary and honorary members must be "mining engineers, metallurgists, or

chemists, or persons practically engaged in mining, metallurgy, or "metallurgical engineering." The papers read and discussed are stipulated to be "professional," and no one who has had the privilege of studying their transactions can doubt that they comprise one of the most valuable compendiums of mining knowledge and experience in the world.

The difficulty of securing any degree of cohesion over so large a territory has been solved by dividing the official positions over the whole of the Union, whilst securing a sufficient number in the immediate vicinity of the registered office to ensure prompt and efficient transaction of business. Under the able guidance of Dr. Raymond, a past president and for 16 years secretary, there has been nothing lacking in this respect.

The officers consist of a president, six vice-presidents, nine managers, a secretary and a treasurer. There is an executive council which acts on the instructions of the council, meetings are called by the Secretary as the council may decide, and business may be transacted by less than the fixed quorum and subsequently confirmed.

The ordinary meetings of the Institute may be held wherever the council thinks fit, and as a matter of fact have ranged from the Atlantic to the Pacific, and from the St. Lawrence to the Gulf of Mexico.

There are two features which are admirable and, as far as we know, peculiar to this Institute. Its transactions are not only distributed to the members, but are sold to the public; and papers, after being read, may be modified and re-written in the light of criticism and discussion before being printed.

The success of the Institute has not been confined to its literary and scientific productions; it is financially sound, and in this respect can claim to have solved the problem that perplexes so many kindred societies. Its members have gone out into the uttermost parts of the earth, and have been the pioneers of scientific mining in many lands. In South Africa at the outbreak of the war they outnumbered the English engineers, and in the development of the mineral resources of China and Japan they have a practical monopoly. We can wish nothing better for the Canadian Mining Institute than that its record may be as honourable and its success as fully assured, and to our visitors we say again "A Hearty Welcome."

Iron Galore!

Under the heading "The Iron Ores of Nova Scotia," the *Colliery Guardian*, of July 20th, prints one of the most extraordinary effusions it has ever been our lot to read, and as substantially the same article appears in the *Coal and Iron Trades Review*, it is evident that there is at least some method in the madness of those who inspired it.

The article purports to be by one Geo. B. Cowlam, New York, and for "high falutin," exaggeration, inaccurate statement, and unmitigated "gall," it certainly takes the cake. No one who is in the slightest degree acquainted with the geology or the mineral resources of Nova Scotia will fail to be astonished when told that Mr. Cowlam has "just returned from an extended and careful examination of some new discoveries of iron ore in Nova Scotia, which are of such magnitude as to make them of the highest economic importance to Great Britain." Their surprise will not be lessened when they learn that this wonderful deposit is "an iron range nine miles in length and about 1000 feet high in Antigonish County." In one series, occupying a breadth of 100 yds., veins of ore aggregating 71 feet have been cut, and show for 1000 feet in height. Mr. Cowlam believes that "the centre of the mountain across a width of half a mile will show it to be a mass of veins occupying fully one-fifth of the half mile space." Prodigious!! Then Mr. Cowlam proceeds: "Taking, however, the 98 feet only for purposes of present estimation with an average of 1000 feet high the nine miles would yield,

at 10 cubic feet of ore to the ton, approximately *half a million* tons of ore above drainage."

(We make it on this computation 465,696,000 tons, but presumably Mr. Cowlam's arithmetic is on a par with his mining knowledge.)

"The ore is a bluish haematite in the larger veins, two of the smaller being clearly fossiliferous, probable Clinton ores, like those found in Alabama; *but they are of much higher grade*. Various analysis show from 49 up to 65½ per cent. of metallic iron, and from .212 to .530 of phosphorus. . . . The highest analysis shows as follows:—

	Per cent.
Insoluble (silica, gangue, etc.)	8.61
Protoxide of iron	28.67
Sesqui-oxide of iron	67.71
Phosphoric acid	0.483
Metallic iron	65.5
Phosphorus212

99 473

Mr. Cowlam very sapiently remarks, "This analysis is not given as a sample, but to show relative proportions of the protoxide and sesqui-oxide of iron. The average yield can be safely put at 53 per cent. metallic iron and the phosphorus at *something under .500*"

He then goes on to speak of railway construction to this range, but as it will never be required for the purpose of transporting Mr. Cowlam's mountain of ore, we need not dwell upon that part of the scheme. We must however, take note of the fact that "This road runs through a coalfield, the coal being a coking coal of the quality long known in Nova Scotia. It contains some 21 or 22 per cent. *volatile carbon*, and over 30 per cent. ash. But it has long *been used* as coking coal for iron-making in Nova Scotia." Among the many remarkable experiences of Mr. Cowlam this is surely the most astounding, and we would give much to know how, when and where iron-making coke has ever been made from a coal containing 21 per cent. of "volatile carbon" and 30 per cent. of ash.

Of course nature, whilst providing this "embarras des riches" has not forgotten the "carboniferous limestone," of which "there is plenty at Antigonish." "The ore could be shipped at 40 cents a ton at Antigonish, and will run 15 to 20 per cent. more metallic iron than the ores used in Alabama."

The next paragraph is so delicious in its naivete that we must quote it "in extenso."

"The Dominion of Canada pays a bounty of \$2 a ton and the Province of Nova Scotia \$2 more—four dollars in all—the arithmetic is right this time)—on all pig-iron made. *It would, therefore, appear inevitable that there must follow from this discovery a development in Antigonish such as followed from the discovery of the Alabama deposits, or those in Michigan or Minnesota, on Lake Superior, with both of which it ranks in magnitude and economic importance.* This, it would seem to me, opens the way for Great Britain, not only to develop enormous interests in Nova Scotia in basic iron and steel, but to increase the British output until it shall again rank first in the world's production. *It means the greatest change in the world's iron trade that has yet been brought about*, as there is ore enough to produce 5 million tons of pig-iron yearly for 50 years."

We must apologise to our readers for quoting this unique effusion at such length, but any shorter extracts would fail to do justice to its originality and imaginative beauty. We are trying to make up our mind whether Mr. Cowlam is a wag or whether he has "had his leg pulled" by some old man of the sea down by the Northumberland Straits. If the latter, he should at least have sufficient rudimentary knowledge of chemistry and metallurgy to know that coal with 21 per cent of "volatile carbon," as he expresses it, and 30 per cent. ash is valueless for

coking purposes, and that iron ore with *a tenth* as much phosphorus as he gives could not be used for iron or steel making. Any senior school-boy could have told him this in New York without his going down to Nova Scotia. If it could for one moment be supposed that a single reader of the *Colliery Guardian* would take Mr. Cowlam seriously, it might be worth while taking steps to prevent the mischief that might follow, but as even the crassest ignorance could not be taken in by so stupendous and incongruous a recital, we content ourselves with this free advertisement of Mr. Cowlam's eldorado, premising that The Dominion Iron and Steel Co. and the Nova Scotia Steel Co. will feel very badly after their years of labor in the Province, that they missed a discovery which, in the hands of any but a madman, would "turn the world upside down," and instead of digging their ore for untold ages in the fruitful and fertile ranges of Antigonish and shipping it for 40 cents a ton, have gone to far-off fields in Newfoundland for their supplies.

The Kootenay Mining Co. Limited.

We have repeatedly called attention to the harm which is done to Canadian mining interests by indiscriminate booming, as well as by inaccurate or indefinite reports. This subject has been much in evidence during the last month or two in consequence of the attacks of the London press on the extraordinary circulars issued by an organization of owners of mineral claims round about Winnipeg known as the Central Canada Chamber of Mines. No one who reads the circulars and the comment of the English papers upon them can doubt that the attitude of the latter was fully justified. They complained of vague generalities and glowing eulogiums being given by an avowedly independent organization counting among its chief officials men of high public position in the Dominion, but a total lack of definite information, actual results, and reliable reports from competent experts of known reliability and status. This is the one great fault with those who undertake to advertise Canadian mining districts. They forget that English capital has been invested in Canada before and not always with such results as would lead capitalists to accept every rosy proposition that might now be made without question. The revelations of the Klondike and Columbian Goldfields, Limited, are not likely to engender a feeling of confidence even when prominent public men lend their names and "accept" shares as the consideration.

In this connection we regret to notice that the prospectus of the Kootenay Mining Co. Limited is so drawn as to attract notice and excite unfavorable comment. With good properties to offer surely it would have been easy to give detailed information in such a form as to escape unfavorable comment, yet although often differing from the attitude taken in respect to Canadian mines by the *Mining Journal* we must acknowledge that there is some ground for the remarks of our contemporary in issue of July 28th. Finding fault with the vagueness of the reports it gives an extract, "The workings have developed extensive deposits of ore the limitations of which are not yet determined. Occurring in these deposits are numerous short chutes of shipping ore of standard averaging say \$12 to \$16, but mining operations would be more profitable if the deposit were mined down to say \$10 a ton. On this basis a large tonnage probably equalling anything in Rosslund would be obtained." This is the type of generalization contained in the cabled report of Mr. Bernard MacDonald. Mr. Carlyle, late general manager of the Le Roi mine has reported on the properties which consist of some five claims, but as far as he can ascertain there is nothing in the extracts given in the prospectus from his reports which enables the reader to know of which property or properties he is speaking, and at the most the results obtained from the ores are assays taken from samples the quantity or bulk of which is in no case given.

COAL MINING AND TRADE.

Public interest in the question of the coal supply of Great Britain is unabated, and prominent men in all walks of life have had their say on the subject. Professor Hull, who from his scientific training and long experience is undoubtedly one of those best qualified to speak on the subject, is, on the whole, inclined to be rather pessimistic; not so much as to the actual extent of unworked coal areas, as to their economical extent: and he is supported by no less eminent a mining engineer than Mr. Forster Brown, of Cardiff, who points out that long before the exhaustion of their coal supplies there will be a period of comparative scarcity and consequent dearness of fuel, which will seriously hamper the manufacturing industries of the country.

The prominence which has been given to the controversy has thoroughly aroused public interest, and has culminated in action on the part of the Government in classifying coal as one of the "munitions of war." This, however, does not in the opinion of Professor Hull and those who think with him go far enough. They are in favour of an export duty of 5s. a ton on coal sent at any rate to European nations, which would yield on present computation the handsome sum of \$50,000,000 to the Exchequer. This, however, would do nothing to conserve the fuel, and would in time of war be a poor solatium for the absence of the best steam coal.

Meanwhile exportation goes on apace. Mr. Ritchie stated a few days ago in the House of Commons that the exports for the present year would probably exceed 40,000,000 tons, of which France would get 7,000,000 and Germany 9,000,000. Russia would probably take 4,000,000 as the Government had suspended the duty on coal used for railway purposes.

It is quite natural that the colliery owners should oppose any measure which might result in curtailing their sales on the principle that "those who live longest should fetch fire furthest," but there is no doubt a strong feeling that there is an imperial aspect to the question, and as it is admitted that it is impossible to replace Welsh steam coal for naval purposes with any of equal quality, it would not be surprising if the controversy should end in some measure for conserving an unique natural product which cannot be replaced, and which, according to the best authorities will only last at the present rate of exhaustion a matter of 50 years.

All this is replete with interest and importance for coal producers on this side of the Atlantic, for obviously whenever British supplies run short or become permanently dear consumers will have to look this way. It is a pity that conditions here have not been favorable for a larger test of the possibilities of American and Canadian coal for the European market. The unexpectedness of the demand, the abnormally high prices realized and maintained, the unprecedented activity in all branches of trade have conspired to keep our coal in its usual markets, but if British coal keeps at its present high figure and the iron and steel industries of the States continue to subside as they have done recently we shall see large exports of coal from Philadelphia to Europe next year, which will have the effect of bringing down English prices to a normal figure, or permanently capturing a share of the market. If this can be done from the States, it can be done much more easily from Canada.

During the eleven months ending 31st May last the United States exported the following tonnage of coal to Europe:—

France.....	26,336
Germany.....	2,136
Other Countries.....	138,640

A recent article in "*Engineering*" estimates that Alabama coal can be put f.o.b. at Mobile for \$1 a ton, made up thus:—

	cts
Mining, Screening, etc	60
Transport to Mobile	25
Unloading and Storing	8
Management	7
	<u>\$: 00</u>

The Cardiff Chamber of Commerce recently had under discussion the placing of a large contract for steam coal c.i.f. Naples. They had to compete with an American offer based on

Coal f.o.b. Philadelphia.....	\$2.50
Freight to Naples.....	4.00
	<u>\$6.50</u>

The Welsh quotation was:—

Coal f.o.b. Cardiff	\$5.00
Freight to Naples.....	2.00
	<u>\$7.00</u>

Apropos of the exhaustion of British coal deposits, Mr. J. A. Longden, a past president of the Institute of Mining Engineers, followed with a paper the remarks referred to in our last as emanating from Mr. H. C. Peake, that more attention should be directed to the economical use of fuel. He indicated two very obvious but generally neglected precautions which should be adopted wherever practicable—the adaptation of furnaces to the class of coal burned, and the super-heating of steam. This is a point applicable wherever coal is used. We know of a mine in Canada with a cost for fuel of \$20,000 a year where a moderate and judicious expenditure would have furnished all the necessary power at less than a fourth of the sum. This can hardly be called one of the "smaller" economies of mining, but it may often make all the difference between profit and loss. We have not the same reason for conserving our coal supplies as Great Britain, but ours may be quite as urgent.

Mr. C. F. Hood, of Connellsville, is putting on the market a briquette made partly of coal and partly of coke dust, in equal quantities. It is said to be adhesive and compact, and to give less smoke and be more durable than ordinary coal dust briquettes. It probably requires more pitch; all the same it is an important departure, and if commercially successful will find a market for another waste product.

Mr. George S. Herbolzheimer, of Denver, has introduced a new system of deep mine pumping on the relay system. Only one discharge column is used, although pumps can be worked at two or more levels simultaneously. This is effected by "pass-by" pipes at each level. The scheme is ingenious, and, if successful, will greatly cheapen pumping at considerable depths.

It is interesting to note that in spite of the enormous demand for English coal all the world over, the United States has not been able to materially increase shipments to South America. In 1899, Great Britain sent to Rio Janeiro 549,896 tons, and the United States 26,227. The largest customers there, the Central Railway, took 120,000 tons at 29s. 6d. Pocahontas coal was quoted 28s. 6d., which goes to show that our former computation of \$7 was correct, and that there should be no difficulty in placing Canadian coal from Nova Scotia at this figure or less. If the C.P.R., I.C.R., and Maine Central can use this coal, there is nothing to prevent the Central of Brazil from doing so.

So important has become the subject of electricity as applied to mining that our esteemed contemporary the *Colliery Guardian* devotes

a column or more to it weekly. There is little doubt that the gigantic strides made in the application of this power to almost every operation of mining will soon revolutionize mechanical methods. The earlier objections to its introduction are rapidly disappearing before the achievements of inventive skill, and it seems as though the greatest difficulty of all—sparking—is within measurable distance of being removed. This is the opinion of as high an authority as Mr. Sydney F. Walker, who has devoted himself entirely to electrical machinery for mines. We notice that the Thomson-Houston company are bringing out a patent automatic switch, which is designed to render "sparking" impossible. If this can be done the "danger" difficulty is removed, and the cheapest and most adaptable of known energies will soon supersede every other in connection with mining.

THE GOLDEN TWINS IN COURT.

Readers of the REVIEW will remember our *expose* in 1898 of the shameless and barefaced flotation of a company called the New Golden Twins of Ontario, Limited, the promoters being The Klondike and Columbian Gold Fields, Limited, on the board of which were certain members of the British Columbia Government, now happily relegated to private life.

The company asked the public to pay \$65,000 in cash and \$150,000 in fully paid shares for a couple of undeveloped gold locations on Clearwater Lake, Western Ontario, the principal evidence of value being the statements of a Johnson Brown, who proved upon enquiry to be, not a mining engineer as he was prominently stated to be in the prospectus, but a poor uneducated half-breed trapper from the district around Port Arthur. Furthermore, investigation showed that the statements attributed to him were entirely fraudulent. Such an endeavor to bolster up the purchase of two unknown and unproved locations we characterized as an offence which ought to be indictable and punishable with the penitentiary.

The affairs of the Klondike and Columbian Gold Fields, Limited, are now in the courts, and it is not unlikely that Mr. J. Morris Catton, an ex-clerk in the War Office, who has been cutting a considerable swath recently in London, as a company monger, and some of his co-directors may now receive the punishment they richly deserve for the part they have played to this scandalous affair.

The evidence in the Bankruptcy Courts throws so much light upon the *modus operandi* of this coterie that we reproduce it:—

Mr. Charles Frederick Flack, examined by Mr. Barnes, stated that he was described in the prospectus of the company as the promoter, but that description was incorrect, Mr. John Morris Catton being the actual promoter. Witness was employed by Mr. Catton as managing clerk at a salary of £2 per week, and became secretary of the company. He took no part in the preparation of the prospectus. Certain contracts were read to him, and he signed them as a matter of course. He was a party to three agreements relating to the promotion of the company, one of which provided that he should pay all the preliminary expenses in consideration of the allotment to him or his nominees of 5,000 fully-paid deferred shares. He did not personally receive those shares. They were issued to the directors and brokers of the company and to Mr. Catton, the last mentioned receiving 3054. The effect of the various agreements was that Mr. Catton not only received the deferred shares, but also the amount of the preliminary expenses, including £1283 paid in respect of advertising to J. Morris and Co. Mr. Catton carried on business in the name of J. Morris and Co. The deferred shares were "pooled" in order to keep up the price. A prospectus having been issued to the public inviting subscriptions for 95,000 ordinary shares, a sum of £27,166 was subscribed. Shortly after its formation the company promoted the New Golden Twins (Ontario), Limited, which was to take over a property in Canada. The Klondike Company paid all the expenses relating to the issue of the New Golden Twins Company. The public only subscribed £2000 to the New Golden Twins Company, that sum being insufficient to pay the advertising expenses. The directors of that company proceeded to allotment, however. These directors were practically the same as the directors of the Klondike Company. The position of the Klondike Company immediately after the New Golden Twins promotion was that it held a greater number of shares in the latter company, for which there was no market. The Klondike Company gave its brokers an option to call for shares in the New Golden Twins Company, with the object of making a market, but he could not say whether the option was exercised. An offer was received in November, 1897, from the Dawson City (Klondike) and Dominion Trading Corporation (Limited), which resulted in the sale of 5,500 shares of the New Golden Twins for £2734. Relying on that transaction, the directors of the Klondike Company declared a dividend at the rate of 20 per cent. on the ordinary shares. A market was made in the Klondike shares on the strength of that dividend. His connection with the company ceased before the declaration of the dividend.

By Mr. Reed—He left Mr. Catton's office in consequence of a disagreement. Mr. Catton alleged that witness had not accounted for money received. Shortly afterwards witness was convicted of attempting to extort money by threats.

Mr. John Morris Catton was next examined by Mr. Barnes, and stated that he was the real promoter of the company. Mr. Flack's name was used because it was the usual custom for company promoters to put forward a nominee. He was a clerk at the War Office, and at the time of the promotion of the company he was on leave through ill-health. He carried on business before and after office hours. He had promoted 18 companies, some of which were in liquidation. It appears that he had received from the company sums amounting to £11,395. This amount included (1) sums paid to him in the name of Morris, some of which he had disbursed; (2) sums received by him for shares in the Dawson City Company; and (3) the preliminary expenses of the Klondike Company and the New Golden Twins Company. He received various sums in addition to the 5000 deferred shares in respect of the preliminary expenses of the Klondike Company, and he contended that he was entitled to them under the agreements. Questioned with regard to the disposal of the 5000 deferred shares, witness said he presented 50 to the Hon. J. H. Turner, 50 to the Hon. C. E. Pooley, Q.C., and 200 to Mr. J. Boscowitz, those three gentlemen forming the colonial board of directors. The brokers of the company received £1000 in cash and £250 in shares. Witness was interested in the sale of the New Golden Twins' property to the Klondike Company, and his interest was disclosed to the directors. Although the amount subscribed by the public in the New Golden Twins Company was very small, the directors went to allotment, on the understanding that any capital which might be required should be found by the Klondike Company. With reference to the dividend of 20 per cent., witness said that at first it was intended to pay it in scrip, but afterwards, at the suggestion of the brokers, it was decided to pay it in cash. All the directors agreed to the dividend before it was declared. In December, 1895, the brokers were given the "put" of 1000 shares of the New Golden Twins Company at par. Some few days previously the Klondike Company sold 5500 shares at 10s. each.

Mr. Barnes—Was the object of giving the brokers the "put" to enable them to make a market?—Yes, you may say that they were given cash to make a market.

Continuing, witness said that the total issued capital of the Klondike Company was £35,000, exclusive of the deferred shares.

Mr. Barnes—And the estimated total assets are now £2800?

Witness replied that the sum mentioned was what they were likely to produce by forced realization. In August, 1898, a circular was issued by the company inviting subscriptions for fresh capital, the ordinary shares being offered at 2s. 6d. premium and the deferred shares at £8 each. The circular contained a letter from the company's manager in Canada, who reported favorably on the prospects of the company. The payment of the 20 per cent. dividend in cash was also mentioned. As a result of the circular 2613 ordinary shares were applied for, but only 24 deferred shares were sold. The company had purchased from witness shares in companies promoted by him, and had paid him in this respect £3687, which he asserted was to be used in the promotion of companies in which the Klondike Company were interested. The shares purchased were now valued at *nil*, this being due to the falling through of a reconstruction scheme. A balance-sheet was issued in March, 1899, showing the result of the company's business from August 5, 1897, to September 30, 1898. The sum of £48,466 was credited to the profit and loss in respect of "appreciation in the value of investments." Asked who suggested the insertion of this item, witness said it was discussed by the directors. The balance-sheet was submitted to the auditors, who reported that the £48,466 was an anticipation of possible profits; that without the appreciation the loss on the period would have been £9,724; and that, consequently, the dividend of December, 1897, would appear to have been paid out of capital. Witness denied that he attempted to induce the auditors to alter their certificate.

By Mr. Gore-Brown—In April, 1898, the shareholders of the company were entertained at dinner by the directors, who provided the necessary funds out of their own pockets. Glowing accounts were given of the probable success of the company and its flourishing condition.

In reply to Mr. Colfax, witness said that none of the directors objected to the payment of the 20 per cent. dividend. From the minute-book it did not appear that Mr. Cohen was present when the dividend was declared. Mr. Cohen resigned his seat on the board in December, 1898.

The enquiry was then adjourned.

At the continuation of the enquiry on Tuesday, Mr. H. Chester-Master, examined by Mr. Barnes, stated that he was one of the directors of the company. Mr. Catton, the promoter, asked him to join the board. Witness had previously acted director of several companies, including the Wentworth and Aladdin Gold Companies, and Trevor's Rhodesian Company.

Mr. Barnes—Of what companies did you act as director under Mr. Catton's instructions?

Witness—The Klondike and the Columbian Gold Fields (Limited), the New Golden Twins Company (Ontario), Limited, and the Dawson City (Klondike) and Dominion Trading Corporation (Limited). He added that of these three companies the New Golden Twins Company was the only survivor. Witness was nominated as a director of the Klondike Company by the signatories of the Memorandum and Articles of Association. Deferred shares for £5,000 in the Klondike Company were issued as fully paid to Catton or his nominees, in payment of promotion expenses, &c., and, in addition, various cash payments were made by the company to that gentleman.

Mr. Barnes—What is the net result of the dealings of the Klondike Company? How much cash did you get from the public?—£35,000, I think.

How much of the £35,000 was lost between August, 1897, when the company was registered, and August, 1899, when it went into voluntary liquidation?—As it stands now we lost it all.

Witness was also examined as to the circumstances in which in November, 1897, a dividend at the rate of 20 per cent. per annum on the ordinary shares was declared by the company. He did not think that any balance-sheet was then prepared showing the net earnings of the company. The justification for paying the dividend was that a sum of £2,750 has been received by the Dawson City Company for 5,500 shares sold to them by the Klondike Company. The 5,500 shares were a holding in the Golden Twins Company. That company was promoted by the Klondike Company, and the only shares in it which were sold were the 5,500 referred to.

Examined by Mr. Croome, witness stated that he read the agreements between the company, Catton, and Flack, and was guided by them in making payments to Catton. He took steps to see that the advance paragraphs, for which Catton received £250 from the company, duly appeared in the newspapers. He acted in good faith throughout.

Colonel A. Burton Brown stated that he was invited by Catton to become a director of the company, and he consented to do so. He had also acted as a director

of the Bird-in-Hand Mining Company, which was wound up, a return of 3d. in the pound being made to the shareholders. Hannan's Find Company, of which he was a director, was still in existence, as was also the Lady Loch Company. Those two companies were the only survivors of several of which he had acted as a director, including the Vehicular Insurance Company, the Rainy River Company, and the N. A. P. Bread Company.

Mr. Registrar Hood—Have you been in the Army?

Witness replied that he was formerly in the Army and retired on half-pay. As a geologist he took an interest in mining, and acting on the advice of friends he turned his attention to company matters with disastrous results.

Mr. Gore Brown also examined the witness as to various transactions of the company and his connection with the Rainy River Company.

In reply to the learned Registrar, witness added that he very nearly brought himself into antagonism with the other directors by taking a deep interest in the company's affairs.

Mr. J. de Lara Cohen, a director of the company, stated that he was also a director of the Golden Twins Company and the Dawson City Company. He objected altogether to the payment of the 20 per cent. dividend, but did not go so far as to protest against it at a meeting of the shareholders. When the Dawson City Company purchased 5,500 shares in the Golden Twins Company from the Klondike Company he did not know that the price was to be used by the Klondike Company for the payment of a dividend. He had now gone to the expense of employing a firm of accountants to ascertain what money was received by the Klondike Company and what had become of it. It appeared that £35,327 was received from shareholders, of which £10,150 passed through Catton's hands, and £1,391 was paid away in directors' fees, including £171 to himself (witness). A great deal of the money was used to charter ships, and was absolutely lost in that way. Of the £35,327 nothing now remained.

By Mr. Colefax—He bought 100 deferred shares in the company and paid for them in cash. He still retained them, although he could have sold them for £8 each. When the circular of August, 1898, was issued he believed that the 20 per cent. dividend had been properly paid. He resigned his position on the board of the Klondike Company in December, 1898.

Mr. Registrar Hood—Do you think that the dividend was honestly earned?

Witness—I do not think so now but I did at the time.

The enquiry then terminated.

EN PASSANT.

Mr. O. E. S. Whiteside, mining engineer to the H. W. McNeill Coal Co., Ltd., has returned to Canada from a well-earned holiday in Europe. Mr. Whiteside speaks highly of the courtesies extended to him by the mining fraternity, particularly in and around Wigan, Cardiff and Brussels.

It is authoritatively stated that in the near future steps will be taken to increase the capacity of the Northport and Trail smelters, in order to treat the larger tonnage of ore about to be produced in the Rossland Camp. The present capacity of the Northport smelter is 800 tons daily, and of Trail, 650; both are to be doubled.

The strike among the workmen at the iron ore mines, Belle Island, Newfoundland, is at an end, with a result that is evidently a compromise. The men were formerly paid 10c. an hour, and struck for 15c. They are to get 11c. for surface work, 12c. for quarrying, and 15c. for overtime.

Amid the scorching flings and reflections indulged in by the eastern press in dealing with the mining industry, it is refreshing to see evidence of proper appreciation as shown in the following article taken from the *New York Tribune*:

"The mining industry has paid more dividends, compared with other industries, than any other business known. Compare the profits in mining with the profits of the 156,000 odd miles of railroad, with the aggregated liabilities of nearly \$10,000,000,000, then you will see which pays the best. Under the wing of mining there exists some of the safest and most profitable of all business. Take, for instance, the twelve great smelting companies—the mineral pawnbrokers. The smelting company that does a strictly custom business show absolutely and unquestionable larger profits than any other industry in America. I know of instances where capital invested in smelting companies has been turned five times a year, and each time the margin of profit has been over 20 per cent. of the entire amount handled. They take no risk, simply buy the raw gold and silver in the ore, at a reduced price, extract their cost of treatment and pay the miner a residue. It is a business where the principal is absolutely safe."

Mr. T. J. Brown, has been promoted to the position of Mining Engineer to the Dominion Coal Co., a well-earned promotion, and one on which we tender him our hearty congratulations.

Mr. Brown is still a young man, having been born in 1860. He was for 15 years at the Old Sydney Mines of the General Mining Association, Ltd., where he received his first instruction in mining from the veteran manager Mr. Richard Brown. Later, he became the manager of Victoria Mine when it was sold to the Dominion Coal Co., and when they closed it down in 1898 he was transferred to the Caledonia, where he greatly distinguished himself both by his ability and personal bravery on the occasion of the terrible explosion in the spring of last year. Mr. Brown was carried out of the mine in an unconscious state, and remained in a critical condition for some days. On recovery, he took a long holiday to recuperate, and on his return was relieved of the responsibility of management and taken into the general office, a step which has just been followed by his promotion to the important position named.

Mr. Brown is a man of considerable ability and no slight degree of culture, his modest and kindly bearing have made him a general favorite, and his 20 years experience of mining should fit him for a position which we have every confidence he will fill with credit to himself and profit to the company.

There seems to be increased activity in every part of the British Empire, and the development of mineral resources goes on apace. During the present decade coal mining in Victoria has practically been established, and has made rapid progress. In 1891 the output of coal was only 22,834 tons, last year 262,380 tons, with an average selling price of \$2.08.

The latest advices from New South Wales speak of the establishment of large iron works at Irondale, on the Mudgee line. The Government Engineer of Public Works says iron ore can be delivered at the furnace for 25c. a ton, and in his opinion works could be established at Port Kembla to smelt iron from New Caledonia to supply the whole of the Australian demand for pig-iron, and ship it to the English market at a profit.

All trade and mercantile affairs throughout the Dominion are in an exceedingly flourishing and satisfactory condition, but in mining matters this state of prosperity and expansion is not quite so evident. It will be claimed that Canada has only recently regarded herself as a metal-producing country, and that, in consequence, money has been wasted in preliminary effort, which experience would have avoided, and this has naturally resulted in lessening the inflow of capital. This contention, while no doubt true, is no excuse for the appalling ignorance which has been displayed in the expenditure of money entrusted to some ex-coal miner for the purpose of opening up mineral deposits in the Rainy River and Kootenay districts. The mistake made in the beginning was that mining was attempted too much "on the cheap." Parsimony is not always profitable. It pays to get the best professional advice, and then to carry out the instructions to the letter.

This fatal policy of getting together a few thousand dollars by selling immense quantities of scrip, and then hiring a cheap mine manager to sink a shaft in the hope of striking a "Bonanza" ledge before the money is exhausted, has been so disastrous in its results that there are few dividend-paying mines in Canada to-day which have been carried to that stage by Canadian capital and under the same management. We grant that equally severe strictures can be passed on the methods adopted by those in charge of enterprises financed by English capital, the only difference being that they had more money to waste, and, therefore, the *fiasco* has taken longer to reach oblivion, but they were in some ways misled by their Canadian *confreres*, who, in

many cases, being ignorant both of the geology of their country and the best methods of mining, proved bad guides. All the initial successes were due to American skill backed with capital and enterprise. They went into the Kootenays quite prepared to gamble on prospects, but their judgment was excellent.

Now when a stage was reached that all the Canadian companies had exhausted their meagre capitals, and the public showed no intention of putting up more, dozens of those unproved prospects were offered for sale in this country, but always with a cash price affixed, which would reimburse everyone concerned, and give the promoter a handsome profit. As insufficient work had been done to prove anything the promoter refused these terms, and the result was that throughout Canada the London market was regarded as senseless, apathetic, blind to their own interests, &c.

The real blame lies at the door of the Canadian brokers. They do not see the imperative necessity of winning attention in London, and they fondly talk of Canada having quite sufficient surplus capital to develop its own mines, and they point to the flotation of the War Eagle, Centre Star, Republic, Payne, Cariboo, McKinney and a few others.

The shares of these companies, we might observe, have not, by any means, all got into the hands of the small investor, who locks them up and waits for dividends, and until Canada has such a class of investors as opposed to the small speculator, broking in mining stocks will continue to be a precarious business. The remedy for this state of affairs is in the hands of the exchanges. There are now a certain number of fully proved and reputable mines in both East and West Canada unknown to the London markets, but which would undoubtedly attract attention if properly introduced. Our idiosyncracies must be taken into account; we like £1 shares, so five shares of \$1 can be grouped together and a register can be opened for shareholders. With mines such as we have named above from which regular reports are forthcoming, and dividends have been declared, there is undoubtedly a market, and these, added to the active English companies operating in B.C., Ontario and Klondike, would enable a substantial list to be placed before investors which would bring the Canadian Mining Market into far greater prominence than it at present enjoys.—*London B. C. Review.*

The pamphlet on the "Economic Minerals of Canada, printed by direction of the Canadian Commissioner for the Exhibition," and prepared by Dr. Dawson with the co-operation of several members of his staff, "more particularly Messrs. Ells, Ingall, Denis and McLeish," is about the meanest and most insignificant of all the Government literature furnished for the Paris exhibition. This brilliant aggregation occupy just 54 diminutive pages to describe the mineral wealth of Canada, and the features of one of the foremost and most progressive of our industries. The design of the cover "Gold Mining in the Klondike" would make the angels weep.

The Catalogue describing the collection of minerals at the exhibition, prepared under the same authority, is a somewhat more presentable volume and will doubtless be found useful.

The proof o' the puddin' is the prein' o't. The best method of bringing the gold fields of Western Ontario or any other mining section of the Dominion to the attention of capitalists will be the evidence of production and dividends. Indiscriminate newspaper booming serves no good purpose and is to be condemned. We are, therefore, pleased to see that the efforts in this direction, promoted by an organization which poses under the pretentious and misleading title of The Central Canada Chamber of Mines, promptly called down by the British press. This institution is very largely, if not entirely, composed

of owners of mining claims and speculators in mining property in and around the Lake of the Woods, and in no sense can it be regarded as representing the real mining element of this section of the Dominion. Here is what the *London B. C. Review* has to say of its modus operandi:—"The Central Canada Chamber of Mines has received a well-merited rebuke for disseminating quantities of 'free copy' to English journals consisting only of optimistic generalities concerning the wealth of Western Ontario and the importance and representative position of this particular Chamber of Mines. It is quite true that the Dominion is full of good things, among which its mineral wealth is by no means the least, but to attract attention and inspire confidence we want tables, statistics, comparative earnings, and costs, and other authenticated statements and details which are read and weighed by the careful and business-like investor. A rumor reaches us that those who run this Chamber are going to turn over a new leaf and give us this valuable and much wanted information, and by so doing they will benefit Canada and confer a favor on the unfortunate journalist who quickly tires of receiving half a dozen envelopes by each Canadian mail ostentatiously marked 'private' and containing a printed slip of airy generalities and nothing more."

The Golden River Quesnelle Co. Limited, is the latest of the many badly conceived British investments in Canada to go up the spout. It has come to the end of its tether at the cost of more than one big dam(n).

"Mining Errors": A Possible Remedy.

By JOHN W. ROCK.*

I had the honour, on my return to Sydney a few months ago, to be elected a Member of this Chamber and thereupon received the two numbers of the *Journal* containing a copy of Mr. Danvers Power's paper on "Mining Errors" and of the discussion thereon. The question dealt with is a very important one, in fact one of vital interest and I thought it might be well worth while if, as a continuation of the subject, further consideration were given to matter in regard to the suggestion of any remedial measure which might mitigate, if not entirely remove the evils brought under our notice and which have injured not only the reputation of the mining profession but even the credit of the Colonies themselves. In proposing to contribute a paper on the subject I did not realize what I had undertaken and, on looking into it, I have found the question so interwoven with issues which militate against any satisfactory solution that I fear I can do little more than state some of these difficulties and endeavour to set forth the factors of the problem, trusting that it may assist in drawing forth suggestions as to the lines upon which remedial measures should be carried out.

Like all reforms of standing evils, the task is a difficult one. Human nature is such that, even when we realize that reform is necessary, each one holds the idea that it is not his particular province to move in the matter, while united action requires leadership of a kind not always available and it is only when the situation becomes so unbearable as to effect us personally that we bestir ourselves. That the situation is of that nature in our particular case is evident, not only by the instances quoted in the recent paper and discussion but by many other examples and I make this the excuse for this short paper.

It was immediately after reading the two copies of the *Journal* as mentioned that I opened the *Sydney Morning Herald* and the first thing I noticed was a paragraph among the legal news headed, as is occasionally seen "In re a gent one etc." Now we know that this somewhat mysterious title is the heading of an account of how some member of the legal fraternity is supposed to have acted in such a man-

*Read before the New South Wales Chamber of Mines.

ner as to have caused pecuniary loss to a client, and the fact being proved as to either deliberate intention or gross neglect, the "gent one" gets punished by losing his professional position, if not more severely. I at once recall the prosecutions that occur against unqualified medical practitioners and it struck me that the above mentioned procedures might indicate a basis upon which a scheme could be formulated for the weeding out of the elements which cause dishonor to the profession and danger to the community and the establishment of a body of Mining men whose status should be such that the investing public would only trust the expenditure of its capital to the direction of a certificated member, an institution, in fact, possessing, as far as practicable, both the rights and the responsibilities now obtaining to the legal profession, neither of which we, as an invertebrate body, possess.

One could easily wax enthusiastic over such an ideal, but for my part I have reluctantly concluded that, for a long time at least, such it must remain and the principal difficulties in the way I will endeavor to set forth

If we analyse the various portions of Mr. Danvers Power's paper and the instance adduced by him and those who spoke afterwards, we find that the persons connected with the mining industry, amongst whom either fraud or incompetence may exist, can be divided into the following classes thus :

- (a) Promoters of Companies.
- (b) Directors.
- (c) Investigators of Mining Properties whose reports are used for influencing the investing public.
- (d) Mine Managers.
- (e) Mining Engineers.

With the first two of these we can hardly concern ourselves. In England strong legal measures have been recently taken against both promoters and directors of concerns which have shown evidence of fraudulent misrepresentations and the tendency is undoubtedly to enforce commercial morality by law. Even in Queensland, the issuers of a prospectus of a new venture in mining are held responsible I believe in practice, not only in theory for the statements therein, even a *bona fide* error rendering them as responsible for action and damage as if it had been a deliberate intent to deceive. In this Colony our legislators we have found to be as the god "Baal" in regard to mining interests and the untruthful statement is allowed to go its fraudulent way unchecked, as witness innumerable instances.

In passing let me ask—Does it not seem strange that, when a Company is registered, it is not required to lodge a copy of the prospectus it issues to the public? A file of these, available for inspection would often have been useful to some possible investor in a long defunct mine again being galvanized again into life.

But apart from any intention to deceive, how often do we find harm done to mining enterprise through the ignorant interference of Directors. It often seems that if one were to take a dozen business men, each capable and successful in his own particular line, and constitute them into a board of Directors, it would appear as if ordinary intellect had departed from them. This curious phenomenon is also sometimes exhibited in the decisions of Commission.

The technical class I have divided into three, thus making a distinction between the Mining Engineer and the so called expert. The reason is obvious, because I think the worst that can be said of the former, in the cases of loss caused by him, is that he has been incapable or careless, the other does his mischief not only through ignorance but as seriously by his too great aptitude in certain devious lines. However, the less said on this point the safer.

The ideal Mining Engineer would be a man of many parts and thoroughly up in all of them and these attainments should be super-added to a level head and cast iron constitution. These latter are the

gift of nature and heritage, the others can certainly only be gained by a long period of practical experience superadded to preparative training.

Much of the above also applies to Mine Managers, who should also possess the somewhat rare gift of personal influence over men. It sounds like an absurd platitude to add that energy is a *sine qua non* to all those here spoken of were it not for the unhappy experience we are all sure to have had that real energy and capacity seldom go together and I myself have often had occasion to realize the truth of those half dozen famous words of Goethe—"There is nothing more terrible than energetic ignorance."

Having therefore set forth our duties and knowing that our desire is to remedy any abuses that may, through no fault of ours, be perpetuated in our good but unprotected name, let me ask you briefly to look at the equally important other side of the question, the consideration of which led me to take a pessimistic view of the whole outlook. As however the matter concerns the whole wide profession of general Engineering, of which we are one branch, I will speak of Engineers as a whole. The question therefore is this—given that "we are willing and anxious to do our duty to the community, will the community do its duty to us?" Let us consider what the relative position is that Engineers hold in regard to other professions and to the public generally, it is, I submit, a curious and anomalous one. Engineering is, compared with the other professions, but a child of yesterday as contrasted with an adult, mature or even showing symptoms of senility. We have therefore no traditions to put a halo round our calling and it is probably the fact that there is no direct appeal to either the sordid or the sentimental instinct of the individual that is the cause of our non-recognition. Seeing that nearly all the conveniences of modern life are due to the results of mechanical skill, I hold that neither in popular estimation nor in pecuniary reward are Engineers properly appreciated, and there are other points of dissimilarity from the other professions which are much to our disadvantage. A lawyer or medical man can, either of them, at the client's expense and with his cheerful acquiescence, consult a brother on a point he is ignorant about, but imagine the plight of an engineer who confessed he wanted advice. The mistake of a legal practitioner can be usually smothered up by an invective against "a preposterous judgement of verdict" and an assurance that an appeal to a higher jurisdiction would be sure to put things right for the client. Doctors' errors do not long remain in evidence, but even if the unavoidable happens to an Engineer as, for instance, a subsidence through unknown old workings; an unprecedented flood; or some "Act of God;" the collapse sticks out like a sore thumb ever afterwards causing a shadow of incapacity to rest upon him however undeserved it may be.

As regards the idea the public entertain of the time, ability, labor and expense necessary to obtain any proficiency in our calling let the following advertisement which appeared in the *Herald* several times in April speak for itself:—

"MUNICIPALITY OF KATOomba. Applications are hereby invited for the joint positions of Council Clerk, Treasurer, Clerk of Works, and Inspector of Dairies and Slaughter Houses to the above Municipality. Salary to be paid £135 per annum and such officer to devote the whole of his time to the work of the Council. A knowledge of surveying and Engineering necessary. For further information apply etc."

You will observe that the little items of "knowledge of engineering and surveying" are added in somewhat the manner that an advertisement for a groom might end "should be able to milk."

The Engineer has undoubtedly more in common with the Doctor than any other calling in that there are certain similar attributes called into exercise in both vocations, courage, patience, endurance, quickness of action, but we are nowhere in public appreciation as we make no direct appeal to physical or mental weakness, no one associates romance with our work and we suffer consequently. This is well put by Kipling

in his poem called "McAndrew's hymn," where the old Engineer, after describing how his unceasing care has brought the big ocean liner with its thousands of passengers safely through the trip, goes on to say:—

"Yon's strain, hard strain for head and hand for though thy power brings
 "All things to naught, ye'll understand a man must think of things.
 "Then at the last we'll get to port and hoist their baggage clear,
 "The passengers w' gloves and canes—and this is what I'll hear
 "Well, thank ye for a pleasant voyage, the tender's coming now,
 "While I go testing follower bolts, and watch the captain bow.
 "They've words for every one but me—shake hands w' half the crew,
 "Except the dour Scots engineer, the man they never knew."

What then is the course to pursue to obtain the twofold result of internal efficiency and proper external appreciation? I confess it is beyond me to suggest anything which could have an early result. Organization and incorporation certainly give a status, but while improving the morale of the profession (if strictly carried out,) they leave pretty nearly untouched the other, the external difficulty, that is to say the harm done through popular ignorance. We cannot hope to attain the unique position held by the legal fraternity, which, an offshoot from the Church in the Dark Ages, and resting under the aegis of the Courts, presents the example of the most solid Trades Union in existence. We might be able, after much struggle, to assume a status equal to the Medical body, but would still be exposed to what, close corporation that they are, they suffer from through the ignorance and credulity of the public itself. As long as people want to be deceived there will be a supply of deceivers, and the truly efficient man, being as a rule modest will have small chance against his blatant rival. No legislation can be enacted to prevent a man from wasting his money if he is determined to, and although we had an act to punish fraudulent statements in prospectuses the result would probably be more punitive than preventive. The investing public is a curious creature, oscillating between insane speculative squandering and sullen obtuseness to legitimate venture and the task of education is not an easy one.

But with all this, the Mining branch of Engineering has a specially advantageous position in comparison with others through its individuality, its great and growing importance and the fact that it contains higher prizes in the way of lucrative positions than any other line. It may not be impossible therefore to attain a position more or less near to the ideal one. I note that in England a feeling of the necessity for action to improve the status of Engineers has lately arisen and the matter has been ventilated to some extent in the technical journals. It is complained that the Engineers have no self-government, no policy, no leader: that there is no educational test for membership to societies, thereby rendering the fact of membership valueless, while *esprit de corps* and professional etiquette are non-existent. Competition is cut-throat with the result that capitalists benefit and they only.

Here we have the whole weakness of the position and can see what is needed to remedy it. A society of Mining Engineers, made a close profession by examination, governed by a Council on the lines of the English Medical Council and backed by legislative enactment would indeed be a power in the land and fulfil the twofold object I have already indicated of seeing duty done to the community and obtaining a proper recognition for its members from that same community.

Colliery Surface Arrangements.

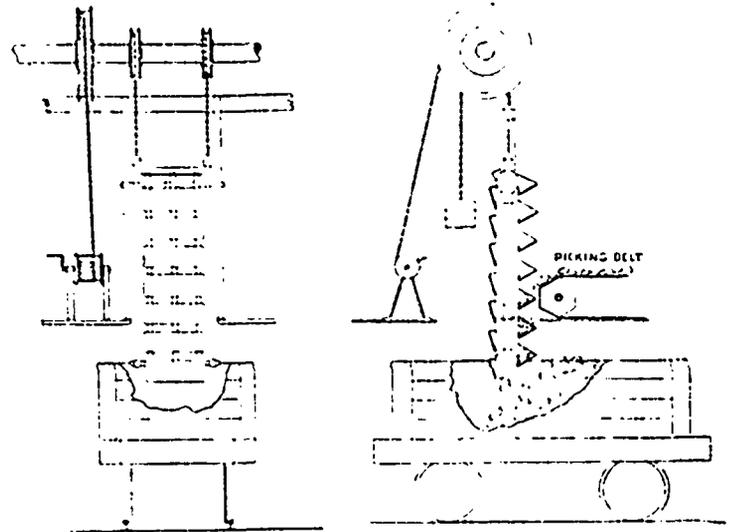
By MR. S. A. EVERETT.

(Continued from July Number.)

A vertical arrangement would appear to be the correct thing, and we have an example of this in Soar's loader (Fig. 13). Here the belt delivers on to a series of plates, hinged upon short linked vertical chains, driven at the same speed as the belt, so that the plates of each duly meet each other. The hinged plates lower the coal after the manner of elevator buckets: but these fold up on their hinges on the return side,

so that the coal can be taken back very near to the end of the wagon. This appliance is certainly an advance upon the others as far as its ability to get well into the wagon is concerned: but, though dealing

FIG. 13.

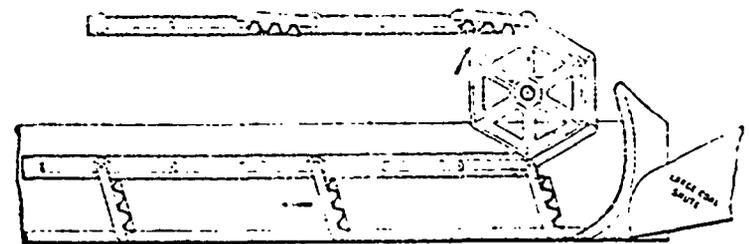


satisfactorily with coals of moderate size, it is not well adapted for handling the large pieces one is accustomed to in this district.

A step towards the solution of the problem is seen in Fig. 14, which represents an arrangement devised by the author some three years ago, for loading coal down an exceptionally long shute. The return chain here runs above instead of below the shute; and the obstructing pieces, made for lightness of corrugated plate, fold up on the return side to economise space. By a kind of cam arrangement of the side angle guards the flaps are made to open gently as they come over the top tumbler: and, being deep, they permit the shute being lowered to a very steep inclination without suffering the coal to fall.

It is not alone sufficient for the proper trimming of the coal in the wagons that an efficient loading gear to the picking band is provided; means must be supplied for readily moving the wagons about under such loader, as required. Usually the sidings are laid at a suit-

FIG. 14.



able gradient, about 1 in 50, so that the wagons can be served down by brake; but a preferable arrangement is to provide a positive motion for them in either direction, and easily controlled from the loading platform, thus saving the necessity for the trimmers constantly running up and down between the brakes and the top of the wagons. A sort of half step to this has been tried, by putting longitudinal pieces of wood near the rails, which can be closed in to grip the flanges of the wheel, or moved out to release them, by the man operating a lever on the loading stage; brake strips arranged to engage with the wagon axles have been tried, but if the trucks have much way on they will ride on the axles on these brake strips, lifting the wheels off the rails. The best plan is to arrange a creeper chain to engage with the axles, driving it by reserving bevel clutch gear controlled from the loading stage by the motion of a horizontal bar running like a handrail.

Returning now to the "billy" coal. If no further treatment is

required, it only remains to arrange for its loading. This, of course, must be done on another road, and it becomes necessary to convey the coal laterally from the line of the large coal siding. In some instances, where the necessary fall is available, this can be done by a simple chute; but usually some simple form of conveyor, such as a belt, push plate, or screw is necessary. Preference is given in Fig. 3 to the last, as having few moving parts to be lubricated and become deranged, or unduly worn by working in small coal. Whichever appliances is selected, a small hopper should receive the small from the billy-box, its outlet being of such width and such height above the conveyor that the coal as it runs out does not overload or choke it by sudden rushes.

In the scheme under consideration, however, not only are cobbles separated, but the small has to be classified; the way in which this is done will to some extent depend upon the intended arrangement for loading the various sizes produced from it. If separate roads can be provided for wagons to receive each kind as it is produced, it may be found expedient to simply convey the contents of the billy-boxes to the screen, and conduct the separated sizes by chutes direct to the wagons; but as the quantity of each kind will be relatively small, a more usual plan is to arrange for the storage of a quantity, say, from two to ten wagons, in bunkers, so that all the various sizes may be loaded on one line of rails.

It is necessary to consider the approximate quantity of the various coals; taking the "billy" at 20 per cent. of the output, we have:—

$$1,500 \times \frac{20}{100}, \text{ or } 300 \text{ tons per day;} \\ \text{or } \frac{300}{24} = 12\frac{1}{2} \text{ tons per hour.}$$

From an actual case the produce is:—

Size of O holes.	Cobbles 3" — 1½"	Nuts 1½" — 1"	Beans 1" — ¾"	Peas ¾" — ½"	Duff ½" — 0
Output percentages	4	6	4	3	9
Tons per hour	5.13	7.69	5.13	3.85	11.53

The storage room to be provided in the bunkers can be readily ascertained on the basis of 42 lbs. coal to the cubic foot. To obtain the necessary height for this storage the billy coal and cobbles produced from the large coal will require to be elevated; in some cases it may be found possible to lead the coals directly to the elevator boot by inclined chutes, but as this is not always admissible, the plant sketched shows the coals being traversed to the elevator by a pair of Archimedian screw conveyors. The elevator needs no special description, but as, unless well made, elevators are liable to annoying breakdowns, special attention should be paid to the various parts, to see they are strongly proportioned. From this elevator the coal is delivered on to a screen, which has to classify into five grades already given. The sketch shows a revolving trommel which, though perhaps not the screen one would select for so large a size as the cobbles, is, on the whole, the most satisfactory for this purpose. It treats the coal gently, has little to get out of order, does not readily clog, and to some extent acts as a conveyor to separate the grades towards their respective bunkers. A shaking screen at such a height would cause injurious vibration of the building, and unless many-decked, would need to be very long; it would be more liable to choke, and the moving parts in a very dusty atmosphere would be apt to warm. The bunkers call for little comment; they will be best constructed of an iron framework, with plank sides. In the plant sketched, the lower part of the screen building is utilized for bunkers.

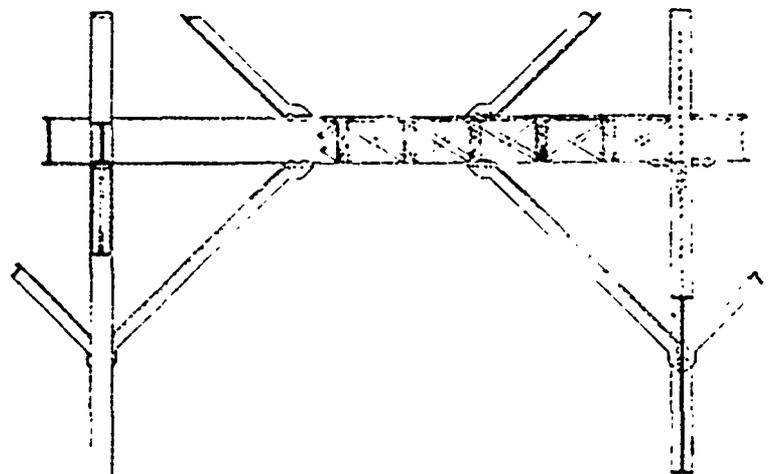
The motive power for the plant next deserves attention. At

present a steam engine is to be recommended, though it appears probable that in the near future it may be possible and expedient to adopt electricity where a number of machines at various situations, have to be driven, each being provided with its own motor, capable of being started and stopped independently. If the screen building adjoins a retaining wall, as is so often the case in South Wales, the engine may with advantage be placed in a recess, a good foundation being thereby secured. Otherwise it should be erected on a girder framing in some part of the building where it can be partitioned off from the surrounding dusty atmosphere. If in the latter situation a high-speed engine is to be preferred to a slow-speed one; for though the majority of the machines run slowly, and considerable gearing down will hence be needful, yet the necessary power is developed by but little weight, and if properly balanced no injurious vibration will be set up. The engine should drive a main line of shafting at a suitable speed to suit the majority of the machines by means of a belt, this is a safeguard in case of accident to any part of the plant, as the belt will probably slip and come off before any serious damage can be done. For this reason each machine should be driven by a belt; but if power has to be conveyed a great distance, and if several turns or corners have to be negotiated, a band rope drive may be advantageously employed. In the case of the two shafts being very close, too close for a belt drive, a pitch chain is often more suitable than toothed gearing. Each machine should have a separate drive, and a clutch, either friction or claw type, according to the speed at which it runs, so that it may be stopped in an emergency.

The various items of the machinery should all have ample provision for lubrication; wherever possible solid grease cups of the screw-down (Stauffer) kind should be employed. Liquid oils simply serve to pick up the dust and cause clogging.

The building should next be arranged for. As a rule the cheapest and most convenient structure will be a steel one, covered in with galvanised corrugated sheet roof and sides. In certain cases where there is ample room at siding level, a brick structure may be preferred; but for low initial cost, durability, and adaptability to the requirements of the case, a building of rolled steel sections is usually the more advantageous. The columns are best of rolled I section steel, as they afford means of attachment for the various cross joists, bracings, &c., in two directions at right angles, and are much to be preferred to cast iron. A complete system of bracing should be arranged for to

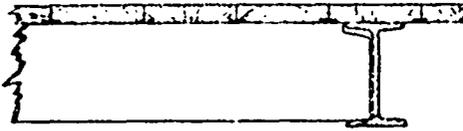
FIG. 15.



prevent vibration and preserve the stability of the structure. As a rule diagonals, preferably of T section, which divide the horizontal members into one-thirds (Fig. 15), will be found most advantageous; they are lighter than crossed diagonals or large angle gussets, quite as

effective in resisting distortion, and add greatly to the strength of the horizontal members by reducing their unsupported lengths. The floors should be of $1\frac{1}{2}$ inch grooved and filleted boards (Fig. 16); these

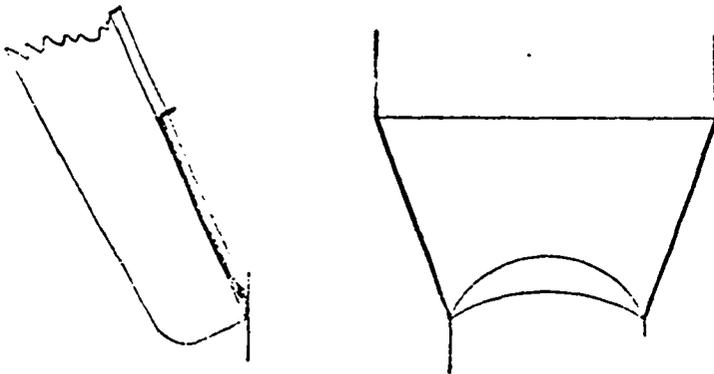
FIG. 16.



are dust tight, stronger than tongued and grooved, less expensive, and wear better. The tippler floor may be rather heavier—say, of 3-inch planks carried in joists of \square or Σ section steel. A segmental roof is the cheapest and strongest form; for ventilation a louvre may be made for a portion of the length. All the sheets should be of stout gauge—No. 16 to 18—galvanised, and attached to the columns and bracings by straps; they then form part of and add to the strength of the structure.

An adequate supply of light is necessary, especially at the picking belts; windows should be kept at least 4 feet above the floor or they will soon be broken. Roof lights may be necessary in some cases; a saw-tooth roof may then be employed with advantage, as unless the glass is steeply inclined, it is continually obscured by dust. Day-

FIG. 17.



light being unobtainable all the year round during working hours, artificial illumination must be arranged for. Electricity is undoubtedly the best medium for this purpose, and for picking foreign matter from the coal the arc light is not to be beaten; elsewhere than at the picking bands, or where a large area has to be lighted, incandescent lamps will give less trouble, and answer the purpose quite well. The arc lamps used should be of the partially vacuous enclosed type, as these are less affected by dust and require less frequent attention than the open form.

One of the most difficult problems is the provision of adequate ventilation; so much dust is produced that not only are the employees greatly inconvenienced, but their labour is impaired owing to their inability to see distinctly. To a certain extent water sprays directed upon those points where most dust is generated will mitigate this; but the best plan is to enclose the dust-producing parts as much as possible, and induce an air current from them by an exhausting fan of large capacity. The extracted air may be blown under boiler grates to consume the dust and increase the draught.

As an iron building with much air circulating will become so cold in winter as to interfere with the work of picking, &c., which does not involve sufficient exertion to maintain the temperature of the body, warming apparatus is almost a necessity. The engine exhaust steam may be used for this purpose by taking it round the building in a line of pipes.

Looking finally at the labor employed, we have:—

- 1 Banksman,
- 1 Weigher,
- 2 Tipplers,
- Pickers *ad lib.*,
- 2 Loaders,
- 1 man to look after small coal screen and do oiling, and a foreman.

(To be Continued.)

Wire Rope—Its Uses, Abuses, and Care.*

By JUSTINE S. DOE, Pittsburg, Pa.

While wire has been produced for many centuries, it is less than a century since wires were first collected in rope form. There are various contestants for the honour of producing the first wire rope, and perhaps naturally so, since the circumstances suggesting utilisation of this construction were not limited to one specific locality, and, consequently, appealed to different individuals. A powerful factor, so far as Great Britain was concerned, was the realisation of rapidly increasing calls for the supply of fuel, in the production of iron and various wares for the world, rendering it obligatory to prepare speedier and more reliable means for the manipulation and handling of her coal, than was at the time practicable with the primitive methods in use at the mines.

The old-fashioned chain used in the balance pits, where to each end of the chain passing over and around a headsheave a cage carrying the car was attached, and below each cage an immense bucket, which, after the discharge of coal from the car at the surface, was sufficiently filled with water to counterbalance and permit of the ascent to the surface of the loaded car attached to the opposite end of the chain, is not particularly suggestive of speed; nor is its counterpart, the operation at the bottom of the pit, of tapping the bucket and allowing the water to run out of the level into the valley below before the loaded car could ascend, an inviting proposition to many operators of our modern mines, where energies are now so seriously taxed to get rid of the water already in the mine. There were, in those days, other places where the pits were sunk to a lower level than the water line, and where such plan of operation was impracticable. In these, hemp ropes with kinks proportionate to amount of water-soaking were utilised and operated by steam power. It is not surprising that the necessity of improvement should assert itself, and that simultaneously, engineers should interest themselves in experiments toward the production of wire rope. These earlier productions were hand made, of both three and also four strands each; the strands and the rope being merely twisted. The separation of the strands from each other, and the untwisting of the strands, were serious difficulties that must be overcome. The splicing of such a rope was impracticable. Efforts were centered on the making of a rope free from the defects outlined, and about 65 years ago resulted in the production of rope, of both five and six strands each, laid around both a hemp and also a wire core. The subsequent perfection of stranding and laying out machines, not only greatly simplified the operation, increased the output, and improved the product, but also permitted of the ready manufacture of various constructions of wire rope, of which there are several different kinds still made, and some of the peculiar constructions possessing special merit for particular uses. The most common standard forms a running rope, are either six strands of nineteen wires each or six strands of seven wires each, both of which forms are laid up around a hemp core to facilitate flexibility. Flat wire ropes duly experimented with, while possessing features of special adaptability to peculiar conditions were found

*Read before the Ohio Institute of Mining Engineers.

objectionable from some standpoints, which has resulted in their comparatively limited usage.

One cannot be otherwise than amazed when the great variety of uses to which wire rope is now applied is considered, as an outgrowth of such comparatively recent efforts. One application we have in the apparently fragile twisted cord, with which the pictures in our home are hung. (Although the fellow who planned such usage would have surely starved to death if dependent upon the consumption of such in the extensive art galleries we of the mining fraternity possess.) Another extreme is that of the immense hawsers spanning streams on large suspension bridges. (While some of us have mighty chasms to span periodically between the chaps who dig out the stuff below, and those who market it, we hesitate as to whether even a Brooklyn Bridge hawser could resist the strain from such tugging contestants on opposite sides of the great divide.) When we consider the multiplicity of uses between these extremes in our present day adaptation, we feel like we do in the age of all other advances—simply wonder how we did without such for so long a time. The particular uses of wire rope, in which those present are mostly interested, are those forms of a running rope used more especially for hoists, inclines, and haulages, and for which the usual construction is either of six strands of nineteen wires each, for flexibility, or six strands of seven wires each at the expense of flexibility, but which provides, through coarse wires, more stock for exterior wear. Both of these forms are laid up with hemp core.

We have all doubtless had experience in which some particular rope has apparently performed a marvel, while the next succeeding rope, from the same manufacturer and supposedly a duplicate production of that immediately preceding, installed in the same location, under ostensibly the same duty, and apparently all else in the surroundings the same as in the former case, unexpectedly proves short-lived. The manufacturer duly compares his original data of these two ropes and finds the carbon and other analytical qualifications identical, out to a remote decimal point, and of course figures cannot lie. Again after getting good service out of one end of a rope of practically double length of operative portion, we turn it end for end, and get 100 per cent. increased service compared with the first end, in the identically same rope. There we are, square up against another mystery. The manufacturer doubtless has difficulties to surmount in the manufacture of a rope, but his greatest troubles are possibly not so much from within as without his factory confines. His trials are sometimes contributed to in the use of a rope in an illy designed plant—too small diameter sheaves and drums, the continued use of carrier pulleys that should have long since been consigned to a scrap heap, numerous bends and reverse bends tending towards, shall we say, crystallisation? It will doubtless be entirely becoming to ask pardon for the use of such expression, in view of its rapidly developing obsolescence, which, however, conveys to the writer, and doubtless many others of his school, far more convincing weight than any more modern characterisation of that identically same condition of molecular change in metals incident to long continued strains, shocks, bends, or reverse bends, which at least tend towards crystallisation, and the effects of which we have all, to a greater or less degree, had occasion to see in wire rope, bridges, structural, and various metal work generally.

Reverting to the conditions under which wire rope is used, and the inefficient protection afforded against abrasion, water, or acid attacks; in many instances, while these irregularities are not universal, they frequently form the basis for the poor satisfaction of which is liable to strike the manufacturer.

Too great care cannot be exercised in the original mapping out of the line of direction of a rope, that such be as free as practicable from bends, and especially reverse bends. The rope should be properly supported by carrier pulleys that revolve, and not such as stand

still and rasp the rope, or that wear to so small a diameter as to permit unnecessary dragging of the rope over rails or ties, and through the dirt or slough. There are many places where wet and acid conditions prevail that make it impracticable to install a rope, where not specially prepared, without its becoming water-soaked in threading same into place. The ordinary prepared rope, as you are all aware, is neither water-proof nor acid-proof. The speaker had experience with a particular material for rope protection through external application, a few years since, when connected with one of the Ohio mining companies, where strong acid conditions prevailed and where the results were so superior not only in thoroughly protecting from the acid and water, but also in greatly retarding the wear of the rope as well as the friction surface with which it came in contact, that he was led to identify himself later with the marketing of the product. The subsequent introduction of another material, by the same concern, for the use of manufacturers and for incorporation in the rope, as being manufactured, to internally lubricate and seal same, makes it now possible to install a rope in wet locations, and still preserve the interior free from moisture, and its attendant corrosive effect.

ROSSLAND AND ITS MINES.

Report Issued by the Rossland Board of Trade
July 14th, 1900.

The mines of Rossland at the present time are giving employment to about 1,200 men (eight hour shifts) at an average wage of nearly \$100 per month, and the shipments of ore are averaging over 4,500 tons per week, of an average value of \$16.50 per ton, at an average profit, clear of all expenses, including development, of \$8.50 per ton.

By the first of December it is conservatively estimated that about 2,500 men will be employed in the mines of Rossland, and the average shipments will be close to, if they do not exceed, 14,000 tons per week, which is at the rate of over 700,000 tons per year, worth about \$12,000,000—more than the total mineral production of the whole Province for 1899.

The present population of Rossland is about 8,000, and is rapidly increasing. Building is more active this year than at any time since 1897.

A GLANCE AT THE PAST

The history of the Trail Creek Mining Division, West Kootenay, British Columbia, begins with the discovery in 1890, in what is now the city of Rossland, of the Le Roi and adjacent mines. The first regular shipments of ore were made in the winter of 1894, and throughout the following year shipments were maintained with more or less regularity, the ore having to be waggoned either to Trail, B.C., or Northport, Wash. Up till the end of 1895 the output of the mines had, however, been merely nominal, as only ore containing from one and one-half to two ounces of gold per ton would pay a profit.

OUTPUT FOR FOUR YEARS.

The output for the four succeeding years was as follows:

	Tons.	Gross Value.
1896.....	38,075	\$1,243,360
1897.....	68,804	2,097,280
1898.....	111,282	2,470,811
1899.....	172,605	3,229,086
Total	390,826	\$9,040,537

REDUCTION IN FREIGHT AND SMELTING CHARGES.

The tonnage, as will be noted from the above table, has shown a steady increase each year, and owing to the improved means of trans-

portation, due to branch lines of the Canadian Pacific and Great Northern railways being extended to all the principal mines of the camp, and the reduced cost of smelting at Trail and Northport, it has been possible each year to ship profitably ore of a lower grade than would have been possible at an earlier date. Freight and treatment charges on Rossland ores have been gradually reduced from \$14 per ton in 1895 to \$4.50 per ton, which has been the prevailing rate for several months past.

OUTPUT FOR 1900.

The output of the Rossland camp by months since January 1st., 1900, has been as follows:

Month.	Tons.
January	24,182
February	8,094
March	203
April	7,239
May	15,299
June	16,710

Total for half-year..... 71,727

Of this total the Le Roi contributed 51,735 tons, of which 32,009 tons were shipped in May and June. The War Eagle and Centre Star have shipped no ore since the second week in February, when their total shipments were 10,603 and 7,017 tons respectively. The Iron Mask suspended shipments early in March, having 1,435 tons to its credit. The I. X. L. has shipped regularly each month, its output to June 30th being 296 tons. The Evening Star shipped 276 tons in the first four months of the year. The remaining shipments were 273 tons from the Monte Christo in January; 50 tons from the Iron Colt in May; and 42 tons from the Giant in January.

The output for the first six months of 1900 would have been very much larger but for the threatened labor troubles which were, however, amicably adjusted after a shut-down extending from the second week of February into April. Since then the War Eagle and Centre Star have been unable to resume shipments, owing to the non-arrival of machinery needed for the proper development of these mines and the economical handling of the ore from the workings to the cars on the railway.

THE OUTLOOK.

What the outlook for the remaining six months of 1900 is, can best be told in the following brief statements by the managers of the principal mines.

LE ROI MINE.

The Le Roi mine was shut down from February 5th to April 10th., owing to labor difficulties. It has since been worked with the old machinery, while the new plant—costing \$250,000—is being installed as rapidly as the machinery is being delivered. It is believed that by October 1st the new plant will be in full swing, and all mining operations will be conducted through the new five compartment shaft. The production from the mine will then approximate 1,000 tons per day. This mine is the most thoroughly equipped and developed property in British Columbia. It is opened to a depth of 900 feet, where the ore bodies are proved to be as good in grade and exceeding in size those encountered in higher levels. It has already paid to its shareholders dividends to the amount of \$1,175,000.

LE ROI NO. 2.

The No. 1, Iosie and adjacent properties have recently been taken over by a new company known as the Le Roi No. 2, Limited. These properties are ready to produce ore as soon as the new air-compressing plant, now being installed, is ready to run. The output will be 300 tons per day to start with.

LE ROI NO. 3.

The Nickel Plate and Great West groups of mines have been acquired by another new company, the Le Roi No. 3, Limited. The Nickel Plate is also ready to produce ore as soon as the ore bins and railway spur, now being built, are finished. The shipments from this group will approximate 250 tons per day.

LE ROI NO. 4.

The Columbia and Kootenay group is being taken over by a company to be known as the Le Roi No. 4, Limited. On these properties large bodies of low grade ore have been blocked out above the No. 6 tunnel, which under-cuts the vein at a vertical depth of 600 feet below the outcrop. The ore chutes in the vein are blocked out to greater depth by workings from a three-compartment vertical shaft sunk from the No. 6 tunnel at a point 1,000 feet from its portal. This shaft has already attained a depth of 400 feet, and development work will be extended under the ore bodies, starting from the 200 and 400 levels of this shaft, which are 800 and 1,000 feet respectively below the surface. No tonnage can be named for the capacity of this property, as the output can be fixed at any point from 250 to 750 tons daily, according to the grade found profitable to smelt.

NORTHPORT SMELTER.

The capacity of the Northport smelter is being increased to 1,250 tons per day, and the additions are being so constructed that other additional units of capacity can be quickly added from time to time.

WAR EAGLE.

Work on the War Eagle, which is at present confined to sinking the main working shaft and opening up levels, is progressing most satisfactorily. The shaft has reached a depth of approximately 925 feet or 175 feet below the sixth level, the lowest level so far worked. At the 575-foot point a station has been cut out for the seventh level and cross-cutting north and south is being proceeded with to reach the two branches of the vein and open them up by levels. Within a short time the shaft will have reached a depth of 1,025 feet, when a station will be cut out for the eighth level and a like plan of development pursued. It is the intention of the company to push work along these lines as rapidly as possible, with a view to placing the property in condition to resume regular shipments.

A steam hoist has been installed replacing the electrical hoist, which did not prove satisfactory, and it is now running smoothly, so that everything above ground is in perfect condition to insure rapid development and successful working of the mine.

Future shipments will depend somewhat on the size of the ore chutes found in the lower levels, but it is anticipated that when shipments are resumed they will average about 50,000 tons per annum.

CENTRE STAR.

In the Centre Star a large number of marketable ore is blocked out ready for stopping and shipping, just as soon as the new air compressor, now being installed, is completed, which should be before the middle of September. With the compressor in place and the completion of the machine shop, framing shop, warehouse, etc., now being erected, the last requirement of a complete surface plant will have been met, and the future development and working of the mine can proceed without delay or interruption.

The output to be shipped from this mine has not yet been definitely fixed, but it will probably be at the rate of 100,000 tons per year, which together with the shipments from her sister property, the War Eagle, will make an estimated aggregate of about 150,000 tons per year.

These two companies are employing a large force of miners and

laborers, both below and above ground, and will increase their forces very materially as soon as stoping and shipping begin.

IRON MASK.

The Iron Mask is closed down at present, pending an examination by the experts in the suit with the Centre Star company. Their examination will only occupy a few days. The work which they then advise will be proceeded with at once and as soon as that is finished, or as soon as the trial is concluded, which will be some time in September, the mine will resume shipments. The output will be from 60 to 100 tons per day.

EVENING STAR.

The Evening Star mine recently passed into the control of George B. McAulay, of the Cariboo mine at Camp McKinney. Since then the work of opening it up in a thoroughly workman-like manner is being proceeded with, a machinery plant has been added and ore bunkers with a capacity of 200 tons are being erected. The mine is expected to be a steady producer from now on.

THE I. X. L.

The workings on the I. X. L., which consist of three tunnels connected by upraises, have a depth of 150 feet. Stoping is confined to the upper workings. The ore is free milling, in this respect differing from all other producing properties in Rossland, but owing to the low freight and treatment rate offered by the smelter, its product is shipped to Northport. The ore body averages about two feet in width and very high grade ore is found in bunches and chutes. Several small lots have been shipped, running from \$1,200 to \$4,000 to the ton, the average grade of the rest of the ore shipped being about \$25 to the ton.

THE JUMBO.

The Jumbo is being equipped with machinery and a tramway, and when these works are completed it is the intention to begin regular shipments. The mine is opened to a depth of 400 feet and large bodies of low and medium grade ore have been developed.

OTHER MINING PROPERTIES.

A large number of properties in the Rossland camp are being developed in addition to the mines mentioned above. Among others work is actively proceeding on the California, Novelty, Giant, Consolidated St. Elmo, Iron Colt, Homestake and Green Mountain, all of which are equipped with machinery, and with the exception of Homestake are in the North Belt. It is announced that the Cliff, which shipped several hundred tons of ore two years ago, but which has since been shut down, will shortly resume; as will the Gopher, R. E. Lee and Maid of Erin. All except the Cliff being situated in the South Belt.

SOPHIE MOUNTAIN—THE VELVET MINE.

Sophie Mountain, situated five miles south-west of Rossland, is attracting a good deal of attention, as a large number of properties in that section are being developed, and one of them—the Velvet—has now reached a stage when it is ready to ship in large enough quantities to justify the construction of a branch railway. This mine is owned by the Velvet (Rossland) Mine, Limited, a new London company with a capital of £200,000. At the annual meeting recently held in London, the chairman stated that above the 250-foot level there were now available 100,000 tons of ore of an average value of \$20 per ton. The workings have reached a depth of 300 feet.

In the vicinity of the Velvet, are the Portland, Douglas, Leiter (all working) Victory-Triumph, Ruth-Ester and many other promising but less well developed properties.

Just west of the Velvet on the opposite side of Sheep Creek, are Santa Rosa and Nigger mountains, upon which are a large number of

mineral claims of a promising character, more or less developed. The Santa Rosa group is being opened by a tunnel which is now 420 feet long. It has some nine different ledges crossing the slope of the mountain at right angles and has an elevation of 1,900 feet above Sheep Creek within its own grounds. It is intended to resume development of this property almost immediately.

NORTH OF ROSSLAND.

To the north of Rossland are promising camps on Murphy creek, Sullivan creek, Sheep creek, Norway mountain and Burnt Basin, all except the last being in the Trial Creek Mining Division. A large amount of development work in the aggregate is being done in these districts, and some very likely-looking prospects are being opened up.

ROSSLAND AS A MINING CENTRE.

The growth of Rossland as a mining centre is best exemplified by the fact that in all parts of Southern British Columbia and the neighboring States of the Union, Rossland companies are working prospects and mines. A large number of the best properties in the Ymir district are owned here, and this is true to a less extent of the Nelson, Slocan, Ainsworth, Lardeau, Trout Lake, Arrow Lake, Fort Steele, Windermer., Grand Forks, Kettle River, Osoyoos and Similkameen mining divisions. In Republic and adjacent camps, and in Okanogan, Washington; in Sumpter, Oregon and in various camps in Idaho and California, Rossland is well represented.

Asbestos Production in Quebec in 1899.

Work in the asbestos mines was regularly carried on throughout the whole year, and the output of the fibre seems to be ahead of that of the previous year. At Thetford, the Bell, King Bros. and Johnson companies have, as in the past, worked their mines as well as their mills. The Johnson Company also worked their property at Black Lake, by contract, deriving very good results therefrom. At Black Lake, the Union mine (formerly the American Asbestos Co.) was run throughout the summer with 70 men; at present the mine is shut down, but the mill is still running. During the season the Glasgow and Montreal Asbestos Co's mine and mill were run under the management of Mr. Matthews Penhale, with 30 men. At Danville, the Asbestos and Asbestic Company operated with 100 to 125 men during most of the year, securing a heavy output of fibre and asbestic, the greater part of which was shipped. Towards the beginning of the year, work at this mine was on a limited scale, only two derricks being employed, while towards the end the number of these was increased to six. The company hopes to have the mine in full operation next summer. In the Ottawa region, the Denholm mine, the property of the Ottawa Asbestos Mining Co., was worked during the season, with the usual results. To sum up, the output of asbestos during the year may be estimated as follows:—

Thetford	1st crude	1243	tons of 2000 lbs.	\$124,300 00
and	2nd crude	2388	" "	241,500 00
Danville	Fibre	10204	" "	163,787 00
	Asbestic	7695	" "	17,069 00
Black Lake	(Shipped)	1484½	" "	44,535 00
Denholm	(do)	251½	" "	7,545 00
Total		23266½		\$568,736 00

These figures are taken from the reports of the companies for Thetford and Danville and from the shipments for the other districts, the total quantity shipped having been: from

Black Lake	1,484 ½
Thetford	12,319 ½
Danville	4,921
do Asbestic	6,734
Denholm (Ottawa)	251 ½
Total	25,710 ½

The prices have remained steady as follows: 1st, \$100; 2nd, \$50; fibre (average price), \$10 to \$12; Asbestic, \$2 to \$3.

Gold Dredging in British Columbia.*

Gold dredging was inaugurated in New Zealand in 1868. The first dredge, though crude, served its purpose, for from it has been evolved the modern dredge with all its latest improvements.

In British Columbia, within the last 12 or 15 years, several attempts have been made at dredging in the Fraser River. All were failures with the exception of one at Boston Bar, three miles below North Bend, built in the fall of 1897.

The earlier dredges were designed to work either by "suction" or "endless chain with buckets." Both types were unsuccessful, because of the nature of the bed of the Fraser, composed as it is of large boulders and cement.

The suction dredge, worked by means of a centrifugal pump, was expected to draw or suck up material from the bed of the river and deposit it in sluice boxes, where it could be washed and the gold separated from the gravel. But trial proved that suction could make no impression on the cement. The attempt to have a diver go down to loosen the cement also ended in failure.

The "endless chain with buckets" type, was unsuccessful, because the machinery was too light, and the buckets were not of such a shape as could cut into the cement.

The '97 dredge, built by Beatty & Co., of Welland, Ont., is of the "dipper" type. The plant rests on two scows, each of which draws about 2½ feet of water. On one is erected the machinery, consisting of a 75-horse power engine, boiler, pump with a discharge of 500 gallons per minute, the arm that works the dipper and the dipper itself; on the other scow, anchored alongside of the first, is constructed the grizzly, across which extends a water pipe connecting with the pump before mentioned; below the grizzly are the sluice boxes.

The grizzly is composed of iron bars laid about 1 inch apart. Into it the dipper discharges its load. The finer material at once passes through the grizzly into the sluice boxes, washed down by the water coming through the holes of the perforated water pipe. Large boulders and the heavier gravel are carefully washed by a man stationed at the grizzly, who throws the worthless material into the river.

The entire string of sluice boxes is 120 feet long, the first 30 or 40 feet being 3 feet wide, the balance 6 feet wide—in the latter part mercury is used.

The dipper is constructed of cast iron with a steel lip protected by steel prongs necessary to penetrate the cement. It has a capacity for raising 1 cubic yard of gravel each trip, and can make two trips in three minutes. The dredge works to a depth of 25 feet. Most of the gold is found in the cement adhering to large boulders. The scow on which the machinery is built, has house room for the crew during the season. The length of season depends upon the state of the water and the winter. Very high water or the running of ice prevents working. In case of ice a hole is made in the bank and into it the scows are run.

This dredge has been successful; but it has been working the greater part of the time on Boston Bar—composed to a large extent of loose sand and gravel—only a comparatively small proportion of the time has it operated on the cement.

The latest dredge constructed on the Fraser River is near Lytton. Its machinery is designed after the most modern of New Zealand dredges, and was manufactured by Robey & Son, of Lincoln, England.

Some idea of the massiveness of the plant may be gathered by considering the fact total weight of the dredge housed in—excluding the weight of the tailings elevator, but including all gold-saving devices—exceeds 400 tons.

The boilers have a capacity to generate steam of 250-horse power. 125-horse power is required to revolve the buckets which scrape the

bottom of the river and bring up the material from which the gold is to be saved; the balance of the power is required to run electric motors connected with the pump and the revolving screen, and will furnish power to run the tailings elevator.

The winches are four in number, and controlled by levers so arranged that one man can handle the entire machinery on the star board side of the dredge boat; another man is required on the port side to attend to the boilers and engines.

The principle upon which this dredge is designed is similar to the endless chain with buckets. Two of the buckets with the two links connecting them weigh 2,100 lbs. empty, and have a capacity of raising 5 cubic feet of material in each bucket. There are 36 of these buckets connected by heavy links, the whole revolving at whatever rate of speed is deemed advisable when the material the dredge is working in is taken into consideration. A study of the illustration showing the machinery in place reveals the string of buckets as they are travelling along the ladder towards the large cog wheel, at which point each bucket is automatically dumped. After discharging its load the bucket passes down into the river and resumes its scooping operations.

So minutely is all the machinery adjusted that whenever a bucket in running along the bed comes in contact with any specially large boulder or material which offers resistance, the man attending to the winches can tell in an instant that something is wrong, and by a movement can stop the machinery, and by another movement can swing the line of buckets to right or left of the point of resistance, by which means—in case of resistance being offered by a large boulder—an extra deep hole is cut out and the boulder allowed to topple over into the excavation; or, if this cannot be accomplished, by reason of the boulders being too firmly embedded or too large, another movement of the lever would lift the string of buckets passing along the bed entirely over the obstacle, and at the same time another lever could be used which would tighten the head lines by which the dredge is secured to the banks of the river, thus working the dredge forward so that with another revolution the line of buckets would be clear of the obstacle.

A bucket is manufactured in three pieces: the bottom, or base, is of cast iron of the toughest description, charcoal Swedish or Scotch pig iron would probably be best adapted for the purpose; attached to the base is a steel side; to the side is attached a lip of hardest steel manufactured, which, it is estimated, will be sufficiently hard to cut into any description of cement found composing the bed rock of the channel.

The depth to which dredging operations can be carried on is regulated by the addition or subtraction of one or more buckets from the chain. It is estimated that the greatest depth to which it can work satisfactorily is 40 feet.

Material hoisted in the buckets is dumped into a revolving screen made of boiler iron punched with holes ¼ inch in diameter. The screen is 20 feet long; through its entire length extends a water pipe connected with the pump, which has a capacity of raising and discharging 2,400 gallons of water per minute. Of course the water pipe is stationary. As the screen revolves around it, water is discharged from numerous holes, not only thoroughly washing the material dumped from the buckets, but, by the pressure exerted, tearing the cement to pieces, and thus aiding the revolving screen. Since all material which enters at one end of the screen has to travel about 150 feet before reaching the discharge end, it can readily be understood that the working of the screen added to the pressure of the water will have a crushing capacity sufficient to grind the gravel to such a degree of fineness as to release all the free gold from the quartz matrix and permit it to pass through holes in the screen onto tables. The tables are arranged under the screen with a slight inclination; on them the heavier particles of gold are saved, while the lighter particles and waste

*Written for *Mines and Minerals*, by R. Luid Watson.

or sand pass over the tables into the sluice, which is at right angles to the tables and extends beyond the end of the dredge a sufficient distance to save all the gold. The method of catching the gold on the tables is gravity—the tables are covered by wire netting to act as riffles. Mercury is used in the sluice box to save the finer gold.

The tailings, consisting of gravel and sand too large to pass through the perforations in the screen, proceed to the elevator. This tailings elevator is not shown in the figure because it had not been installed at the time the picture was taken, but the framework for it is shown above the screen. The elevator is so arranged that the tailings are dumped at some distance from the side of the dredge instead of immediately in the rear. Such a method of dumping permits of the dredge being backed from the location of its working, which could not be done if the dumping were immediately astern of the plant.

By the discharge of so much material and water from the screen it would at first sight appear impossible for any substance, however high its specific gravity, to remain on the tables under the screen. It must be remembered though, that the screen is about 4 feet in diameter, and that although an immense amount of material and water is discharged into it during 24 hours, yet the holes, being only $\frac{1}{4}$ inch in diameter permit but a small proportion of either water or material to pass onto the tables. It is estimated that little outside of gold and black sand, with their proportion of water, will find its way through the holes to be received by the tables. The balance of the material and water is discharged into the tailings elevator. The area of the series of tables is 20 ft. by 22 ft.

Only one feature of this dredge calls for adverse criticism, viz., the direct dumping of the buckets into the screen. While this course will work satisfactorily in sand or small-sized gravel, when you come to consider the problem of hoisting a large amount of material consisting of boulders weighing from 100 to 500 pounds, it would seem that dumping such material into the screen directly from the buckets would make the wear and tear of the revolving screen so excessive as to seriously interfere with profitable results.

Of course this difficulty might be overcome by stationing a man at the bow to remove any materials from the buckets revolving from the river, which he considered too large or too heavy to be dumped into the screen. The adoption of such a course would tend to depreciate the capacity of the dredge, and, consequently, make operations more expensive and results less satisfactory.

Had a grizzly been constructed to receive the material directly from the buckets, and to automatically dump all material too large to pass between the bars of the grizzly into the river, thus allowing only comparatively light material to pass into the screen, then, according to our judgment, this dredge would apparently be as nearly perfect as it is possible to construct such machinery.

The valleys of the Fraser and Thompson rivers were apparently excavated at the close of the Miocene period. During the glacial period that followed, these valleys were filled with boulder clay. In the post glacial and modern periods, when the country stood at its present level relatively to the sea, rivers cut through the drift-filling, and, swerving from side to side, produced a series of terraces or benches. These terraces thus represent the bed of the river at a former stage in its history.

In '57, '58 and '59, when placer mining in the Fraser and Thompson rivers was at its height, fully \$1,500,000 worth of gold was washed from the beds and benches with the rocker and by sluicing. The pay streak in the benches was found near the surface, the general mass of material composing the terraces was not payable worked by such rough methods. What was not profitable worked by primitive means might easily yield good results to more improved methods. Terrace materials especially in the vicinity of the mouth of a stream flowing

from a known auriferous locality would justify test operations. But the present dredging law in British Columbia precludes such from being worked by the dredge miner. For, according to it, a lease gives the right to work in a river only below low-water mark.

In New Zealand, alluvial deposits extend into the banks for acres, and miners are allowed to work the banks as far as they find them profitable.

True bed rock is seldom seen in the Fraser river. In most places the bottom of the old valley is below the present river level.

The formation at Boston Bar is of a slaty and schistose character closely resembling the Cambrian, but probably of later date. Similar rocks occur at Leech River, Vancouver Island. In each case the slates contain gold-bearing quartz veins. To the degradation of large areas of these slates, the placer gold is probably due.

The present law for dredge mining in British Columbia is drawn so as to protect the placer mining along the banks of the various streams. According to this law a lease conveys the privilege of working material in the bed of a stream from bank to bank, below low-water mark.

Leases are granted by the government at \$10 per mile; and five miles of a river bed may be taken up by a lessee each year. Lessees may enter into a contract to expend not less than \$1,000 per year on the territory occupied by each lease. These lessees must be either miners or joint stock companies holding a free miner's license. Every person over 18 years, regardless of nationality, is entitled to a free miner's license on the payment of \$5 per annum.

Up to the present dredging in British Columbia has been almost entirely confined to the Fraser River. The yield of placer gold from portions of the Thompson, North Thompson, Columbia, and other rivers on the mainland, as well as from Leech and Sooke rivers, on Vancouver Island, will probably attract the attention of dredging miners to the advisability of prospecting the beds of these streams to ascertain whether the conditions are favorable for dredging. In the foregoing estimate of likely localities, no mention has been made of the more northerly section of the Province, including the Cassiar, Omineca and Atlin mining districts. So far as we know, no attempts have been made to discover whether the streams in these districts are favorable to this mode of mining.

Undoubtedly, if the companies which are at present using this method of winning gold from the bed of the Fraser demonstrate that the business is profitable there will be no lack of others to embark on a like enterprise.

Considering that there is hardly a river in British Columbia which does not show colors of gold, the field for the industry appears large. The time is not far distant, we may assure ourselves, when dredge mining will be one of the most profitable industries of the Province.

Winding from Great Depths.

In a paper prepared for the International Congress on Mining and Metallurgy, held in connection with the Paris Exhibition, M. Léon Poussigue discusses the methods that may be adopted to enable large outputs to be obtained from deep shafts. The following is a resumé of the article:—

To increase the speed of winding is impracticable, the speeds already attained approaching the maximum, so that no material gain can be effected in this operation; time may, however, be saved in many ways in the decking of the trams. Increasing the number of landings to correspond with the decks of the cage is an effective but costly method requiring many men, but special apparatus (of the Fowler type) which bank all the decks at one operation and afterwards deliver the trams on to a single floor has the advantage of speed at less cost. The

duty of the winding engine should be simply to raise and lower the cages, all reversing operations for decking and for the keps being suppressed.

A second method of obtaining the same object is to increase the load per wind. Many deep shafts are small in section and a heavy load is only possible with many decks. For example, the St. André shaft of the Poirer Colliery in Belgium with six decked cages holding one tub on each deck and banking on two floors, at top and bottom thus necessitating three movements of the engine, has an annual output of 100,000 tons from a depth of 1,040 yards.

Winding may be divided into three methods, namely, by flat textile fibre ropes, by round or flat wire ropes, and without ropes. Only one application of the latter—the Blanchett pneumatic system—being yet made. The rope problem of winding from depths up to 1,300 yards is solved by the use of Manilla fibre ropes, though a difficulty may arise in the coiling of the rope on the pulley by reason of the varying section.

Flat wire ropes are little used, except in some districts for moderate depths, but a notable exception is that of the St André shaft previously cited where a flat rope of uniform section, weighing almost 20 lbs. to the yard and measuring $6\frac{1}{2}$ inches across is employed. Flat wire ropes of varying section have been tried, but had to be abandoned through the coils slipping over each other. This difficulty is greater with the wire than with the fibre ropes, owing to the necessity of keeping the former well lubricated.

A difficulty with round ropes or cylindrical drums is the great width of drum, and the necessity of placing it a great distance from the shaft to prevent the angle made by the rope with the plane of the pulleys becoming too great. This is remedied in some cases by coiling the ropes in two or three rows, no difficulty being experienced providing the rows do not exceed three in number.

The Koepe system is the simplest solution of the problem existing, but the disadvantage for great depths is the necessity of the ropes being of uniform section. Its application to great depths depends upon the strength that can be given to wire ropes. The sagging of the rope in the shaft, however, becomes so great as to preclude its use at depths greater than 875 yards.

In some cases the cylindrical drum with ropes of constant or varying diameter have been employed with a balance rope which is not fastened to the undersides of the cages, but is placed out of the way near the circumference of the shaft. Its balancing effect is transmitted to the engine by attaching it to the drum by means of a much smaller section rope than itself. The lighter rope is fastened to one end of the balance rope, and then passed twice round the drum, from thence to the other end of the balance rope to the bottom of the shaft. The ends of the balance rope are thus kept in the same positions in the shaft as if connected to the undersides of the cages. Theoretically the system is satisfactory, but in practice great complications of ropes are involved and the disadvantage of sagging is still present. Another method of transmitting the effect of the balance rope is to take the lighter rope over pulleys at the surface and connect the ends to the tops of the cages. The lighter rope in this case requires to be more than double the length of the shaft. The limit of depth to which this method can be applied is soon reached.

Balancing is effected with flat ropes by winding the rope upon itself so as to give a drum of increasing diameter, and it would seem that the same effect could be obtained with round ropes. It is to be deplored that round ropes as now made do not admit of their being applied to greater depths.

With conical drums almost perfect balancing is obtained and ropes of varying section may be employed. The width of the drum will be considerable for shafts of great depth, which is a disadvantage, but the

best method of overcoming this difficulty is to have the drum made in two parts, one for each rope, and place them one behind the other. The resulting complications of the engine are more than compensated by the advantages of this method.

Summing up the various methods for deep winding the choice lies between Manilla fibre rope and round steel wire rope of varying diameter with conical drum.

The Kootenay Mining Co., Limited.

(From *Engineering and Mining Journal*.)

The Whitaker Wright group of British Columbia Companies in London has been again increased by the flotation of the Kootenay Mining Company, Limited. This is the third subsidiary company issued by Mr. Whitaker Wright during the last few weeks. First we had the Le Roi No. 2, then the Rossland Great Western, and now the Kootenay Mining Company. This company has been formed to take over the remaining properties of the British America Corporation in the Rossland District. They are the Columbia, Kootenay, Tip Top, Copper Jack and South Kootenay Junction, of which the first two are the best known. The capital of this company is £400,000, and the purchase price is £350,000, payable as far as possible in cash, and £50,000 to be devoted to working capital. There will no doubt be plenty of dealings in these shares among professional speculators, and the movements will have little to do with the actual value of the properties. It is appalling to think of the capitalization of the various claims near Rossland, belonging to the Whitaker Wright Group. We have before us the prospectus of the second company above referred to, the Rossland Great Western. It is after the usual style of these documents, but even the meagre statements given are sufficient to show that the valuation placed on the properties is vastly excessive. There are successful mines in the Rossland District, and there are large ore deposits, which may be successfully worked hereafter, but the Rossland ores are, as a rule, of low grade, and will have to be worked economically to yield a moderate profit. There is no possible basis for such capitalizations as have been put upon them—\$2,250,000 in one case and \$2,500,000 each in two others—making \$7,250,000 for three groups of undeveloped claims whose values are still to be tested. There is no probability that they will ever earn respectable dividends on this enormous amount, and the valuation is for the vendors' and promoters' benefit, the public being expected to take care of itself.

(From the *London Critic*.)

The disastrous position into which the London and Globe Finance Corporation has drifted, and the reckless methods which Mr. Whitaker Wright is adopting to bolster up its fortunes, are gradually calling forth spirited comments in the Press. Where *The Critic* once stood almost alone, there may now be numbered scores of prominent London and provincial newspapers who have warned their readers not to follow the fortunes of the companies which Mr. Whitaker Wright and his henchman, at 43 Lothbury, are promoting week by week, and rapidly directing to destruction. The latest hantling is the Kootenay Mining Company, which may be regarded as a sort of Le Roi IV. Directors, bankers, brokers, solicitors, auditors, and secretary are those whose names we are accustomed to see figure on most of Whitaker Wright's prospectuses. The capital is £400,000 in 80,000 shares of £5 each, the high assessment of the latter more easily lending the shares to "rigging purposes," in which the members of the Globe group are such adepts. The prospectus is mainly made up of reports by an engineer, who long ago left the service of the company, and an engineer who is now in the service of the vendors. With all due respect to these experts, neither can be regarded as independent. Dismissing these re-

ports, therefore, the public has this offer, and I quote literally from the prospectus:—

THIS COMPANY has been formed to acquire and work the group of mines or mineral claims, well known as the Columbia, Kootenay, Tip Top, Copper Jack, and South Kootenay fraction, formerly called the Columbia-Kootenay group, located in the heart of the mineral zone of Rossland, British Columbia. The group lies near to the great mines known as the Le Roi, Le Roi No. 2, Rossland Great Western, War Eagle and Centre Star, and embraces an area of 126 acres. . . . The purchase price has been fixed by the vendor company at £350,000, and 80,000 shares are now offered for subscription.

Nothing more, nothing less. The public is coolly asked for £350,000 (and £50,000 extra for working capital), and the information given respecting the property consists of seven lines. I cordially join with my contemporaries in denouncing the flotation as one of the most arrant and impudent that have come from Mr. Whitaker Wright's office. His name is speedily becoming a by-word in the City, where his methods are now regarded as a weak copy of those which have brought Mr. Bottomley's companies to the ground.

Revelstoke Notes.

There is, as usual, very little to report in the mining way from Revelstoke itself, though the annual assessment is being done on all claims that are reached from this point, and steady work is going on at the more developed properties, such as the Carnes Creek Co., the Prince Mining Co., and others. From Smith Creek, further north, very good returns are said on reliable authority to have been made recently from some placer claims that are being worked there; one of the owners of the Revelstoke claim who has just come back from the mine reporting that the shaft is now down 115 feet, and the gravel at that depth carrying as much as \$22.00 per cubic yard in gold. Still better results are expected when the bottom of the old river channel is reached, but if, as seems to be actually the case, that the dirt is so rich as reported, it is an extraordinarily valuable property, and one is not surprised to hear that much of the adjoining ground has been staked.

It is probable that this town will be made the supply point for some very fine mica claims that are being opened up at Tête Jaune Cache, much further north, as the owners consider access can be had better from Revelstoke than from any other point, but transportation is difficult still from those outlying districts. The mica, however, is of such exceedingly fine quality that it will stand the great extra cost of shipping to market, as it is as clear and colorless as glass.

If we are quiet here, however, the Lardeau, as always, is active enough in every direction. It is very pleasant to record another splendid strike on the Nettie L. so frequently mentioned, which is said by those who have seen it to be a most magnificent sight. This body of ore was found during development, and it may be said with truth that all development in the upper workings has been in good ore, although the continual outrageous cost of transportation renders it necessary to ship only the very best. Another 70 or 80 tons is now lying on the shore of Arrow Lake, waiting till the Great Western Mines directors decide to which smelter they will send it. Most certainly this Lardeau district is destined to be one of the richest ore-producing localities in British Columbia, and in addition to ore (usually galena), there are several known veins that carry native gold, some of which will probably be permanent. The Silver Cup—about the most developed mine in the locality—is busy, and the manager reports increased values with increased depth. It is in contemplation to erect a concentrator at least, if not some reduction works, on this property in the near future, to handle the large bodies of second-grade ore. A smelter—which has often been talked of—in the vicinity, treating the Lardeau ores at a reasonable price, would be equal in value to a good mine and pay its owners very handsome profits. Roads,

trails, and railway communication are all most urgently needed, and it is to be hoped that the present government will be able to appreciate this need and make a considerable appropriation to help us, at any rate, with roads and trails. There are still some hopes of the C.P.R. continuing the work already begun, and bringing in a branch line to the foot of Trout Lake. It is utterly impossible in the limits of these few notes to mention a tenth part of the groups and claims in the district; in every issue of the local papers we find an account of some new strike or some new location, always very promising, and no doubt many of them will turn out all right in the future. Some very fine copper ore has been found on the north fork of the Lardeau and elsewhere giving high assay values, which may or may not continue as development increases, though the mineral that seems by far most abundant as yet, is high-grade galena usually accompanied by that peculiar compound known as grey copper, always in this camp wonderfully rich in silver. The same statement holds good with respect to the Fish River district, which must be considered distinct from the Lardeau, though not very far away; and the hundreds of claims situated on the creeks flowing into Fish River, upon nearly or quite all of which considerable development has been done, show high values in silver, lead, and often gold.

Mining in Frontenac, Ont.

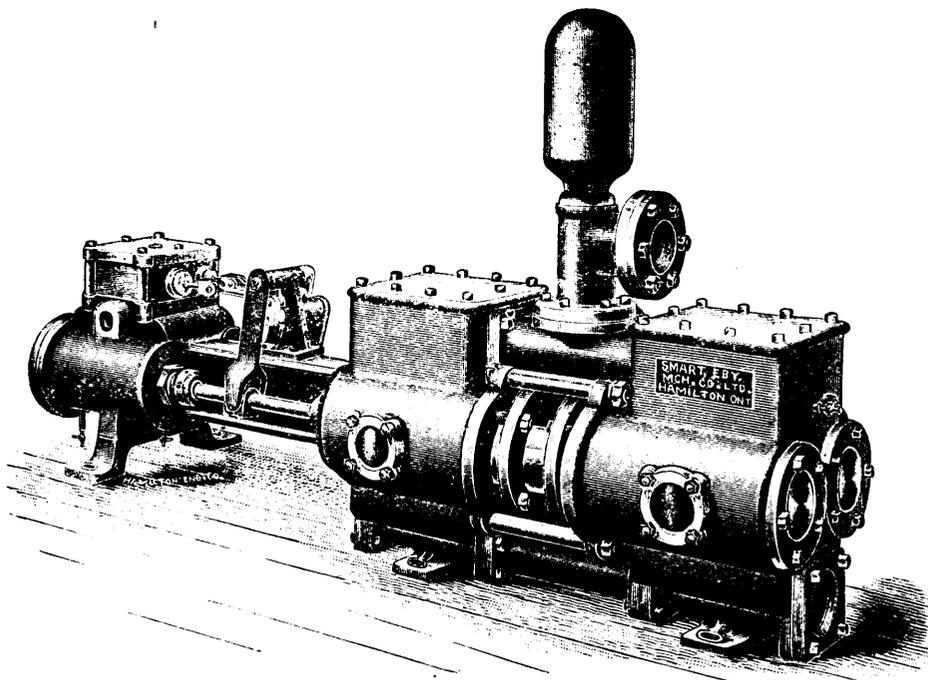
Mica.—A promising mine of amber mica has been opened by Folger & Campsall on lot 12 in the 7th Concession of Oso, near Oso Station, K. and P. Railway. The phosphate mining property of Bawden & Machar, Lot No. 5 in 14th Concession of Storrington, proves its mica-bearing character. A pit has been opened near the old phosphate mine which gives indications of a large output of amber mica of good quality.—Exploration for mica on the Bedford Mining Company's property leased to F. W. Webster is going on, and a promising pit has been opened on Lot 10 in the 5th Concession.—The mines of P. Freeman, Stoness & Kent, F. W. Webster and J. Foxton are steadily producing considerable quantities of high-grade mica.

Iron.—The boring-drill test on the Bedford Company's property, which was begun on the north half of Lot 3 in the 3rd Concession of Bedford, about 6 miles east of the K. & P. Railway, was unprofitable in its first run under the option held by the Buffalo and Niagara Investment Company, and the drill is now in operation for the same Company in hematite ore in the 17th Concession of Bedford near Lake Opinicon. This boring promises to be of great interest, showing jasper and limestone boundaries of the hematite similar to those met with in Minnesota.—A large mine of magnetite has been opened in the vicinity of Crow Lake, east of Parham station, K. & P. Railway. Western parties are looking for options on iron ores in this county, but the history of optional contracts hereaway does not imply any definite trade demand, and as often as not the expectation fever of the persons making them terminates in mild or severe attacks of disgust.

Feldspar.—Excellent feldspar for pottery purposes is found on the line of the K. & P. Railway. It can be furnished in enormous quantities, and should give a considerable tonnage for ocean steamers. J. Richardson & Sons have been answering enquiries for this mineral. J. B.

Large Concentrating Plant.

By long odds the largest concentrator in the province is that of the St. Eugene Consolidated at Moyie. The first concentrator was erected last fall with a capacity of 150 tons per day. Before its completion, owing to the splendid development of the property, it was decided to increase the capacity to 250 tons per day. This was done during the past winter, and the mill was started up in April. In the meantime, however, development work on the property proved the existence of such large ore bodies that additional machinery was placed in the mill during May, bringing its capacity up to 300 tons per day, and an addition to the mill was immediately started with a view to still further increasing the capacity to 400 tons per day. This addition is now completed, and from now on the St. Eugene Consolidated will be putting through 400 tons every twenty-four hours.



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Boundary District.

Already the shipments of ore from Boundary mines, since the completion of the C. P. R. lines into the Boundary mining district, have reached a very respectable total. They amount to at least 550 cars or nearly 15,000 tons of ore. This ore has come from a number of different Boundary camps, but those on the line of the Phoenix spur have sent out the great bulk of all that shipped to date.

B. C. Mine	225
Old Ironsides and Knob Hill	55
City of Paris	165
Golden Crown	50
Mother Lode	4
Gold Bug	2
Last Chance	2
Golden Eagle	1
Winnipeg	20
Athelstan	3
Gold Drop	1
Snowshoe	17
Oro Denoro	2
Scattering	17
Total Cars	550
Total Tons over	14,500

If these figures are inaccurate they are under rather than over the actual amounts shipped. Each car contains from 23 to 30 tons.

Slocan District.

The Payne still has the lead among Slocan shippers, having sent 350 tons to Everett and San Francisco in July, and double that amount by way of Sandon. The Whitewater shipped over the Kaslo and Slocan railway to the ore sampler here about 300 tons, while the Last Chance, the Rambler, the Ruth and the Slocan Star forwarded their usual quantities either to the Kaslo ore sampler or to the smelters on the American side. The Hillside, on the south fork of the Kaslo river, made a test shipment of two and one-half tons to the ore sampler here, while the Soho sent out a carload to Everett.

The Lardo-Duncan has joined the shipping districts, the Lavinah having sent out its first shipment of 100 tons. The Lucky Jim, near Ferguson, is about to make a test shipment. The ore bins of the Nettie L. are full, and the True Fissure, Broadview, Great Northern, Old Gold and other claims are being actively developed so as to be in a position to ship as soon as the railway runs through the country, which all hope the Great Northern will build quickly. The Bosun, in New Denver, is a regular shipper, and other properties are ready to ship when wagon roads have been completed.

Mill tailings at the Alaska-Treadwell mill, Douglas Island, Alaska, assay from 10 to 15 cents per ton.

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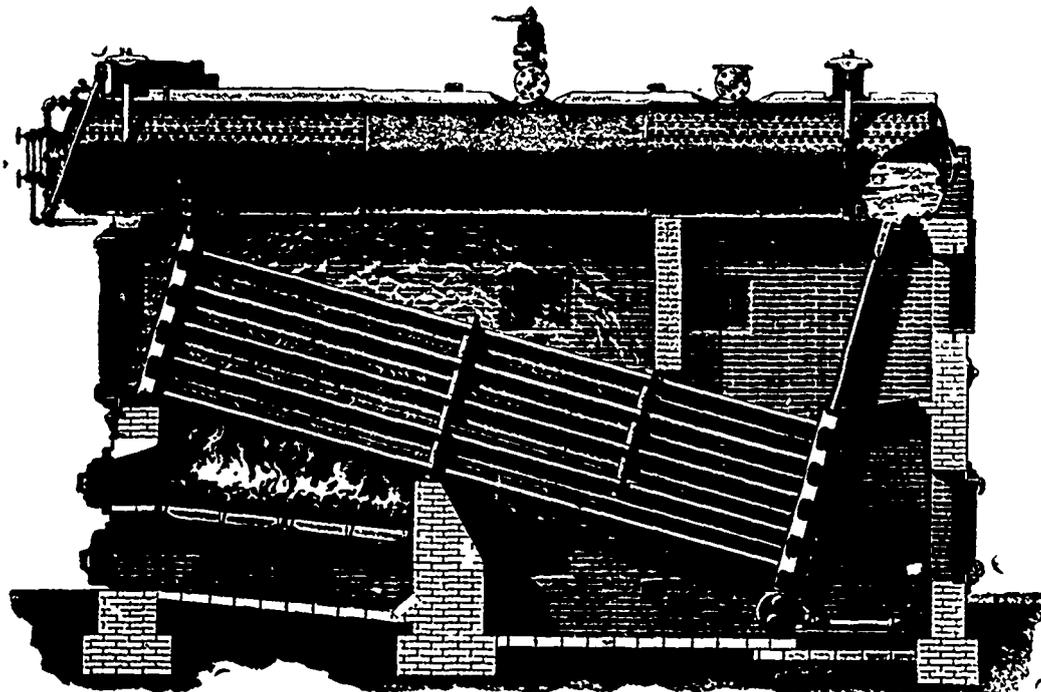
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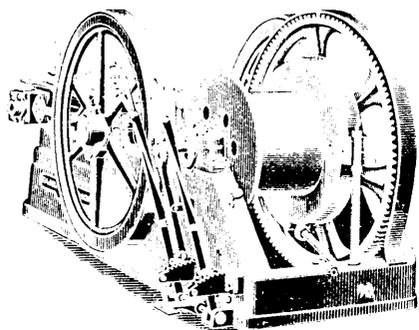
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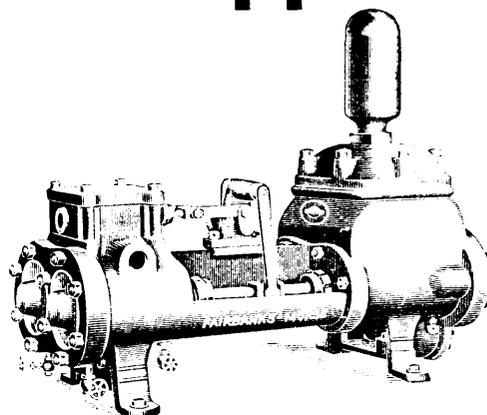
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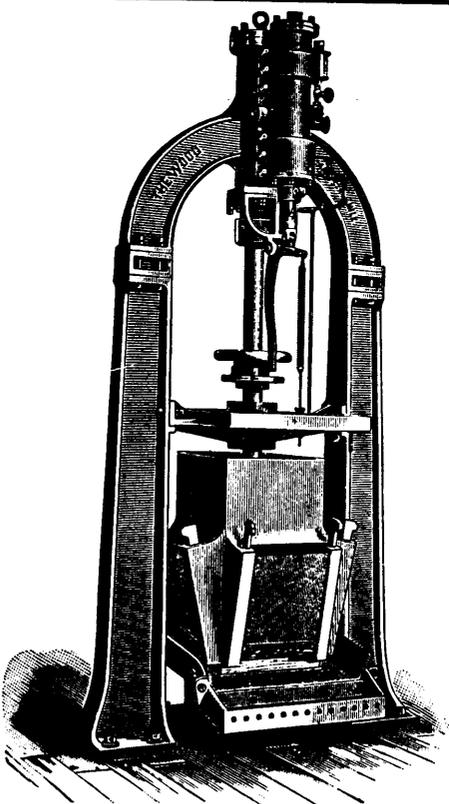
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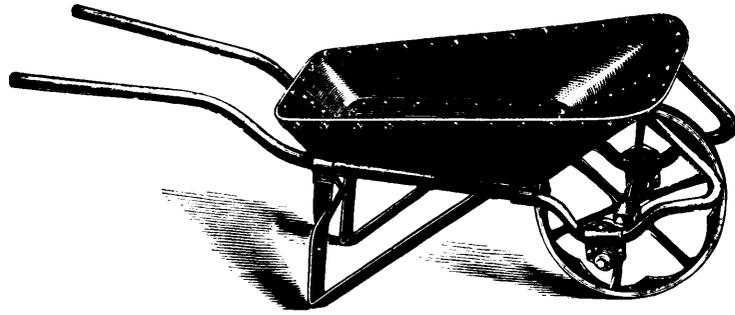
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Licenses to search for eighteen months are issued, at a cost of thirty dollars, for minerals other than Gold and Silver, out of which areas can be selected for mining under lease. These leases are for four renewable terms of twenty years each. The 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.

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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.

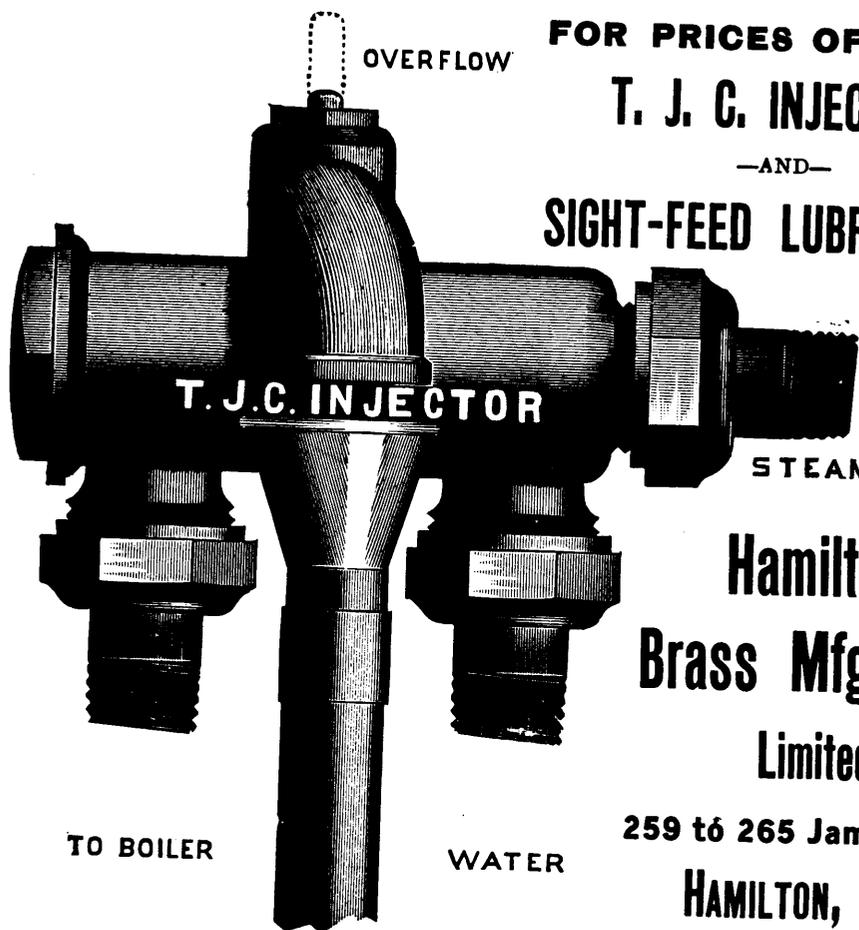
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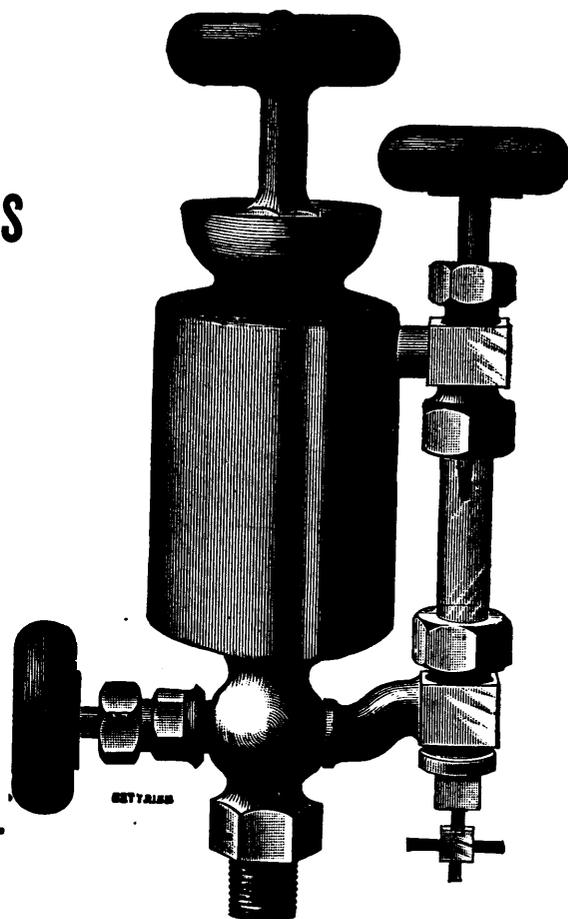


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FROM THE PRESS

It has been a pleasure year by year to welcome the successive issues of this valuable work, and to express our recognition and appreciation of its increasing interest and value. The *Canadian Mining Manual and Mining Companies Year Book* is the best volume of its kind published either in the Canadian Dominion or elsewhere. To all those, whether resident in Canada and immediately interested in the mineral resources and works, or resident elsewhere, but likely to have a personal and direct association with Industrial Canada, the book is simply invaluable. We know no other man so competent as our friend, Mr. B. T. A. Bell; and we do not think that even he has ever given better proof of his industrial Editorial talents than in this particular publication. We shall have further opportunities of placing before our readers some of the fascinating information of which the book is full; we content ourselves at present with saying that the present issue excels all its predecessors, and is a magnificent four dollars worth.—Dr. C. M. Percy in the *Science and Art of Mining*.

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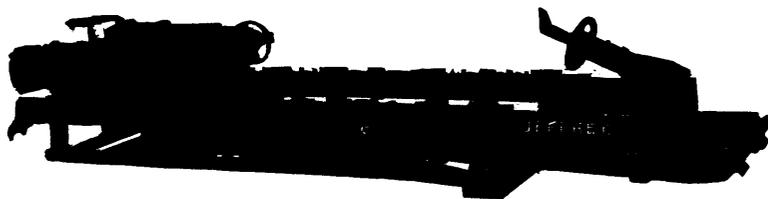


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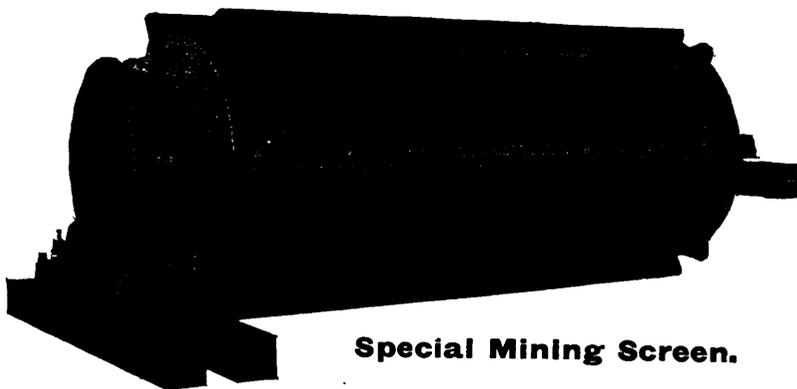
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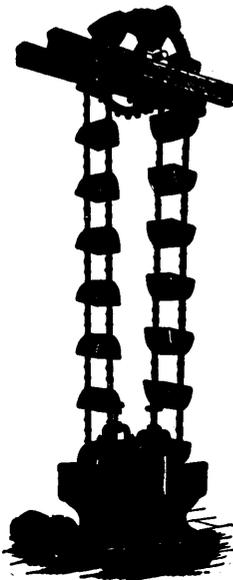
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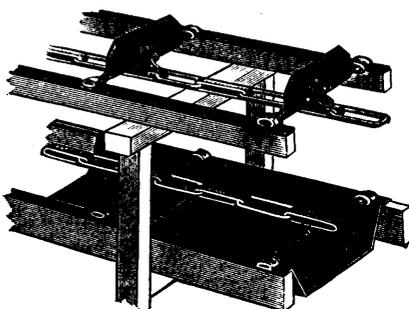
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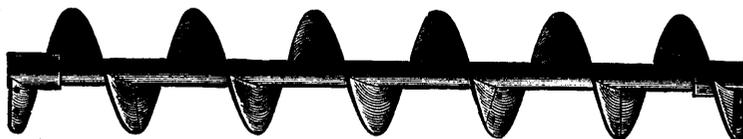
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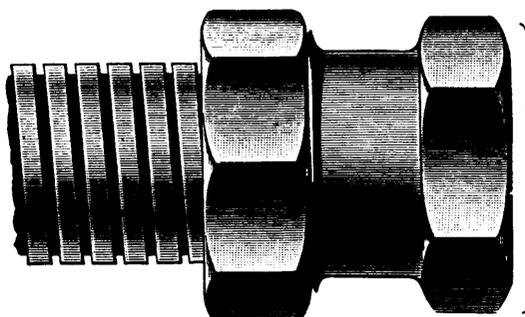
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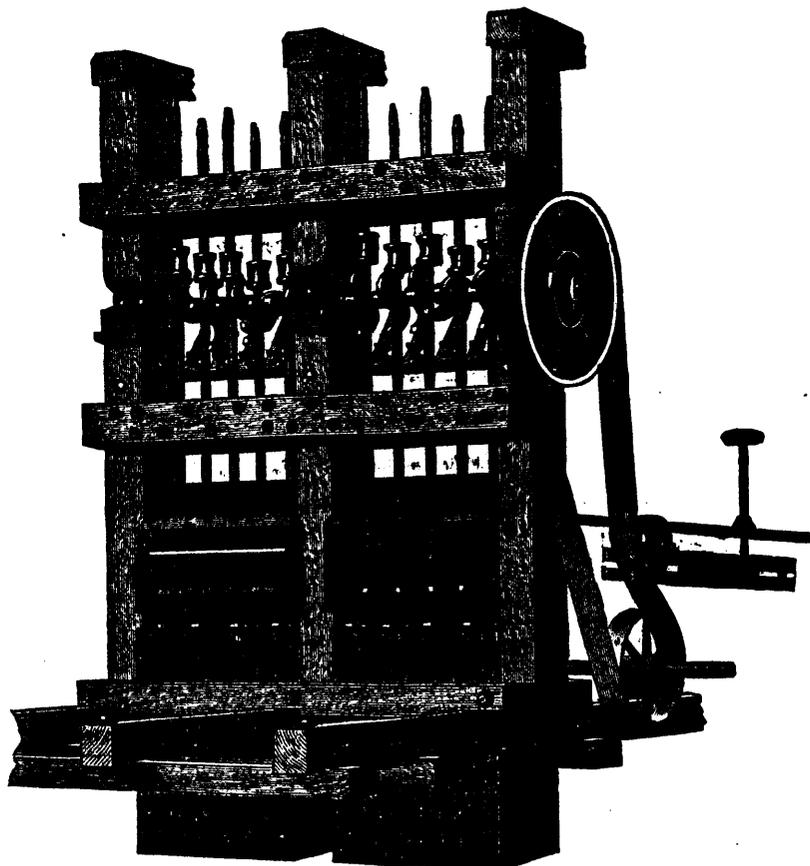
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