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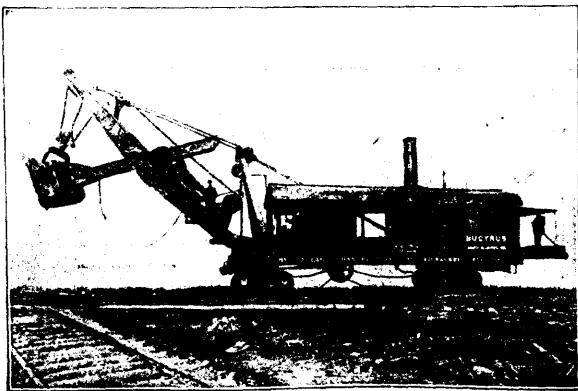
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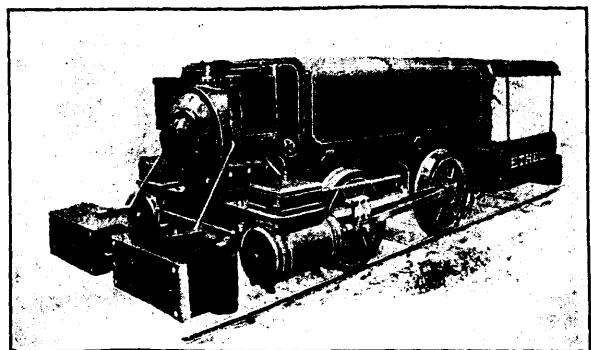
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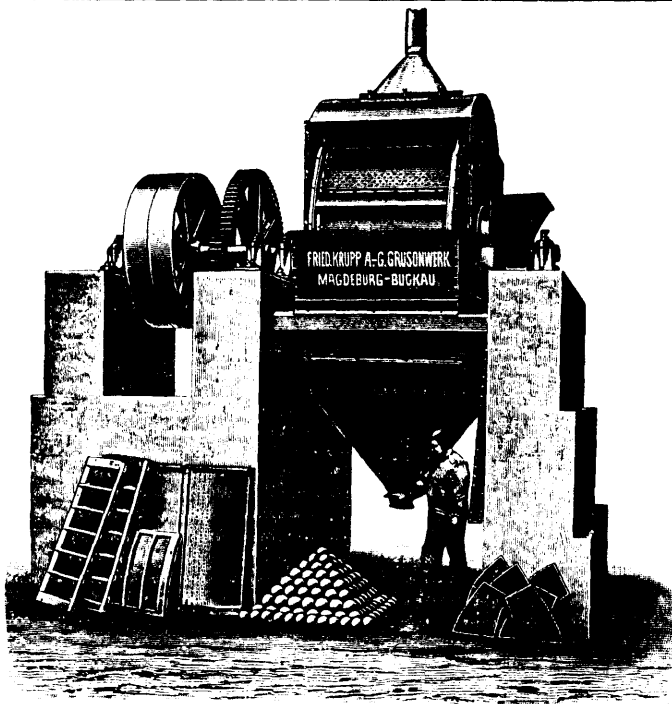
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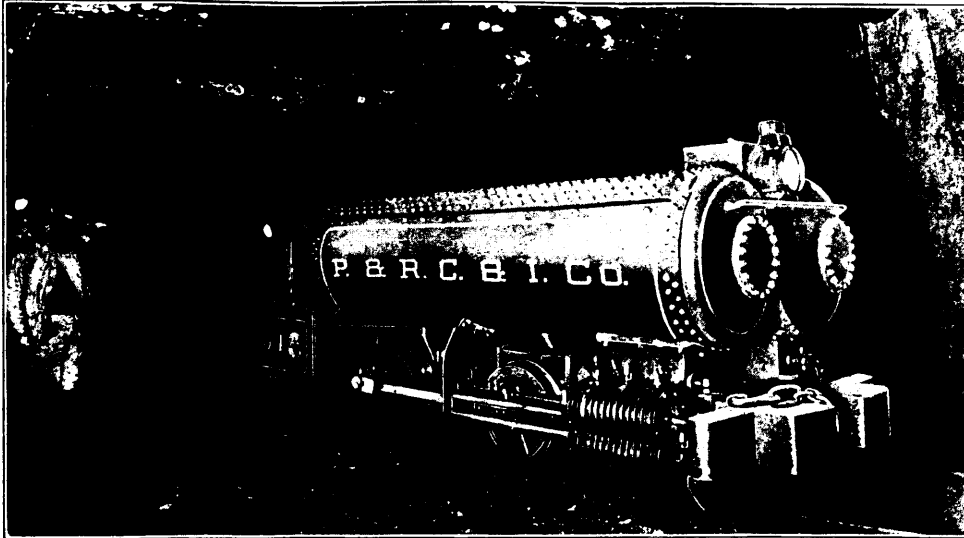
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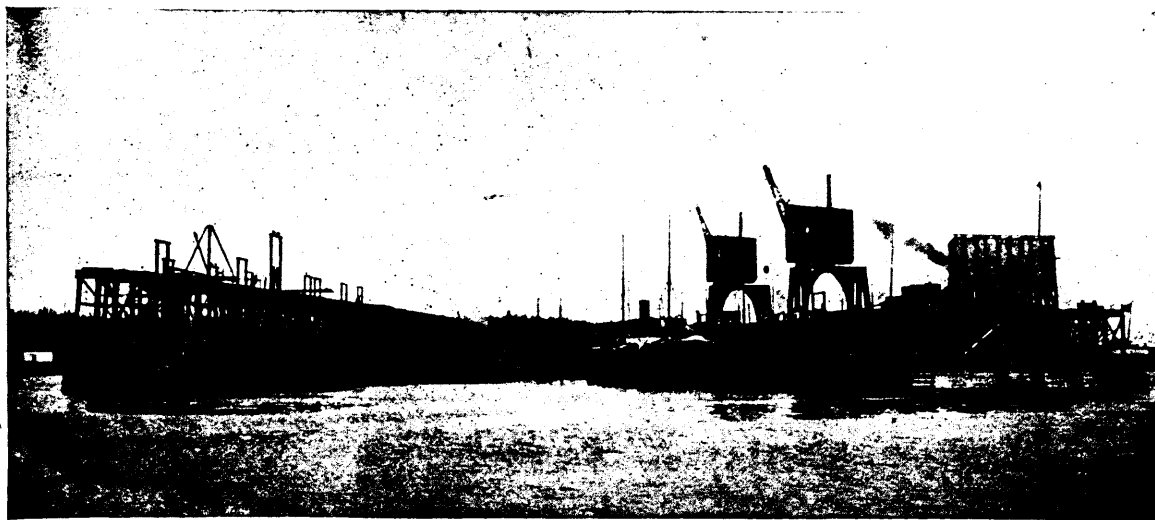
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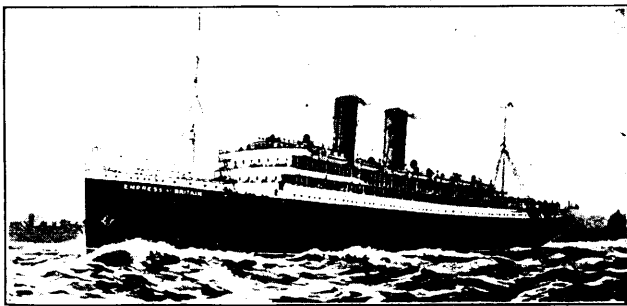
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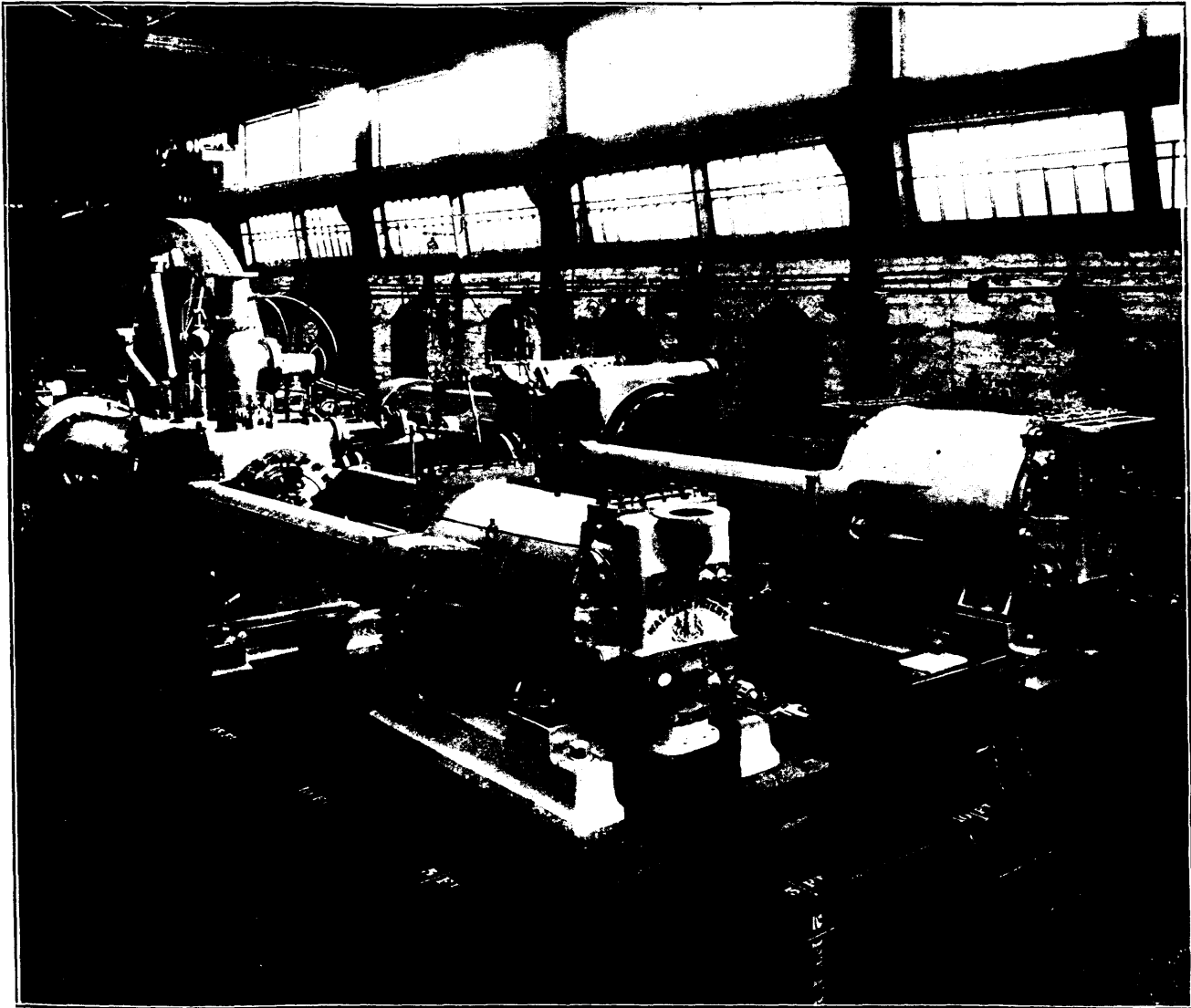
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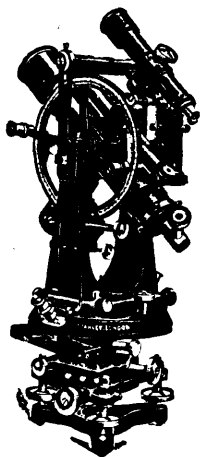
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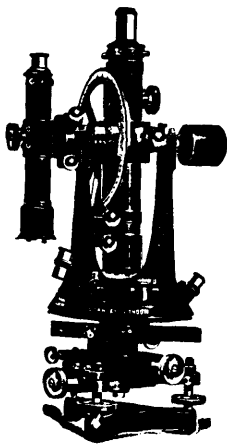
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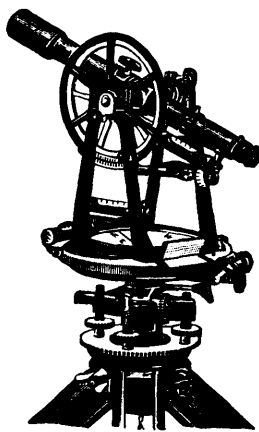
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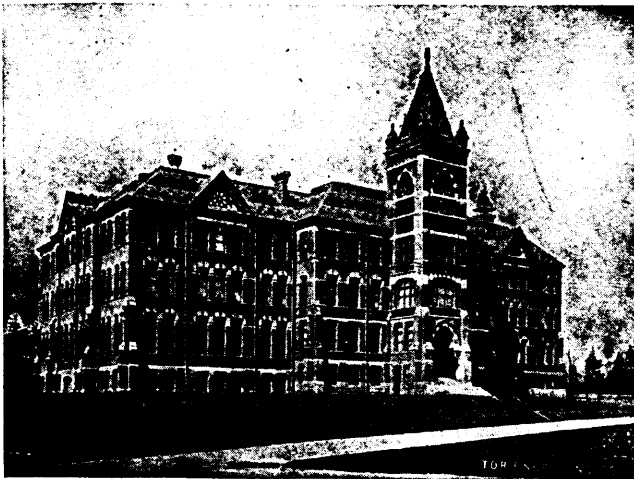
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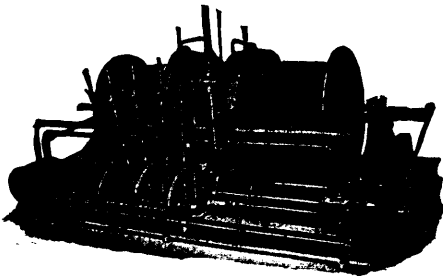
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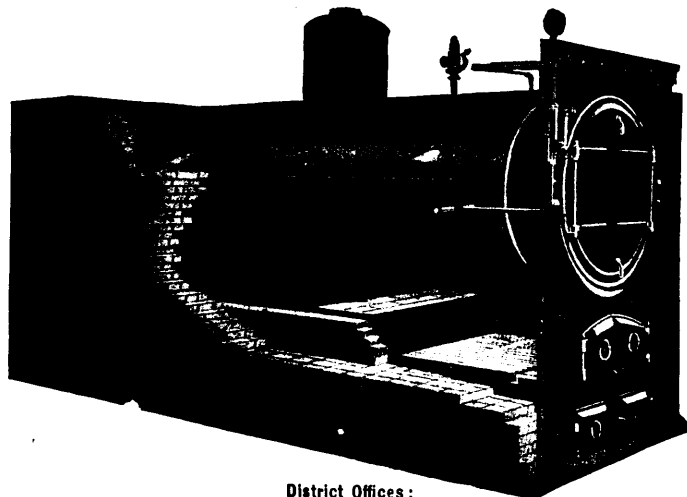
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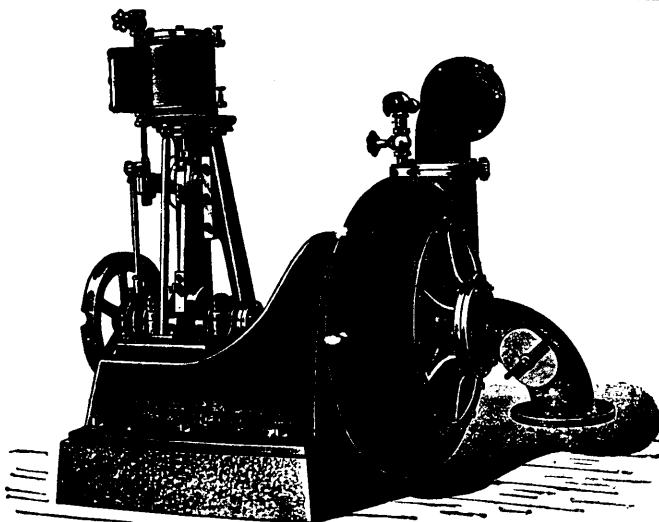


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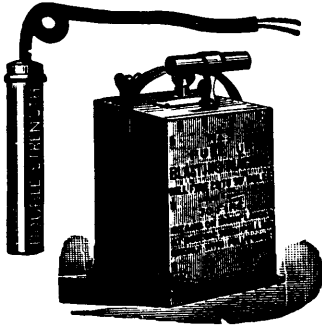
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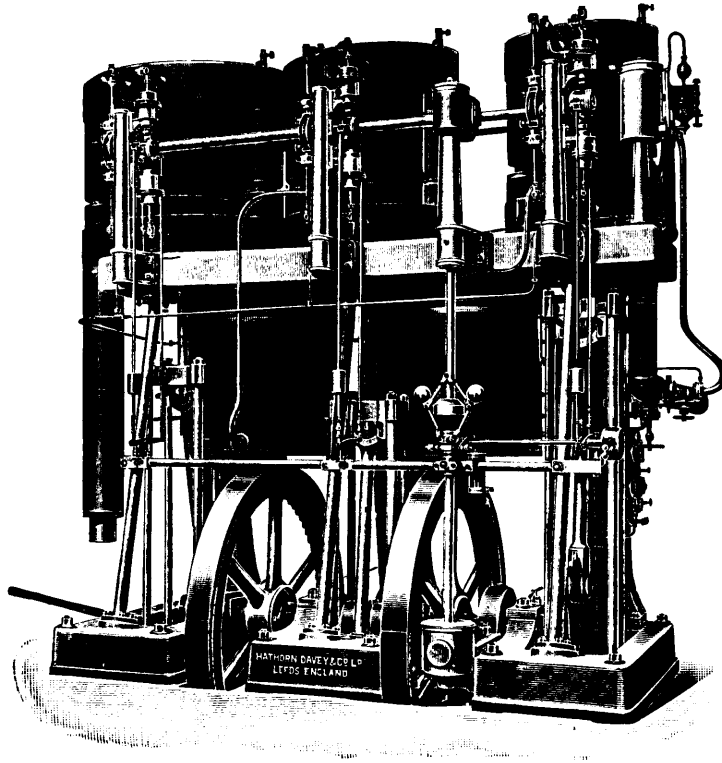
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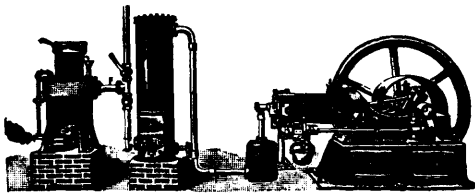
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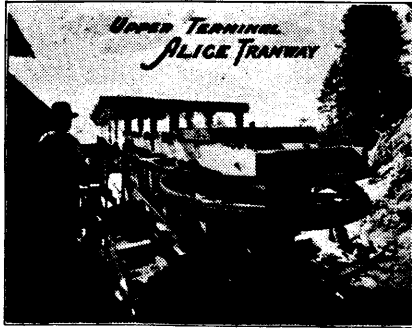
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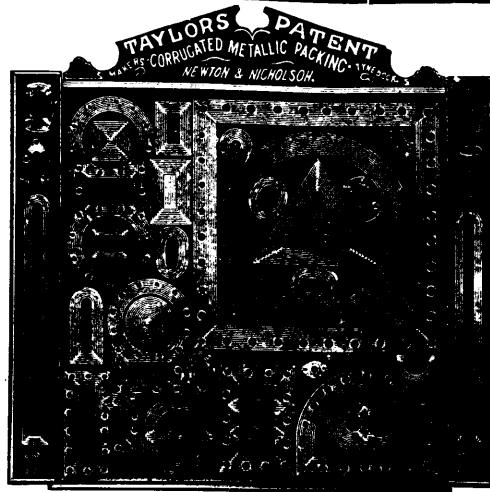
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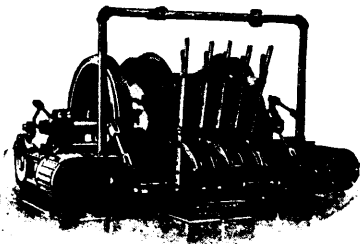
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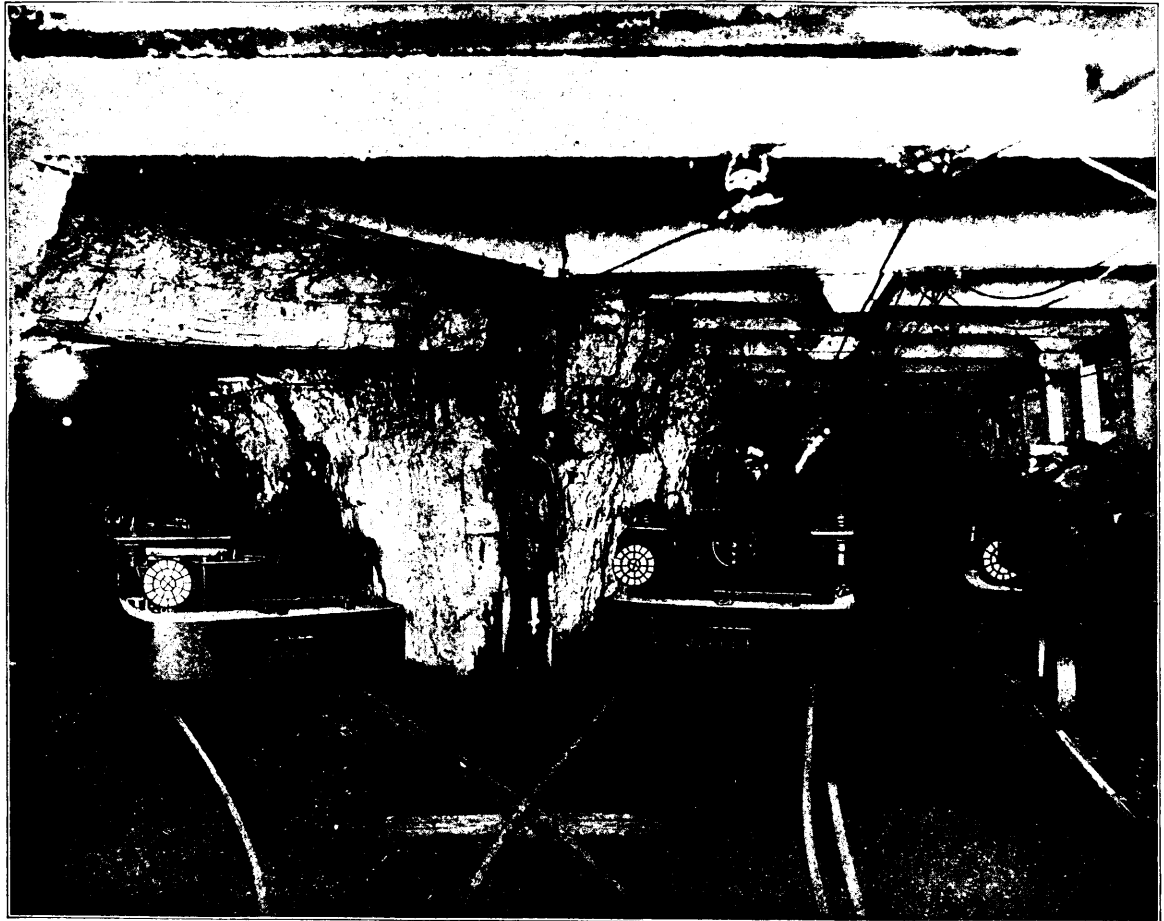
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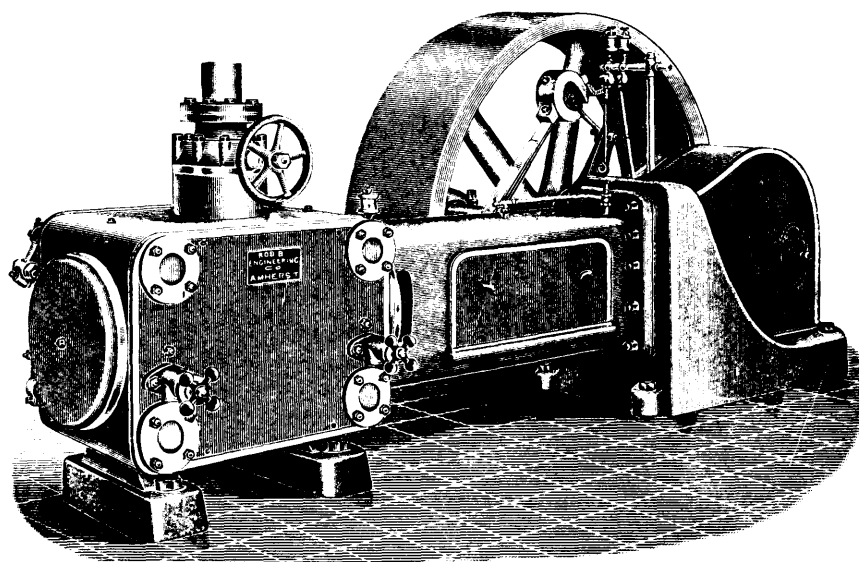
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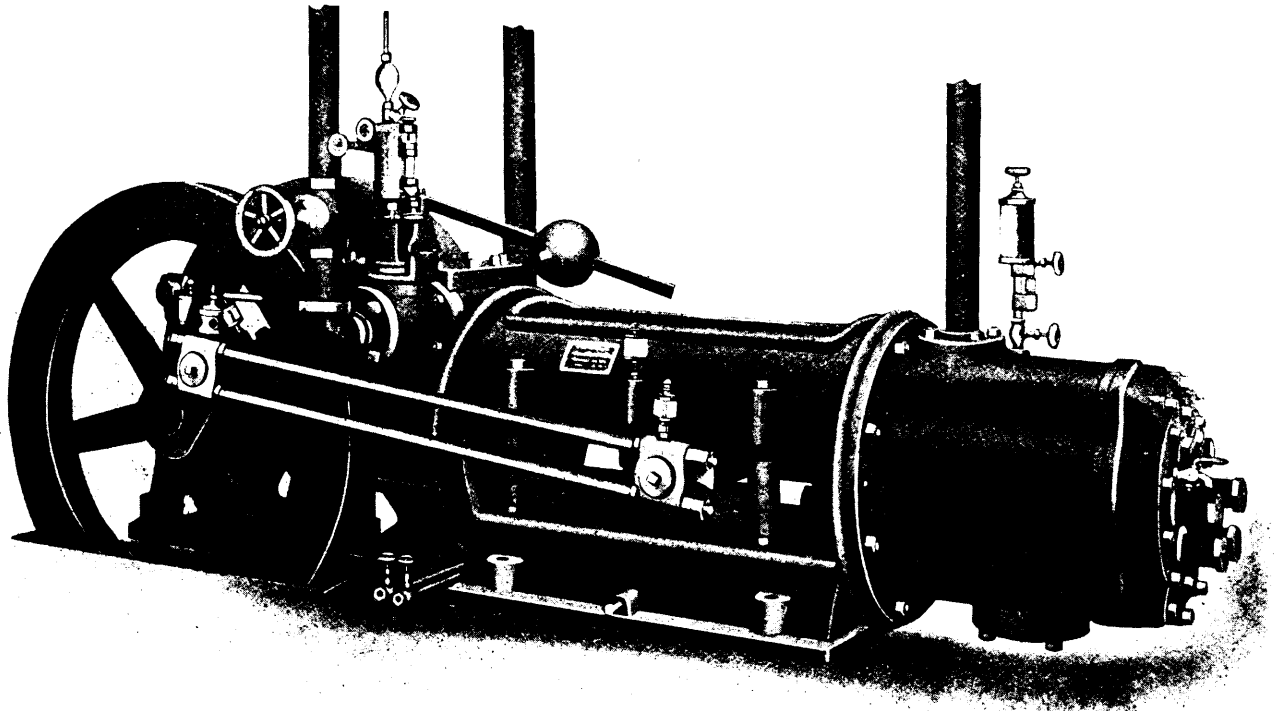
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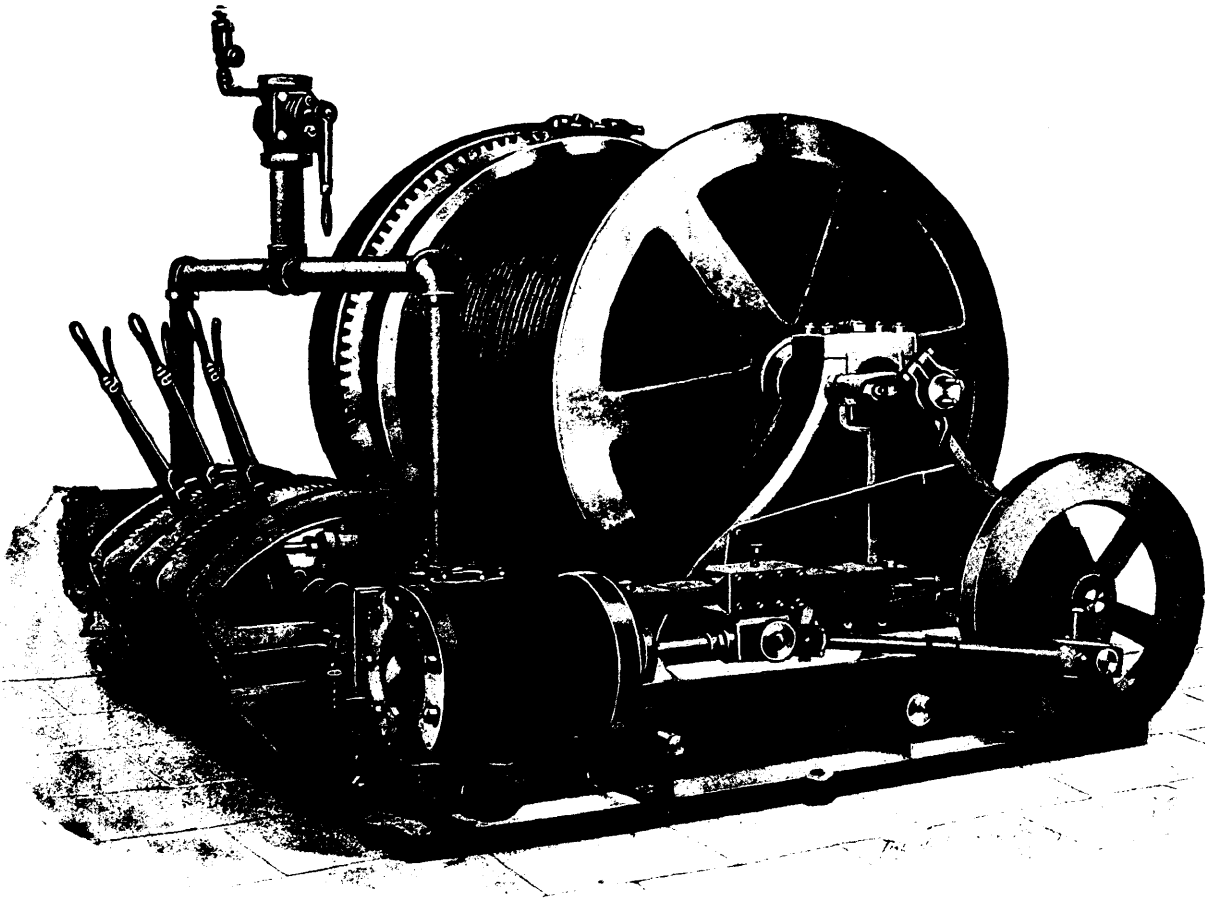
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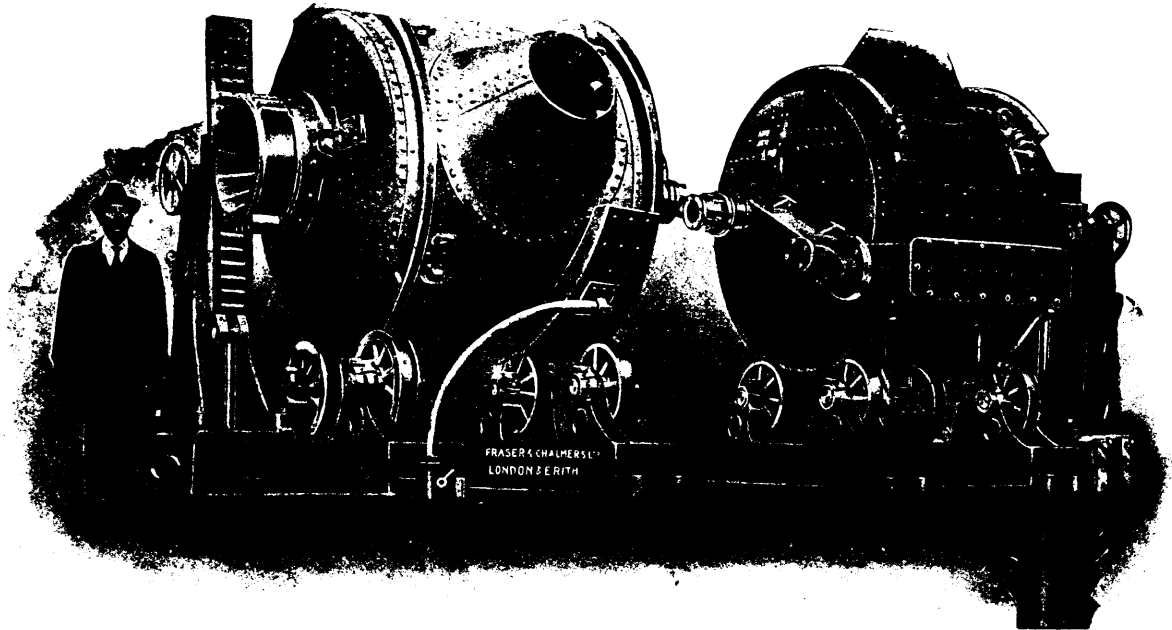
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BRITISH COLUMBIA:

Alfred W. Dyer, Nelson.

Recent paragraphs in the press of Ottawa and Montreal have conveyed an impression that Mr. W. R. Brock, of Kingston, had been promoted to the position of Director of Geological Survey of Canada; other notices conveyed the impression that he had been appointed Chief Geologist, implying that Dr. Robt. Bell had resigned.

Neither statement is accurate. Mr. Brock has merely received well-earned recognition, in the shape of an increase in salary, and the offices of Director and Chief Geologist remain exactly as before. It is regrettable that the daily press does not employ writers whose chief object is accuracy in the news they send to the printer.

At the last session of Parliament, an Act was passed that will be known as the "Miners' Lien Ordinance." It provides that any persons who performed any work or service upon or in respect to a claim, or supplies wood to it, shall, by virtue thereof, have a lien for the price of such work or services or wood, upon the said mining claim, and all belonging thereto. The claim to this lien may be registered at any time within thirty days after the labor being performed, or the wood furnished, or within thirty days after the time fixed for payment; or should the work or wood have been furnished between the first day of November and the thirtieth day of April, within thirty days from the latter date. If steps are not taken to realize upon this claim within sixty days from the registration of the lien, it shall absolutely cease to exist.

The issue of the *Engineering and Mining Journal*, of New York, for July 7th, gives considerably more Canadian news than is usual with American publications. Straws show which way the wind is blowing, and when the leading professional publications of the United States are willing to give up so much space to Canadian matters it is clear that the Dominion is occupying an important position in the estimation of our enterprising cousins south of the international boundary line. We are glad to

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notice this change of heart, and we hope that their enterprising and progressive mining men will come up in larger numbers and see what we have to offer.

Canadians have no reason to be ashamed of their country either in its showing of minerals, timber or farming lands, or men.

The *Engineering and Mining Journal* has absorbed the *Mining Magazine*.

As regards mining, it is always a feast or a famine. But a few short months ago people were thoroughly incredulous as to the value of the Cobalt mining field; now estimates are from \$25,000,000 to \$50,000,000 for individual mines. While we should be unwilling to say, positively, that any one mine will not produce \$50,000,000, still we opine to the belief that it will be safer to take off a few naughts when calculating the probable yield. After all, when owners claim that some of the better known mines will have a productive depth of 1,000 feet, it is the merest guess-work, for even the La Rose Mine is as yet only down 250 feet. It is true, however, that mineral has been found in the Keewatin, which is the formation underlying the lower Huronian conglomerate, and which was but a few months ago considered barren. The CANADIAN MINING REVIEW hopes earnestly that there may be many mines in the Cobalt camp that will yield \$50,000,000 and upwards. In the meantime, let us keep our estimates under severe restraint, and not let these naughty, irresponsible, deceptive ciphers get the better of us.

NICKEL AND MICA.

In two mining products at least, Canada can hold its own with any other part of the world. These are nickel and mica. India is Canada's chief competitor in mica, but cannot for many years more continue to be a serious opponent, owing to the fact that the surface deposits of Bengal are being gradually exhausted, and deep mining would place the mica industry of that large province on practically the same plane as it is in Quebec. At present, the cheap woman and child labor of India gives that country an unhealthy pull as compared to our more advanced views.

New Caledonia, the convict island in possession of France, is Canada's chief competitor in the production of nickel, but since the wonderful development in the Sudbury district, New Caledonia has had to take second place. The Sudbury district is to-day the only portion of the Dominion in which nickel is being worked on a large scale, but a study of the Geological Survey reports makes it clear that there are great possibilities of other rich nickel deposits being discovered.

This useful metal which, owing to its increased use in the manufacture of armor-plating, is being

more eagerly sought after day by day, is likely to have another boom due to a very different cause. The Government of India have, for some time, been considering the possibility of substituting nickel for copper coins. Last summer the master of the Calcutta mint paid a visit to the Sudbury mines and has, it is understood, reported favorably on the suggested conversion. What the Indian Government has decided to do in this matter is not definitely known, but to judge from the Indian newspapers, there seems a strong probability of the copper coins being very largely withdrawn.

Any new deposits of nickel must therefore attract more than ordinary interest, and such interest is certainly inspired by reading of the discovery lately made in the Fraser River.

In working the material obtained in dredging for gold some two miles below Lillooet, B.C., it was found that a fine, heavy grayish sand with a metallic aspect remained after the clean-up.

A sample of this sand was sent to Dr. Hoffmann, chemist of the Geological Survey, for examination, and was found by him to consist essentially of an iron-nickel alloy with scales of platinum, grains of the rare metal iridosmine, gold, magnetite, garnet and quartz.

The nickel alloy and platinum were nearly in equal proportions and constituted about 90 per cent. of the whole.

This nickel-iron alloy is especially peculiar owing to the large amount of nickel it contains, namely, over three-quarters of the whole.

Only two occurrences of similar minerals are known, one in New Zealand and the other in Italy; it is proposed to call this new mineral souesite after Mr. F. Soues, who sent the sample for identification.

The large amount of platinum in these sands and the ease with which the nickel alloy may be separated by dissolving in nitric acid, leads to the hope that we have here a new source of this valuable metal.

AS TO SOME GOVERNMENT REPORTS.

There is perhaps no more effective way of hiding a statement than the putting of it in a Government report. The man on the street fights shy of Government reports. It is only a misguided few who, having the old-fashioned craving for truth, delve into such things. This is why the daily papers are saying so much just at present about the discovery of certain rare earths in the Province of Quebec. If they as well as the public had mastered the contents of the last Blue Book—which, by the way, was yellow or red—issued by the Department of Colonization, Mines and Fisheries, of the Province of Quebec, they would have found a brief description of these discoveries, by Monsieur H. Nagant, a French chemical engineer. One of his

paragraphs says: "With the progress in industrial chemistry now being made in connection with these interesting substances, new and remarkable properties are constantly being discovered and the applications of which they are susceptible are occupying more and more the attention of specialists. Finally, in these same rare earths are disseminated the famous radio-active metals, such as radium, polonium, radio-active thorium and uranium." The writer very properly points out that in the Province of Quebec the study and exploitation of rare earths is only in its inception. Only a few years ago, minerals that were considered valueless and thrown aside as refuse from the mica mines, may well become of such importance that the mica itself will be a secondary product. Even so long ago as 1901, Mr. J. Obalski, the Inspector of Mines, gave some interesting details regarding some of the minerals and rare earths found in various parts of the province. But, as we said before, the way to bury a fact deeply is to put it into a Government report.

Speaking of Government reports: How many people read the report of the Surveyor-General of Dominion Lands, issued annually by a paternal government? Yet, if you want a detailed description of distant and unfrequented parts of our great Dominion you could not go to a better source. The surveyor is not generally a man of much imagination, but he is accurate and precise. Moreover, he rarely has an axe to grind, so that what he says is worth paying attention to. The difference between these reports and the lurid productions that are issued by interested persons is marvellous, hence, perhaps it is just as well that the intending immigrant does not always find access to the reports of the Surveyor-General. But we think that the readers of the CANADIAN MINING REVIEW are not likely to be influenced adversely by perusal of these reports. On the other hand, we feel sure that many of our roving engineers will find a good deal of information in them that may be turned by a shrewd man into hard cash.

With the coming of the Grand Trunk Pacific, the Peace River is likely to attract a great many people, and in the last report of the Surveyor-General, for the year ending June 30th, 1905, there are some reports by Dominion land surveyors that give a very fair idea of the country through which the Peace River flows, from its birth on the western side of the Rockies, to its final merging in the Slave River, which is but another name for great Mackenzie.

PROFITS IN MINING.

The summary of the mining production of the United States recently given by the Chicago Mining World shows that the industry for the first half of this year has been unusually profitable. It also

shows, and this is of still more value, both to the investor and the mining engineer, that this profit is more the result of improvements in methods of mining and reduction, than of new discoveries in old mines or of new districts. It should, however, be noted that not a small proportion of the profits are directly due to the higher market prices which have prevailed for copper, lead and silver.

As in previous years, the mines which produce copper are easily in the van of profitable mining properties. From twenty-four listed corporations the dividends for the first six months of 1906 aggregated \$25,586,613 and of this number 10, or practically 40 per cent., have returned a total of dividends which is larger than the total of their capital stocks. At the head of these copper companies comes the famous Calumet and Hecla, of Lake Superior, the capital stock of which is \$2,500,000; and whose dividend for the first six months aggregated \$3,000,000. In the 35 years of its existence, this mine has paid out to its shareholders in the form of dividends the sum of \$95,350,000, nearly 40 times the par value of its shares; in other words the average dividend has been 100 per cent. per annum. No wonder that the average quotations of these shares is between \$600 and \$700, for a par value of \$25.00.

The gold, silver and lead companies on the list, 58 in number, paid in dividends for the first half of this year \$13,143,671; of this total, seven have returned their/capital. The chief mine on the list is the Old Homestake, of South Dakota, which paid \$665,200.00 on a present capital of \$21,840,000, making the full disbursements in dividends from this property within \$2,000 of \$15,000,000. The second largest gold mine is the Alaska Treadwell, and the third is the Portland, of Cripple Creek, Colorado.

A little comment, we think, may be made on these figures by the REVIEW. Mining, when conducted as an industry by men whose reputations for honesty and ability are unquestioned, is one of the most profitable and legitimate businesses in the world. The mining as described is very different from "mining" as known on the stock exchange, and as known to the small investor who buys a share for 5c with the expectation of getting a 100 per cent. dividend; fake dividends, declared through juggling of accounts on the books of fake companies. In honest mining dividends are taken out of the ground. To quote from our esteemed contemporary: "A dividend is a dividend when it is earned from ore actually mined, and when the company's surplus is large enough to meet emergency expenses."

The subject is also important as drawing attention to the increased yield of low grade gold ores. The great bulk of the gold values of the world are in in this class, for example, the \$4 grade of the Homestake and \$2 or \$3 grade of the Alaska Treadwell. The fact that a

few of the gold mines of South Africa paid about \$3,000,000 in dividends in the month of April of this year alone is conclusive proof of our statement, the yield per ton being less than \$8.00.

The discovery of valuable metals in Northern Quebec and Ontario leads us to the belief that before long Canada's gold production may again mount to the high figures it attained seven or eight years ago, when the Yukon yield was at its maximum.

DIAMONDS.

There are but four regions where diamonds have been met with in the United States. These are, according to Mr. George F. Kunz of the United States Geographical Survey, (1) the Pacific Coast, chiefly along the western base of the Sierra Nevada, in the central counties of California, associated with gold in the cement gravels; (2) along the line of the moraine of the ancient ice sheet in Wisconsin, Michigan, Indiana and Ohio; these have been transported from an undiscovered source, presumably somewhere in Canada; (3) Kentucky and Tennessee; (4) the Atlantic States from Virginia to Alabama, chiefly along the eastern base of the Appalachians in what is known as the Piedmont region. The actual place of origin of diamonds is in all these cases unknown. Those of the Pacific Coast and the Atlantic States have been derived by erosion from the adjacent mountain ranges, but the original sources have never been discovered. Those of the northern drift have doubtless come from Dominion territory, and their exact source is entirely a matter of speculation. The few occurrences in Tennessee and Kentucky are not as yet definitely traceable, even in theory. All have been found in loose and superficial deposits, and all accidentally. Most of those in the Atlantic and Pacific regions have been met with in washing gold.

We Canadians have a special interest in these diamond discoveries in the drift region of the United States, as during the last four years they have been found in connection with gold washings of Brown and Morgan counties, in southern central Indiana. Mr. Kunz obtained a full series of specimens of the rocks found in the gold-bearing drift of that region and forwarded them to Ottawa with a view to tracing out, if possible, the source of the diamonds. These specimens were examined by Dr. A. E. Barlow, Mr. W. J. Wilson, and Prof. H. M. Ami, of the Geological Survey of Canada; Prof. W. G. Miller, Provincial Geologist of Ontario; Dr. G. A. Young, petrographer, and, subsequently, in more detail by Prof. Frank D. Adams, McGill University. These gentlemen, who will be recognized as specially qualified to judge owing to their intimate acquaintance with the geology of Quebec and Ontario, recognized these fragments as apparently identical

with rocks familiar to them at various points in Northern Ontario. Especially marked was the prevalence of pieces and rolled pebbles of jasper and jaspilite, which are found associated most characteristically with the iron ores of Michipicoten and other iron ranges north of Lake Superior. Professor F. D. Adams made a still more detailed examination. In the thirty samples sent him there were two hundred specimens, each one of which was carefully examined and then divided into groups clearly definable. These groups and the percentages which they represent were as follows:—

No. 1 is represented by characteristic material, much of it evidently coarse pegmatite, rich in feldspar.

Nos. 3 and 4 are certainly, and Nos. 5 and 6 probably, from the iron ranges of the Huronian or Keewatin.

The pieces numbered 7 seem to be partly Keewenawan and partly Huronian, while those included under 8 are distinctly Paleozoic.

It thus appears that the portions decidedly referable to the iron ranges of the Huronian and Keewatin (Nos. 3 to 6, inclusive), make up nearly half of the whole material (49.4 per cent.), while the quartzite, No. 2 (29.8 per cent.), is largely Huronian. These rocks are widely developed north of the Great Lakes and at no great distance from them.

It is to be hoped that the careful instructions given by Dr. H. M. Ami to a hundred or more parties that have been surveying for the Transcontinental Railroad may bring forth good fruits. They were instructed how to search intelligently for diamonds and no doubt some of them have profited by the directions given to them. It is within the bounds of possibility that a diamond field may yet be found in Canada, and we think it would be a wise thing for the Geological Survey to issue such particulars of diamonds, their appearance in the rough and the tests therefor, as would enable prospectors, lumbermen, farmers and explorers to recognize these gems should they be so fortunate as to find them.

METEORITES.

Coming apparently from nothing and disappearing as mysteriously, now as silvery threads across the darkness and anon bursting forth in all the brilliancy of the noon-day sun, sometimes as silent visitants and at others outrivalling the thunder's roar, meteors and their progeny, meteorites, must have early excited the wonder of even primitive man. Of his notions regarding these phenomena we can have no accurate conception, but certain it is that they have furnished him with the basis of one of the earliest, if not the earliest, forms of idolatry. Whole religions and much mythic folk-lore have had their origin in the descent of bodies from the



Silver Queen Mine, Cobalt.

skies. Viewed sometimes as the forerunners of great national disaster and sometimes as the harbingers of unwonted prosperity, they have among various peoples and at different periods been treated on the one hand with a mixture of awe and contempt, and on the other raised to the dignity of divinities in themselves. According to the old Lithuanian mythology, at the birth of each infant a star is suspended in the heavens from a slender thread by the spinstress Werpeja; the star thus sheds forth its light while the child lives, but at the end of its earthly career the thread breaks and the light of its star is extinguished. Traces of the ancient reverence with which meteorites have been regarded are still to be found in the case of the Kaaba stone. This stone is built into the northwest corner of the Kaaba at Mecca, and despite the antiquity of its advent upon earth, is profoundly revered by all devout Moslems; its history is buried in tradition, but of its celestial origin there is no room for doubt. The Diana of the Ephesians and the Venus of old Paphos were primarily meteorites, and many others of the ancient divinities had an origin of this kind. At first the meteorite itself was regarded as a deity, but as the exigencies of time demanded it was made to serve as the headpiece to a statue of wood or stone fashioned in either human or animal form. The old Romans, at the very height of their civilization, were not proof against the worship of bodies that had come from the skies. The Ancyle was obtained from Attalus, king of Pergamus, about the year 204 B.C., and brought to Rome by Publius Scipio Nascia, and installed with an elaborate ceremony in a temple specially prepared for it; it had been worshipped for centuries at Pessinus under the name of Cybele, "the mother of gods," and was acquired by the Romans in accordance with an oracle which declared that its possession would assure stability and prosperity to the Roman Empire; this specimen has been looked for within recent years in the excavations about Rome, but the probability of its ever being found seems very remote indeed. A stone which fell at Emesa in Syria was brought to Rome by Antoninus (Heliogabalus) early in the 3rd century A.D., and for some time was made the object of a most disgusting worship. The chronicles of the Chinese government furnish us with the earliest records in historic times of the fall of bodies from the skies; these records date back to a time ten centuries before the birth of Christ; they are, however, made public only at the termination of each dynasty, and thus, though voluminous and teeming with information, are not made available with any great frequency. The worship of meteorites has not been confined to any particular continent or people; it has been practised by the unenlightened of all climes and times; in Africa the custom seems to have been widespread, many tribes maintaining a special order of priesthood in whose custody these messen-

gers from the heavens were placed; in America many examples are to be found of this kind of worship; some of the old Mexican temples have held treasures in meteorites; the Octibbeha meteorite was found in an Indian grave; meteorites have also been found on the altars of some of those mysterious people, the moundbuilders, the remains of whose temples may still be seen in part of what is now the State of Ohio; for long ages, the Indians of the Saskatchewan worshipped an iron meteorite which had fallen at the head of Iron Creek; about the year 1869 this specimen was removed from its resting place and ultimately found its way into the collection of Victoria College, where it now remains; the Indians were loud in their wailings when they found that it had been removed, and their medicine-men were profuse in their predictions of the calamities that would befall the tribes of the Saskatchewan in consequence of the removal of their idol; this meteorite weighed about 386 pounds, and by a little stretch of the imagination the profile of an Indian's face may be clearly made out on the edge of it. A stone which fell near Ogi in Japan, about 1730, and which came into the possession of the British Museum in 1883, was for long made the object of reverent attentions at annual festivities.

In view of the widespread interest which is now being manifested in the study of meteorites, the Canadian Geological Survey has for some time past been putting forth special efforts to trace the history of all Canadian specimens and likewise to augment the numbers in the collection either by exchange or purchase. Within the past few weeks five plaster models and two specimens—one of the latter being a new one and as yet undescribed—have been added to the collection, which now consists of three main masses, three fragments or sections and nine plaster models, and negotiations are in progress for the addition of others.

GEOLOGICAL SURVEY NOTES FROM COBALT MINING CAMP.

A visit to the famous Cobalt Mining Camp shows that the unhealthy conditions due to the "boom" of the past year are rapidly changing for the better, and that the camp is now settling down to a sane state of development and production. During the past year the area containing the silver-bearing veins has been only slightly enlarged, while the areas of cobalt-nickel veins have been extended considerably. From present indications there appears to be no great chance of wide-spread new discoveries of silver veins in this camp, except perhaps to the south, on the Gillies timber limit now controlled by the Ontario Government and to the northward in the southern portion of the township of Bucke where the thick covering of glacial drift makes prospecting slow and expensive.

The first break in the "boom" is said to have been due to the withdrawal from sale, by the Government, of the Gillies limit, thus greatly reducing the presumably rich area open to the prospectors; the second cause was the difficulty of making discoveries in the areas deeply covered with boulder clay, while the finishing touch was added by the refusal of the mining inspectors to pass any claim which did not show sufficient mineral to justify the presumption, that a workable mine would be developed on the claim. Of course there are still many persons going about Cobalt and Haileybury with the usual collection of mineral specimens in their pockets ready and anxious to show them to intending purchasers, but the time is past, never to return, when a slight tinge of cobalt bloom found on a claim made it worth thousands of dollars; the investor has now become wary and only risks his money in claims which have passed the inspector.

The miscellaneous floating population of the early spring, consisting largely of amateur prospectors and investors, has departed almost without exception, leaving only a law-abiding assemblage of miners and of those in legitimate trade, so that only the constantly recurring blasts from the surrounding mines show that Cobalt differs from the prosaic character of an ordinary new village of Ontario. The only cause for trouble at present is due to several parties prospecting on the same mining lot, all trenching for discovery veins, with equal rights in the eyes of the law. In these cases the party that has been at work for weeks digging unsuccessfully but hopefully, feels naturally sore at the intrusion of others, and threatened violence has been expressed in a number of instances of this description; luckily, whisky is absent, and "guns" are few, so that to date these bickerings have all ended in words.

The older claims are beginning to be systematically worked—almost every mine now has a shaft with the necessary steam hoisting and drilling plants. Shafts are being sunk and tunnels run, to block out and prove the mines, and a start is being made to recover from last season's dumps much of the valuable ore thrown aside in the hurry for rich returns. Milling plants are being introduced and the time will soon be passed when ore valued at hundreds of dollars a ton will be cast aside as of no consequence. Along with this change from open quarrying to shaft mining, owners are prospecting their claims for other veins hidden beneath the boulder clay and in this they are usually marvelously successful, many new veins being found by surface trenching. This method is so slow, costly, and otherwise unsatisfactory that an attempt is being made on one of the larger properties to move the surface dirt by a hydraulicing plant and deposit it in an adjoining lake. On some claims the veins uncovered by trenching are so numerous

and close together that it is a question whether it would not be better to take out the entire rock mass rather than honeycomb the claim with a network of small tunnels following the irregular courses of the many veins.

In the shafts and borings no depths greater than 300 feet have been reached, but these all show a continuation of the rich ores in depth and so point to greater depths for profitable mining. The information obtained from the shafts and tunnels shows that the rich ores occur in zones or patches in the cobalt-nickel ores, but at present sufficient information has not been obtained to state whether these occurrences of the rich ores follow a general law or are of irregular formation.

No discoveries of new minerals have been lately found to add to the large number already discovered in the veins. Smaltite is the common ore in the greater number of the mines with the various other compounds of cobalt and nickel in changeable quantities. The silver usually occurs in the native state or as dyscrasite (an alloy of silver and antimony); it is also frequently found as argentite and more rarely as ruby silver. Native bismuth is found frequently but sparingly in many of the mines.

The future of Cobalt camp looks bright for several years to come, and there appears to be little doubt that continued development will lead to the discovery of many new veins, while the sinking of shafts will show a continuation of values in depth.

BEYOND THE CLEARINGS.

So little is known of the northern parts of the provinces of Quebec and Ontario, that the Blue Book issued by the Government, as to the resources of the country, between Quebec and Winnipeg, along the proposed route of the National Transcontinental Railway, possesses a value that is perhaps hardly realized by any but our geographers and engineers. This Blue Book was compiled from authentic sources by Dr. Henry M. Ami of the Geological Survey Department, Ottawa. The report deals with an area of 180,000 sq. miles, divided into sections averaging 100 miles in length, and taking in a belt of country 75 miles on each side of the proposed line of railway. For the sake of convenience, these sub-divisions are numbered in consecutive order from 1 to 12, beginning with the city of Quebec, and continuing in a westerly direction to Winnipeg. They were named as follows:—(1) Quebec Division, (2) Saint Maurice Division, (3) Upper Gatineau Division, (4) Upper Ottawa Division, (5) Abitibi Division, (6) Upper Moose or Mattagami Division, (7) Mamattawan Division, (8) Long Lake Division, (9) Nipigon Division, (10) Lake Saint

Joseph Division, (11) Lac Seul Division, (12) Lake of the Woods Division.

Quebec Division, No. 1.

The Quebec division includes the narrow flat lying and bordering the alluvial and marine plain of the St. Lawrence, north and north-west of which the Laurentide Hills raise their well-wooded and majestic heads in beauty and grandeur, presenting a bold front in their southern exposure. It is well known that these hills lose their rugged appearance to the north—the country resembling more a generally level plateau. The St. Maurice River offers a natural highway into that well-timbered and well-watered region, which could be easily taken advantage of in reaching the broad and more generally level country along the height of land.

This is typical Laurentian country; rounded hills and valleys, with lakes and rivers everywhere.

In a northwesterly direction from the city of Quebec it is not difficult to reach the St. Maurice. The Lake St. John Railway runs in that direction quite a distance, and from the point near Rivière à Pierre in a northwesterly direction towards La Tuque and Iroquois Chute. Thence to the height of land there are no obstacles of any account, a general level plateau is struck which can be followed in a westerly direction for 800 miles, not varying 200 ft. in that distance.

Timber is abundant.

The climate is identical with that of Quebec city.

Iron, mica, plumbago, and other Laurentian materials are found.

There are excellent water powers on all streams.

The St. Maurice valley can be easily reached and forms a natural highway towards the generally level tableland to the north.

There is a zone or belt of flat undulating and alluvial land consisting of sand and clay loam which occupies the Saint Lawrence valley proper.

To the north, the country is generally hilly. The Laurentian Hills present a bold front here as they do all along their southern border. In a northwesterly direction as well as north of the city of Quebec, the hilly character of the country obtains for a considerable stretch, nevertheless, it is a well-known fact that a more open and less distinctly rugged country occurs as we proceed towards the height of land.

Along a line drawn from the city of Quebec to James's Bay, when the height of land is crossed, a comparatively level plateau is reached where an easy grade can be obtained. All the reports consulted agree upon this point that there is a level tract of country from the headwaters of the Gatineau to Lake Mistassini. Between the city of Quebec and the height of land, the great valley or highway of the Saint Maurice river may be taken advantage of. The Laurentian Hills are not made up of

continuous chains of hills which as a rule present barriers, but consist of innumerable bosses placed here and there, between which, on one side or the other, it is quite possible to obtain a valley suitable for a roadway or railroad line. The fact that the Saint Maurice river is navigable for upwards of seventy miles without interruption and forms a natural highway to the height of land, clearly points to the direction of least resistance, as well as easy grades.

St. Maurice Division, No. 2.

In his report for 1874-1875, printed by order of the Legislative Assembly, the Commissioner of Crown Lands of Quebec, Mr. H. G. Malhiot, describes the valley of the Saint Maurice as follows:—

“To give an idea of the importance of the valley of the St. Maurice and of the vast field which it offers to commerce, industry and colonization, it will suffice to state that the territory watered by the St. Maurice and its tributaries is 18,020 square miles in extent, and the greatest part of it is thickly wooded. Eight thousand and forty-five square miles of this forest are under license, producing a revenue of about \$70,000 a year, and capable of producing much more. This territory contains about 3,000,000 acres of land fit for settlement. The river St. Maurice, one of the largest in the province, is navigable for a great part of its length, from the Grand Piles Falls to about twenty-eight miles from its mouth; and when the Piles railway now undertaken, and which will connect the navigable waters of the St. Maurice and the St. Lawrence, is constructed, it will afford to settlers and immigrants an easy route by which to reach the interior of this vast region.”

Upper Gatineau Division, No. 3.

In ascending the Clear-Water River, a tributary of the St. Maurice through Pemsachie, Watoush, Fishing, and Clear-Water Lakes to the height of land portage, a distance of about 17 miles, the country bears the same level aspect as on Sandy Beach Lake. For nearly half this distance the woods have been burnt, considerable areas now producing only small cypresses about four or five feet high. Where the forest has not been burnt, the sandy soil produces a smaller growth of timber than on Sandy Beach Lake.

The river in this distance, to the height of land, rises only 131 feet, reaching 1,418 feet above the sea. The distance from the height of land down from Falls River, through Lake Normandin, Kakaskapethiouisse, and Askatiche, to Lake Nikabau, is about 34 miles. For the whole of this distance the description given of the country along Clear-Water River is equally applicable. It presents the same alternation of green and burnt woods, as well as the

comparatively level, barren, sandy soil. The height of Lake Nikaubau, is 1,266 feet above the sea, showing a fall 152 feet from the Height-of-Land.

The Upper Ottawa Division, No. 4.

The country is generally flat or an undulating plain, part of Hudson Bay basin. The southern portion hilly and rocky. Middle portion, through which the line traverses, is flat and gives easy grades, occasional ridges and hills.

Large areas of dry clay soil extend around the height of land. Although the district as a whole in its southern portion cannot be said to be suitable for agricultural purposes, still, in many places, considerable areas of good land are known to exist.

Silver, lead, zinc, copper and other minerals exist. Gold, gypsum, and lignite have also been discovered and recorded.

In this division water powers are numerous.

The Abitibi Division, No. 5.

Iron copper, magnetic iron pyrites and steatite are reported, and, inasmuch as the great Huronian belt of metalliferous rocks traverses this region further discoveries are anticipated.

White and red pine found over the whole region. On the north side of the height of land pine trees measure from eight to nine feet in circumference. White spruce, yellow birch, cedar, also tolerably abundant. Poplar, canoe birch, banksian pine, elm and ash are also reported, and sugar maple and aspen.

The whole country northward from the mouth of the Montreal River is pretty correctly described as a level clay plain with rocky hills protruding here and there through it. Mark the distinction between this region and the country south. Clay appears to be uniform throughout the whole region. Several acres of this clay soil are cultivated at the Hudson Bay Company's post at Abitibi. All the ordinary cereals cultivated on the St. Lawrence can be cultivated at Abitibi. Indian corn is grown in several localities near the head of Lake Temiscaming.

Upper Moose or Mattagami River Division, No. 6.

Fine agricultural land, clay and sandy loam forms part of great clay basin of Moose River, and its numerous tributaries, which take their rise near the C.P.R. line, north of lakes Huron and Superior, and even south of the line. The head-waters of the rivers in this division are well timbered, and the country may be described as an undulating, rolling plain, gently sloping towards James Bay.

Red and white pine, spruce, tamarack, white birch, poplar, and balsam, abound.

Is good for farming throughout the greater portion of the country. The hills are not very high. At Brunswick House, a Hudson Bay post, the soil is clay.

Coal as lignite, fine sand, china clay, and peat have been discovered and geologists report the occurrence of the mineral-bearing Huronian formation.

Dr. Bell writes:—"I am now enabled to demonstrate that an immense area of mineral-bearing Huronian rocks, the largest as yet known in the Dominion, runs northward from Lake Huron through the greater part of the distance lying between it and the area of unaltered rocks of the southwest part of James Bay; also that the Michipicoten belt of these rocks is much more extensive than had hitherto been supposed. Some deposits of economic minerals were discovered, and others which have been little known were examined. In the Moose River basin a remarkable set of wide spreading trap dykes was found to exist. The occurrence of Tertiary lignite on this river was not previously known to the public, although a few persons living in the country were aware of it. The flat lying rocks of this region had been previously represented on geological sketch-maps as continuing up the eastern side of James Bay, but I found this supposition to be erroneous."

Mamattawan Division, No. 7.

The country is generally a level plain, slightly inclined to the west. Easy grade. Practically level country.

The land low and swampy in places, needs drainage. Rolling land, heavily timbered.

Good spruce, tamarack, banksian pine, poplar, red pine, cedar, reported throughout this division, beside white birch, balm of gilead.

Inasmuch as the greater portion of this division is covered by good agricultural land and surface deposits mineral occurrences have not as yet been specially noted, but the Huronian mineral bearing rocks also crop up and may yield their quota of mineral species peculiar to that formation.

Long Lake Division, No. 8.

Partially a dissected plain. Fine agricultural land in numerous sections. Level and rolling country. Hilly and rocky in the southern portion. Flat and generally level along the projected line.

Abundant vegetation everywhere.

Tamarack, spruce, balsam, white birch, pine, poplar abound throughout this district. Hardwood in the southern portion and jack pine along the sandy stretches.

Two large areas of Huronian mineral-bearing rocks are known to occur in this division.

The Nepigon Division, No. 9.

The country is in part level and undulating and part rocky. The Nepigon region constitutes a dissected plane. Good agricultural land, clay soil and clay loam and sandy loam.

A little north of Lake Nepigon the country is heavily timbered with spruce, banksian pine, poplar, and balsam, with occasional birch, also tamarack.

The iron-bearing band occurs in this division and resembles the iron from the Michigan Ranges. Lignite occurs in beds of clay.

The climate of the Nepigon country seems to be well suited to agriculture. Farming has been successfully carried on at Nepigon House, Hudson Bay Company post.

Lake St. Joseph Division, No. 10.

Topographically, the region forms a part of a low, rocky, well-watered plateau. Except in a few cases the relief of the interior is rarely over fifty feet. The country is generally flat or very gently sloping.

Spruce, poplar, tamarack, with birch and banksian pine occur near Osnaburgh House, Hudson Bay Company's post.

The water bodies lie in shallow basins, and many of the streams are sluggish, being situated near the height of land and intersection of three watersheds.

Huronian mineral-bearing rocks are reported to occur in this division.

Lac Seul Division, No. 11.

Many of the islands and shores of the lakes are covered with clay and drift and other drift deposits. The drift area extends easterly to a considerable distance. Country is uniformly a level plateau, partly drift covered, with large areas of swampy country.

The forest growth consists principally of black spruce, poplar and white birch, with occasional red and white pine,

Active mining is in progress in this district. Gold locations are reported. Iron pyrites iron (occurring in a well marked iron belt), and other minerals peculiar to the Huronian.

Lake of the Woods Divisions, No. 12.

The country is generally rolling and covered with areas of sand, occasionally forming ridges. Lakes abound everywhere and swampy tracts of land. Better country than Rat Portage section to the south. The valley of the Winnipeg River would form an easy route towards Winnipeg, in which direction the country slopes gently.

Spruce and tamarack occur throughout the region.

Prospecting for gold and iron has been carried on vigorously for fifteen years, and considerable mining has resulted in numerous enterprises which bid fair to be of value.

The soil throughout wherever present is light and sandy. Numerous swamps or muskegs are present.

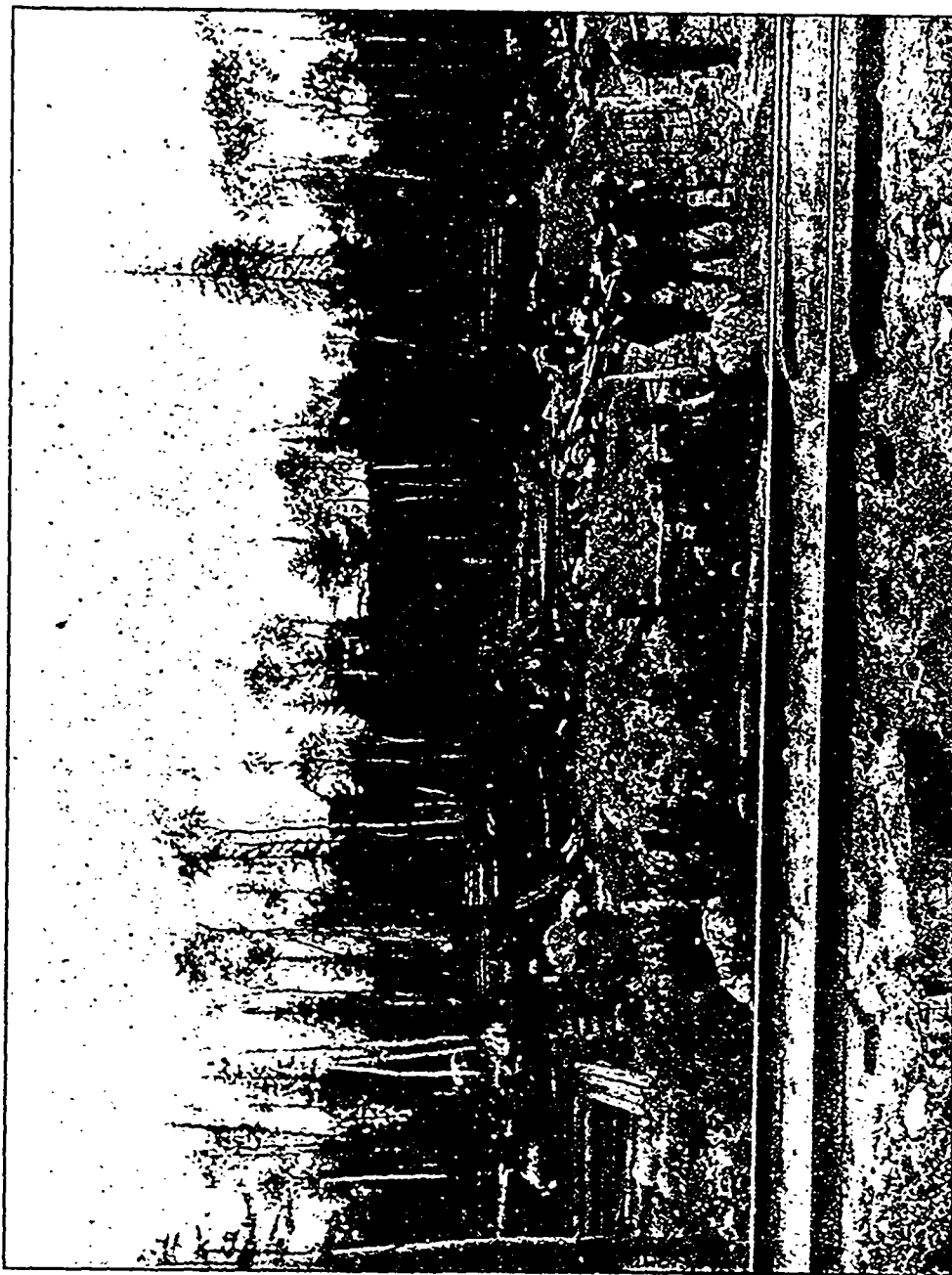
CYANIDE PLANTS AND THEIR EQUIPMENT.

Pamphlets that are issued by firms selling mining machinery are not always very impartial reading; generally they refer in more or less eulogistic tones to the particular products of the firm issuing them. Occasionally, however, one finds that manufacturers have got out of this groove and have put out something that is of general interest and more than a mere sales catalogue. One of the best that we have come across lately is a description of cyanide plants and their equipment put out by the Allis-Chalmers Company, whose Canadian representative is Allis-Chalmers-Bullock, Limited, of Montreal. The introduction to this pamphlet consists of thirteen pages written by a well known mining engineer who has superintended the operation of cyanide plants not only in the United States, but also in Australia and South Africa. Nearly all the classics on the cyanide process start with Elsner's equation and follow a certain well beaten path, so that the treatment of the subject varies but little, no matter who the writer may be. This course has been avoided and the stereotyped method abandoned by the writer to this publication, which should have more than ordinary interest for all who are interested in the extraction of gold from free milling ore. Moreover, it is non-technical and the mine-owner or operator can understand it almost as well as the mining engineer.

The cyanide process is based upon the principle that dilute solutions of cyanide of potassium will dissolve gold and silver under certain conditions, and, while there are limitations to its use, its application has been greatly broadened since the first few years following its introduction in the mining industry, until now the process is one of the most important known to metallurgy. It is particularly adapted to certain classes of ores, which, owing to their low grade character and other features, physical, chemical and mineralogical, are not treatable by other processes, at least on a commercial scale; such ores were, it seems, destined to remain in nature's keeping until the advent of this process, which gives promise of extension to such fields and such ores as were formerly never dreamed of by its most enthusiastic advocates. So it is that we now have a wet chemical process whose practical application is understood and whose position in metallurgy is not only firmly established but is actually threatening the very existence of other and older processes and in many places superseding them.

THE PROCESS INVOLVES FOUR DISTINCT OPERATIONS.

In the simplest application of the cyanide process ore undergoing treatment is first crushed to the proper degree of fineness, and then charged into leaching vats, where contact is had with a dilute



Cobalt Townsite Mine.

solution of cyanide of potassium. When the gold and silver is dissolved, the solution is drawn off the ore through a filter bed, thus clarifying it, and thence conducted to precipitating boxes or tanks (filled with zinc shavings), where the gold and silver is extracted and later recovered in the form of a marketable product or bullion. Thus it will be seen that the process consists essentially of four operations:

1. Preparation of the ore.
2. Dissolving of the precious metal contents by cyanide of potassium solution.
3. Precipitation of the dissolved gold and silver.
4. Recovery of the precipitated gold and silver.

DIFFERENT CYANIDE PROCESSES.

Our remarks so far have been made more particularly with reference to the straight cyanide process; that is, as originally devised. This process has survived nearly all attempts to replace it with something else, and in principle has undergone no changes. Many other so-called methods, which were only modifications of this well-known process, have been launched, tried and have disappeared. They differed from the original only in one thing, perhaps; as, for example, in the manner in which precipitation was effected, the zinc box extractor being replaced by some other means of precipitation; but it is noteworthy that the original process is used almost exclusively throughout the world, nor has its position ever been seriously threatened.

Bromo cyanidation has met with considerable success, but its application is restricted rather to certain sulphotelluride ores, and then its use would depend largely upon a comparison of cost of treatment by this method and the old method of roasting followed by plain cyanidation. Its success, however, has been remarkable in Western Australia where raw ores are successfully bromo cyanided. Its use involves fine grinding, the cost of which, plus the cost of bromo salts and royalties to the patentees, is to be considered.

Precipitation by means of zinc shavings has a fixed place in cyanidation, and no doubt gives greater general satisfaction than could be obtained through any other method proposed, such as precipitation on charcoal, by means of zinc fume, on lead in the electrolytic method, etc. There are instances where special conditions have favored precipitation but the successful issues have been rare.

VARIED METHODS OF PREPARING THE ORE FOR TREATMENT.

The preparation of the ore for cyanidation is accomplished in as many different ways as there are machines used for disintegrating, and the particular class of machinery best suited for any ore will depend upon the physical and mineralogical composition of the ore proposed for treatment.

Preliminary breaking of the ore in crushers or breakers is common to nearly every method of ore reduction, while grizzly bars find valuable use in relieving the crusher of unnecessary work.

After preliminary breaking, one ore may require wet crushing in the stamp battery, another a system of gradual or progressive crushing, by means of crushing rolls, either wet or dry, while certain ores must be crushed in the dry state and then roasted to prepare them for successful cyanide treatment. The degree of fineness to which an ore is to be crushed is a question requiring the most careful consideration and when once determined the method by which disintegration is to be effected is selected; one ore will be found to yield the maximum amount of gold and silver in the shortest time at the lowest cost when crushed to coarse size, such, for instance, as will pass a three mesh screen—and such ore would possess sufficient porosity to allow the solution of cyanide of potassium to penetrate and reach the gold and silver contained everywhere within the largest piece of ore; another ore might lack porosity entirely and will need grinding to such a degree of fineness as will insure contact of solution with the gold and silver.

The extent to which grinding will be carried is regulated, not so much by the amount of gold and silver that it will be possible to save by additional grinding, as by the net results attained, expressed in terms of costs, i.e., the process as a whole must not only be a metallurgical success but a commercially good enterprise, so that costs of achieving a desired end form a consideration of the greatest importance.

THE FIRST STEP.

The first step, that of preparing the ore for cyanide treatment, is one involving considerations that tax the cyanide chemist, the metallurgist and the manufacturer of milling machinery to the utmost, and it will be seen that if the preparation of the ore is not effected in the proper manner at the least cost, the process as a whole, and especially the chemical treatment of the ore, will not give the most satisfactory results.

ORE CRUSHING BY ROLLS.

In the treatment of certain ores, especially of low grade character, where the cost of special treatment of slimes would militate against a commercial success, the ore will be cyanided by the straight-percolation method, the success of which will depend largely upon the absence of interfering slimes.

The production of slimes in crushing must be kept at a minimum; to this end crushing rolls are employed. Progressive or gradual disintegration, of the ore in conjunction with efficient screening is the method which produces the least slimes.

Ores are frequently cyanided at 20 or 30 mesh, and in such case a disintegration would be accom-

plished by preliminary breaking in a Gates Gyratory or other crushers, followed by passage of the material through a set of roughing rolls, the product of which would be screened, with the oversize being returned to same set of rolls and the undersize fed to a set of finishing rolls to be still further reduced in size, thus gradually disintegrating the ore from lumps to the required fineness. After each pass through a set of rolls it is desirable to remove by screening the particles which are fine enough, to prevent their further comminution. Sometimes the ore is made to pass through two, three or even four sets of rolls, as conditions demand.

There are many ores which are most successfully cyanided at the coarser meshes, such as two, three or four mesh. An approved method of crushing an ore to these coarse meshes is by preliminary breaking in a Gates Gyratory crusher, followed by secondary crushing in a Gates fine Gyratory crusher, and finishing in one set of rolls, with screening interposed advantageously.

Crushing rolls and the intelligent use of efficient screening devices, such as revolving or vibrating screens, or both, form an important part in the preparation of an ore that should never be underestimated, even by those who favor stamp battery crushing or other machinery for disintegration. Many ores absolutely demand crushing by rolls and consequently the skilled laboratory investigator will invariably weigh the merits of roll crushing as applied to any ore under examination.

In using rolls either wet or dry crushing may be practiced.

The limit as to fineness in crushing by rolls is usually accepted as 30 mesh in mill practice, with 40 mesh as an exception.

STAMP BATTERY IN CONNECTION WITH THE CYANIDE PROCESS.

The stamp battery has proved a great success in crushing ore for cyanide treatment notwithstanding the fact that it was formerly considered that successful cyanidation depended upon dry crushing. Wet crushing in this was has become a prominent feature in cyanide operations the world over; while in some cases the ore is crushed dry in the stamp battery most generally the work is done in the wet method.

Crushing in dilute cyanide solution is practiced considerably and is claimed to be a favorable factor in treatment, reducing time required and tending to increase the saving.

Where amalgamation is practiced in combination with cyanidation, the stamp battery is ideal for crushing, and with the progress made in the treatment of slimes, the production of the latter is not so much considered a menace to cyanide treatment. Amalgamation is responsible for a goodly share of the combined saving, and this feature is not to be

ignored, especially when it is considered that the results obtained from the single operation of cyaniding refractory ores, raw, might not always be sufficient to justify metallurgical treatment.

THE USE OF HUNTINGTON MILLS.

The Huntington Mill is particularly well adapted for crushing for cyanide treatment, contributes to low working costs and satisfactory savings. It is used extensively for regrinding work, and in addition is very suitable for reducing the product of rolls to size required for leaching treatment. Various sizes of screens may be used, depending upon conditions to be met, ranging from comparatively coarse to very fine.

CHILIAN MILLS.

For high efficiency and economy of operating the Chilian mill has earned the praise of practical mining men.

In cyanide practice this type of mill is sometimes used for reducing ores to 20, 30 or 40 mesh sizes. The mill is suitable for even much finer comminution, being employed frequently in the production of material all of which will pass a screen of 100 meshes per linear inch.

It is claimed for it, that the product of a Chilian mill contains less metal, abraded from the grinding surfaces of the machine, than is the case with any other type of mill, a consideration of importance, more especially when certain chemical processes are used.

FINE GRINDING.

In the early life of the cyanide process the presence of finely comminuted ore in the leaching vat gave rise to all the difficulties characterizing un-leachable ores and the inability to cope successfully with those difficulties at the time, made it imperative that the proportion of fines and slimes approach the minimum possible with any system of crushing, but with the development of the process, and the discovery of successful methods of treating slimes, the same fear of the production of slimes no longer occurs. The fact is the metallurgist now is often confronted with the problem of installing machinery that will accomplish one of the very things he formerly had to avoid—fine grinding.

TUBE AND BALL MILLS.

There are a number of different machines used for fine grinding ore, among them being Tube and Ball Mills, both of which have gained prominence in connection with cyanidation.

In West Australia, in the treatment of raw ores, the method comprehends, in many mills, preliminary breaking in Gates Gyratory crushers, followed by the stamp battery, with subsequent amalgamation and concentration, the tailings of the concen-

trators being separated into three classes, namely: sands for treatment in leaching vats, slimes for treatment in agitators, and comparatively coarse material which is reground in tube mills, so that all would pass a screen having 100 holes per lineal inch or even more, the product approaching slimes and being cyanided with the other slimes previously separated for treatment, in agitators. For this fine grinding, tube mills have given eminent satisfaction.

Another method which is used involves preliminary crushing in Gates Gyratory breakers, the product of which is fed to Ball Mills, working dry and arranged to reduce the material to a state of fines, all of which will pass a 20 mesh screen. The product of the Ball Mill in this case is roasted and subjected to cyanide and other treatment. There are other mills used in the same field, for producing material, but so far none of them have reached the same high state of efficiency as the Tube and Ball Mills.

ROASTING ORES FOR CYANIDATION.

Roasting for cyanidation is a question requiring the consideration of practical experienced cyanide experts familiar with every detail of the art, and it may be recorded that no branch of metallurgy is so exacting, so far as roasting is concerned, as cyanidation.

Cyanide treatment demands that the roast shall convert the ore into such a state as will aid cyanidation, and in nowise hinder it. If the roasting has not been properly done, certain sulphates of base metals present may remain in the roasted product to destroy cyanide of potassium to such an extent as to not only interfere materially with the dissolving of gold and silver but actually defeat the commercial end sought, by reason of the cost of the cyanide consumed.

The roast most generally given an ore preliminary to cyanide treatment is an oxidizing one, while in the case of treating a purely argentiferous ore a chloridizing roast is giving great promise as a valuable aid to cyanidation.

Roasting affects the physical condition of an ore, promoting porosity, as well as changing its chemical constitution; the resultant product should be such as to make a satisfactory saving of gold and silver by cyanide of potassium a matter of easy attainment. Roasting, then, necessarily done at a cost not prohibitive, has to be effected in a furnace built to meet the needs of a cyanide roast, which means, among other things, that the heat must be applied to the ore in its passage through the furnace with particular regard to the chemistry of the operation.

An oxidizing roast must be carried to the point of "dead" roasting, i.e., to as complete an elimination of sulphur as is possible. Most of the oxida-

tion will occur at a dull red heat, and at this stage more or less sulphates of the base metals will form, to decompose which the temperature must be raised to a bright red heat. This higher temperature must be imparted to the ore at the critical moment, and at a point in the furnace removed from that where the oxidizing temperature prevails. This higher heat should be of sufficient intensity only for the decomposition of the sulphates, a still greater heat being liable to cause fusion, in the presence of certain metals.

It might be far better to forego roasting entirely and to treat the ore in a raw or unroasted state than to subject an imperfectly roasted ore to cyanide treatment with consequent prejudicial effect on extraction and prohibitive cost for cyanide of potassium.

BEGINNING THE PROCESS OF CYANIDING.

After the ore is crushed for treatment the important operation of "cyaniding" begins, and if the ore requires no classification, and has been crushed dry, it is at once charged into leaching vats for cyanide treatment. Some ores, however, are so physically made up that when charged into a leaching vat the cyanide solution will not percolate with sufficient rapidity through them to give a profitable saving, owing to the great length of time required for their treatment and in certain cases the passage of the solution is nil; in the earlier life of the process some of these ores were abandoned as unsuitable for treatment and then it was that Cyanogen was said to have been dethroned. The cyanide process was condemned in so many instances, through reasons of this and other kinds, that a rapidly growing faith received considerable shaking, but the believers remained true and the real believers were men of great metallurgical attainment, who, supported by the efforts of the machinery manufacturers, brushed aside the difficulty referred to, as well as many others of greater and lesser importance. As a result, it is now known that if an ore on account of its slimy nature defies treatment by the percolation method, other means are available for its successful cyanidation.

SLIMES NO LONGER FEARED.

In some sections of the world, with many ores, fineness of the crushed product is desired rather than avoided and the suggestion that certain classes of ore be finely ground—reduced to a state of division closely approaching slime—has been received with considerable favor by experts whose efforts have been directed toward the development of cyanide treatment of unroasted ores. However, ores containing both coarse and the regular gradations in sizes down to slimes present difficulties in treatment which render their classification necessary;

the ore is separated into "sands" and slimes, prior to cyanidation, the former receiving treatment in the leaching vats and the latter being subjected to agitation with cyanide solution in agitating tanks, followed by separation of the precious metal-bearing solution from the slimes, usually by either decantation or filter press methods.

SEPARATION OF SANDS AND SLIMES.

Where the slimes exist in prejudicial proportion, as regards percolation, and agitation must form a part of the operations and classification into "sands" and slimes is necessary, the work must be blended in with the task of eliminating the excess water and the charging of the leaching vats, so that the correct proportion of slime will be removed from the "sands" for agitation treatment and no "sands" will reach the agitators. These, when working properly, achieve their purpose with gold ores usually in the maximum time of sixteen hours, and commonly in less time, so that any coarse ore particle finding its way to the agitators would not yield its gold and silver in the allotted time and thus the saving would be impaired.

The instance is not uncommon where the separation of "sands" and slimes is so faulty as to partially reverse the conditions needed for good extraction—where the leaching vat receives an undue proportion of slimes, and "sands" are diverted to the slimes plant, with the result that the respective steps of cyanidation suffer to a degree which clouds the enterprise as a commercial proposition. Such a condition, if the equipment used is what it should be, demands correction at the hands of a cyanide man whose mastery of the details of cyanidation is complete. Classifiers, V-shaped, conical and other shapes find use in this important work, with, perhaps, the spitzkasten employed most extensively.

METHODS OF CHARGING LEACHING VATS.

The methods used for charging leaching vats may be classified as "direct" and "indirect" filling, and a selection of the kind to be employed will invariably be based upon the nature of the crushed ore, the respective merits of the methods for that particular ore and cost of accomplishment, together with results in the way of recovery obtained.

DIRECT FILLING.

Direct filling involves the use of some sort of pulp distributor or a method of distributing the pulp in such a manner as to place the pulp into the leaching vat so that the different sized particles of ore will occupy definitely related positions and thus insure the uniform passage of the cyanide solution through the mass. Imperfect filling leads to the deposition of material some portions of which resist

the passage of solution more than others, and the cyanide solution follows the lines of least resistance, with the result that gold and silver is dissolved only from the ore in spots, thus accounting for low extraction.

Among the appliances used for direct filling in the wet, one of the most successful is that known as the Butters and Mein's Distributor.

There are other distributors and other methods used for direct filling, many of which are giving satisfaction.

INDIRECT FILLING.

Indirect filling comprehends the separation of a crushed product into sands and slimes and water, the settlement of the sands so separated in boxes or tanks suited for the purpose, from which the material is usually removed by hand to the leaching vat, in which the cyanide treatment is to occur.

Both methods of filling have advantages.

FILLING WHEN DRY CRUSHING IS USED.

Where dry crushing is practiced, the material is charged into leaching vats direct by any of the well known means, such as tramping in ore cars or by conveying belts. In dry filling every precautionary measure should be taken to avoid packing of the ore in the vat, which has the effect of retarding percolation, and leads to an uneven passage of solution through the body of the ore.

LEACHING PROCESS.

In the simple application of the cyanide process, in the case of dry crushing, the raw or roasted ore is charged into leaching vats for treatment with cyanide solution. Either at some point in the crushing operation or when the vats are being filled lime is added for the purpose of neutralizing the acidity of the ore. Sometimes an alkaline wash is given the ore in the vat previous to introduction of cyanide solution.

Cyanide solution is introduced into vat either by upward percolation from below the filter bed, or introduced on the top of the ore, or use is made of both methods. Care is exercised that the ore will take the solution without channelling.

After thorough saturation of dry ore, the solution being allowed to stand about two inches above the top of the carefully levelled ore, percolation may be commenced at once, if maceration is not desirable. The working solution is turned on to the top of the ore and the solution filtering downward through the mass is allowed to drain to gold tanks, whence it is eventually conducted to extractors for precipitation of the gold and silver contents.

Various strengths of solution are employed to dissolve the gold and silver, depending upon the ore,

while the time of treatment also varies. The quantity of cyanide solution applied is also variable.

Finally wash water is used to displace as far as practicable the cyanide solution remaining with the mass of ore. Necessarily, this wash must be restricted and is usually such as will preserve the "balance" of solution in the mill.

Solutions are manipulated in accordance with the best judgment of the man in charge and in the way best calculated to yield the highest extraction.

In the treatment of "sands," the only difference in the method just described would be due to filling, the ore being already wet, and percolation with cyanide solution is commenced as soon as the vat is filled and partially drained of the crushing water or solution.

DOUBLE TREATMENT.

Leaching vats are arranged in many plants so that a charge of ore which has been subjected to leaching treatment for a number of days in one vat, may be drained of its solution and transferred to another vat for further cyanide treatment. This is known as double treatment, and its use with many ores undoubtedly results in higher extractions.

The transfer from one vat to another affords aeration of the material, besides rearranging all the particles of ore. The benefit is apparent after a few days' treatment in the second vat.

The vats in which first treatment is accorded are generally superimposed above the second treatment vats. In some plants they are arranged on the same level and the transfer of ore from one vat to another effected by means of mechanical excavators and conveying belts.

THE TREATMENT OF SLIMES.

In the treatment of slimes, after the slimes have been separated from the sands, they are thickened in "V" shaped boxes or conical bottom tanks, when they are conducted to agitators, there receiving a charge of lime or caustic soda to neutralize acidity and subjected to agitation with cyanide solution.

AGITATION.

Agitation may be accomplished in several ways but the most prominent methods in use employ mechanical stirrers or centrifugal pumps, or a combination of both. The centrifugal pump is a later adaptation of the agitation process but has proven well suited to the purpose.

When mechanical stirrers are used, the slimes are agitated by means of revolving arms fitted in tanks, for a suitable period, when the pulp is allowed to drain from the agitator into a well from which it is pumped direct to filter presses in which the gold and silver bearing solution is separated, after which the solution drawn away from the presses may be

clarified and then conducted to gold storage tanks, whence it is allowed to flow to precipitating boxes.

MONTEJUSES.

Montejuses are sometimes used for charging filter presses in place of pumps and by many are considered the more satisfactory. The Montejuses make use of air pressure for raising and forcing the pulp into the presses.

AGITATION BY MEANS OF CENTRIFUGAL PUMPS.

If agitation is effected with a centrifugal pump, the agitation vat is usually constructed with a conical bottom with suitable slope. An orifice is situated near the bottom through which the material may be finally discharged. A centrifugal pump is so connected with the tank that the pulp may be drawn from most any position inside the tank, passed through the pump and elevated to the height of the tank, returning to the same tank at a point close to the bottom, thus establishing a circulation which promotes continued disturbance of every particle of slime and cyanide solution in the charge undergoing treatment, ensuring dissolving of gold and silver in the shortest time possible. After agitation is complete the contents of the agitator are transferred to a similar vat used for decantation.

DECANTATION.

In the decantation tank the solid matter is allowed to settle and the solution is decanted, usually by means of a decanting pipe or hose attached to a float, and conducted thence to the extractor house for precipitation. The decantation vat is then recharged with precipitated cyanide solution or water and the centrifugal pump is put to work and agitation commenced for the purpose of intimately mixing the slimes with the new charge of cyanide solution or water, when settlement is again allowed to occur. This operation is repeated until a satisfactory separation of the gold and silver bearing solution and the slimes has been effected when the residue is discharged and runs to waste.

FILTER PRESSING—ITS SUCCESS IN WEST AUSTRALIA.

The filter press is an adaptation in cyanide work, having been successfully used in other industries. After a series of repeated failures, in almost all of which its attempted use was abandoned, West Australian interests renewed the work of experimenting with, finally, gratifying results. The ores of that section when treated raw require fine grinding to the point of sliming, and the successful work of the filter press makes it possible to practice such grinding.



Cobalt Townsite Mine—No. 2 Shaft.

ITS ADAPTABILITY TO OTHER FIELDS.

The filter press is not restricted to use with sulpho-telluride ores nor confined in employment to West Australia. There are many ores in various sections of the United States and other countries not now being treated owing to certain physical properties which interfere. Many of these could be made to yield their gold and silver contents by cyanide treatment embracing filter pressing.

OTHER METHODS OF TREATING SLIMES.

The filter press as generally known is intermittent in its operation. The cost of installation and expenses of operating sometimes prohibit its use.

Continuous filter pressing in self-discharging filter presses, in combination with replacement leaching therein, is receiving the attention of eminent men in the metallurgical profession. It is claimed that such a method offers all the advantages and scope afforded by leaching tank work besides giving the same economy and higher extraction.

Other methods have been proposed for slime treatment, and tried. One worthy of note made use of a basket of canvas-covered filter frames, which was mechanically immersed in a tank containing the slimes which had been agitated with cyanide solution. Filtration was caused by means of a vacuum. The suction caused the slimes to collect on the filter surfaces in layers or cakes. The apparatus with adhering slimes was subsequently transferred to another tank for washing of the slimes.

Efficiency and economy were claimed for the method. However, the suggestion that the method be improved to make of it a continuous process possessed merit and it is understood that progress is being made in this direction.

Methods other than, as well as, those described herein lend justification for the hope that slimes may eventually be treated less laboriously, at lower working costs and with higher extraction.

PRECIPITATION OF GOLD AND SILVER.

The chemistry of precipitation is very complex, and the chemical reactions that occur in the zinc box are so varied and some of them so obscure and yet so vital to the undertaking that the cyanide chemist is frequently called upon for the exercise of the highest skill.

The manufacturer views the problem more particularly from a mechanical standpoint, thus aiding the chemist through the production of zinc boxes best suited to meet the requirements of the process, minimizing some of the difficulties encountered in precipitation, as well as facilitating easy dressing of boxes with zinc shavings and making the periodical clean-up a matter of great simplicity.

RECOVERY OF PRECIPITATED GOLD AND SILVER.

Various methods of cleaning up zinc extractors and reducing the precipitates to bullion form are in use, and the practice employed at any plant always conforms with the particular ideas held by the man in charge, although some steps in the operation are common to all methods.

Periodically, the precipitates, with more or less zinc are removed from the zinc extractors for treatment, preparatory to final reduction by fire. Usually dilute sulphuric acid is used to dissolve the zinc with which the gold and silver is associated, after which the concentrated mass is conducted to a small filter press for thorough washing to remove as far as practicable the acid and soluble sulphates. Compressed air is then used to dry the precipitates.

The dried precipitates are roasted in a muffle furnace to eliminate remaining sulphates of the base metals, more especially zinc sulphates.

The roasted precipitates are then fluxed, economically, with borax, silica and bicarbonate of soda, and charged into crucibles for fire reduction. In the resulting fusion a slag should be produced that will give a good separation of the bullion.

The recovered bullion will be contaminated with more or less zinc and other base metals, but is usually fine enough to be satisfactory. Refining of the bullion bars on the premises beyond the purification that would result from remelting once or twice, is a question that would depend upon the conditions imposed by the mints and penalties exacted for impurities in the marketed bullion bars.

There are instances where the precipitates are sold direct, without any attempt at reduction in the cyanide plant, to reputable custom refineries. In some of these instances the cyanide managements prefer to forego the operation of producing bullion, often for the reason of difficulties encountered in refining.

Generally, however, the gold and silver extracted in cyanide treatment is reduced to bullion form upon the premises.

IMPORTANCE OF FIRST-CLASS CLEAN-UP EQUIPMENT.

The appliances used in the clean up and bullion department are of such importance that a high grade quality of equipment is excellent insurance against loss of gold and silver.

The slag and old crucibles can be worked over economically on the premises and much of the gold and silver bullion existing therewith recovered; with this end in view, the slag and other material may be crushed and screened and that which passes through the screen treated upon a concentrating table for the recovery of the bullion. The tailings from this operation are generally sold to the smelter.

DISPOSITION OF TAILINGS.

Tailings may be removed from leaching vats by sluicing and this method is practiced invariably when the tailings are to be treated upon concentrating tables for the recovery of some of the precious values that have not been saved by cyanide—such as sulphurets, etc. Sluicing will always find favor where water is abundant, and there is no objection to the tailings leaving the mill site, and where such objection does exist, in some instances, the tailings are impounded within a dam, this rendering sluicing possible.

Conditions for impounding tailings are not always favorable, water for sluicing not always available and in such cases the tailings may be removed from the leaching vats by shovelling by hand or with the use of mechanical excavators. The tailings are either removed in cars or by conveying belts. In a flat topography the conveying belt has the additional advantage of enabling the stacking of the tailings in heaps of considerable height, a task that is performed economically as well.

The residues of filter presses may be handled in any of the ways described.

It is common practice in some mining districts to utilize the cyanide tailings for "back filling" of stopes in the mines, thus turning the refuse material to valuable account, at the same time overcoming the difficulties due to limited storage space on the surface of the property.

COMBINED TREATMENT METHODS.

The cyanide process is frequently used in combination with amalgamation and concentration. The order in which the various processes will be arranged for the whole treatment will depend largely upon the character of the ore.

In some mining districts the ore is first amalgamated and then passed over concentrating tables to remove the sulphurets as concentrates for separate treatment, or shipment to the market for sale, while the tailings of the concentrators are subjected to cyanide treatment.

Another method provides for amalgamation, followed by cyanidation, to be finally followed by concentration of the cyanide tailings.

Amalgamation and cyanidation form a combination most suitable and economical for certain ores, while in the case of dry crushing, with some ores, cyanidation and concentration are used to advantage.

Combined treatment by Lixiviation with hypsulphite to recover the silver and cyanidation to extract the gold contents of ores amenable to such treatment has very strong advocates in the metallurgical field.

Wherever metallurgical conditions demand and net results justify combined treatment will continue to find employment.

CORRESPONDENCE.

THE NIPISSING MINES COMPANY.

Editor, The Canadian Mining Review,
Montreal.

Dear Sir,—

When the July issue of your paper, to which I am a subscriber, reached here I was out of the city, but on my return, on reading the same over, I came across the article on page 4 relating to the Nipissing Mines Company, and a number of the statements therein contained were so at variance with facts known to me that I thought it well to forward the paper to Mr. Earle. Had such an article appeared in some papers we would not have paid any attention to it, but an article of that character appearing in a publication such as that of the Canadian Mining Review we cannot let the same pass, because it is calculated to do a great harm and injustice to those interested in the mines, and I may say that there are a number of Canadians very heavily interested in the same. I will go over certain of the matters which require correction.

1. Mr. Earle did not become interested in these properties for the benefit of himself and some members of the International Company. The fact is that he acted solely for himself when he dealt with the previous owners of these mines, and no person in any way interested in the International Nickel Company had any interest whatsoever in the same and had no knowledge whatever of his dealings. This fact has already been established in evidence given in an action which was brought by the Government with regard to a small portion of the property, which action has since been dismissed. It is quite true that certain persons interested in the International Nickel Company as soon as the value of the mines began to be known approached Mr. Earle and obtained from him an interest in the company, but the Nipissing Mines Company is in no way connected or in any sense governed by the International Nickel Company. I think it was quite reasonable and good business judgment on the part of Mr. Earle to part with a portion of his interest in this property to one gentleman who is a shareholder in the International Nickel Company and whom he wished to interest on account of his wide experience and successful career in practical mining.

2. With regard to your criticism of the flotation of the company, such criticism is in no way warranted by the facts. The capital of the company is \$12,000,000 but only \$6,000,000 thereof was issued in connection with this property and of that you will remember about a million was in cold cash, leaving the properties themselves at practically five million. Last year, as you are no doubt aware, there was a net surplus from mining on a very small portion of the property of over a million, and I, therefore, cannot understand how you can say that it was unreasonable to expect five millions more to be taken out or even several times that amount. The general opinion among experts and men most qualified to know is that the flotation is most conservative. In a word, during one year and from about five per cent. of the territory owned by the company, and at less than fifty feet from the surface, the net profits were almost twenty per cent. of the total issued capital.

3. You make the statement that it is a known fact that at least four of the veins have completely disappeared at a depth of forty feet or less, and the experience of several of the deposits that increased depth has been accompanied by diminished values. The fact is that every vein operated with the exception of perhaps one small one is still being operated to a depth of between sixty and seventy feet with practically the same results as were obtained within a few feet from the surface. It is quite true that at the surface for some few feet, say from three to six feet throughout the camp, that the general experience is that the richest ores occur, but from that point down to where the veins have been worked the results have been practically the same and are to-day good paying veins.

I believe that your desire as editor of the paper you represent is to give to the public facts and I must, therefore, ask you to take the trouble to verify the statements which I have made and to check the statements which you made in your paper and when you have done so then give the facts in your paper to the public.

I understand that Dr. A. P. Low, Mr. T. W. Gibson and Professor W. G. Miller are advertised as special contributors to the Canadian Mining Review. They are familiar with the developments in this camp and we are quite content that they should go over the property and satisfy themselves as to the statements which I am making. If for any reason they do not wish to do that for you, then appoint some experienced expert who is independent of all other mines in the camp and let him report to you the conditions. The Nipissing Mines Company have nothing to conceal. Any statements that they have made are believed to be conservative and all we would ask from you in your paper is fair treatment, and I am sure that you will gladly correct statements which are erroneous in your paper and which have no doubt been supplied to you from an interested source. What I would propose is that when you have investigated the facts you submit the statement to me which you are prepared to publish and I will let you know whether the same is in accordance with the facts or not. Please let me know by return mail what you are prepared to do in this matter, because you can understand that we cannot allow to go unchallenged the statements made in your paper.

Yours truly,

D. FASKEN.

Toronto, Aug. 4, 1906.

[We print Mr. Fasken's letter in criticism of the article on the Nipissing Company appearing in our July issue, and as Mr. Fasken's letter speaks for itself we need make little comment.

As to our statements being at variance with facts, we think Mr. Fasken is mistaken, and has misread our language. Whether Mr. Earle was entirely alone when he acquired the territory is immaterial, as he writes that subsequently certain shareholders of the International Nickel acquired interests.

Our criticism of the flotation is but an expression of our own views; we repeat that to expect a return of so large a capital as \$12,000,000. with adequate interest, is an improbable expectation, although we admit that the property has been very remunerative.

We regret that Mr. Fasken has taken our article as incorrect; if any statements therein are not true nor fair we shall be glad to make the necessary corrections upon proof of our mistatements.—Editor.]

B.C. LEAD PRODUCTION.

Editor Canadian Mining Review,—

Until the lead tonnage can be obtained there can be no large reductions in smelting charges such as have occurred during the past decade in copper reduction, and until capital is invested there can be no proper development of the mines. It is from lack of development, and the presence of zinc, that the lead mines of B.C. are suffering. For the price of lead has so soared that it is now beyond the bounty figure and the silver quotations are higher than they have been for years past. But the low price of lead, and of silver for years has led the lead miners to neglect development, shipping whenever an opportunity was seen to net a little money. This is not the case with all of the mines, of course, but it certainly is with many. But now that better prices have come, and that there is a smelter to which zinc ores can be sent, effective separators which can separate the lead and the zinc, and thus render them both of commercial value, the question naturally occurs, why are not these mines proceeding with their development? Many are, but even in these cases the process is slow; many are not, they require capital. If the same amount of capital were expended upon the lead-silver

properties that is and has been expended upon the copper-gold, there would be an equally good showing. But even without capital the country will get along, though results will not be so immediately apparent.

ALFRED W. DYER.

THE ROSSLAND DISTRICT.

Mr. R. W. Brock, of the Geological Survey, is the author of Preliminary Report, No. 939, on the Rossland Mining District, recently issued by the Geological Survey. In it he says:

Situation and Topography.

"Rossland is situated in the Trail Creek Mining Division of the West Kootenay district, Province of British Columbia, about six miles west of the Columbia river, and five miles north of the International Boundary line. It lies in the central portion of the Western Cordillera, in what has been called its Gold, or Columbian, range of mountains. To the east of the Columbia river, and separated from the Gold range by the Columbia valley, is the Selkirk system. The Gold range, or Columbian mountains, are, as a rule, less lofty and alpine than the Selkirks and in the vicinity of Rossland rarely exceed 7,500 feet in altitude. Here, all the hills below 6,000 feet have easy, flowing outlines, the inequalities of detail having been erased by the Cordilleran ice-sheet. The camp occupies the head waters of Trail creek, which flows east to the Columbia, and the head-waters of Little Sheep creek, which flows southward to join the Columbia below the boundary line. To the west of Little Sheep creek is Record mountain ridge, about 7,000 feet in elevation, forming a local divide. On its slopes Trail creek probably had its rise before these waters were captured by the headward growth of Little Sheep creek. This creek has now notched the transverse ridge from Record mountain, which separates Trail creek from Stoney creek on the north, thereby severing Red mountain (5,150 feet), from Mt. Roberts (6,450 feet), a shoulder of Record mountain. A second gulch to the east of Red mountain cuts it off from Monte Christo and C. and K. mountain, the continuation of this transverse ridge, and leaves Red mountain as a prominent dome. South of Trail creek are Lake Mt. (5,410 feet) and Look-Out mountain (4,420 feet). As a rule, the slopes are gentle, rising, on an average, about 1,500 or 2,000 feet in the mile. Roads may be run almost anywhere. The slopes were formerly well forested, but the demands of the mines and towns, and forest fires have largely denuded the hill sides of their timber. The climate is excellent. The summers are moderately warm and dry, with cool nights, and the winter climate is equable, the thermometer remaining remarkably steady, only a few degrees below freezing. The snowfall is heavy, but the clear air and sunshine and the absence of wind furnish an ideal winter. On the north side of Trail creek and almost at its head, perched on the slopes of Red and Monte Christo mountains, is the substantial city of Rossland, which for natural situation and general characteristics will rival any mining camp in the west. It commands a view of Trail Creek gulch and the Columbia valley 2,000 feet below, of the Selkirk mountains beyond, and of the ranges in northern Washington and Idaho. The elevation of the main street, Columbia avenue, is about 3,410 feet above the sea. The town is well built and is provided with a complete system of water works and drainage, local and long distance telephone, telegraphs, express companies, churches, schools, daily papers, board of trade banks, etc., and all the industries required in a mining and self-supporting community. Ample power for all mining and industrial purposes and light is furnished by electricity, generated at Bonnington falls, on Kootenay river. Two lines of railways connect the camp with the outside world. The Columbian & Western Railway joins it with the smelter town of

Trail, on the Columbia river, and with Robson, Nelson and Boundary district points. At Robson connection is made with Arrow Lake steamers, for the Canadian Pacific Railway main line, and at Nelson with Crow's Nest Pass branch. The Red Mountain Railway unites Rossland with Northport, Wash., 18 miles distant, where the Le Roi smelter is located, which point the Spokane Falls and Northern Railway connects with Spokane. The Kootenay district is remarkably well adapted for gardening and fruit raising, and the camp is well supplied with fruit and vegetables.

History.

"Although lead was discovered on Kootenay Lake (Blue Bell Mine) in the early twenties and was used as a source of lead for bullets by the Hudson's Bay Company, mining in West Kootenay is of recent growth. In the early sixties, a few hardy prospectors came northward, attracted by the rich placers of the Cariboo, and tested and worked some of the local streams for gold. In 1865 the Dewdney trail was completed, from Hope, on the Fraser river, to the placers of Wild Horse and other East Kootenay creeks, passing close by the site of Rossland down Trail creek. In the eighties, some claims were staked in the Boundary district; in 1883, at Ainsworth on Kootenay Lake, and in 1886, rich ore was discovered on Toad mountain, near Nelson. In 1887 the news of this discovery had attracted prospectors, and a trading post was established at Nelson. These discoveries started prospectors along the Dewdney trail, on the lookout for lode ores. The first claim located was the Lily May, on the trail itself. It was discovered in 1887 and located in 1889.

"Although the gossan of Red mountain had attracted the attention of the earlier travellers, along the Dewdney trail, some of whom, as Nelse Demers, had done a little work on it, the values were too low to warrant lode mining in a wilderness with its costly transportation, and development; placer mining, naturally, absorbed their interest. It was not until 1890 that claims were located on the lodes which were to create the city of Rossland and to bring southern British Columbia prominently before the mining and commercial world.

"In the summer of 1890, Bourjois and Morris, who were working on the Lily May, crossed over to Red mountain and located in one day the Le Roi, Centre Star, War Eagle, Idaho and Virginia. These claims were recorded at Nelson, the Le Roi being given to E. S. Topping for paying the \$12.50 recording fees. He secured specimens and went to Spokane, interesting some business men of that town in the Le Roi, and the development of the camp began. The news of the strike brought prospectors, and the Josie, and most of the other claims whose names became so familiar, were located shortly after the first discovery—many in the month.

"Development was for the first few years slow, and the prospects of the camp uncertain. Lack of transportation and the financial panic of 1893 were the chief deterrent factors that nearly wrecked the fortunes of the camp. The first ore sent out of the camp was a small lot in 1891, which was packed to the Columbia river and thence shipped to an American smelter. In 1893, a waggon road having been constructed to Trail, on the Columbia, about 700 tons were despatched. The results were sufficiently reassuring to justify the erection of machinery, and with improved facilities, 1,856 tons of ore, shipped in 1894, returned \$75,510. During the summer the Geological Survey, through Mr. R. G. McConnell, made a reconnaissance survey of the camp. Several of the more important properties were bonded for considerable sums and development was begun in earnest. The following year, the young camp received marked attention. The population rose from 300 to 3,000; railroad and smelting facilities were projected, and from this time forward, developments were rapid. The smelter at Trail, and a tramway to connect it with Rossland and the mines, were begun in October, 1895,

by Aug. Heinze, of Butte, and the first furnace was blown in the following February. In 1896 the Red Mountain Railway connecting Rossland with the Spokane Falls and Northern Railway at Northport, was completed. Then came the inevitable wild boom. The evil effects of a boom are not confined solely to the thousands of dollars squandered in worthless property, the losses sustained by the innocents, and the damaged reputation of the district, but they are manifest in careless work on deserving claims, in a rash expenditure that may for some time survive the boom; in a loss of interest in properties of merit that only require additional work to demonstrate their worth; and in a tendency to maintain prohibitive prices on promising prospects by owners who have purchased during the period of inflation and are not prepared to accept a serious loss, or by owners who, once having experienced the sensation of being millionaires, are loath to accept present conditions, but to prefer to speculate on the improbabilities of the future. Rossland has been called on to pay in full all the penalties attaching to a boom. The phenomenal rise in the value of Le Roi stock, the dividends declared by this company and the War Eagle, and the sale of the latter, to Toronto capitalists, for the reported sum of \$700,000, produced a feeling of buoyancy that afforded every opportunity to the unprincipled boomster and the amateur mining magnate, the public for the time being cheerfully swallowed whatever was offered. The inevitable slump followed.

"In 1897 Rossland had an estimated population of 6,000 and was incorporated as a city. A broad gauge railway was built from Trail to Robson, giving better connection with the Canadian Pacific Railway than was afforded by river navigation along this rapid stretch of the Columbia. Stronger companies were formed to take over and develop promising prospects. In particular, the British American Corporation purchased the Josie, Nickel Plate, Great Western, Poorman, West Le Roi, Josie, No. 1, and Columbia-Kootenay mines. Development work had yielded most promising results. The Le Roi having completed its contract for 75,000 tons with the Trail smelter, erected its own smelter at Northport. In 1898 the Canadian Pacific Railway purchased the Trail smelter and railway from Heinze, and immediately made an important reduction in smelting charges. The British American Corporation secured the Le Roi mine and smelter by purchasing the stock at a price which was said to represent nearly \$4,000,000 for the property. The Centre Star was purchased by Toronto capitalists for \$2,000,000 cash. The construction of the Crow's Nest branch of the Canadian Pacific built through the Crow's Nest coal fields to Kootenay Lake, was an important event for the camp. It meant cheaper and better fuel and coke, and a consequent reduction in cost of ore production and treatment. These reductions brought about a large increase in ore tonnage, with a corresponding diminution in the grade of ore mined. Large plants with the most improved machinery for the economical working of the mines, were installed or planned, and operations on a large scale were projected. The construction of the West Kootenay Power Company's plant at Bonnington Falls, 32 miles distant, was another important event. Electric power was now available for the Trail smelter and the Rossland mines, although full use has not been made by the mines of this most convenient and economical form of power. At the close of 1899, the reputation of Rossland suffered from the sudden collapse in the price of War Eagle stock. This stock had been run up to a wholly unwarranted point, and was held in the hope that new machinery would permit an increased output, with a resultant advance in the stock. Unfortunately the machinery proved a failure, and the stock dropped. A general desire to realize followed and brought about a collapse, with a consequent loss of faith in the camp. In 1901, Rossland again received a set-back, this time in the form of labor troubles, which closed up the mines

for a part of the year. These difficulties were amicably adjusted, but the evil effects of such troubles in discouraging investments are not quickly effaced. By 1902 the mines had resumed their normal operations and on a more business-like basis than before. Although the great number, size and value of the ore shoots in these mines have been proved, and it is known that much lower grade ore can now be profitably worked, this has so far not had the effect that might be expected in encouraging the search for other pay shoots and new veins outside the area already developed. Experiments in concentration were commenced in 1903 and are still being made, and serious efforts are being made to obtain the greatest possible profit per ton of ore.

"The development and progress of mining is reflected in the following table of production:

	Tonnage. (long tons.)	Smelter returns.	Value. per ton.
1894	1,856	\$ 75,510	\$40.69
1895	19,693	702,457	35.67
1896	38,075	1,243,360	32.65
1897	68,804	2,097,280	30.48
1898	111,282	2,470,811	22.20
1899	172,665	3,229,086	18.70
1900	217,636	2,739,300	12.59
1901	283,360	4,621,299	16.31
1902	329,534	4,893,395	14.85
1903	360,786	4,255,958	11.80
1904	312,991	3,760,886	12.01
1905 (estimated)..	295,589	3,750,000	12.70
Total	2,212,271	\$33,839,342	\$15.25

"Shipments by mines to December 31, 1905 (estimated):

Le Roi	1,220,475
Centre Star	417,529
War Eagle	357,814
Le Roi No. 2	173,035
Jumbo	28,422
Iron Mask	17,655
Rossland-Kootenay	12,878
Rossland-Gt. Western	12,331
Velvet-Portland	7,751
Spitzee	6,709
White Bear	5,973
Giant	4,344
I. X. L.	3,500
Evening Star	1,500
Monte Christo	400
Miscellaneous	1,200

"The development work in the four leading mines is now in the neighborhood of 24 miles, and is at present advancing at the rate of about four miles per annum."

(To be Continued.)

THE PLACERS OF CARIBOO.

Among the various parts of the Province of British Columbia which are now attracting the attention of investors none seems to have a brighter outlook than Cariboo—the district which in the first place attracted settlers to the province, says the Cariboo correspondent of the Victoria Daily Colonist.

The vast fields of placer gold are again coming into prominence, and promise to exceed in returns by the use of the improved facilities of the present day the harvests which were gathered in by individual miners in the early days.

The advent of the Guggenheim Exploration Company to the Cariboo district is said to be attended with most important results. It is useless to attempt to estimate the advantages which the province will derive from the introduction of a firm with such world-wide fame as that of the Guggenheims.

In addition to the Cariboo Hydraulic Mines, in which the Guggenheims became so deeply interested last win-

ter, the firm has recently acquired the control of two large groups of hydraulic mines on the Quesnel river.

These include the Spanish Creek group, fronting on the south side of the north fork of the Quesnel river east of Spanish Creek. There are in this group eight placer mining leases.

In addition there is also a large area on the north side of the main Quesnel river about four miles west of Quesnel Forks. This latter group includes the Maud Hydraulic, the Homestake, and others, making up in all 18 hydraulic leases of 80 acres each.

These two groups have been turned over to the Bullion Gold Mining Hydraulic Company, organized for this express purpose.

In order to work these properties there will be water supplies provided for independent of that which will be furnished for the Cariboo Hydraulic Mines. The water supply will be taken from Black Bear creek, Sailors' creek, Goose creek, and Cariboo lake. Involved in this scheme will be about 50 miles of canal. This will be 18 feet wide and 5 feet deep, which will be capable of delivering 5,000 miners' inches for each group.

Mr. J. B. Hobson, the efficient manager of these mines as well as of the Cariboo Hydraulic, has just returned from Cariboo. He was accompanied on the trip to that district by James A. Macdonnell, the railway contractor, who has been engaged on the building of the Nicola railway branch, and J. S. Gzowski, Jr., a well-known engineer.

As a result of their visit a contract has been let for the fifteen miles of canal which is to be provided for the supplying of water for the Cariboo Hydraulic Mines, which were recently purchased and turned over to the Cariboo Gold Mining Company, organized by the Guggenheim Exploration Company. The water will be taken from Spanish Lake by this canal, which will be 18 feet wide by 5 feet in depth. It likewise will be capable of delivering 5,000 miners' inches continuously.

When these canals are all completed there will thus be under the control of the Guggenheims three mines, each having 5,000 inches of water available daily for the washing of gold.

Messrs. Macdonnell and Gzowski will push the work forward, and already there have been ordered two steam tractor excavating shovels to be used on the work. These are on their way from the East now, and will be put at work at once.

There are now 250 men engaged by the company building roads between Bullion and the line of the Spanish Creek canal. A bridge 800 feet long has already been constructed across the south fork of the Quesnel river at the outlet of Quesnel Lake. This is built across the crest of the Golden river canal dam.

The latest improvements in the way of gravitation trains, etc., to be used in the handling of lumber, etc., at a lower cost than at present are being installed at the old Cariboo Hydraulic Mines. It will thus be seen that all is activity in connection with the Cariboo Hydraulic in preparation of the new order of things connected with the installation of an adequate water supply.

The mining company will put in the steel pipe required in connection with the scheme. There will be required about 8,000 feet of 40-inch pipe to deliver the Spanish Creek water to the mines. This will be placed across the south fork of the Quesnel river to connect with the ditches on the south side. Another inverted syphon of steel pipe will be utilized to carry the water across Coquette Pass. The contractors expect to have about six miles of the canal completed before the close of the present season.

Work on the canal system for the Spanish Creek and Maud groups will be commenced early next season. There is, therefore, assured a very large expenditure of money in the Cariboo in installing the plants. The operations afterwards extending over three groups and continuing throughout the whole of the open season will mean the employment of a large staff of men and a material increase of the mineral output of the province.

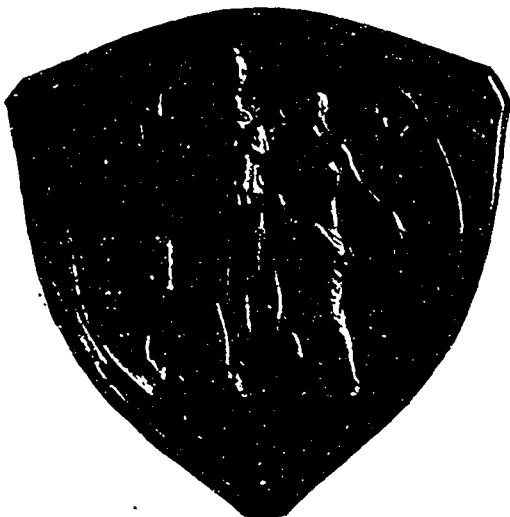
But the Guggenheims are not the only capitalists engaged in developing their properties in the district. Others have been attracted by the latent wealth of the country, and are preparing to extract the golden harvest from the placer fields. Among those who are doing excellent work is Howard Du Bois and family of Philadelphia. Mrs. Du Bois and family are spending the summer in Victoria, while he is actively engaged in furthering his projects in Cariboo. He has interested a company of capitalists in Philadelphia and Pittsburg in a large hydraulic mining property at Twenty-Mile-Creek, on the south side of the main Quesnel river, at Twenty-Mile-Creek, about 20 miles west of Quesnel Forks. Mr. Du Bois is at work with a large force of men exploring the route for a canal.

The secretary of the Slough Creek Company has issued the following notice from the London office to the shareholders: "I beg to inform you that the engines which have been purchased to double the output of water from the mine have now been shipped to the property. The drain tunnel which is being driven with the object of taking any water from the upper gravels has been completed for about 1,500 feet. It is intended to continue this tunnel for another 1,000 feet for the purpose of intercepting any water from the upper part of the valley and so reducing the possibility of this water finding its way to the lower or gold-bearing gravel. This will leave the increased pumping plant free to deal with the water in the gold-bearing gravel, which should thus be more quickly pumped dry."

REWARDED FOR BEING GOOD.

We publish, herewith, reproductions of the gold medal awarded the Canadian Mining Review by the Commissioners of the Louisiana Purchase Exposition, for excellence of printing and production.

In the composition of the obverse of the medal are shown two figures, one of which, Columbia, tall and stately, is about to envelop the youthful maiden by her side, typifying the Louisiana Territory, in the flag of the stars and stripes, thus receiving her into the sisterhood of States. The other figure is depicted in the act of divesting herself of the cloak of France, symbolized in the emblem of Napoleon, the busy bee, embroidered thereon. In the background is shown the rising sun, the dawn of a new era of progress to the nation.



Obverse of the Medal.

The reverse of the medal shows an architectural tablet bearing an inscription giving the grade of the medal. Below the tablet are two dolphins symbolizing our eastern and western boundaries, the whole surmounted by an American Eagle, spreading his wings from ocean to ocean.

On the gold medal there are three distinct corners, each containing a wreath encircling a monogram or emblem, and each of these wreaths is surrounded by fourteen stars, representing the Louisiana Purchase States and Territories. On the Grand Prize design there is the same number of stars in the upper field of the shield, and there are thirteen bars in the lower field, representing the original States. On the design of the silver medal the artist has used the cross of the Order of Saint Louis.



Reverse of the Medal.

The medal was designed by Adolph A. Weinman. The design was approved by a committee composed of J. Q. A. Ward, Daniel C. French and Augustus St. Gaudens.

The dies were engraved and the medals struck by the United States Government Mint at Philadelphia.

INTERNATIONAL GEOLOGICAL COMMISSION.

BULLETIN NUMBER I.

The Commission Recognizes the Following Succession on the Hastings Road.

PNEUMATOLITIC SURFACE EXHALATIONS. "The soul of the Magma."

1. Oxtail Soup.
2. Mock Turtle Soup.
3. Mulligatawny Soup.

The Commission found all these to be stamiferous.
Belt of Cementation.

The same original material may assume very varied forms under the influence of Thermal Metamorphism (see R. Van Hise—A Treatise on Metamorphism, p. 16, 294).

4. Ham and Eggs.
5. Ham and no Eggs.

If the former is rusty it is to be referred to the Grenville Series (A. C. Spencer).

6. Bacon.

Recent analyses by Hoffmann have shown that this contains the molecule B_2O_3 , probably in the form of B_2CO_3 —thus bringing out the close relation of this "Etage" with the igneous intrusions of the Rocky Mountain province, as shown by the work of U. S. Washington.

7. Scrambled Eggs.

This bed shows undoubted evidence of mashing.

8. Baked Beans.

Frequently a source of natural gas.—(Barlow).

9. Kipperd Herring.

10. Chicken.

"Alas! my poor brother."

11. Tongue.

This is an intrusive apophysis.

12. Hard Tack.

Water does not circulate below this horizon, cementation in this being complete and recrystallization well advanced.

Zone of Flow.

13. Cheese.
This shows microbic segregation (compare Cushing "An Investigation into the damified gneisses of the Adirondacks.")

14. Dough Boys.
Closely allied to the Thanet gabbro. Shown by recent investigation to have a high modulus of Elasticity (E) combined with a very low modulus of Shear (C).

15. Cherry Pie.
This although possessing a red streak is undoubtedly pyrite.

16. Non-Cherry Pie.
17. Marmalade.
Rang I.—Keilerose. Sub-rang II.—Dundeease.

18. Tea and Coffee.

19. Moxie.

20. Ice Cream Soda.
This stratum is wanting in the Hastings district, but the committee have reason to believe that it is well developed in the Adirondack area.

21. Cigars.—Cigarettes.—Pipes.

The internal pressure is here so great that the critical point is past and bodies pass into a condition of gas.

INTERNATIONAL MINING CONFERENCE.

In connection with the Third International Colliery Exhibition recently held at the Royal Agricultural Hall, a representative gathering of delegates from mining and allied institutions in different parts of the world was entertained at luncheon by Mr. H. Greville Montgomery, M.P., the proprietor of the Exhibition. The delegates had been appointed to consider the advisability or otherwise of organizing an International Mining Conference to discuss subjects of international interest, especially the unification of statistics, the prevention of accidents, and technical mining matters generally. Amongst the delegates entertained were T. H. Holland, F.R.S., president of the Mining and Geological Society of India, and director of the Geological Survey of India; H. M. Ridge, representing the Australasian Institute of Mining Engineers; and Dr. Juengst and Herr Trippe, representing the Mining Association of Westphalia. Other gentlemen present were Colonel Yorke, R.E., and W. Russell, C.B., secretary of the recent Royal Commission on Coal Supplies, and invitations had been accepted by (amongst others) Lord Allerton, chairman of the recent Royal Commission on Coal Supplies, Sir Lees Knowles, Bart., president of the Institution of Mining Engineers, and Thos. Ratcliffe Ellis, secretary of the Mining Association of Great Britain, who were prevented, at the last moment, attending.

It was unanimously resolved to hold an International Mining Conference in connection with the Fourth International Colliery Exhibition in 1908, and it was further resolved that an organizing committee be at once elected, consisting of the following gentlemen, with power to add to their number:—

J. C. Cadman, President of the North Staffordshire Institute of Mining Engineers (Delegate).

Professor S. Herbert Cox, Delegate of the British Association.

William Cullen, Delegate of the Chemical, Metallurgical, and Mining Society of South Africa.

Professor Dunstan, Director of the Imperial Institute.
W. B. Esson, President of the Civil and Mechanical Engineers' Society (Delegate).

Professor Gowland, Delegate of the British Science Guild.

E. M. Hann, Past-President of the South Wales Institute of Engineers (Delegate).

T. H. Holland, F.R.S., President of the Geological and Mining Society of India (Delegate) and Director of the Geological Survey of India.

James Heppell Marr, Delegate of the Institute of Civil Engineers of Ireland.

T. W. Mitchell, President of the Midland Institute of Mining Engineers (Delegate).

W. H. Patchell, Vice-President of the Institute of Electrical Engineers (Delegate).

H. M. Ridge, Delegate of the Australasian Institute of Mining Engineers.

W. Rowley, Delegate of the Yorkshire Geological Society.

W. Russell, C.B.

Dr. Juengst.

Herr Trippe.

with H. Greville Montgomery, M.P., as Chairman, and Allan Greenwell as Secretary.

Promises of representation and assistance have also been received, amongst many others, from the Directeur-Général des Mines, Belgium; Comité Central des Houillères de France; Association des Ingénieurs sortis de l'Ecole de Liège; and the Société de l'Industrie Minière, St. Etienne.

Letters of approbation have been received from H. Cunyngame, C.B., Assistant Under Secretary of State, Home Department, Edmund J. Garwood, Secretary of the Geological Society of London, on behalf of the Council, Dr. J. J. H. Teall, Geological Survey of the United Kingdom, and Dr. Horne, Geological Survey of Scotland.

All communications should be addressed to the Secretary at the offices (provisional) of the Conference, 30-31, Furnival Street, Holborn, London, E.C.

THE OUTLOOK FOR SILVER.

The uniform steadiness and comparatively high level that have been maintained in the price of silver during the closing months of last year and onward to the present time are without a parallel since 1896, when the average price of bar silver for the year worked out at 30¾d per oz. In that year Russia indulged in an extensive coinage of silver, and the price at one time rose as high as 31 9-16d per oz. From that date, however, prices experienced a steady downward movement, varied by brief rallies, which have redeemed the movement from an uninterrupted decline, but nevertheless sufficiently persistent to almost justify the description on balance as continuous up to the year 1903. The nadir in values was reached in November, 1902, when bar silver was quoted at 21 11-16d per oz. In the following year large purchases on behalf of the Indian Government rescued the price from the abyss to which it had fallen, and, subject to fluctuations from time to time, the tendency has since been gradually upward, until by the end of February of the present year it had touched 30 13-16d per oz. Therefore, between November, 1902, and February, 1906, silver on balance had risen 9½d per oz. in value.

The maintenance of silver at the present level of prices, which has now extended over a period of six months, is due mainly to the buying on behalf of the Indian Government, and also to some large purchases on French account. The consumption by India during this period has been very large. During the current year the exports to India have amounted in value to about five and a half millions sterling, as compared with about two and a half millions sterling for the corresponding period of 1905.

With the figures of the past two years in evidence it would hardly be safe to anticipate a continuance of this large increase did we not bear in mind the strong hoarding instincts of the native Indian, and the fact that the Indian Government continues in the market is evidence that the present demands are not yet satisfied. How long that demand will last, it is impossible to say, and of course it may be suspended at any time; but there are at present no indications of it, and while the requirements of the Indian Government remain unsatisfied they will continue in the market, and consequently support the price of the white metal. Any cessation of that de-

mand will, of course, cause the price to give way; unless other demands arise simultaneously with the present Indian requirements a further rise in the price of silver would probably result.

The question now is, What is likely to be Russia's requirements in the near future? With the completion of the forthcoming loan it is not unreasonable to expect that that country will be a large purchaser of silver for a considerable time, and this is what the market is anticipating. In that event, it is natural also to anticipate that there will be a further increase in the price of bar silver. No doubt this will be the result, given the buying on the part of the Indian Government does not fall off; but that is just what the best informed authorities on the subject are anticipating may happen, in which event it is a moot point whether the present price can be maintained. So far indications point to a slight reaction from that cause, but its probable effect may be fully neutralized by purchases in other directions, not only for Russia, but also for France, which is regarded as a likely large purchaser when the Russian loan is disposed of.—London Financier.

ABOUT PROSPECTORS.

A man may be an expert as a salesman, a wonder at a lathe, or a phenomenon at a plow or a threshing machine, but as a prospector without a full and complete knowledge of rock formation he is as helpless as a babe. The uninformed man fancies to himself that the silver is lying on the ground ready to be picked up by anybody, and all he has to do is simply go into the bush and find it. This picture may seem extravagant but in Cobalt and vicinity it is true to life. All manner of men are here, fixed up in shoe packs and conceit who are wandering through the bush who do not know the difference between lower Huronian formation and granite. They have heard that silver veins make their abode in cracks in the rocks, so to them it does not matter whether the crack is in syenite or limestone; they devote their energies to probing every crack that shows its nose. That geologists have devoted years of patient study and exploration in order to definitely locate minerals and give their experience and observation to the public, this amateur prospector may never have known, or if heard of, he considers as of no importance at all and pits "luck," as they call their ignorance against science. In time their enthusiasm and their spare cash wanes and grows beautifully less and they leave for their former home and loudly declare "there is nothing in the country." Before a man can prospect with any chance of success, he should take a course of training in a mine where his every day labor will teach him the lessons he must know. Theory is all very well in their place but theories have no place in the location of a silver vein. Practical work in a shaft with drill and hammer will give a man practical insight into rock formation which is absolutely necessary. This is the practical school of science that knock theories sky high. A man cannot be a successful prospector in a minute or by inspiration. He must have knowledge of rock formation and must apply that knowledge. Without this, mere wandering in the bush is like carrying water in a griddle.—Cobalt Free Press.

A FIGHT FOR A MINE.

A motion was heard by Master-in-Chambers Cartwright, on July 31, that involves the title to a silver mine said to be valued at something like \$750,000, situated in the Township of Coleman, District of Nipissing, being the south-western part of lot No. 3, sixth concession.

Messrs. Arthur G. Browning, W. M. Boulton and John Ferguson made an application that in the suit brought against them by Charles F. Hanson the writ of summons should be set aside, that \$1,000 as security for costs should be furnished, and demanding that his suit proceed to trial in the non-jury sittings.

While Hanson described himself in the writ as a resident of Toronto, they stated he was a resident of the United States, and was going back there.

Hanson brought suit in May against the defendants named. He asked for a declaration that the mine is held in trust for him, in pursuance of an agreement between himself and Murdock McLeod, George Glendenning, and Arthur G. Browning. He asks for damages for breach of contract, for an injunction preventing the disposition or the working of the mine, and to prevent those named from trespassing on it, and for an order for possession of the same.

The defendants to this suit claim that Hanson agreed to buy the mine for \$250,000, but that he was to put up \$15,000 before a certain date in May last, which he did not do. Therefore, they said, he lost his equity in the property. They contend that his present suits tie up the mine, when they have a chance to turn it over and sell it.

Hanson's counsel claim that when the property was mortgaged that a payment of \$15,000 was made by the mortgagees, to be applied as a payment by Hanson, and that nearly \$30,000 more was paid. Hanson brings a suit of the same nature against five others—L. H. Timmins, John McMartin, Noah Timmins, Duncan McMartin, W. E. Dunlop, all of Cobalt, or Haileybury.

The motion was adjourned to allow of the examination of W. F. Boulton.

B.C. LICENSES VALUELESS.

"It must be treated as a document without statutory validity."

With these words Mr. Justice Duff consigns to the waste paper basket licenses to prospect for coal and petroleum for which the Government of British Columbia has received \$50,000 in hard cash from men who, even yet, probably in the majority of instances, are not aware that they have purchased with their good money the James Bay equivalent of the gold brick, says the Vancouver "World."

The judgment of Mr. Justice Duff is of a most sweeping character and completely disposes of at least this attempt to govern by order-in-council. It is summed up in the words quoted at the head of this article. The powers of the Governor-in-Council are limited, says his Lordship. The order purported to be made under the Coal Mines Act is really ultra vires. The licenses granted by virtue of that act have no statutory validity.

As already stated, the Government has taken \$50,000 from innocent prospectors for these utterly useless pieces of paper, and this at least should be returned forthwith to the men who paid for them. It is money received for which absolutely no value has been given. The matter, however, does not end here, as men who have staked and worked properties in good faith now find that they have no valid title to them, and that any man who comes along with a regular license may take possession.

THE CONSOLIDATING MINING AND SMELTING CO.

The directors of the Consolidated Mining and Smelting Company, of Canada, Limited, have declared a dividend of 2½ per cent. for the quarter ending 30th June, 1906, payable on the 1st of August, to the shareholders of record on the 23rd July.

The following is a statement of the operations of the company's smelter at Trail, B.C., for the month of May, and for the five months ending 31st May, 1906:—

	May.	5 months.
Tons ore received	30,318	148,155
Tons ore smelted	25,398	134,195
Metals produced—		
Gold, ozs.	10,221	54,387
Silver, ozs.	205,563	1,007,524
Copper, lbs.	356,343	1,949,083
Lead, lbs.	2,880,600	13,716,000
Total gross value	515,231	\$2,608,362

JAMES CRONIN, OF THE ST. EUGENE.

Thirteen years ago last month James Cronin, in company with Father Cocola, and an Indian named Peter, staked the St. Eugene property, says the Moyie Leader. Then the work of converting the prospect into a mine was begun. There was no railroad, no Moyie, no Cranbrook then, and every pound of grub and supplies had to be packed from Fort Steele, thirty miles away. Cronin and Pete Olson comprised the first working force. They each took turns at holding and hammering the drill, as well as doing the cooking, sharpening the steel, etc. Then payday would come and Cronin would pull a roll of bills from his pocket, and pay Olson for his month's work. There were no labor troubles in those days. Then the force was increased, and Peter Lynch, W. P. White, Wm. and James Mills, the Hamilton boys, and John Bakke were hired. White is now superintendent and Bakke is a foreman.

After thirteen years of continuous management, Mr. Cronin has tendered his resignation, which the company has reluctantly accepted. Mr. Cronin took the St. Eugene when there was nothing but the cropping of a ledge. He leaves it the second largest silver-lead mine on the American continent, and he has made for himself a reputation as a mining man that anyone might envy. Not only that, but he has accumulated a considerable fortune.

Thursday he was arranging his fishing outfit, had two of his dogs tied, and was ready to go on a trip with I. C. Drewry, to the Old Man river in Alberta, when a representative of the paper called on him.

Mr. Cronin's family is living at Spokane, and Mr. Cronin will spend most of his time there.

PERSONALS.

Hon. Wm. Templeman has been given charge of the Department of Mines at Ottawa.

Mr. J. B. Hobson, manager of the Cariboo Consolidated Mining Company, accompanied by Mrs. Hobson, are spending a few days in Vancouver.

Mr. A. G. Campbell, of the Brown Alaska Mining Company, accompanied by Mrs. Campbell, are visiting Mr. and Mrs. R. S. Byrn, 110 Vancouver street.

After thirteen years of continuous service, Mr. Cronin has tendered his resignation as manager of the St. Eugene, which resignation the company has accepted.

Mr. A. C. Cole, late geologist of the Centre Star, Rossland, B.C., recently received a presentation service of plate, when leaving. He has removed to Cobalt.

It is understood that Prof. W. C. Baker, of Queen's University, has been appointed by the Ontario Government as assistant mining inspector of the Cobalt district for the season ending October 1.

Mr. A. E. Barlow, lithologist of the Geological Survey, has resigned that position to accept a more lucrative situation with a German mining syndicate operating in Canada. Mr. Barlow is now on his way to Europe.

Mr. W. C. Thomas, superintendent of the Dominion Copper Co.'s Boundary Falls smelter, visited Franklin camp, last month, in company with George A. McLeod, and made an examination of the Maple Leaf group.

Prof. F. Hille, who has been engaged in the eastern portion of New Ontario, for the past few weeks making an inspection of iron ore deposits for the Dominion Government, has left for a trip through the western portion of the same district.

Mr. H. A. Guess, M.A., a graduate of Queen's School of Mining, who has been manager of the Silver Lakes mines at Silverton, Cal., is about to return to Cananea, Mexico, as superintendent of reduction for the Cananea Copper Company.

Mr. J. H. Rogers, traffic manager of the White Pass & Yukon Railway, left Victoria a few days ago for Dawson. Mr. Rogers has lived in the Yukon for the past six years as general agent at Dawson, and as traffic manager, with headquarters at Fairbanks, for the past two years.

Mr. A. C. Cole, late engineer and assayer of the War Eagle and Centre Star mines, of Rossland, B.C., has accepted the position of expert mining engineer to the Temiskaming & Northern Ontario Railway Commission. Mr. Cole will decide the value of ores on all the mining leases controlled by the Commission, and his decision will be final.

Alfred Beit, the well known South African financier and mine owner, died on July 16, in London. He was a life governor of the De Beers Consolidated Mines, a partner in the firm of Wercher, Beit & Co., and a director of the Rand Mines, Rhodesia Railways, Bechuanaland Railway Trust, Consolidated Company, Bullfontein Mine, and British Chartered South Africa Company. His wealth has been estimated at 125 million dollars, but it is not thought he left anything approaching that sum.

Charles Addison Bragg, District Office Manager of the Westinghouse Electric and Mfg. Company, Philadelphia, Pa., died at that place on Sunday, July 29th, after an illness of over two months' duration. Mr. Bragg was one of the pioneers in the electrical business, he having been associated with the United States Electric Lighting Company as early as 1882. His connection with the Westinghouse Electric & Mfg. Company began in the year 1889, when he was made manager of the Philadelphia office, which position he filled successfully up to the time of his death. He was 56 years old.

Mr. G. H. Robinson, of the Britannia Mines, B.C., died recently in New York. He was one of the best known mining men on the Pacific Coast. He had not been in good health for several months past. Prior to going to the coast deceased was for a long time manager of the interests of Mr. August Heinze in Montana. In all the sensational fights that Mr. Heinze had in connection with his mining interests Mr. Robinson was identified. He was a mining engineer of national repute, and was admitted to have been at the head of his profession for years, and one of the best experts on copper mining. Besides being interested in Montana, he had extensive mining interests in Utah and Mexico.

E. D. Sowden, secretary-treasurer of the Northern Development Co., of Detroit, visited Port Arthur recently with a party of Americans, most of whom are interested in the company's mining claims, and properties in the Wabigoon district.

The following composed the party:—

H. S. Ayers, Detroit; O. S. Sturtevant, Adrian, C. H. Willson, New York; G. E. Newald, Fluct. M.; G. O. Wright, Adrian; M. Frole, Toledo; J. H. Doherty, G. Winters, Detroit; C. E. Haynes, W. A. Smith, W. Clement, F. O. Bray, Adrian; F. H. Clarke, R. Strolmes, W. F. Elliot, M. S. Wain, Detroit; A. Bradley, S. D. Drewry, Cincinnati, O.; A. H. Reeder, Dayton; J. R. King, Md.; E. D. Sowden, Detroit; D. W. Bliss, Toledo; H. W. King, Adrian; A. L. Johnston, R. J. Elliot, Detroit; H. R. King, Chicago.

Mr. E. W. T. Gray, who has for years been manager of the New York sales office of the Westinghouse Electric and Mfg. Company, resigned recently to take up commercial work in another field. Mr. Gray's decision to sever his connection with the Westinghouse Company

was received with great regret by the management, he having been one of the pioneer employees of the company. Mr. Gray began his work with the Westinghouse Company about the year 1890. In 1898 Mr. Gray received the appointment of manager of the New York office.

Mr. W. C. Webster, who succeeds Mr. Gray as manager of the New York sales office, has a broad general knowledge of the company's commercial policy. Mr. Webster entered the employ of the company in 1898, and has always been identified with the sales department.

MINING NOTES.

The new tungsten ore deposits near Porte Alegre, South Brazil, are stated to have been acquired by manufacturers of tungsten salts in Hanover, Germany. These deposits are extensive and rich, analyses running over 70 per cent. tungstic acid. Equally interesting is the announcement that the Wolfram Lampen Company, Limited, of Augsburg, Bavaria, will utilize the Just-Hanamann patents for the manufacture of tungsten filaments for electric lamps.

NOVA SCOTIA.

Hematite has been found at Logan's Glen, by the Canadian Mining and Development Company, near Whycomagh.

The only crushings reported to the Department of Works and Mines of Nova Scotia during the month of June were:—Lake Catcha District, J. H. Anderson mill, during May, 30 tons crushed yielded 31 ozs. 9 dwt. 0 grs. Mount Uniacke District, J. A. Crease mill, during May, 11 tons crushed yielded 29 ozs. 12 dwt. 0 grs.

During the month of June some nine hundred gold mining areas were applied for in Nova Scotia under lease and license as per summary below:—

District.	Areas.	District.	Areas.
Oldham	2	McKay Settlement .	21
Vogler's Cove.	6	Leipsigate	7
Whiteburn	12	Cow Bay	11
Montague	32	Miller's Lake	72
Barrasois	18	Salmon River	18
Somerset	110	Scraggy Lake	6
Fifteen Mile Brook.	10	East Rawdon	145
Stormont	64	Gold River	73
Renfrew	49	New Canada	8
South Branch, Upper		Lochaber	14
Stewiacke	103	Brookfield	44
East River, Sheet		Port Hilford	20
Harbour	12	Ovens	13
Earltown	15		

QUEBEC.

For three or four weeks past the iron mines at Ironsides, near Hull, which have lain idle for more than 25 years, have been the scene of considerable activity. Borings with diamond drills are being made to a depth of 400 feet, with a view of testing the possibilities of the mines. Sir William Logan, at one time Dominion geologist, declared that there should be one million tons of ore in these mines.

The mineral discoveries in the northern part of Quebec Province are stimulating the activity and enterprise of the Quebec and Lake St. John Railway.

Mr. J. G. Scott, managing director of the undertaking, states that \$10,000,000 has been secured under satisfactory conditions, to build the proposed extension from Roberval to Port Nottaway on the James Bay. He believes that large traffic will arise from the asbestos, gold and other mineral deposits.

This extension would mean an addition of 380 miles, which would not, of course, be undertaken at once, but

if the mining development in the Lake Chibougamou county produce the results expected, some 180 miles of the line will be built in the near future.

ONTARIO.

The Rosa Blanda gold mine on the Atikokan river has been sold to Americans.

Mr. W. A. Cockburn, of Sturgeon Falls, has made a discovery of rich iron ore in the township of Kirkpatrick, two miles from the Canadian Pacific railway south of Verner station, and about twelve miles from Sturgeon Falls.

An important mining deal was closed by the sale of the White Lily mine, in the Atikokan gold range, which Col. Baltimore bought from Messrs. Manion & Murphy 200 acres for \$30,000. A \$10,000 plant will be put in at once.

COBALT.

Machinery is now in course of erection at the Edison mine, near Trout Lake.

The Star Mining Co. (known locally as the Nova Scotia), shipped a considerable quantity of smaltite-silver ore during July.

The Silver Queen, which is shipping a carload of ore has nearly completed its plant, the boiler and engine having been installed.

The Nova Scotia, which has been adding to its conveniences in sections, is completing its plant and may be said to be fully equipped.

Very large quantities of ore are stored at the various working mines, awaiting the time when the Canadian smelters are ready to receive it.

The Silver King mining claim immediately east of the Nova Scotia property, is being actively developed. At present there is a force of twelve men at work.

It is reported that negotiations for the purchase of the Violet mine are in progress at \$175,000, and it is hoped that active mining operations will be in progress very shortly.

Discoveries of smaltite in a gangue of calcite have been exposed in lots 2 and 3 Con. X, Lorrain township, and opening up and further prospecting are in active progress.

Native silver has been discovered on the Quebec side of Lake Temiskaming, in Fabre, Pontiac Co., but so far insufficient development has been done to demonstrate actual values.

Prof. W. E. Hidden, F.G.S., states that he has discovered the presence of polybasite in veins in the Cobalt district, thus adding another rare mineral to the thirty odd known to exist in this camp.

Development on the Beaver Mining Company's property in Con. 3 of Coleman is showing up a high grade body of native silver bearing ore. This property is controlled by Montreal gentlemen.

A four-inch vein of smaltite has been uncovered in Bucke township, immediately at the head of Sharp Lake. The claim is owned by the Silver Ledge Mining Company, and development is in progress.

The T. & N. O. Railroad Commission have leased the mining rights of the right-of-way to a syndicate of Ottawa men. It is stated that a bonus of \$50,000 was paid, and all ore mined will be subject to royalty.

The De Forrest wireless telegraphic station at Haileybury is nearing completion, and New Ontario will be brought nearer civilization than even the most sanguine enthusiast could have imagined a year or so ago.

It is reported that the McLeod & Glendenning property has been purchased by a syndicate composed of the owners of the La Rose mine—Messrs. McMartin, Dunlop & Tinmins—Messrs. John Ferguson, Boulton and others.

The work of partially draining Peterson and Cart Lakes is rapidly proceeding. A new ledge was discovered on the shore of the former at the end of July, which is stated to be one of the richest in native silver, in the district.

Dr. Drummond and family are spending the summer at their new residence at the Drummond mines on Kerr Lake. Diamond-drilling and development work are in successful operation, and further shipments of ore were made during July.

The McKinley-Darragh-Savage has installed a boiler, engine and compressor plant, which some people expect to see in operation within a week; but as this company conducts its operations with great secrecy it is difficult to predict when the plant will be in operation.

Prospecting parties returning to Haileybury and locality, from the Quebec side of Lake Temiskaming, state that they have located quartz veins, which pan gold in fair quantity every sample. As to whether there are any deposits of economic value still remains to be proven.

It has been rumored for some time that the Canadian Pacific Railway has its eyes upon the Timiskaming district and it is generally believed that the recent application for a charter to build a railway from Fort Timiskaming to Haileybury, was advanced in the interests of that corporation.

The King Cobalt Mining Corporation property on the west side of Cross Lake is being energetically prospected. A tunnel has been driven 146 feet into the hill, and is still being continued. One vein was struck about eight inches wide, and this is now being drifted upon. Values up to the present do not run high.

The Montreal-Cobalt Mining Company is operating on a 107-acre tract on the south side of the Montreal river and immediately next to the noted Gillies' limit, which the Government has withdrawn from location with a view of mining the area on its own account, if it does not conclude to lease the territory.

A compressor plant has been installed at the Silver Leaf, and the property is to be further prospected underground by cross-cut from the main shaft, in the most expeditious manner. Superintendent Clark is pushing the work ahead as rapidly as possible, and states he will be able to ship within six weeks.

Mr. A. C. Cole, late engineer and assayer to the War Eagle and Centre Star mines, Rossland, B.C., has been appointed expert mining engineer to the Temiskaming & Northern Railroad Commission. The duty of sampling and valuing for royalty purposes all ore mined on the Commission's leased properties will fall to his lot.

Government Commissioner Price sat during July at Haileybury hearing the various mining disputes, arising out of "discovery or no discovery," and in regard to other matters. The amount of litigation in progress is much to be deplored, and is undoubtedly proving a serious drawback to New Ontario's mining development.

Development at the working mines is steadily increasing and several properties report new discoveries, both on the surface and underground. Near Ledge No. 26 on the Nipissing Company's property a new vein has been uncovered, showing high values in silver. This is the second find within a few feet, during the last fortnight.

Considerable anxiety is being caused in the town and district by the appearance of typhoid fever. The long expected supply of pure water from Clear Lake has not put in an appearance, and the supply of spring water has dwindled to a mere trifle. The springs have run dry in many cases, and in others the water supply is full of disease germs.

The new hydraulic plant on the Nipissing property has already justified itself. One large smaltite ore body has been exposed near the shore of Peterson Lake, as also has a small vein, running high in native silver. New boarding and dining camps, which will accommodate up to 300 men have just been completed, and the development of this company's property is fully in proportion to its acreage.

The Temiskaming & N. O. Ry. engineers are surveying for a spur line from Cobalt to Kerr Lake. This will run round the south end of Cobalt Lake through the McKinley & Darragh, & Nipissing Coy.'s properties. It is hoped to have the line completed during the coming winter. Speaking generally, the railroad engineers are much to be congratulated on the condition of the road-bed on the main line. It is in excellent shape.

A new strike of valuable ore was made recently on the east shore of Lake Sasaganagi, on ground just west of the Trethewey mine, and operated by the Amalgamated Mines Company. The territory has not been regarded as surely productive heretofore. The vein is about two inches wide on the surface; but as the outcrop has not been blasted or trenched it is difficult to forecast the length or value of the discovery.

Forest fires are raging throughout the Temiskaming region from Temagami to Englehart. The country is dry as tinder. A protracted drought has prevailed and thousands of prospectors are in the woods, many of whom are careless. Further north settlers are making clearings and they, too, are frequently indifferent to fire possibilities.

Down at Gillies Depot the men have been fighting to save the buildings. For several days, in fact for weeks, bush fires have been raging up the Montreal River.

Work is progressing rapidly at the Jacobs mine at Kerr Lake, now that all the new machinery is in place. In reference to the new discovery made last month two items are of particular interest. The vein cuts the Huronian and diabase contact almost at right angles, and is well defined and high grade in both formations. Dyscrasite or antimonial silver is present in massive form, at one point being 11 (eleven) inches in width of practically pure mineral. This adds another to the list of comparatively rare minerals discovered in the Cobalt camp, and is all the more interesting on account of the massive form in which it occurs.

Gasolene launches are now carrying prospectors and tourists for 35 miles up the Montreal River from Latchford, with one change of boats at the first rapids. Latchford is becoming quite a little town, under the influence of the mining development. So far no silver in quantity has been discovered up the Montreal River. Cobalt Bloom is plentiful, but veins are not to be found in any number. One about two inches wide near Iron Lake, a mile N.E. of Portage Bay, is rich in native bismuth, and another, near Front Lake, on the borders of Timagami forest reserve, shows about two feet of calcite heavily shot through with smaltite, this latter is perhaps the best in the particular locality.

During the last month the reported discovery of gold, both in quartz and as placer, near Lake Opasatika on the Quebec side, attracted great interest throughout New Ontario, and several parties left Cobalt, Haileybury and New Liskeard, for the "New Eldorado." Undoubtedly many handsome specimens of visible gold in quartz influenced the more speculative individual—but on the return of the various parties without even a "color," the anticipated rush has been checked.

Gold undoubtedly is present in the various sand bars, and quartz veins are plentiful—most of which pan gold—but not in paying quantities, and the discovery of a "New Klondyke," as it was locally called, is still a question of future prospecting effort.

The latest discovery at the Foster mine is not only interesting from a geological standpoint, but should (among others) prove an object lesson to those who are in favor of "discovery" as opposed to continuous "working conditions." From the forty-five foot level in one of the shafts a cross-cut for underground prospecting purposes, disclosed a vein upwards of eight inches in width, carrying high values in native silver. No indications of the same can be found on the surface—which had been stripped some time previously—as to either vein or value! Comment is unnecessary. Upon another vein on the Foster property, high values in native silver are found in the country rock, outside the vein proper for a distance of two feet; in point of fact the mineral is perhaps more plentiful outside the gangue than in it. There is a large quantity of ore of the highest grade in silver bagged up, awaiting the decision of the directors to ship.

Six miners have been arrested for stealing ore from the mines and disposing of it to jewellers and souvenir vendors, who make it up into pins and other articles. It is thought the thieving has been going on for months and that the mine owners have been robbed of thousands of dollars' worth of silver. The Mine Owners' Association have been aware of the operations of some of their employees, and applied to the Noble Dominion Detective Agency of Toronto to send a man to establish a system of espionage. The detective went down into the La Rose mine, where much of the ore is pure silver, and chummed it with some of the men, who informed him he could make hundreds of dollars a month out of the business of selling nuggets to the jewellers. He was also informed that there was a man in Toronto to whom he could dispose of the stuff.

Acting on the information gathered by the detective, the mine owners decided to search the bungalows of the suspected men. In some cases trunks full of valuable ore were discovered. The officers also located some of it hidden in the woods.

Advantageous bargains for the lease of mineral-bearing lands were closed by the Temiskaming & Northern Ontario Railway Commissioners at a meeting held on July 18. Eight Ottawa gentlemen, who had not yet formed a company, secured the right to develop the portion of the railway right-of-way other than the track allowance, between mileage 101 and 105. This extends two miles to the north and south of Cobalt. The northwest 40 acres of the Cobalt town site has also been disposed of on somewhat similar terms to those exacted for the southwest 37 acres a little while ago.

The parties who have acquired the right-of-way will pay to the Government Railway a bonus of \$50,000, while the purchasers of the northwest 40 acres will contribute a bonus of \$22,000. All will pay royalties while the 999-year lease is in force. These will be figured out at 10 per cent. of the gross value at the mouth of the mine of all ore mined assaying less than \$400 a ton; 25 per cent. when the value is between \$400 and \$1,000 a ton, and 50 per cent. when the output assays over \$1,000 a ton.

Prof. Miller is still pursuing his topographical and prospecting work in the Gillies timber limit. At the writer's last interview with him the Prof. stated that the veins so far discovered were small (with exception of one six in. in width of solid smaltite, near Cart Lake), and carrying but little silver, and the prospecting part of the enterprise does not at all seem to be equal to expectations.

It is generally conceded locally that the Ontario government will not carry out their original intention of mining the Gillies limit for the benefit of the ratepayers of the province generally.

A good suggestion—meeting with general favor in the district—was put forward at one of the recent meetings of miners and prospectors in regard to the method of dealing with the mining rights of this much discussed limit, viz.: That when the same are disposed of by the government no bonus should be asked, and that tenders should be upon the basis of royalty only, thus giving the poorer prospector or miner a more equal chance of acquiring a portion of it.

A showing of smaltite and native silver has been exposed on the G. W. Lawson claim lying N.E. of the Drummond mines. This property must not be confounded with the "Lawson" mine which has been and still is the subject of so much regrettable litigation.

ALBERTA.

The Canadian Pacific is making a test to ascertain whether or not there is oil underlying the natural gas field at Medicine Hat.

Nine carloads of drilling machinery arrived at Medicine Hat, consisting of a cable drilling outfit, and drill pipes of various diameters. The drill is a modern one and is capable of fast work, and will be the first cable-rig to work in this field. The greatest depth that has been reached in this field is 1,010 feet, where there is a tremendous flow of natural gas, and if necessary 2,500 feet deeper will be sunk. This test should certainly ascertain what is below and the result of the test, if oil is found, will mean as much to Medicine Hat as the great gas find of a few years ago.

The work will be in charge of Mr. Eugene Coste, while the drilling will be in charge of Mr. Gunter, who has been doing the gas drilling at Edmonton. It will be necessary to start drilling a fourteen-inch hole, and work down smaller from that diameter. The well will be drilled on Bull's Head Creek, about three miles from Medicine Hat.

BRITISH COLUMBIA.

Mr. A. J. McMillan, managing director of the Le Roi Mining Company, has arrived in Rossland from London.

The Pine Creek Power Company, Ltd., Atlin, put off a very successful shot in their No. 1 pit. Some 1,500 pounds of powder were used.

It is said the Granby Consolidated Mining & Smelting Co., of Grand Forks, have closed a contract with the C.N.P. Co., of Fernie, for a full supply of coke to fill their requirements for the next three years.

The Whitewater mill in the Boundary district is running full blast again after having been shut down for many years. S. S. Fowler and associates are operating the Whitewater and the Whitewater Deep under a lease.

Mr. E. M. Hand, of the Ymir, has been in Nelson, engaging miners. Work has been begun on a 2,500 foot flume that will be completed within the next 30 days. Not being able to obtain sacks for shipping the ore, Mr. Hand is having the output placed direct on the cars. About 90 tons daily is being treated at the mill.

The Vancouver Syndicate, who own the Imperial Limited group on Gold Gulch, Gainer Creek, Lardeau, will work the property all summer. The stripping has

uncovered a fine lead six feet in width, carrying galena and carbonates of a shipping value. The work to be done this summer will consist of driving a crosscut tunnel for about 125 feet.

Important changes in the management of the Canadian Metal Company, have taken place.

Mr. S. S. Fowler, M.E., of Nelson, has been appointed resident manager.

Mr. F. W. Rolt retires from the position of secretary and is succeeded by Mr. J. E. Harrington.

Managing Director Riondel and Secretary Harrington will leave for Paris shortly, and in their absence Mr. Fowler will have full charge of the company's operations.

A \$10,000 clean-up by the Société Minière de la Colombi Britannique on Boulder Creek, Atlin, B.C., augurs well for the present season's operations being the most successful in the history of that company. During previous seasons the company confined their energies to the handling of the gravel in the bed of the creek with only moderate returns. This year, however, under the direction of T. Obalski, M.E., the operations have been carried into the southwest bench of the creek where, with the re-arrangement of both flume and piping plant, a large yardage of gravel has been removed with most satisfactory results. The above amount was secured from the three upper boxes of the sluice and is taken as conclusive proof that the company is opening up rich ground.

The task of deepening the shaft of the Le Roi from the 1,350 foot level has been begun. The winze has now reached a depth of 1,700 feet, being about 50 feet below the 1,650 foot level, and between the 1,350 foot level and the 1,700 foot level some large shoots of ore of a pay grade have been encountered. That these shoots are of sufficient importance to justify the extension of the shaft is shown by the orders received from Managing Director McMillan. The shaft is a five-compartment one, and from the 1,350 foot level it will cost from \$130 to \$150 a foot to deepen it, so it will be seen that the deepening of the shaft will cost a considerable sum. The average output of the Le Roi is 2,820 tons per week. Some high grade ore is being taken from the Peyton ledge.

Although the discovery was made three weeks ago, the almost fabulous wealth of the Gold Hill region was not known until recently. An ore body three feet wide and of unknown depth and length has been located to Telluride, which assays from \$265 to \$8,000 per ton in gold and silver. Two hundred miners are already in the new field, where Col. J. H. Conrad, of Windy Arm fame, who already has large interests at Gold Hill Mountain, is building eight stone houses for camps.

Governor McInnes and Comptroller Lithgow arrived from Dawson last night and left for the new quartz field this morning. Gold Hill is located twenty-two miles from the White Pass Railroad, which is left at Robinson, twenty miles south of White Horse. The new strike is attracting more attention than any ever made in the North.

A discovery of an important copper-gold deposit, which with development may rival the famous Britannia property, has been made by Joseph Saulter, a prospector well known in Kootenay and Similkameen. The find is situated some three or four miles to the northeast of the Britannia.

In Rossland, persistent rumors are current that the Great Northern people are doing their utmost to bring about another mine merger which would result in that railway again obtaining an ore tonnage from that camp and enable the Northport smelter to blow in. It is stated that efforts are being made to bring about a consolidation of the group of properties on Red Mountain

lying to the west of the Le Roi No. 2, including such well known properties as the Giant, Gertrude, California, Coxey, and others, all of which have been more or less extensively developed in past years, but which are lying idle to-day.

For the first six months of 1906, the output of the mines of the Boundary show a total of 633,526 tons, with an estimated total valuation of more than \$3,000,000. During the same period of 1905, the mines of this section, practically the same properties, shipped 458,193 tons of ore, valued conservatively at a little over \$2,000,000. In the absence of definite valuations of the products from all the mine managers, the average per ton is placed at \$5. These figures show that the output of 1906 thus far, as compared with that of 1905 for the same period, is an increase of nearly 50 per cent. The ore record for June is slightly larger than for May, notwithstanding the fact that the British Columbia Copper Co.'s smelter is out of commission, owing to extensive enlargement in progress at the reduction works. Granby shipped nearly 12,000 tons more in June than in May, and Dominion Copper sent out about 2,000 tons more than the previous month.

A contract for the construction of twenty miles of ditches to bring water to the Cariboo Gold Mining Company has been awarded to Messrs. Macdonell & Gzowski, of Vancouver. The members of this firm are J. A. Macdonell, a partner of C. E. Loss in the building of the C.P.R. line from Spence's Bridge to Nicola, and C. S. Gzowski, who has been assistant to Mr. Macdonell.

The Cariboo Gold Mining Company is the style of corporation under which the Guggenheims are operating in the Cariboo. They bought the properties of the Cariboo Consolidated Hydraulic some months ago, the sale being negotiated through J. B. Hobson. Mr. Hobson is retained as general manager of the properties.

For many years the operation of these properties had been hampered through lack of water in the summer. In order to get the necessary water it is the intention of the Guggenheims to build some sixty or seventy miles of ditches and flumes. The contract let to Messrs. Macdonell and Gzowski is the start toward providing more water. The ditch to be built by them will have a capacity of five thousand miners' inches of water. It is to be completed by fall.

YUKON.

Owing to the need of the waters of the Yukon lakes and streams for mining the Government has adopted stringent regulations for the use of the water for power purposes. The ordinance passed by the Government authorizes the Minister of the Interior to grant a lease of water to develop power for a period of not more than twenty years, upon proof of the ability of the applicants to utilize the power expeditiously and of volume of unrecorded water available on the report of the Government mining engineer, he may grant such water as he thinks may be reasonably required by the applicants for the purpose specified. Waste or failure to utilize power may be punished by cancellation or reduction. Grants are subject to rights of miners who at the time of granting may be working on the stream above or below. Location of the ditch must be approved by the Yukon Commissioner, who shall have power to permit change of location upon proper notice. When power is sold distribution and price are under control of the Yukon Commissioner. The fees to be paid the Government for water, \$10 for fifty miners' inches or less; fifty to two hundred miners' inches, \$25; two hundred to a thousand inches, \$50. Every additional thousand or fraction thereof, \$50. The amount to be expended on development work for the first year, and the times at which the power plant is to be in working order have to be specified.

COAL NOTES.

Shipments from the Cumberland Railway and Coal Company's collieries for the month of July were 27,706 tons.

The Dominion Coal Company has recently completed an iron and brass foundry in connection with its shops at Glace Bay. It is of the most modern construction with steel frame and brick walls. Thirty men are employed.

For the year ending June 30th, the output of the different collieries of the Nova Scotia Steel and Coal Co. exceeded all previous records.

In 1904-5, the total production amounted to 476,510, as against 558,316 tons in 1905-6. This is over 80,000 tons in excess of last year, and with the installation of modern machinery and the opening up of the old Queen pit, there is no reason to doubt that the ensuing year will mark an epoch in mining for this industry.

There are at work in the mines over 2800 men, exclusive of the office staff.

There are rumors of many extensive additions and alterations in the near future, particularly with regard to the company's railway. This company is now about to commence the development of large limestone areas in Richmond county which they have under lease. The areas are located less than a mile from an excellent shipping point on the Bras d'Or Lakes.

The new tippie now just finished by contractors, Frayer & Sinclair, for the Canadian-American Coal Co., is one of the largest and best constructed in Western Canada. It resembles somewhat that of Michel, although providing many improvements over the latter. This building which contains over 320,000 feet of material, is 60x120 feet in length, with an incline by another system of haulage. The tippie which will be fully provided with the latest machinery for the expeditious handling of coal has a storage capacity of 1,000 tons and capable of handling 2,700 tons in a ten-hour shift. There is now being installed picking tables, screens, dumps, automatic car haulage, and automatic car-loader, and this tippie will be fully up-to-date when all of the machinery now on the ground has been placed in position. The mine itself is in excellent shape to produce a large tonnage of coal and the shipments from Frank will be second to none in this district just as soon as the new tippie is put into commission.

THE MINING AND INDUSTRIAL SHARE MARKET.

(Specially reported for the CANADIAN MINING REVIEW by ROBERT MERRIDITH & Co., Mining Brokers, 57 St. François Xavier St., Montreal.)

The markets during the month have been more or less of a holiday character, prices in the main are firm, but business is very limited. Amongst the mining stocks International Coal has been the feature and has scored an advance of some fifteen points. This stock, which was largely marketed in the West at lower prices, has now come back, the present demand being now almost entirely local. It is reported that the company's prospects are exceedingly bright, and that a dividend is nearly in sight.

Industrial stocks are almost unchanged. There has been a little buying of the Dominion Iron & Steel issues on the company's improved position, and Nova Scotia Steel has advanced on very limited transactions in sympathy with other stocks of steel and iron industries.

One reason for the small amount of speculation is the stringency of the money market; the amount of funds available being very limited.

The latest quotations are as follows:—

	Bid.	Asked.
Consolidated Mines	128	132
Can. Gold Fields	6½	7½
Granby Consolidated	12	12½
Rambler Cariboo	22	24
North Star	5	...
Monte Cristo	2	3
White Bear	8	9
California	2	3
Virginia	5	7
Deer Trail	1½
International Coal	65	67
Sullivan	2½	3½
Jumbo	22½	25
Cariboo-McKinney	1½	2½
Denoro	7	8
Diamond Vale Coal	15	20
Dominion Copper	2½	2¾
Dominion Coal (common)	76	78
Dominion Coal (pref.)	115	115½
Dominion Iron & Steel (com.)	28¾	29
Dominion Iron & Steel (pref.)	78	80
Intercolonial Coal (com.)	85	86
Intercolonial Coal (pref.)
Nova Scotia Steel & Coal	71	71½
Nova Scotia Steel & Coal (pref.)	122	125

COMPANY NOTES.

Allis-Chalmers.

At the last special meeting of the stockholders of the Allis-Chalmers Company held in Jersey City, it was voted to authorize an issue of bonds to the amount of \$15,000,000, of which \$12,000,000 are to be offered at 80 per cent. for subscription by the preferred and common stockholders of the company, the remaining \$3,000,000 to be reserved for the present in the treasury of the company.

The stockholders also approved a conditional contract between the company and Shearson, Hammil & Co., acting in behalf of a syndicate which includes and may include several directors of the company, for the acquisition by the syndicate of such bonds as may not be subscribed for by the company's stockholders.

AN ELECTRIC DUMP CAR.

The accompanying cuts illustrate The Jeffrey Manufacturing Company's new design for electric slack dump car, which covers a wide range of usefulness, and which may be adapted to meet a number of different requirements.

The car consists of a structural steel truck or frame, upon which is mounted a steel hopper. The truck is provided with such electrical equipment as the required duty demands.

In the car here illustrated, the equipment consists of two Jeffrey H.H. 64, 250 volt motors, one motor being geared through a single reduction to each axle, the gears being enclosed in dust proof cases and running in oil.

The journal boxes are removable without dropping the wheels, and are provided with renewable steel wearing faces. The boxes are held in cast steel pedestals which are securely bolted to the steel channel frame, and which are also braced at the lower end with diagonal braces.

Four sand boxes of liberal capacity are provided.

The brake is of the well known Jeffrey Self-Locking type.

The hopper is built of heavy sheet steel suitably braced and re-enforced, and when loaded as shown in the accompanying illustrations, has a capacity of 25,000 lbs. of run of mine coal. This hopper is so supported on the

frame that the weight is uniformly distributed throughout the structure.

Probably the most novel feature of this car is the ease and rapidity with which the load may be discharged.

To facilitate this, the bottom of the car slopes from a hip or ridge in the centre down to the bottom edge of each side door, and at the front end is a triangular face or slope descending from the ridge to the bottom edge of the front door. The angle of slope of the bottom is made

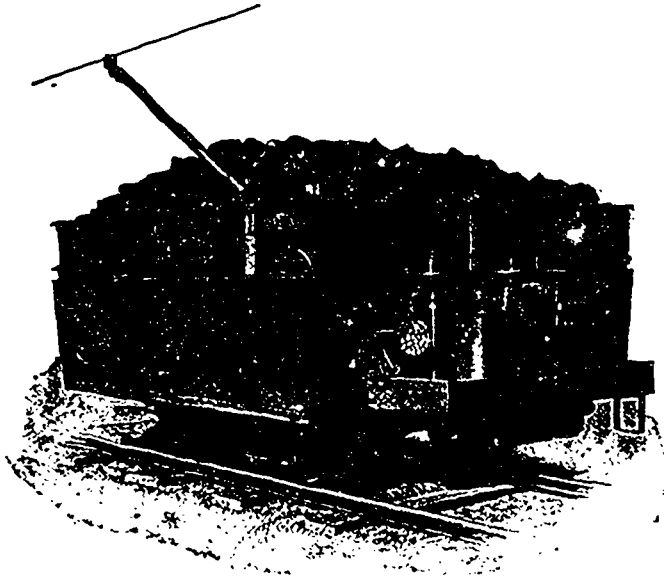


Fig. 1.

whatever may be necessary to readily discharge the material to be hauled. The doors are securely hinged to the body of the hopper, and are so hung that they open slightly by their own weight whenever the holding chains are loosened. This feature, together with the sloping bottoms result in a free and rapid discharge of the load.

Each door is provided with three chains for holding it closed. The two side doors are operated simultaneously, the front door being operated independently. The chains are wound upon windlass shafts and each chain is pro-

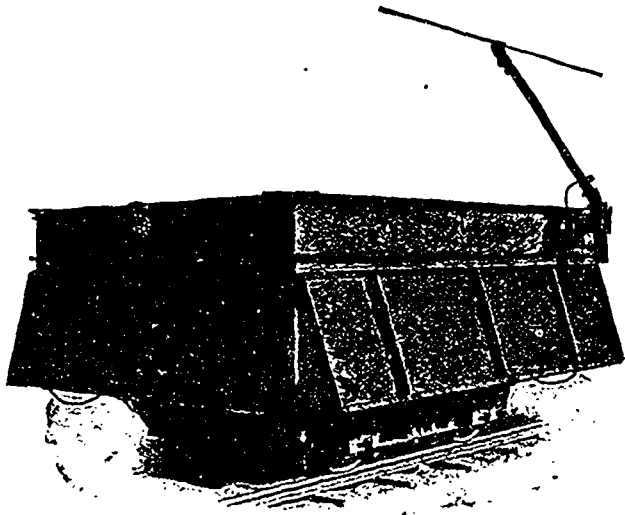


Fig. 2.

vided with length adjustment so that the strain may be equally distributed on all of the chains. The method of operating these doors may be arranged to suit the purpose for which the car is to be used. For instance, each door may be operated separately, any two may be operated together, or all doors may be arranged to operate simultaneously.

The mechanism for operating the doors is self locking in any position, and is easily and quickly manipulated. Figure 1 shows the convenient arrangement of the

operating mechanism. The vertical shafts and hand wheels at the right and left operate the front and side doors respectively, and the hand wheel and shaft in the centre operate the brake. At the left of the operator's seat is seen the controller, and at the right, supported between the brake and the front door control shafts are seen the sand valve handles.

Each car is provided with two headlights, and a gong is located under the floor plate within reach of the operator's foot. The car illustrated is used for handling slack, and discharges its loads from a trestle elevated at a considerable height above the ground. Dumping the slack from the front and both sides will gradually form a fill or embankment upon which extensions to the track may be laid.

These cars are built in several sizes and for any purpose to which they are suited, by the Jeffrey Manufacturing Company, Columbus, Ohio, U.S.A.

INDUSTRIAL NOTES.

The Denver office of the Allis-Chalmers Company has been removed to the McPhee Building, 17th and Glenarm streets, and the El Paso office to the Guarantee Trust Building, Rooms 301-305.

The Canadian Rubber Co. of Montreal, Ltd., have just concluded a deal whereby they obtain exclusive control of rubber advertising in all street cars owned and operated in the principal cities and towns in Canada.

The corporation of Fredericton, N.B., has awarded to Allis-Chalmers-Bullock, Limited, Montreal, the contract for the municipal pumping engine. It will consist of "Allis" high duty, horizontal, double acting, crank and flywheel pump, driven by a cross-compound "Reynolds"-Corliss engine. The pump will have a capacity of 1,500,000 gallons for ordinary service and of 4,000,000 for fire service. Both pump and engine will be built at the works of Allis-Chalmers-Bullock, Limited, in Montreal.

Among the orders for Farrel Bacon Crushers built by the Jenckes Machine Co., Limited, of Sherbrooke, was one for a 10 x 16 crusher shipped R. C. Mosher, Plaster Rock, New Brunswick, and one of 24 x 13 size shipped Coast Quarries, Limited, Vancouver, B.C. The former was sold through W. H. C. Mussen & Co., Montreal, and the latter through the Vancouver offices of the Jenckes Machine Co., Limited. The Canadian Pacific Railway made a record run on the Vancouver shipment taking the car from Sherbrooke to Vancouver in fifteen days.

The 250 horse power electric hoist which was built for the Granby Smelter at Phoenix, B.C., by the Jenckes Machine Co., Limited, of Sherbrooke, Que., has recently been shipped. The fact that this hoist has been built by a Canadian firm is noteworthy, as heretofore electric hoists of large size have been regularly imported from the United States. The hoist has two conical drums, each 8½ feet in diameter at large end, 5 feet diameter at small end and 5½ feet long, both drums being capable of independent operation through the medium of powerful friction clutches. The capacity of the hoist is a load of 10,000 lbs. on drum at 500 feet per minute, and the shipping weight in the vicinity of 50,000 lbs.

For some months past, the officers and engineers of the Montreal Street Railway Company have been in consultation over the question of improvements. After careful consideration it was decided that the increase in traffic justified the purchase of a 1,000 K.W. Westinghouse Railway Generator, as well as three 500 K.W. Westinghouse Motor Generator Sets. For the new cars, which promise to be the easiest and most comfortable of any in Canada, twenty quadruple equipments of motors were ordered, and fifty sets of Westinghouse Air Brakes with motor driven compressors.

The fact of the Montreal Street Railway adopting the Westinghouse apparatus and intrusting the making of this costly equipment to the Canadian Westinghouse Company is clear evidence that Canada is now able to compete with the world in everything electrical.

The West Kootenay Power and Light Company, which supplies electricity to many of the mines, reports unusual activity in this direction, so much so that they have decided to extend their electrical distribution plant.

On the advice of the well-known consulting engineers, Messrs. Ross & Holgate, whose opinions on matters electrical, are born of wide experience, the West Kootenay Power and Light Company are adding to their already splendid equipment six Westinghouse raising transformers of 1,875 k.w., 2,200 to 60,000 volts. and fifteen lowering transformers of 1,250 k.w., 60,000 volts to 2,200 and 440 volts.

Throughout the entire West there is a marked increase in the use of electricity, including the employment of electric locomotives in place of steam for mine haulage, fast traction work, factory yards, etc.

MINING INCORPORATIONS.

NEW BRUNSWICK.

Rothwell Coal Company, Ltd.; capital, \$500,000, in 500 shares of \$100 each. Head office, Dorchester, N.B. Provisional directors: George Frederick Atkinson, of Rexton, N.B., merchant; John Nute, of Portland, Me.; master mechanic; Charles Smith Hickman, of Dorchester, N.B., gentleman; Albert J. Chapman, of Dorchester, N.B., barrister-at-law; Charles Lionel Hanington, of Dorchester, N.B., barrister-at-law.

ONTARIO.

The Hudson Cobalt Mining Company. Capital, \$300,000. Head office, Barrie, Ont.

The Amalgamated Cobalt Mines, Toronto; capital, \$100,000; provisional directors, George McP. Clark, barrister; T. C. Russell, solicitors' clerk; Ethel Mabel Lindsay, accountant.

The Wabi Cobalt Silver Mining Co. Capital, \$500,000. Head office, Cobalt. Provisional directors: John Rupert Gamble, Thomas Langton, jr., George Kiely, William A. Marsh and John Martin.

Amalgamated Cobalt Mines. Head office: Toronto. Capital, \$1,000,000. Shares, \$1.00 each. Provisional directors to be George McPhail Clark, Thomas Clarkson Russell and Ethel Mabel Lindsay.

The Cobalt Diamond Drilling and Development Company, Ltd., with head office at Toronto, capitalized at \$50,000. Provisional directors: Stewart Jenkins, Douglas Ponton, and George J. Ashworth, all of Toronto.

The Amalgamated Cobalt Mines, Ltd. Capital, \$100,000,000. Head office, Toronto. Provisional directors: George McPhail Clark, Thomas Clarkson Russell, and Ethel Mabel Lindsay, all of Toronto.

Cobalt Diamond Drilling and Development Company, Limited. Capital, \$50,000. Shares, \$100 each. Head office: Toronto, Ont. Provisional directors to be Stuart Jenkins, Douglas Ponton and George Johnston Ashworth.

The Wabi Cobalt Silver Mining Company, Limited. Capital, \$500,000. Shares, \$1.00 each. Head office: Cobalt, Ont. Provisional directors to be John Rupert Gamble, Thomas Langton, jr., George Keilty, William Alexander Marsh and John Martin.

Giant Silver Nugget Mines, Limited. Capital, \$1,000,000. Shares, \$1.00 each. Head office: Haileybury. Provisional directors of the Company to be John David Spence, John Campbell MacMurchy, George Abram Walker, Eliza Spearing and John Shirley Dennison.

The Hudson Cobalt Mining Co., Limited. Capital, \$300,000. Shares, \$1.00 each. Head office: Barrie, Ont. Provisional directors of the company to be John Knox Lindsay, Alfred William Wilkinson, Alexander Touchette, Frank Lindsay Burton, Noah Grose, Harry Duncan Jamieson, Charles Devlin, William Graham Colville and William Alvis Boys.

BRITISH COLUMBIA.

British Columbia Mining Exchange, Limited. Capital, \$25,000. Shares, \$100 each.

The Colonial Trading Company, Ltd. Capital, \$25,000, divided into 25,000 shares of \$1 each.

The British Columbia Mining Exchange, Ltd. Capital, \$25,000, divided into 250 shares of \$100 each.

The Greenwood-Eureka Mining Company, Ltd. Capital, \$300,000, divided into 300,000 shares of \$1 each.

The Greenwood Eureka Mining Company, Limited, non-personal liability. Capital, \$300,000. Shares, \$1.00 each.

The Stemwinder Gold and Coal Mining Company. Capital, \$1,250,000. Shares, 1,000,000 preference; 4,000,000 ordinary shares; all at 25c each.

The Stemwinder Gold and Coal Mining Company, Ltd. Capital, \$1,250,000, divided into 1,000,000 preference and 4,000,000 ordinary shares, all of 25 cents each.

CATALOGUES.

The Wellman-Seaver-Morgan Company of Cleveland, Ohio, has issued a pamphlet descriptive of "Water Power Equipment for Low Heads." It contains some useful tables in addition to the descriptive matter.

The high grade, geared, hoisting engines, manufactured by the Wellman-Seaver-Morgan Company, Cleveland, Ohio, U.S.A., are figured and described in a pamphlet just issued. Those needing high grade hoists should procure a copy of this pamphlet.

We are in receipt of the following circulars issued by the Canadian Westinghouse Co., Ltd., Hamilton, Ont.: No. 1035—The Westinghouse No. 12a Railway Motor. No. 1132—The Westinghouse Protective Apparatus. No. 1133—Westinghouse Revolving Field Alternators.

The Coal Pick Machines, manufactured by Sullivan Machinery Co., Railway Exchange, Chicago, U.S.A., are adequately described in "Modern Methods of Producing Coal." This superbly illustrated pamphlet will be sent on demand to all who write and mention the "Canadian Mining Review."

The Carter Auto-Magnetic Ore Separator Company, 123 Liberty street, New York, is sending out an illustrated pamphlet descriptive of their "Ore Separator and Concentrator," which is operated without artificial power, requires no dynamo, engine, or electric current, and has no gearing or other moving parts.

The B. F. Sturtevant Company, Hyde Park, Mass., have issued Bulletin 132, descriptive of the Economizers used in the power houses of the Interborough Rapid Transit Company, and other railway and municipal cor-

porations. It describes the magnificent power plant of the Interborough Rapid Transit Company with considerable detail.

For years the balances made by Henry Troemner, of Philadelphia, Pa., U.S.A., have been considered standard—there is none better. The latest illustrated catalogue issued by this firm describes all the balances made as a result of years' experience, and covers everything from a dispensing scale to an assay balance, with a sensibility of 1-200 milligram.

The following catalogues have reached us from the Wellman-Seaver-Morgan Company, Cleveland, Ohio:—

- M-101—Akron Crushing Rolls.
- M-202—Copper Blast Furnaces.
- M-103—Stamp Mills and Equipment.
- M-104—Copper Converters and Equipment.
- H O-9—First Motion Winding Engines.

Messrs Fraser & Chalmers, Ltd., London, England, have issued a "General or Index Catalogue," which is intended for the information of their numerous customers, being a brief description (mostly by means of illustrations), of the machinery manufactured and supplied by them. Few more useful catalogues could be consulted by a mining engineer. The illustrations are unusually good.

The Westinghouse Co., Ltd., Hamilton, Ont., sell a great deal of machinery to Spanish-speaking countries, and the demand for technical literature dealing with these machines in that language is considerable. To meet this demand the Westinghouse Co. has issued a work entitled, "Industrias y Productos de Westinghouse," descriptive of the various productions that have made the firm world famous.

Wherever the English language is spoken Fairbanks scales are known, and it is a sign of the energy with which the business is conducted that the firm has seen fit to issue a publication descriptive of its various products. No. 6 of Volume 1, is a "Toronto Number." It is intended to acquaint the thousands of customers in and around that city with the facilities that now exist for supplying their requirements.

The Canadian Westinghouse Company, Ltd., of Hamilton, Ont., has issued a very interesting description of the electric locomotives manufactured by the Westinghouse Company, and in use by the N.Y., N.H. & H. Railroad and other lines. Descriptions are also given of the Swedish State electric railways, and it may be remarked that the conditions in Sweden are approximately the same as those governing Canada.

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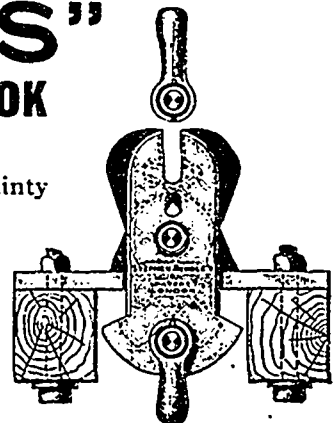
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The Mining Law gives absolute security to Title, and has been specially
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All mines belong to the government of the Province on all unsold lands and on all those sold since the 24th of July, 1880, but gold and silver are always reserved, whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

The government grants PROSPECTING LICENSES for lands on which the mines belong to it, giving the holders of such licenses the first right to purchase the mines. In the case of lands where the surface alone is sold, the owner of the surface may be expropriated if he refuses an amicable settlement.

The price of prospecting licenses is \$5.00 per 100 acres on surveyed lands and per square mile on unsurveyed lands. If the surface has already been sold, the price is only \$2.00. They are valid for three months and are renewable at the discretion of the Minister.

When mines are discovered, they can be bought or leased from the government. The purchase price is as follows :

Mining for superior metals on lands situate more than 12 miles from a railway in operation, \$5.00 per acre, and on lands situate less than 12 miles from such a railway, \$10.00 per acre ;

Mining for inferior metals—the price and the area of the concessions are fixed by the Lieutenant-Governor in council.

The words "superior metals" include the ores of gold, silver, lead, copper, nickel and also graphite, asbestos and phosphate of lime ; and the words "inferior metals" mean and include all the minerals and ores not included in the foregoing definition and which are of appreciable value.

MINING CONCESSIONS are sold in entire lots in surveyed townships or in blocks of not less than 100 acres in unsurveyed territories.

Patents are obtained subject to the following conditions :
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and accompanied by an affidavit ; a survey at the cost of the applicant must be made on unsurveyed lands ; work must be bona fide begun within the two years.

Mining licenses giving the right to work the mine and dispose of its products, are granted on payment of a fee of \$5.00 and a rent of \$1.00 per acre per annum. Such licenses are valid for one year and are renewable on payment of the fee and of the same rent. They may cover from 1 to 200 acres for one and the same person and must be marked out on the ground by posts. The description or designation must, however, be made to the satisfaction of the Minister.

Persons working mines must send in yearly reports of their operations to the government.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which remarkable discoveries of minerals have already been made and through which the New Grand Trunk Pacific Railway will run.

The government has made special arrangements with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. Tariffs of assays can be obtained on application to him.

The Bureau of Mines at Quebec, under the direction of the Superintendent of Mines, will give all the information asked for in connection with the mines of the Province of Quebec and will supply maps, pamphlets, copies of the law, tariff of assays, etc., to all who apply for same.

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

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

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

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

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

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

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Commissioner of Lands and Mines.

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QUARTZ—A free miner's certificate is granted upon payment in advance of \$7.50 per annum for an individual, and from \$50 to \$100 per annum for a company, according to capital.

A free miner having discovered mineral in place, may locate a claim 1,500 feet x 1,500 feet.

The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year, or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey, made, and upon complying with other requirements, purchase the land at \$1 an acre.

The patent provides for the payment of a royalty of 2½ per cent. on the sales.

Placer mining claims generally are 100 feet square; entry fee \$5, renewable yearly.

A free miner may obtain two leases to dredge for gold of five miles each for a term of twenty years, renewable at the discretion of the Minister of the Interior.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles. Rental \$10 per annum for each mile of river leased. Royalty at the rate of 2½ per cent. collected on the output after it exceeds \$10,000.

W. W. CORY,

Deputy of the Minister of the Interior.

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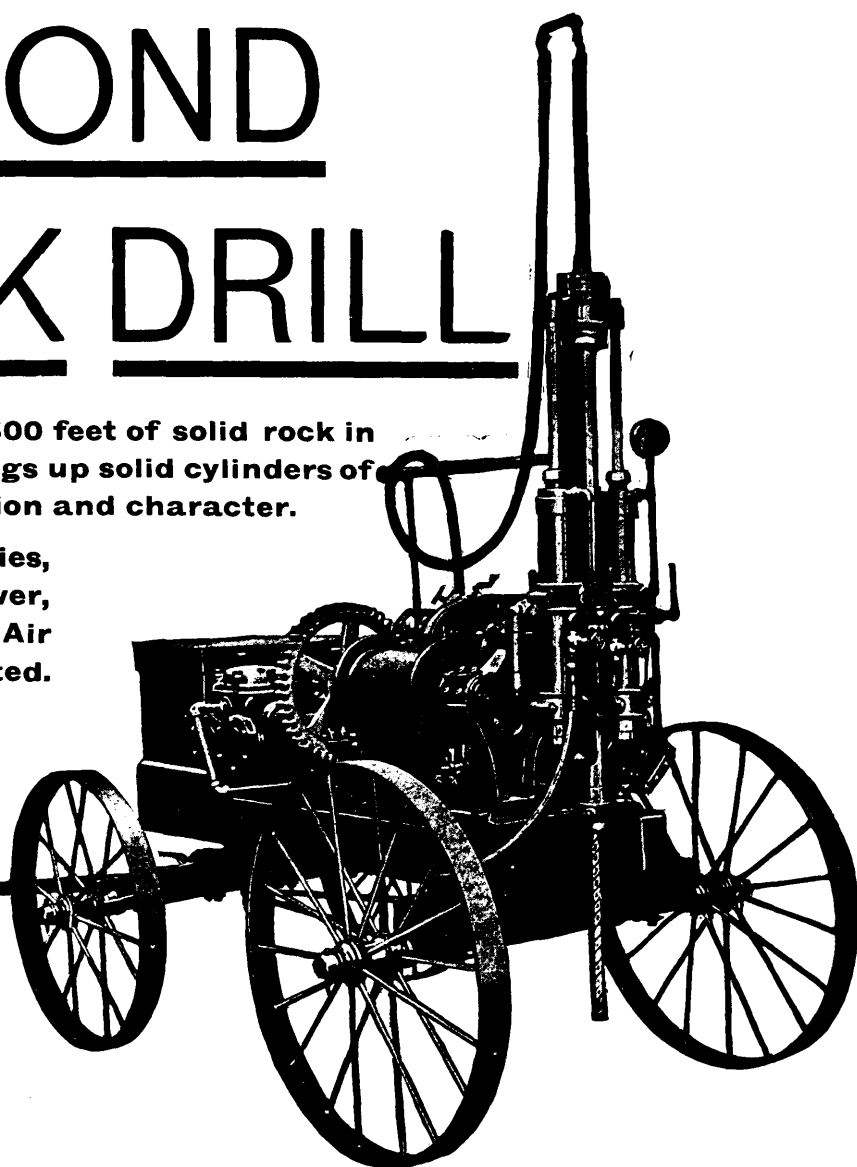
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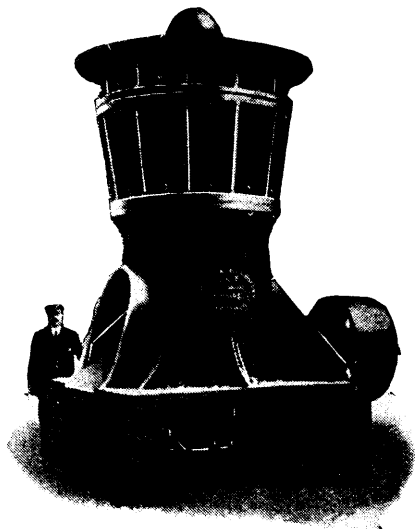
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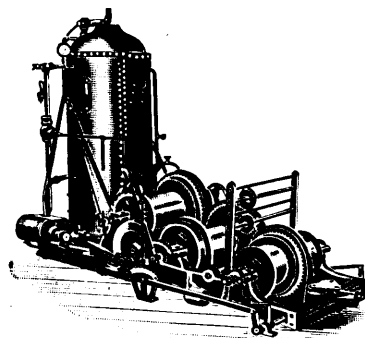
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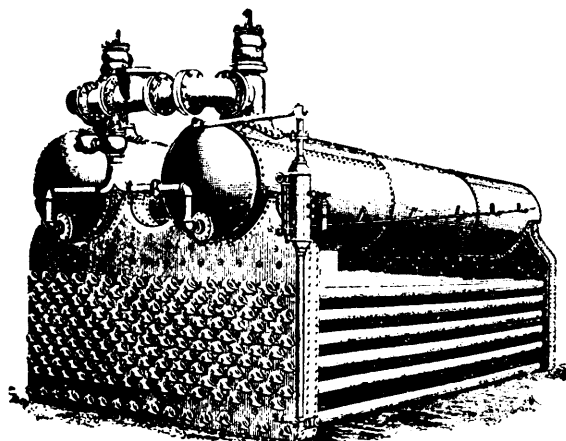
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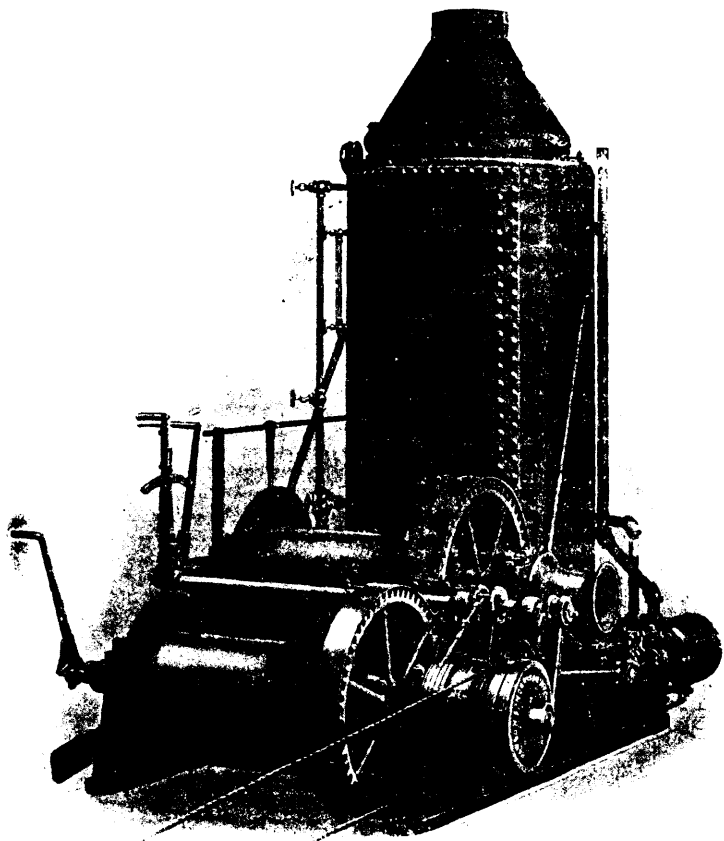
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