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Vol. XVIII—No. viii.

OTTAWA, AUGUST 31st, 1899.

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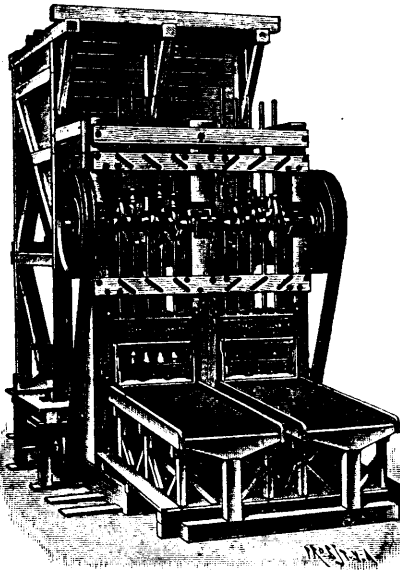
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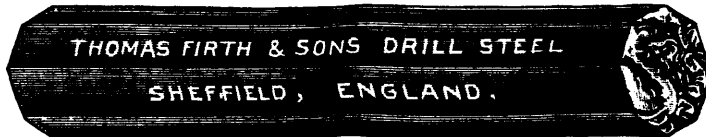
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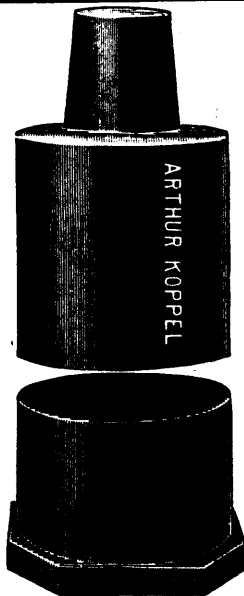
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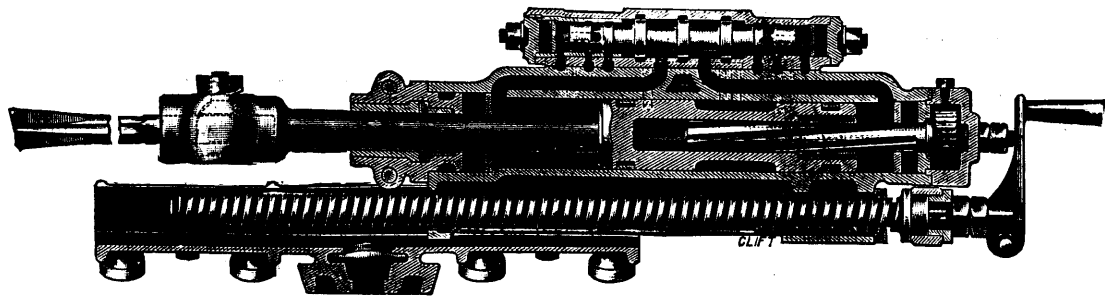
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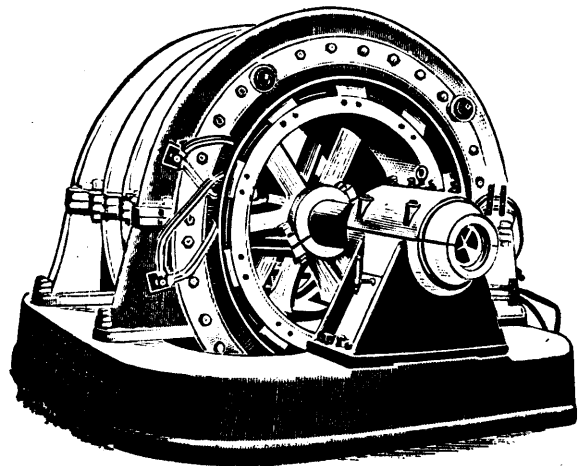
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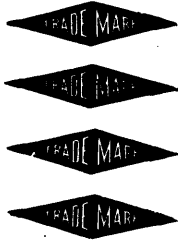
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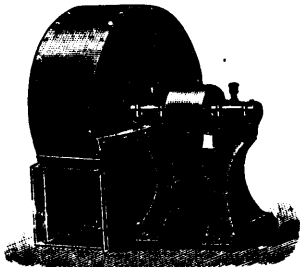
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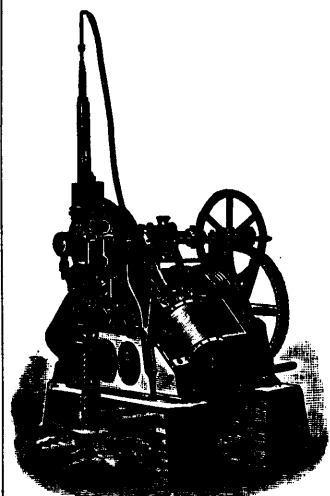
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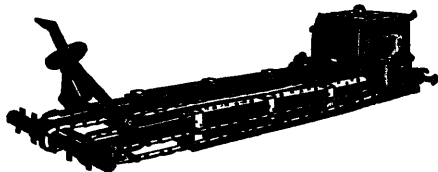
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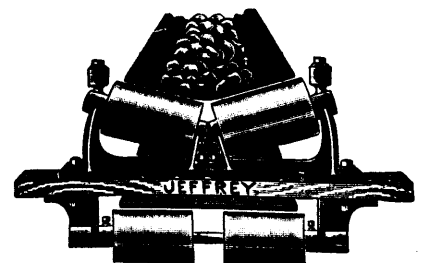
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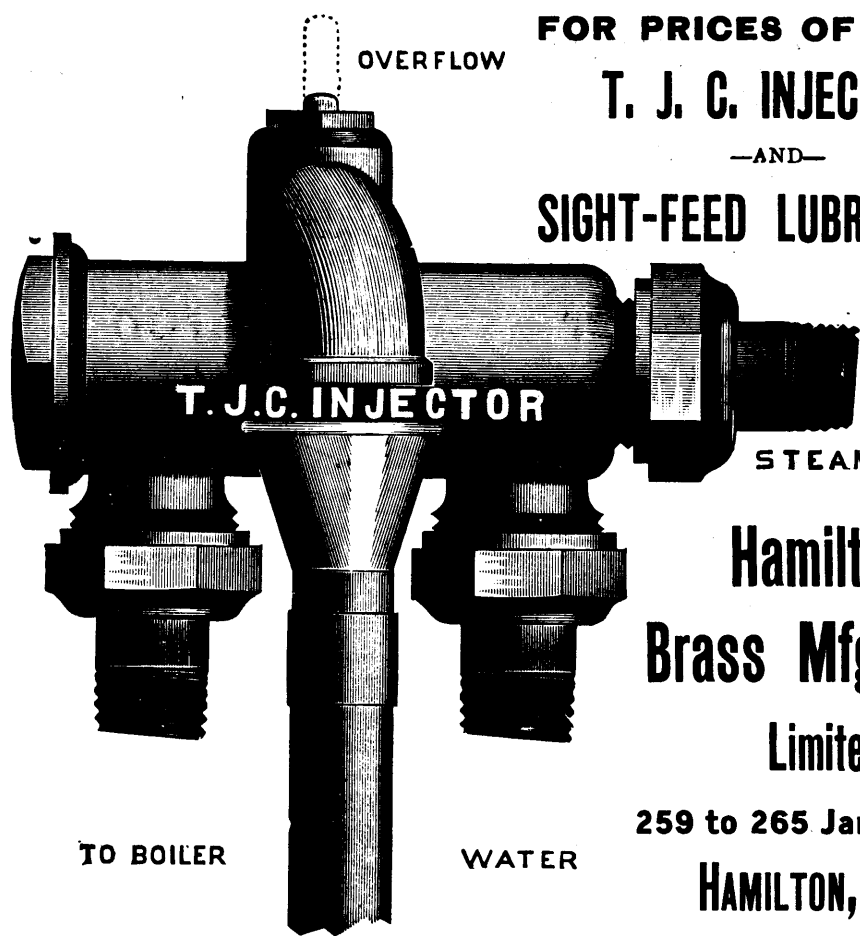


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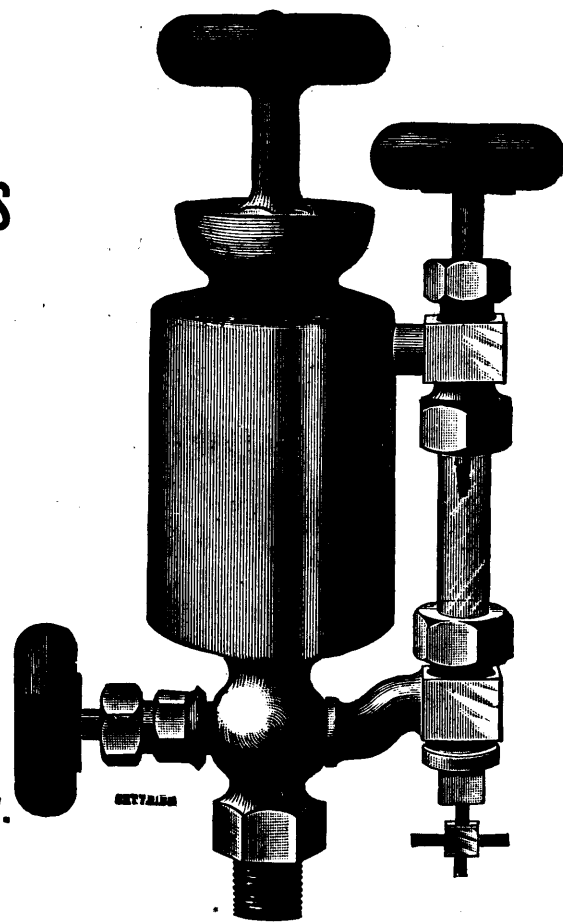


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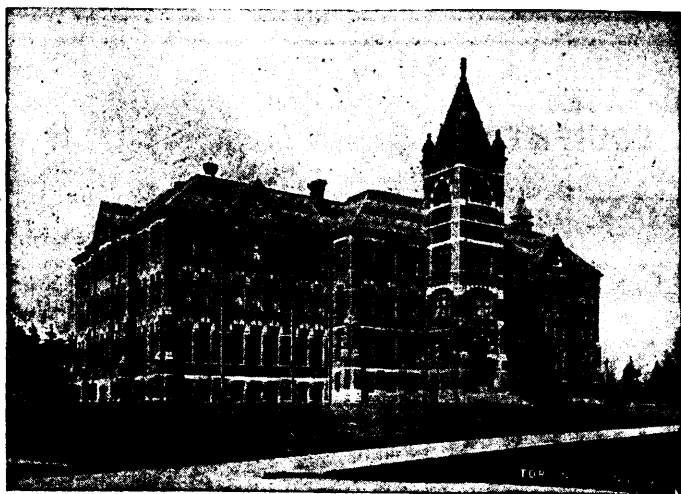
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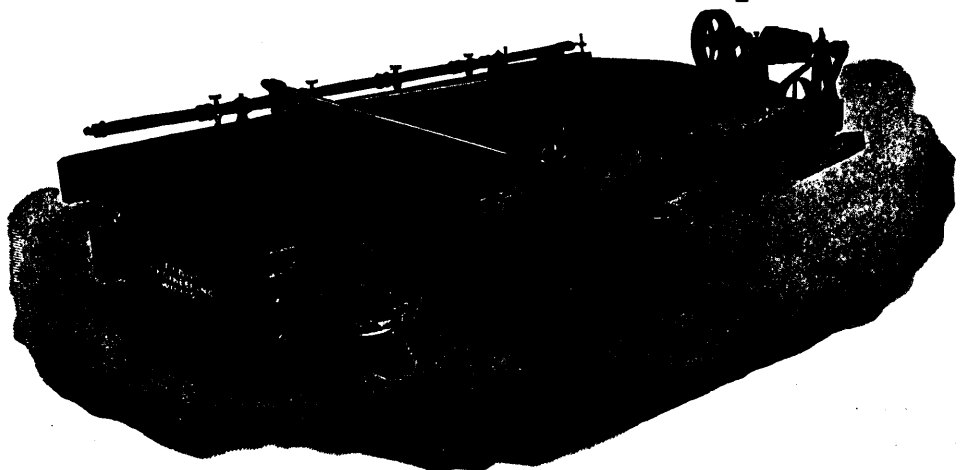
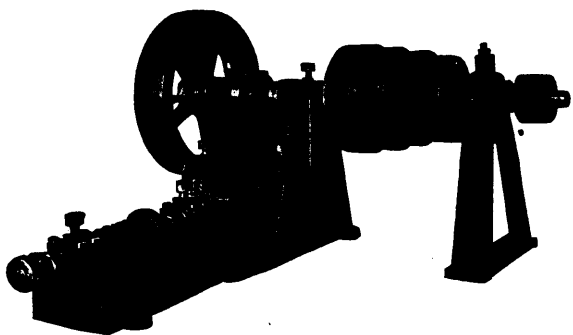
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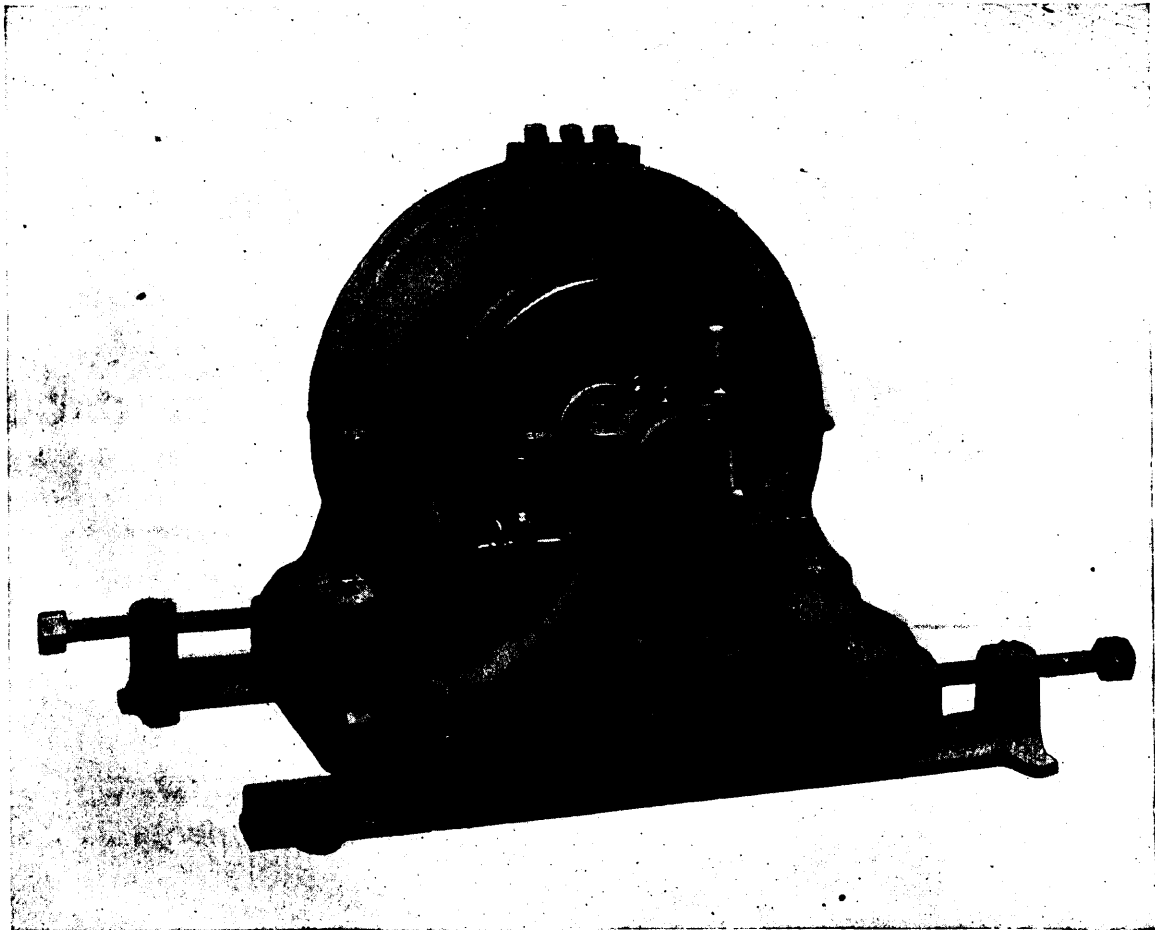
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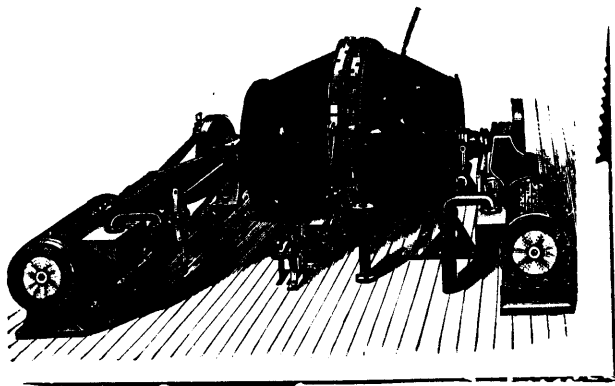
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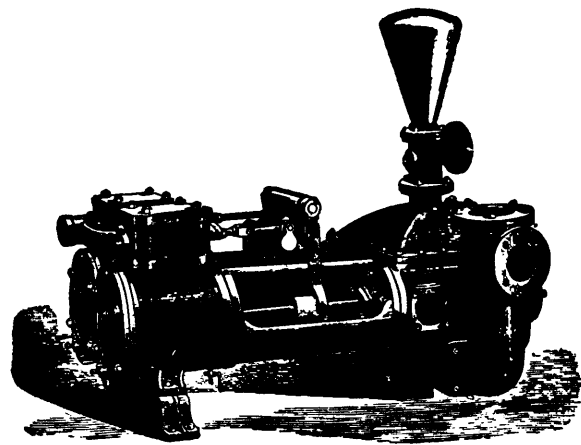
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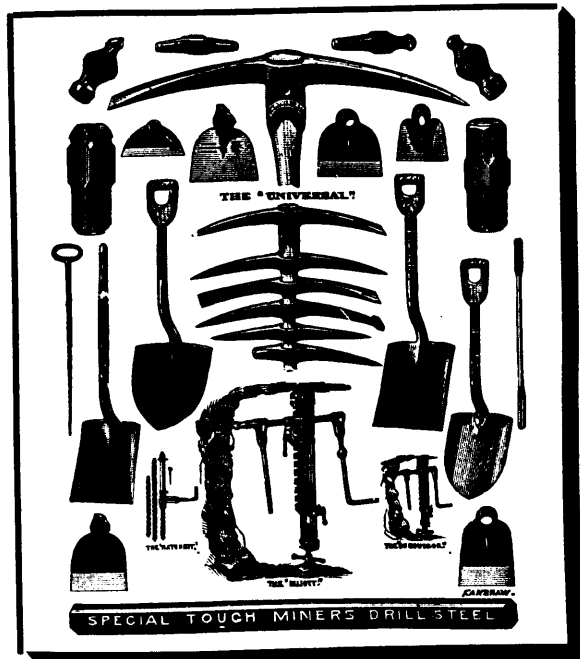
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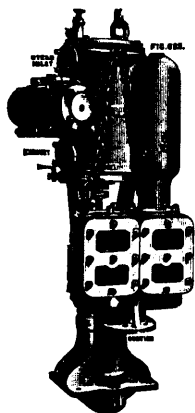


Fig. 620—"Griff"
Sinking Pump.

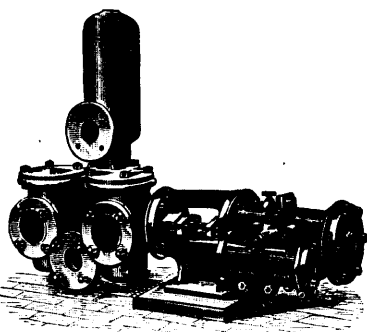


Fig. 598—"Cornish" Steam Pump
for Boiler Feeding, etc.

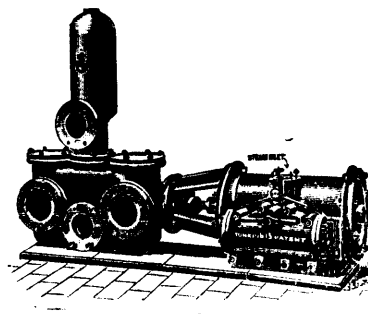


Fig. 600—"Cornish" Steam Pump
for General Purposes.



Fig. 621—"Cornish" Sinking Pump (Ram Type).

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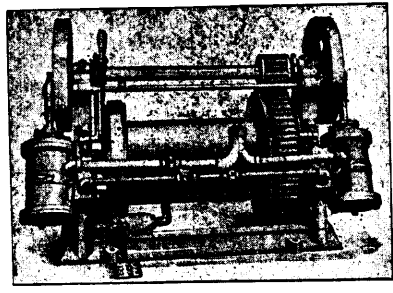
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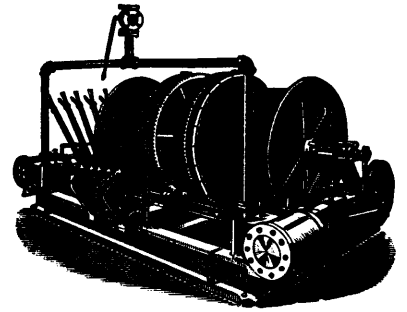
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VOL. XVIII., No. 8.

AUGUST, 1899.

VOL. XVIII., No. 8.

Concerning Western Ontario Gold Fields.

The REVIEW has been frequently accused of being in a measure antagonistic to the gold deposits of Ontario, as it has also been accused of many other opinions which it never held, and its attitude of insisting on honest management and legitimate mining has been perverted into a representation of pessimism. The REVIEW has no need to heed such perversions, its position being perfectly clear to any unbiassed mind, and it makes every effort to obtain positive and reliable information concerning every mining district in the Dominion.

In pursuance of such effort we have recently obtained the views of an engineer of reputation and large experience who has visited Western Ontario at divers times during the last three years, and who has recently devoted a long period to the inspection of the various mines and prospects in that section. His views have been summarised in this article.

The work that is doing this year in the Lake of the Woods and Rainy River sections is of a much better and higher character than ever before. To begin with, the owners of locations are much more reasonable in the terms asked for their properties than formerly, and are beginning to recognize the fact that prospects are not mines and can not be sold as such. Men of undoubted ability (such as the representatives of Capt. De Lamar) have inspected prospects this summer and have plainly, but courteously, informed the owners that sufficient work had not been done to justify expert examination or expert opinion. Many of the owners of properties recognizing this fact have made and are making most reasonable terms to secure the development of their locations, and if this procedure is continued for another year it is altogether probable that Ontario will have a substantial mining industry in her gold fields.

But another point, fully as important, must be mentioned and that is the dawning on the minds of owners and investors, that Prof. Winchell was not far astray in his article, in these columns, on "An Epidemic of Mismanagement," and that to ignorant and incompetent management is due the bulk of the ills that Ontario gold mining has been heir to.

This year one notes, for the first time, a tendency to secure experienced management, and a willingness to pay liberally for competency.

To the lack of mining knowledge and experience must be attributed the slow recognition of the fact that most of the gold bearing veins of this section encounter a zone of disturbance, or improvement, or both, at depths ranging from 40 to 100 feet. In many cases personally observed, a vein which showed compact quartz of good width on the

surface was split up into four or five branches or stringers at the depths mentioned, and usually the shaft was then abandoned. In other cases, through the quartz remained compact, there was a diminution of values in sinking. In very, very few cases has the management had the confidence to continue sinking under such conditions, but in every case in which it has done so it has been found that the split vein reunited into solid quartz, and that lost values have been recovered, and this at depths of usually from 200 to 300 feet.

This important characteristic has not yet been fully recognized except by the more intelligent, and to ignorance of it must be attributed the scores of shafts which have been sunk to 100 feet or thereabouts, and then abandoned; though it is safe to say that a skilled mining captain would never have been discouraged thereby. There has also been a complete ignorance of, or disregard of, the well established maxim that *all* metalliferous deposits have *pay chutes*, or portions of the vein-filling which contain the profitable ore, or mineral of higher grade than the average.

Examples of this ignorance are to be seen in every section—in the Lake of the Woods, in Rainy River, in the Manitou and in the Sawbill Lake regions

In the Manitou region there is one striking example of where a very promising property was entrusted to the care of a manager whose chief qualification was that he had been a locomotive engineer. The vein was of a width of five or six feet, and surface cuttings had clearly shown the outcrop of a pay chute or streak. The manager was instructed to sink a main shaft where this pay chute outcropped, but, as there happened to be a slight rise or knoll between this spot and the mill-site, his railway instincts prevailed and, leaving pay quartz, he sank his shaft on the top of the knoll so that it should be all "down grade" to the mill, with the result that the development has all been in quartz too poor to pay for extraction, the owner's money has been wasted, and a probably valuable property abandoned. A competent manager knows that to determine the extent and direction of the pay-streaks is of primary importance in opening a new property.

In addition to the lack of technical knowledge there has been a noticeable want of business ability or ordinary economy. At one of the noted mines of the section it was observed that six men and two horses were required to transfer cordwood from the lake shore to the boiler house. The boilers were at an elevation of about 40 feet above the lake and possibly 100 yards distant from the shore. The cordwood was unloaded from a barge by two men, throwing single sticks at a time to two men on the wharf who loaded the same on a rack on a tram car; when the rack was full (a load of possibly 3,000 lbs.) it was drawn up a track, laid with iron rails, by means of a rope attached to a double

armed horse-whim, and each horse had a full grown man for a driver. The veriest school boy or tyro in management wouldn't consume a grain of brain tissue in devising a more economical way of delivering that fuel to the boiler house.

In the best equipped and one of the best managed mills in the region, the amalgamator was conspicuous by his absence, and by the fact that 80 per cent. of the surface of his apron plates was banked an eighth of an inch thick with sand.

Another property upon which a very large sum of money has been spent, has had two milling plants upon it, yet to-day it enjoys the double distinction of being unable to save the gold in its ore, and of having the most useless collection of worthless machinery under its roofs that can be found in Canada. To the steam economist the fact that this plant has 21 cylinders taking 1½ steam will be a sufficient commentary.

The foresight of the "Lucky Coon" people in building a mill 180 feet above, and over a mile distant from the nearest water has been referred to by Prof. Winchell.

It is eloquent testimony to the intrinsic merits of Ontario's gold fields that in spite of such mismanagement there has been a steady forward progression in work and in bullion won. Impartial investigation over portions of four years warrants the statement that there exist in Western Ontario deposits of auriferous quartz of a size and grade to give a very satisfactory remuneration on the capital required to be invested.

Ever since the inception of active mining here, which began with the quieting of titles in 1891-92, Ontario's gold mining industry has been almost entirely in the hands of men inexperienced and ignorant of the business; lumber camp bosses, railroad men, merchants, coal miners, assayers, land agents and book-keepers have been considered capable men to undertake the opening up of a new mining country.

No wonder is it that the Pacific Province, beginning a new life about the same period, has so greatly outstripped the Midland Province, for British Columbia was opened, examined and developed (since '91) by men practically born and bred in the mining towns of Montana, Idaho and Washington, and hence who selected their properties with experience, expended their capital with economy, and conducted their operations with intelligence.

Happily several Ontario properties are now in the hands of competent men, and when this becomes the rule instead of the exception, the gold mining industry will assume such proportions as will ensure a permanent and profitable field for home and foreign investors.

EN PASSANT.

In the death of our old friend Mr. J. P. Nelson, which occurred last month at Montreal, the Intercolonial Coal Company has lost an officer who will be hard to replace, and a prominent figure is removed from the Nova Scotia coal trade in Upper Canada. Mr. Nelson was an expert in colliery accounting, and had been associated with the affairs of the Intercolonial Coal Company, as its Secretary-Treasurer, for a great many years.

It is currently reported that an amalgamation between the General Mining Association, Limited, operating the old Sydney Colliery, and the Nova Scotia Steel Company is on the tapis. From the same source we learn that these companies will erect furnaces and a steel plant at North Sydney, Cape Breton.

The Regina Mine, the most extensively developed gold property in the Lake of the Woods, has been shut down pending, we are informed, reorganisation. It is not improbable that the property will be taken over by Canadians, and it is hoped, operated in a more workmanlike manner.

The following except from a letter received from an English dealer may serve as an index to the present condition of the market, and the outlook for Canadian phosphates in Europe:—

"As you can well imagine, it is difficult to forecast what price can be realized for Canadian phosphate for shipment next year, but from present indications we think—always provided that normal freights are obtainable, say 6/ per ton to Liverpool, London, &c., that you could safely reckon upon realizing \$9 per ton free on board steamer Montreal. It might, of course, be possible to do a little better than this, but we would prefer to be on the right side. The Tennessee phosphate, about which we have written you previously is coming along in large quantities, and testing 80 per cent., the easiest phosphate for grinding, is increasing in favour with European buyers."

The richness and proximity of our Canadian asbestos mines, added to the superior quality of fibre, have been potential factors against the successful exploitation of the asbestos industry in the Eastern States, while the long distance from manufacturing centres, and consequent expensive freight costs have militated against the development of the industry in the Western States. The total value of the asbestos produced in the United States in 1897 is given at \$6,450, while Canada exported to that country asbestos valued at \$190,971.

An authority whose estimates have heretofore proved conservative, brings word from Dawson that the wash up from the Yukon this year will aggregate \$19,000,000, apportioned as follows: Eldorado, \$2,500,000; Bonanza, \$2,500,000; French Hill, \$1,500,000; Gold Hill, \$1,500,000; Big Skukum, \$1,000,000; Little Skukum, \$1,000,000; Dominion, \$4,000,000; Hunker and Quartz, \$5,000,000; total \$19,000,000. These figures leave out of consideration a number of important locations, including Sulphur Creek, Stewart River, Upper Klondike, and Scroggie Creek.

During the year 1896 India produced 309 long tons of mica as against 375 tons in 1895, and 180 tons in 1894, 50 per cent. of the output being shipped to the United States. Probably one half of the mica exported from India to Great Britain finds its ultimate market in the United States. Canada during the same period supplied the United States with about 530,000 lbs. of mica annually.

A Los Angeles exchange has something of value to say on the subject of protecting investors against the numerous fake promotions characteristic of the times. It says:—

"To suggest a remedy, with the object of making mining stock company enterprises a safe investment for the public is the most important measure which the industry requires at the present time.

"Before any new mining company is granted articles of incorporation, the property or mines of such company should be reported on by the inspector of mines of the state in which it is located, to establish the truth of the statement made in the prospectus and reports. The promoters of the scheme paying for such official inspector's expenses, (but not for salary or fee to him) in addition to their own mining engineers' reports. An office of inspector of mines would then have a double value to the state. If no company was granted incorporation without first receiving such inspection and official guaranty, it would become impossible for fakes and frauds to be presented to the public as legitimate mining enterprises.

"In the case of a sale between a private owner and one seeking to purchase a mine, such official inspection is not necessary, as the purchaser can consult his own mining engineer, but in the case of selling stock to the public, no such examination is asked or granted in all cases, and the stock of new mining companies ought to have the official guaranty of honest representations and intentions to give them value. We have insurance company inspectors and bank inspectors, but the mining industry is not protected against fraud."



THE LATE J. P. NELSON,
Secretary-Treasurer, Intercolonial Coal Co.
Montreal.

Why are the terms "Mining Risks," "Mining Ventures," etc., so generally used in speaking of the buying and selling of mining properties? Is mining simply a lottery? Do mining speculations differ essentially from other speculations? Are mining risks unusually hazardous? The answer is emphatically no, when the common-sense principles which are used in other business are applied to mining transactions. Why then do such phrases receive such almost universal acceptance in the daily and even in the technical press?

Mines and Minerals for July has an excellent leader touching these points in which it urges the prime importance of the investor securing competent technical advice before placing money in any mining enterprise. It says:—"To be sure there are mining sharpers and mining tricksters just as in every other business, but it always takes two to make a mining bargain, and if the second party to the transaction will use the same care that he gives to his ordinary business, the amount of money lost each year through unprofitable mining investments will be greatly reduced and the bad name which mining transactions have received in some quarters will soon be shown to be undeserved. It is very difficult often times to teach an ordinarily careful business man that "All that glitters is not gold" and it is incomprehensible to those who are versed in mining matters that the many prospectuses filled with fool promises should so readily catch the suckers who seem literally to be swarming in certain localities, inviting some one to come and fool them. The man who is unacquainted with mining matters, or as he is called "the tenderfoot," is at the mercy of the man having the property for sale, and in no other business probably is there a greater need for an experienced and thoroughly reliable middle man who can report honestly upon the property for the prospective investor and who can at the same time do full justice to the property and to the seller of the same. We hesitate to use in this connection those much abused words "mining expert," but this term is so generally in use that we are scarcely at liberty to discard it and would simply say that there are experts and experts, and one is often fain to say "What's in a name?" A certain mining engineer of national reputation sometime ago defined a mining engineer as "a man with practical experience about the mines, coupled with a good technical education, secured either from a technical school or by wide and wise reading, together with a good stock of common sense." A mining expert he defined as "a bald-headed graduate of a foreign university who knows the books thoroughly from A to Z but don't know a thing about mining." While this latter definition may seem rather harsh, the distinction will appeal to every one who has any knowledge of the subject.

"Every mining excitement breeds a group of experts whose mining pedigrees can usually be traced to the beginning of the excitement, and whose mining knowledge has probably been acquired in a neighboring newspaper office, corn field, or country store.

"How then does the tenderfoot pick the proper man? Preferably, of course, by personal contact and as the result of personal judgment in sizing up a man, which is one of the first essentials of successful business men. Secondly, he must consider the character of his report very carefully before investing upon the strength of it. Does it bear the ear marks of a business document? or is it a pseudo scientific document that starts with the nebular hypothesis and ends with the latest geological theory, with an incidental reference to the property in question? In the latter case, beware.

"The experienced reliable engineer, or expert, if some prefer that term, takes as little for granted as possible and does very little prophesying, while he uses with great caution such terms as "true fissure veins," "increasing richness and width with depth," "nearness to a rich property," "vein crossings," etc. The inexperienced expert gives full range to his imagination. He uses these terms indiscriminately and reads the horoscope of a mining property with the assurance given only by that wonderful searching glass invented by Mr. Frank Stockton in his story of the "Great Stone of Sardis."

We would not pretend to say in detail what a mining report should be and should not be, but the following suggestions, given by Mr. Walter McDermott, before the Institution of Mining and Metallurgy some years ago will give to the investor some of the ear marks by which a good report can be judged.

"A report need not be long-winded to justify the fee paid for it, but should be so full in actual description as to enable a reader experienced in mining to draw his own conclusions from the facts given, without having to trust entirely to the deductions of the writer. The important details to be set forth clearly are those relating to position, and facility of access to the property; local conditions as to fuel and water, and timber supply; extent and forms of openings; variations in thickness of deposit; character and value, and form of occurrence of ore. It is important in giving a clear idea of the property that the distribution of the payable ore in the deposit should be described. It makes a great difference sometimes in the conclusions to be drawn, whether the value consists in a uniform value throughout the rock. On account of the necessity for this description it is not always sufficient to state that an average width of vein contains an average of so much value per ton, as this may be in the nature of a conclusion, not of a fact, and so may need to be justified by detailed facts of the report. The extent and character of dump piles at a worked mine often afford valuable confirmatory evidence as to the character and value of the property. I have seen reports in which piles of rich ore were stated to be on hand at the mine in certain quantities and value; but on figuring out the expert's own statements as to width of pay ore and extent of openings, it was clear the hole in the ground could never hold the ore said to have come out of it. The configuration of stopes in a worked mine often gives very suggestive ideas as to the run of pay ore, and as to the probable character of ground still standing.

"Geology and mineralogy should naturally be used with discretion, but only for purposes actually bearing on the description and conclusions to be drawn, not for mere padding, nor for the airing of theories better treated in a purely scientific paper."

An important American iron and steel company has paid \$10,000 on a working option over the McKellar iron properties in the Atikokan District, Thunder Bay District, Ont. The amount involved is \$350,000. The deposits contain magnetite ore high in iron, and are reported of great extent and value.

It is not unlikely that work will be resumed at an early date on the Bristol iron mines in Pontiac County, Que. These high grade magnetite ores were first worked in 1872-3, considerable shipments were made in 1884-5, also in 1890, when they were acquired by the present owners, the Bristol Iron Company. In 1890 the mine was leased on royalty to Ennis & Co., of Philadelphia.

Messrs. Mackenzie & Mann, the well-known contractors, who have displayed considerable faith in the mineral wealth of the Dominion by making large mining investments in different sections of the country, have practically completed the organization of the Dominion Copper Mines, Limited, a strong Canadian syndicate, to acquire and work the Stenwinder, Brooklyn, Idaho, Montezuma, Rawhide, and Golden Eagle claims in the Boundary Creek District of British Columbia. These claims upon which considerable development work is being done, contain large deposits of auriferous pyrrhotite ore. The new railway, known as the Columbia and Western, which is being built by the Canadian Pacific Railway to connect the rest of their Kootenay lines with Penticton, on the Okanagon Lake, will afford cheap transport for the carriage of these ores, or of the fuel to smelt them.

A correspondent writes for our opinion of the Golden Star. While it is not our province to report on mines (that can be very well attended to by a number of competent Canadian engineers) we might remark that the property from all accounts is a likely investment, if capably worked and moderately capitalised. So far as we can make out there has been nothing to justify the high selling price of the shares, other perhaps than popular fancy, and the capitalisation of the present company \$1,200,000, is in our judgment, altogether out of proportion to the value of the mine as demonstrated by development. Possibly on a capital of from \$300,000 to \$500,000 Golden Star might be made a dividend paying investment.

Gold dredging machinery, for which there is a rapidly increasing demand for work on the rivers of British Columbia and the North West Territories, is now practically admitted free of duty. An Order-in-Council, under date of 26th June, 1899, provides:

"That the declaration of the Board of Customs that elevators of floating dredges used in mining submerged alluvial gold bearing deposits, shall be free of duty under tariff item 555 as being elevators for hydraulic mining be approved—the Treasury Board so recommend."

The attention of dredging companies is also directed to tariff item 542, which provides:

"And iron, steel or brass manufactures, which at the time of their importation are of a class or kind not manufactured in Canada, when imported for the construction or equipment of ships or vessels."

The Department of Customs is liberally interpreting these two items, and as a consequence gold dredging machinery has no difficulty in passing the customs duty free.

The last monthly returns from the Brookfield mine, North Brookfield, Queen's County, Nova Scotia, (officially reported) show a yield of 996 oz. 8 dwt. from 1,656 tons of rock milled.

Until recently most of our large dividend-paying mines have been owned and worked by Americans. A glance, however, at the balance sheets published by English companies shows a rapidly extending list of substantial profits earned by the old country investor in Canada last year. Here are a few culled at random from the *Canadian Mining Manual*, issued this month:

New Gold Fields of British Columbia, year ended 30th June, 1899.			
Profit realized	£20,377	18	3
Bell's Asbestos Co., net profit for year ended 31st December.	5,033	18	2
Dominion Mining and Development Agency, Limited, for the year ended 30th June, 1898, profit realized.	27,991	11	1
General Mining Association, Limited, profit on year ended 30st Dec.	16,716	14	11
Hall Mines, Limited, profit for year ended 30th September, 1898.	28,861	13	11
London and B.C. Gold Fields, profit for year ended 30th September, 1898, on a paid up capital of £96,181 5s.	84,804	11	4
New Vancouver Coal Mining and Land Co., profit half year ended 30th June, 1898	29,279	17	10
Profit half year ended 31st December, 1898.	38,019	0	3
	£ 67,298	18	1

It is also gratifying to note the widespread and rapidly growing interest being taken by our Canadian people in the mineral wealth of the country, many of whose investments are yielding substantial balances on the right side of the ledger.

"The Diamond Field of the Great Lakes," is the title of a paper by Prof. W. H. Hobbs of the University of Wisconsin, published in the last number of the *Journal of Geology*. This paper ought to be of greatest interest and importance to Canadian prospectors and miners, as it points out in an indubitable manner the existence of Diamonds in the glacial gravels which cover the underlying rock-formations of Wisconsin and Michigan—which gravels contain diamonds as well as other rock material which come over from Canada, accompanying the southerly trend and movements of the great Ice Sheet and deposited them south of the line. The mode of occurrence and descriptions of eight specimens of diamond from the glacial drift are published in this number of the *Journal of Geology*. The names of the owners of these diamonds giving the material in which they were found, the names of those who

found them, the date of the determination and by whom, as well as the date of the finding, together, with descriptions of the surface markings, crystalline form, colour and weight in carats are also given. The following are the weights in carats of six of the diamonds: 15 $\frac{1}{8}$, 21 $\frac{1}{4}$, 10 $\frac{7}{8}$, 6 $\frac{1}{8}$, 2 $\frac{1}{8}$, 3 $\frac{1}{4}$. From the paper just before us the magnificent work by Tyrrell, on the West of Hudson Bay, and by Low in the Labrador area in glacial geology, besides their reports on the economics of these districts, leads the geologists to infer, that the apex of the fan of diamond bearing rocks and gravels lies somewhere in the strip of territory bordering James Bay on the east.

In order to ascertain the true source of the diamond in Canada, it would be necessary:

- (1.) To ascertain the direction of ice movements in detail in the territory surrounding Hudson Bay on the south west, south and east.
- (2.) Also to examine the moraines or glacial drift south in Ohio and Western New York and Pennsylvania.

It may be that the apex of the fan shaped mass of glacial drift is located near the center of Labradorian Neve.

One of the best of our exchanges, the *Mining and Scientific Press* of San Francisco, makes the following pertinent remarks on the question of capitalization and dividends in a recent number:

Much stress is laid upon the amount of capitalization of mining companies. Numerous corporations are formed for the purpose of operating mines of more or less merit, and these are capitalized at sums ranging all the way from \$5,000 to \$30,000,000 and more. At the beginning of operations it is often the case that the mine is a prospect justifying capitalization at a merely nominal sum, but not infrequently enterprises of this character branch out with a capitalization of from \$5,000,000 to \$10,000,000. What useful purpose this excessive capitalization serves does not appear. Of the numerous corporations now in existence and operating in the United States less than twenty on the dividend-paying list have paid dividends exceeding their capitalization, while there are about an equal number which may, in the course of a few more years of success, equal to the past, be able to pay an amount in dividends near their capital, and perhaps exceeding it, but there are hundreds of companies which have never yet, and in all probability never will pay an amount approximating one-tenth of their capitalization, and there are a great many more that have never paid any dividends at all, and never can, whose capitalization runs from \$1,000,000 to \$10,000,000 and over. The most noted instances of mining companies that have paid dividends exceeding their capitalization are that of the Calumet & Hecla, which has paid \$62,850,000 on a capitalization of \$2,500,000; the Boston and Montana, with a capitalization of \$3,750,000, has paid \$10,775,000, and others have paid 200 per cent. to 300 per cent. on their capital, but these are exceptions.

With the financier who is not a miner an estimate is made of the amount of a dividend on the basis of interest on capital invested. Thus a mine pays \$50,000 each month in dividends and the company is capitalized at \$12,000,000. In a year this company will pay its stockholders, if dividends are not interrupted, \$600,000, which is 5 per cent. of the capital stock. Stock in this concern may be quoted at par or above it without there being anything to demonstrate that the dividends will continue long enough to justify any such conclusion. At the rate indicated it would require twenty years to recover an amount equal to the capitalization (which in this case may represent the price of stock), and this allows for no interest on the investment.

Mining is legitimate when properly conducted, and dividends are the prime factor in the business, but those who pay excessive prices for stock simply because it is in demand are likely to suffer financial loss. As soon as the stock of a paying mine leaves the realm of legitimate business and enters the speculative it is no longer a safe investment, but must be placed on the same plane as other risky investments.

The Australian *Mining Standard* is our authority for the following list of rare and precious metals in the order of their respective values :

	Per pound avoirdupois.
Gallium	£ 14,000 0
Vanadium	2,200 0
Rubidium	2,000 0
Thorium	1,700 0
Glucinium	1,200 0
Calcium	1,000 0
Lanthanum	1,000 0
Lithium	1,000 0
Indium	885 0
Tantalum	885 0
Yttrium	885 0
Didymium	885 0
Strontium	850 0
Erbium	740 0
Ruthenium	540 0
Niobium	500 0
Rhodium	500 0
Barium	400 0
Titanium	220 0
Zirconium	210 0
Osmium	210 0
Uranium	200 0
Palladium	115 0
Tellurium	100 0
Chromium	100 0
Gold	65 0
Molybdenum	50 0
Platinum	30 0
Thallium	25 0
Iridium	23 0
Tungsten	7 10
Potassium	6 0
Selenium	4 0
Silver	2 2

Cobalt, magnesium, bismuth, sodium, aluminium, manganese, cadmium, arsenic, and nickel follow in this order.

Since the publication of this table many enquiries have been made as to certain of the metal mentioned therein, especially with respect to osmium, platinum, and iridium. The following information regarding the three metals named will be of present interest.

The metal osmium, says the *Scientific Review*, the bluish-white metal with violet lustre which Smithson Henant discovered 90 years ago in the residue from dissolved platinum ores, has a specific gravity of 22.447, that of gold being 19.265, lead 11.369, iron 7.79, and lithium, the lightest, only 0.594. The French chemist Joly determined that osmium is likewise the most infusible of metals. It could never be made to yield to the oxyhydrogen flames, which make platinum and iridium run like water. But Joly has been subjecting the osmium to the excessively high temperature of the electric arc which Moissan has of late employed successfully in the manufacture of diamonds. Under this fierce heat the rare metal ruthenium, which is to be deemed all but infusible, readily melts. But osmium remains refractory, there being apparently only the faintest traces of fusion. On this account osmium cannot be prepared in sufficient quantity to make it very useful in the arts. By its alloy with iridium, which defies the acids, it is of some value, nothing better having been found wherewith to tip gold pens. Being non-magnetic, its employment for the bearings of the mariner's compass has been advocated

A high grade of ore does not necessarily signify large profits any more than a low grade of ore may indicate failure. The environment of the mine, the size of the vein or ore body, the facility with which it may be attacked and the character of the ore all have a direct bearing on the economics of the proposition. Next in importance is the accessibility of the property, means and cost of transportation, cost of water, fuel, wages, etc. No item of importance can be disregarded when passing judgment on the prospective value of a mining proposition. When all these facts have been arbitrarily determined by actual operation the proposition is simplified, but the engineer in a new and untried field has a great responsibility resting upon him when he undertakes to determine these important questions, and experience elsewhere is the only way in which it can be done.

A learned judge, who served many years upon the bench in western mining States, once said that a mining expert is one who is thoroughly conversant with, and possesses a practical knowledge of mining. And added: "Mining is not an exact science. What may be true of one mine may not be true of another. Geology is a science, but it is a science yet to be perfectly understood. The Almighty gave no easy lesson to man when He placed the study of His creation before him." To a layman the reasoning of the judge appears plausible, if not sound. The Creator gave no text book treating upon mining or geology to man. But He endowed him with perceptive faculties and reasoning powers and has permitted him to fathom the mysteries of both in his own way. If all do not agree it is because each cannot look upon an object with the same mental vision that the others do.

He was a miner as well as a wise man who said: "Silver is in rock, gold is where you find it." The saying is ascribed to Solomon. It was said a great many years ago, but it has not yet been disproved. He said nothing about apexes, dips, angles, spurs, variations, horses, anticlinal folds or synclinal folds, or quaquaversal folds or monoclinal folds. Nor did he mention anything about simple fissure veins, or of normal faults, or the recession of cliffs or the many other terms which figure in present day text books, but he got there all the same with his temple with its massive decorations of gold and silver and precious stones mined without the use of dynamite, or the employment of experts, unless Tubal Cain, the first worker in brass was one. Solomon was evidently a practical miner, prospected for and worked a placer, or gold bearing ore body, for the yellow metal, and milled or smelted his silver from rock in place. He doubtless exhausted his mines and stopped to their apexes or they would now be in litigation and a crowd of experts be on hand to prove or disprove that Rider Haggard re-located the mines after the death of "She," that Allan Quartermain, working for him, followed the synclinal fold of the uplift down to its blending with John Doe & Co.'s, and that then a row commenced.

Expert testimony is valuable in determining whether a man died from heart failure or want of breath, or whether he is insane when drunk, or gets drunk when he is insane. These are nice points to determine, but the latter day expert is supposed to see through the earth as easily as he can through a looking glass or the brain of a man, and everything he says goes with everyone but the other fellows. Experts can tell us all about the post-tertiary period, the tertiary period and the other periods, but they cannot see into the solid ground further than the veriest chump.—*Western Mining World*.

A well known mine owner and operator has been quoted as saying: "A mine that will not pay under any kind of management is not much of a mine." In a great measure this is true, but it is also equally true that good and experienced management has made a success of mining operations where poor management failed absolutely.

The duties of a mine manager are manifold. He should be an engineer, a metallurgist, a chemist and assayer, a good business man, and must possess, above all, that peculiar element known as common sense. All of the above qualifications are not absolutely essential to success, but to attain the highest success the most of them are.

Next month the Canadian Mining Institute will hold two meetings, one at Rossland on 8th September, the other at Nelson on 12th September. The Rossland meeting will be largely taken up with the consideration of papers on the geology and mining practice of the Trail Creek Mining District. At the Nelson meeting, which, by the way, will be the regular meeting of the members, the following papers are on the syllabus for discussion: "On Mine Costs," by Mr. John E. Hardman, President; "On the Small Economics of Mining," by Mr. Howard West, A.R.S.M., New Denver; "On Mining and Milling

Practice at Ymir, B.C.," by Mr. S. S. Fowler, E.M., Nelson; "On the Direct Cyanidation of the Ores of the Dorothea Morton Mine," by Mr. W. Pellew Harvey. Needless to say the Institute will welcome the attendance of all local mining men, or parties interested in mines, at these meetings. A graphic description of the excursions of the Institute, and a full account of the meetings will, as usual, appear in these columns.

At the meeting of the New Gold Fields of British Columbia, held in London on the 16th inst., the accounts show a cash profit for the year ended 30th June, £17,380 14s. 3d., to which has to be added the sum of £4,334 8s. 1d. brought forward from last year, making a total of £21,715 2s. 4d. This sum, after deducting the amount of the interim dividend paid at the rate of 10 per cent. per annum, leaves a balance of £18,702 4s. 4d., in addition to which there is a further profit of £2,915 12s. 6d. derived from premium on shares sold. This latter amount of £2,915 12s. 6d., together with £2,048 7s. 6d. transferred from profit and loss account (making £5,000), has been carried to a reserve fund, leaving a net balance of £16,617 16s. 10d. available. The directors recommended the payment of a balance dividend at the rate of 20 per cent. per annum free of income tax, carrying forward £8,212 2s. 3d to next account.

A recent presidential address before the Institute of Mining and Metallurgy contained, among many good things, the following remarks in regard to the qualification of a mine manager, which are particularly pertinent during the present very great and general interest which is being taken in mining matters:

A capable mine manager of to-day requires to be a man of parts. The days when it was considered that an illiterate man, whose whole knowledge consisted of an appreciation of the price at which a level should be driven, ground stoped, or a shaft sunk, coupled with the ability to do the manual work himself as well as, or better, than his men, was the best manager for a mine, have passed away forever, and although we still occasionally hear the "practical man" quoted, no one in his senses would employ such a man nowadays in preference to a properly trained manager. A practical man is still required at the head of affairs, but he must have a wide grasp. He must, of course, have a good knowledge of mining as a first consideration, but he equally ought to possess a considerable acquaintance with the treatment of ores, and a fair knowledge of chemistry, so as to be able to investigate the causes of unexpected difficulties in treatment which may present themselves. He should be an accountant, a mechanical engineer, and an electrician, and able, moreover, to handle men and get a fair day's work for a fair day's pay; I might add that he must be a diplomatist, and more or less of a bush lawyer, in order to deal with those with whom he is brought in contact outside the actual working of the mine; and there may be other qualifications I have not mentioned. Very few men possess all these attributes in perfection; and, perhaps, the most necessary qualification that a manager requires is a knowledge of his weak points and an ability to select capable and reliable men for those posts with the details of which he is least acquainted.

Mr. James M. Swank has just published in the *Bulletin* a statement regarding the production of pig iron in Canada in the first six months of 1899. He says:

The production of pig iron in the Dominion of Canada in the first half of 1899, according to reports which have been received by the American Iron and Steel Association from every manufacturer of pig iron in the Dominion, amounted to 43,156 gross tons. The total production in the whole of 1898 amounted to 68,755 tons, against 53,796 tons in the whole of 1897. The production in the first half of 1899 exceeded by 5,327 tons the total production of the whole of 1895, when only 37,829 tones were made. Of the production of pig iron in the

first half of 1899 about one-sixth was made with charcoal as fuel, the remainder being produced with coke alone or with charcoal and coke mixed.

Canada produced both Bessemer and basic pig iron in the first half of 1899, all of which was manufactured by the Nova Scotia Steel Company, Limited, of New Glasgow, Nova Scotia. The production of Bessemer pig iron was less than one-third of the production of basic pig iron.

Spiegeleisen and ferromanganese are now being produced in Canada, the Mineral Products Company having blown in its furnace at Bridgeville, Nova Scotia, on May 11th, 1899. On June 30th the furnace was producing on an average about 70 tons per week. So far as we know this is the first time that either spiegeleisen or ferro-manganese has been made in the Dominion.

The unsold stocks of pig iron in Canada on June 30th, 1899, in the hands of manufacturers or their agents, none of which was intended for consumption by the manufacturers, and all of which was for sale, amounted 13,954 gross tons. A small part of the total was spiegeleisen and ferro-manganese. About one-half of the unsold iron was made with charcoal as fuel and about one-half with coke.

The number of completed blast furnaces in Canada on June 30, 1899, was nine, of which four were in the blast and five were out of blast. On December 31, 1898, there were three furnaces in blast and six out of blast. Of the total number of furnaces in Canada four use coke as fuel, four use charcoal, and one use charcoal and coke mixed.

A rich strike is reported from the new workings of the Grand Calument mining company's property, Pontiac county, Que.

On the 14th July the War Eagle paid its usual monthly dividend of \$26,250, making the total amount of dividends paid to date \$361,500.

Work is being vigorously pushed forward on the new furnaces and steel plant of the Dominion Iron and Steel Company, at Cape Breton.

Abuse of Mining Machinery.*

BY D. L. HOWARD, M.E.

To begin with the consideration of abuses of mining machinery, one must take the initiative before the machinery actually exists, for nowadays, with a decision arrived at to install machinery at any plant, begins the abuse of that particular outfit; with the first line of the designer placed upon paper, commences the cruelty; for his first step is to make machinery to conform to conditions affecting the relations of labour and capital, and dictated by them—physical conditions of surroundings as to location of mine, transportation facilities, finances of the investors, theories of the owner, his manager, engineer, &c., and many other complex influences, when, in fact, all conditions should be altered or at least modified to allow the machinery to have the best conditions under which to produce the best returns for the money to be invested.

"Anything is good enough for a coal mine," is a very usual cry, and is enough to wear out the ambition of an engineer and make him doggedly accept expediency in the place of experience in directing his efforts.

The most prominent abuses of mining machinery are common to all classes of appliances throughout the art. We can consider in the space at our disposal only a few of the items of the almost endless list of trouble, wrong, injury, and sorrow—longer than a bill of particulars in a divorce court.

*Read before the Ohio Institute of Mining Engineers.

Speed of operation, abnormal forces of capacity in quantity of output.—This abuse is all too common, notwithstanding the oft-repeated lesson of loss and disaster from over straining the constructive material, the work well performed from correct designs, constructed with proviso for safety in case of possible accident. We often hear of a plant designed for an output of 900 tons per day reported as having loaded 1,000 tons or more in the specified time, and larger plants showing phenomenal extension of output in proportion. Safe construction may have saved a disastrous demonstration of disapproval from the over-tortured and abused machinery by a breakdown at that time, but the utter failure of machinery so abused is early and inevitable. Remedy: More judgment; less greed; more steady and continuous working, less fitful and spasmodic over-exertion. The whole outfit feels the over-strain.

Filthy and slovenly management of equipment.—A tidy laborer using the commonest of tools finds satisfaction, profit, economy and comfort in caring for his implements. The ditcher cleans his spade; the gardener his hoe.

How about a coal-cutting machine, elevator, conveyor, power-transmission machinery—in some mines, even the power appliance itself? Neglect of a proper and frequent inspection of the entire plant is a feature of filthy and expensive management, a fruitful source of abuse and unforeseen trouble. Filthy and slovenly management are terms used advisedly. I have even included the engines in the neglected outfit, although in justice to the motive engineers I must accord them praise for a cleanliness about their machines that at some mines is meritorious, noticeable at almost all, being absolutely absent at but a few. This refers especially to that class of engines that require the constant attention of an attendant in manipulating the machine to perform a constant though variable duty. It has not been my experience to be able to note so favourable a condition with extra engines, running special machines and machinery about the mines—elevators, conveyors, fans, and pumps, &c. How much evidence of cleanliness, inspection, or any attention can be found among these appliances, and consider every moving machine from power throughout the equipment, from quitting whistle to starting blast? Day in and day out for months, save by a perfunctory glance over dirt and all, many entire equipments never receive any attention other than to start and to stop them, until a breakdown compels a partial cleaning up.

In an ordinary equipment for a tippie of 800 to 1,000 tons daily capacity, considering one tippie, one revolving screen, one small elevator, 40 feet lift, one conveyor for fuel and slate, with transmission chains, belts, counter shafts and main shaft, sprockets, &c., there are, roughly estimated, approximately 5 000 contact surfaces of friction and wear. With filthy machinery constantly wallowing in grit and dirt, is it to be wondered at that durability is disappointing, and that disastrous breakdowns are frequent and expensive?

The mention of cleanliness in its relation to colliery machinery will, I have no doubt, inspire a smile of derisive incredulity as being even a possibility; but a little careful consideration of how thoroughly and quickly an air or steam blast under high pressure will wipe off gummy machinery, and how inexpensive is the piping and hose to apply to it, will make more evident the desirability of the plan, and give it a more practical look.

Those who have seen a coal-cutter come to the shop for repairs, I will ask to especially consider this. I unhesitatingly claim that every machine and every part of every machine about a coal plant, its condition and its requirements, should be made intimately familiar to the superintendent every day. All parts should be cleaned daily and thoroughly, and not rarer than once a week every part made as clean as when newly installed, or as nearly so as possible, for economic reasons, if for no other.

A mine of 600 or more workmen laid out of work for five days from a break, undiscovered because not to be seen on account of accumulated oil and filth, is one illustration of the actual effects of the abuse from filth upon mining machinery.

Again, let the gentlemen who pay the bills, the workmen who wait in idleness for mechanics at the shops to clean up mining machinery when taken to the shop for repairs, before any mechanic can approach the break to begin a repair, and note how much time you perform must pay in connection with the repairs, including with your observation the added delay of anxious time: go on and on in this "train" of thought, and you will find frequent stations worth stopping at to collect loads of ideas of valuable interest all along the whole line.

Another expensive, but not so harmful abuse to machinery is imperfect, wasteful, and slovenly lubrication; but a more dangerous abuse is the entire lack of it. The boy's definition of a lubricant was "that stuff that made the machinery wear out when you did not put any of it on." An £8 horse is fed and watered every day, sometimes groomed, and has an attendant whose duty it is to see to this. I know of hundreds of pounds' worth of coal-handling machinery that runs on and on, day in and day out, doing the work of a hundred men and a half a dozen mules, that does not get an iota of attention—for days and days left to its own resources. Good lubricant to the value of the corn fed daily to a single £8 piebald old horse would ensure a better return in value, if judiciously applied to £800 worth of coal-handling machinery, in an increased efficiency in horse-power, that could be gotten from a whole corral of horses at the expense per head, or would yield for the whole output of horses.

Underground Fires.

By GEORGE SPENCER.

Several years ago, in studying the best methods of extinguishing gob fires, the writer conceived the idea that if a gas in itself non-combustible and not supporting combustion could be obtained in any required quantities at a cheap rate, and this ideal gas be applied to any fire, it would prove to be a convenient way of extinguishing gob fires. About the same time, liquefied carbon dioxide gas came under his notice, and he decided to give it a trial when an opportunity occurred.

At a colliery with which the writer was connected a fire broke out in a heading as the result of a fall of roof and sides on steam pipes. The heading was built off with as little delay as possible, but, notwithstanding all efforts to keep out the air, sufficient reached the seat of fire to keep it burning slowly. It was, therefore, decided to apply carbon dioxide, and for this purpose six cylinders of liquefied gas were connected to a two inch pipe with $\frac{3}{4}$ inch branches placed at intervals of one foot, and the contents discharged through a hole in one of the stoppings. From a distant stopping it was ascertained that the gas had diffused throughout the headings, and from that time the heat abated, and no trouble whatever was subsequently experienced.

The liquefied carbon dioxide was supplied in drawn steel cylinders (C size), containing 30 pounds, and the pressure varying with the temperature, was 509 lbs. per square inch at 32° Fahr.; at 50° Fahr. the pressure would be 664 lbs. One pound of the liquid will produce eight cubic feet of CO₂ at atmospheric pressure and temperature. The liquid carbon dioxide costs 2d. per lb., delivered in quantities of not less than 300 lbs., or ten cylinders of C size. According to Professor Clowes, air containing 15 per cent. of carbon dioxide will extinguish flame, and probably the same mixture will fail to support the combustion of the material usually met with in underground fires. It is not claimed by the author that the method he advocates could be successfully applied to all fires, but he considers there are many cases which might be so treated.

Winding.

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(Continued from July number)

Name of Engine		Steam used per indicated horse power per hour
		Pounds
1	Llanbradach No. 1, without expansion	35·6
2	*Hetty Pit, without expansion	74·0
3	*Hetty Pit, with expansion	46·0
4	*High-class engine, with expansion	37·0
	*Tymawr Compound, with expansion	26·0

Name of Engine		Steam used per actual horse power per hour
		Pounds
6	Llanbradach No. 1, without expansion	52·2
7	†La Grange (Anzin)	87·7
8	†Treuil (St. Etienne), raising Coal.. ..	96·8
9	† Ditto raising Water	81·4
10	†Llanbradach No. 2 Compound, without expansion	51·9

* Transactions of the Federated Institution of Mining Engineers, Vol. XII., p. 286.
 † Ibid. Vol. XI., p. 207.

In the case of the Llanbradach engines, and probably also in that of all the others with the exception of La Grange, no notice is taken of losses due to condensation of steam in the cylinders or priming. On the other hand, M. Waymel, who kindly sent me the information about La Grange engine, mentioned that losses of every kind were accounted for in the *15 kilogrammes per tonne utile eleve a 100 metres=87.7 pounds per horse power per hour.*

I attribute the relatively high economy of Llanbradach No. 1 winding engine partly to the high pressure of the steam with which it is worked, partly to the ratio of the aggregate weight of the moving masses to that of the useful load.

More or less successful attempts have been, and are being, made to render winding engines less wasteful of steam by providing them with expansion gear and by expanding the steam in two cylinders—that is, making them what is called compound.

A few compound winding engines have been working on the Continent for some years. One of the greatest difficulties to be overcome in this class of winding engines is that of starting.

In considering this question more than ten years ago, it occurred to me that if a self-acting reducing valve were introduced in a special

pipe, extending between, and communicating with, the high-pressure steam pipe on the one hand and the pipe through which the steam passes from the high-pressure to the low-pressure cylinder on the other, this difficulty would disappear. Accordingly I caused a small compound winding engine, provided with this contrivance, to be built in 1887. It began to work at Llanbradach in October of the same year, and was found to answer the purpose admirably.* Some time after I had published an account of this engine a patent was taken out for the use of a reducing valve for starting compound engines in this way, and even as I write proceedings at law are pending between the patentee and a well-known firm of engine builders in the Midlands. The compound winding engine of No. 2 Pit Llanbradach (Figs 36 and 37) was fitted with two reducing valves, one for each high pressure cylinder, and in this case again all difficulty in starting has been successfully avoided. That engine starts as easily and smoothly as any other winding engine, and raises its useful load, 3 tons 3 cwt. of coal, from a depth of 500 yards in 40 to 45 seconds from start to finish.

It has four cylinders—two high-pressure in front, two low pressure behind, the latter connected to the former tandem-fashion. The high-pressure steam-pipe is marked F, the stop-valve E, the reducing valves H, and the pipes leading from the latter to the intermediate pipes G.

The dimensions of the cylinders were taken such that a balance rope under the cages would be required to obtain the maximum of economy while the steam was being expanded in both the high-pressure and low-pressure cylinders. The balance rope had not been adopted when the continuous diagrams were taken, which show the consumption of steam to have been 51·9 lbs. per horse power of useful work per hour, as given in the foregoing table, and hence the relatively high consumption of steam as compared with the Tymawr Compound winding engine whose performance is given in the same table.

Balancing the Ropes.—According to the ordinary system of winding, the rope to which the cage at the bottom of the shaft is attached is unbalanced, and the winding engine requires to be strong enough to raise this weight as well as that of the useful load when the operation of winding commences. But the ascending rope is continually becoming shorter and its weight less, while the descending rope is becoming longer and its weight greater as the cages get nearer and nearer to their respective destinations. Thus at the commencement of a winding, when it is necessary to accelerate the motion of the moving masses, the resistance is greatest; and at the end, when their motion ought to be retarded, the resistance is not only least, but may even become negative if the quantity xD is greater than Q .

* South Wales Institute of Engineers, Vol. XVI. (1888).

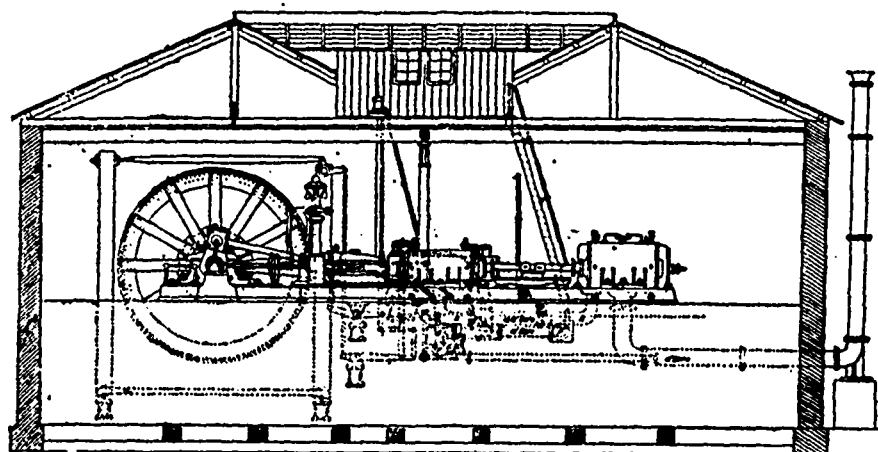


FIG. 36.

LLANBRADACH COMPOUND WINDING ENGINE.

High-pressure cylinders, 2 ft. diam.; low-pressure cylinders, 3 ft. 8 in. diam.; stroke, 4 ft. 6 in.

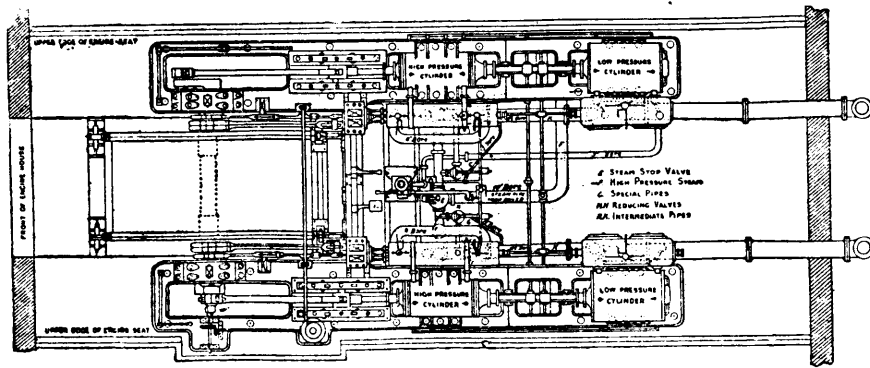


FIG. 37.
LLANBRADACH COMPOUND WINDING ENGINE.—Plan.

This circumstance has led to the adoption of many different methods of balancing the rope in the pit. Amongst these may be mentioned the employment of heavy chains, which are attached by means of a light rope or chain to a moveable link on a small drum on the main drum shaft, and hang freely in a small pit sunk for this purpose. As the operation of winding is commencing the chain descends into the small pit, thus accelerating the motion of the engine, and gradually forms a heap at the bottom; or its lower end is fixed to the side, and then it forms a loop as it descends. The length hanging from the rope thus gradually decreases in each case, until it becomes *nil*. As the operation is drawing to a close the chain is again raised up, thus retarding the motion of the engine.

Herr Koepe, an eminent German mining engineer, invented and adopted a system in which a large pulley took the place of the winding drum. The same rope extends all the way from one cage up over a pulley on the head gear, round the engine pulley, back over the second pulley on the headgear, down to the other cage, then to the bottom of the shaft, where it forms a loop, and lastly up to the cage from which it started. When the engine pulley is made to revolve one cage ascends and the other descends the shaft. The pulleys on the headgear may either be placed at an angle to the plane passing through the groove of the engine pulley (Fig. 38); or the two pulleys may be in the same plane with the engine pulley, and then one must be higher and further away from the engine shaft than the other. The friction between the

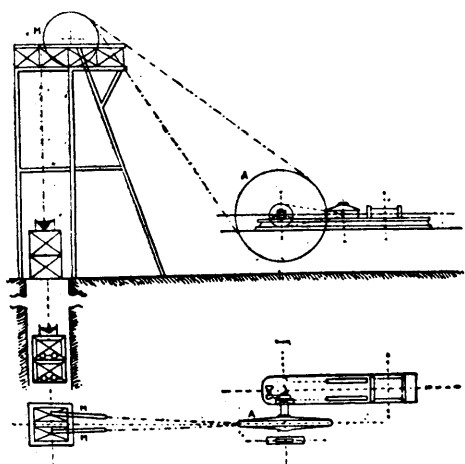


FIG. 38.
KOEPE'S SYSTEM.
A, Engine pulley; M M, headgear pulleys.

rope and the engine pulley is sufficient to raise the useful load, which represents all the work required to be done by the engine, since the rope is balanced in every position of the cages. One modified application of this system (Fig. 39) consists in making use of two other pulleys below those on the headgear and at right angles to them, over each of which a rope extends from one cage to the other. Another consists in attaching the two ends of a rope, whose length is rather

greater than the depth of the shaft, to the bottoms of the two cages respectively, and allowing it to form a loop under the platform on which the cages rest at the bottom. In some cases a pulley free to move vertically in guides rests on the loop at the bottom of the pit and keeps the rope in position. In other cases, holes of six or eight inches square are made in the platform at the bottom of the pit, and the rope passes down through one and up through the other, having just sufficient slack under the platform to enable it to form a natural loop, but not enough to allow it to kink. Ropes used for this purpose should be more than usually supple. When an old winding rope is employed, one of the strands is generally untwisted from it to give it the necessary degree of flexibility.

Another method of obtaining a perfect balance is to employ flat

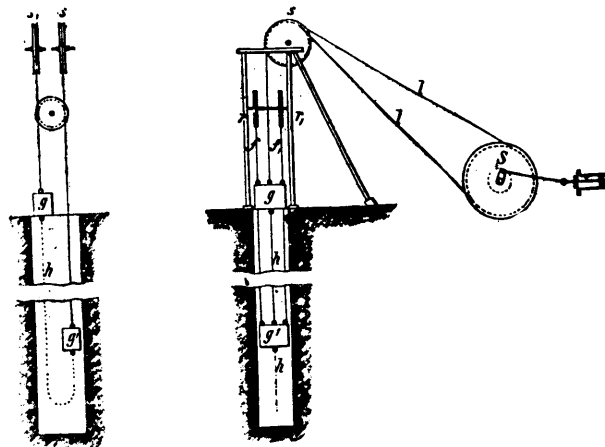


FIG. 39.

KOEPE'S SYSTEM, WITH SAFETY ROPES.

S, Engine pulley; r r, headgear pulleys; r r, pulleys for safety ropes; f f, safety ropes; g g, cages; h, balance rope; l l, winding rope.

ropes which coil upon themselves between the arms of a narrow drum or reel (Figs. 40 and 41). The depth of the shaft being known and the initial or smallest diameter of the drum having been determined, the final diameter of the coil and the thickness of the rope are ascertained by calculation. When these quantities are fixed for a winding of a certain depth the same appliances cannot be so economically used for a greater or less depth. The same remark applies to spiral and conical drums.

The spiral drum, properly so-called, is also a perfect solution of the problem of balancing, and its modifications, the conical and cylindrical drums, are approximate solutions.

*There are certain properties which appertain to every spiral drum, whatever may be the form of the rope employed. Such a drum consists of two parts which are symmetrical when referred to a plane passing between them—that is through the middle of the drum at right angles to its axis.

*Condensed translation from Cours d'Exploitation des Mines. Hanton de la Goupillière. Paris 1897.

One of the ropes is coiled on each part of the drum and the two are suspended from opposite sides, so that when the one is being coiled up the other is being uncoiled. At the end of a winding one rope is entirely coiled up and the other is entirely uncoiled and hangs vertically downwards from its point of contact with the periphery of the drum. The two ropes are identical in every respect whatever their form may be, tapering or otherwise.

At the instant when the two loads pass each other the whole of the phenomena are symmetrical. I shall therefore regard this position as the point of departure to which all other points in the winding will be referred.

The total number of revolutions of the drum being denoted by the letter n , the number required to raise the load from the passing point

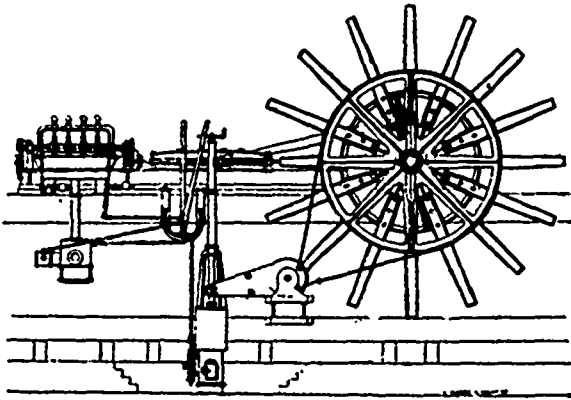


FIG. 40.
FLYT ROPE DRUMS—Elevation.

to the surface will be considered as a *positive* quantity, that required to lower the empty cage to the bottom as a *negative* quantity.

There are necessarily as many revolutions required to raise the full cage as to lower the empty one: *the passing point must therefore mark the exact middle of the revolutions.*

If then $2N$ signifies the total number of revolutions whole or fractional, n will vary from $-N$ to $+N$: namely, from 0 to $+N$ to take the full cage from the passing point to the surface, from 0 to $-N$ to take the empty cage from the same point to the bottom of the pit.

Signifying by Y_n the ordinate of the curve of the surface of the drum, or the radius of the rope coil at the end of n revolutions, the radii of the circumference at the two extremities of a complete winding will be given by the expressions Y_n and Y_{-n} .

We have then:

$$Y_n > Y_{-n}$$

for we must have the longer arm of the lever to which the shortening length of rope coming towards the surface is suspended compensating the shorter arm to which the longer length of rope approaching the bottom is suspended.

Let H be the total depth, h_n will be the straight part of the rope

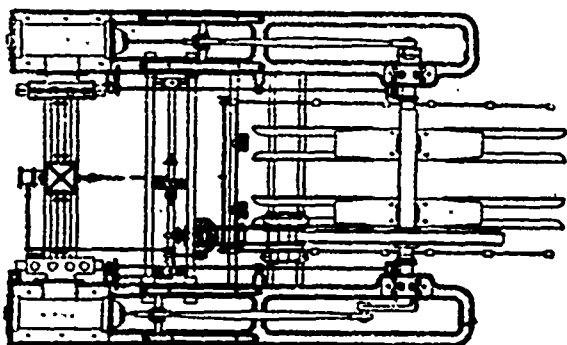


FIG. 41.
FLAT ROPE DRUMS.—Plan.

hanging from the drum perpendicularly to the radius Y_n . On arriving at the surface we have then:

$$(1) \quad h_n = 0,$$

and at the bottom:

$$(2) \quad h_{-n} = H;$$

h_0 the depth to the passing point is for the present unknown as well as the radius R which corresponds to it. It is, however, easy to see that we have necessarily—

$$h_0 > \frac{H}{2},$$

or that the passing point is always below the middle of the pit.

Let Q be the useful load, q the dead weight—that is, the cage, chains, and empty waggons.

The load on the ascending rope is then $Q+q$. At the passing point the moment is reduced to QR the weight of the mineral, because then the two ropes and the two dead weights are equal to each other. The problem to be satisfied is to maintain absolute equality at each instant during the continuation of the winding between the algebraic sum of the moments of the forces in regard to the axis of the drum, and this sum will always be equal to QR .

At the n^{th} revolution the load $Q+q$ is suspended at the end of a length h_n of the rope. Let the weight of this length of rope be represented by p_n . We have then on this side of the drum the moment $(Q+q+p_n)Y_n$. At the same time the empty cage q , occupying the position $-n$, is suspended from a rope whose length is h_{-n} and weight p_{-n} . The radius of the point on the spire from which it hangs is Y_{-n} , and this part of the system produces a negative moment equal except as regards its sign, to $(q+p_{-n})Y_{-n}$. Taking the whole system therefore we have:

$$(3) \quad (Q+q+p_n)Y_n - (q+p_{-n})Y_{-n} = QR.$$

From this we can immediately derive an important consequence. Let us write this equation in such a way that it will represent its own symmetrical equivalent; that is to say, the two cages change their positions in the shaft reciprocally, and the number of revolutions then becomes $-n$ instead of n .

$$(Q+q+p_{-n})Y_{-n} - (q+p_n)Y_n = QR.$$

The ensemble of the two statements reproduces as we see here, the same terms as before, but with contrary signs, with the exception of those which include Q . If therefore the two are added together and divided by Q we obtain:

$$Y_n + Y_{-n} = 2R.$$

Thus, *each radius of the spiral on one side of the drum continually increases by exactly the same amount that the other decreases; or in other words, the arithmetical mean of the radii of simultaneous winding on and off remains invariable.*

It stands to reason therefore that the radius which corresponds to the passing point is the *mean radius*, and it is determined from the preceding equation by writing it for the extreme positions:

$$Y_n + Y_{-n} = 2R.$$

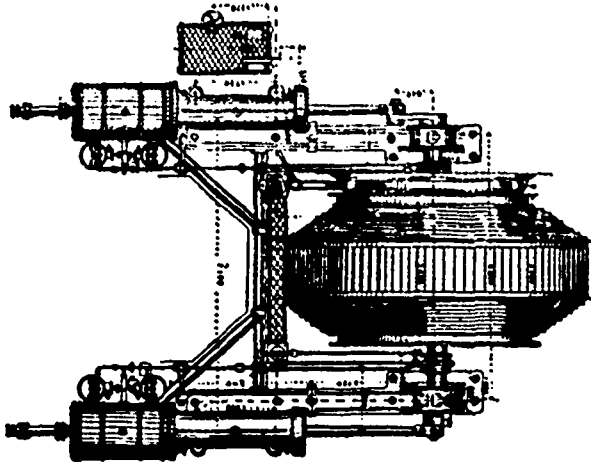
Some further relations that may be deduced from mathematical considerations may be stated verbally as follows:

1. The arithmetical mean of the simultaneous velocities of the two cages remain constant and equal to the velocity at the passing point.
2. The distance between the cages varies proportionally to the angle described by the shaft of the drum.
3. The total number of revolutions of a spiral drum is the same as would be required in a cylindrical drum, constructed with a diameter equal to the mean radius of the spiral drum.

Thus far M. Haton de la Goupillière.

Spiral drums have been largely introduced of late. They are perfect as far as balancing the rope is concerned. They are, however,

cumbrous, heavy and costly—three charges which can be brought with equal truth against the less perfect conical and cylindro-conical drums (Fig. 42)—and it is questionable whether the advantages which they



(FIG. 42.)

CYLINDRO-CONICAL DRUM, ANICHE MINES.

present in the way of balancing the rope are sufficient to compensate their disadvantages in other respects. Their great weight, which may amount to anything between 40 and 80 tons, according to their size, involves the expenditure of a corresponding amount of work in imparting to them sufficient angular velocity to accomplish the winding within a given time. If the momentum thus acquired is wholly absorbed in doing useful work, that is in raising the load, after steam is shut off towards the end of a winding, no work is lost in consequence of the great weight of the drum. But if it is necessary to maintain the angular velocity of the drum so near to the end of the winding that the brake has to be applied in order to assist the load to arrest the motion of the drum at the proper instant, then a certain proportion of the work done by the engine at the commencement of the winding is destroyed.

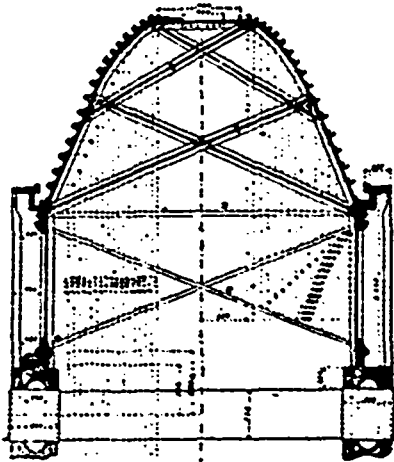


FIG. 43.

SPIRAL DRUM.

Under these circumstances it is more economical to employ a lighter drum, and to balance the rope according to one of the other methods already described.

For instance, let us compare two problematical cases: one with a spiral drum in which the whole of the moving masses referred to the periphery of the mean radius of the drum represent a weight of 40 tons, moving with the maximum velocity of the cages, say 64.4 feet per second: the other with a cylindrical drum and a balanced rope in which the same masses referred to the periphery represent a weight of 20 tons, moving at the same rate as in the last case.

Let the useful load in each case be 3 tons and the depth 1,800 feet. The influence of friction being left out of account, the time which the useful load will take to arrest the motion of the drum is given by the formula.

$$t = \frac{v}{g} \times \frac{W}{w}^*$$

* This equation is derived from the well-known formula :

in which t is the time in seconds, v the velocity in feet per second, g the

$$g : a :: W : f,$$

in which $a = \frac{v}{t}$ and f is the accelerating or retarding force.

acceleration due to the force of gravity = 32.2 feet per second, W the weight of the moving masses, and w the useful load.

In the first case :

$$t = \frac{64.4}{32.2} \times \frac{40}{3} = 26.66 \text{ secs.}$$

In the second case :

$$t = \frac{64.4}{32.2} \times \frac{20}{3} = 13.33 \text{ secs.}$$

Suppose the winding engine to be of the same power in each case, and that the time required to impart the velocity of 64.4 feet is 26.66 seconds in the the first case and 13.33 in the second case. Then the whole time occupied in the winding is :

In the first case—

	Secs.	Feet
Acceleration.....	26.66	856.52
Retardation	26.66	856.52
Full speed.....	1.35	86.96
	<u>54.67</u>	<u>1800.00</u>

In the second case:

	Secs.	Feet.
Acceleration.....	13.33	428.26
Retardation	13.33	428.26
Full speed.....	14.65	943.48
	<u>41.31</u>	<u>1800.00</u>

With the lighter drum 13.36 secs. are gained in each winding without any loss of efficiency. If the brake is applied in the first case so as to stop the drum in 13.33 seconds, we should have :

	Secs.
Acceleration ..	26.6
Retardation..	13.3
Full speed.	8
	<u>47.9</u>

and even in this case the loss would be over 6½ seconds per winding.

If a sufficiently powerful winding engine be provided to impart an angular velocity of 64.4 feet per second to the heavier drum in one-half the time calculated above, and if the brake be used at the end of the winding, then the winding may be effected in the same time as with a cylindrical drum with a balance rope, but at a greater first cost for engine and drum, and with a certain constant additional expenditure of power.

Following is my estimate of the cost of winding 700 tons per day from a depth of 792 feet with No. 1 engine of Llanbradach Colliery :

Labor per day—

3 Winding-engine men (8 hour shifts) ..	£0 16 6
1 Engine-cleaner.....	0 3 0
3 Hitches (2 by day 1 by night) ..	0 12 0
3 Hanksmen (2 by day 1 by night).....	0 11 6
	<u>£2 3 0</u>

Stores per day—

Coal, 6 tons at 4s.....	£1 4 0
Hauling, stoking, and boiler management, 6 tons at 1s 6d.	0 9 0
Engine and rope oil, packing, waste, and light.....	0 10 0
	<u>£2 3 0</u>

Ropes per 600,000 tons coal raised—

2 Winding ropes, each 366 yards, at £75.....	£150 0 0
6 Guide ropes, each 284 yards, at £35	210 0 0
	<u>£360 0 0</u>

Repairs and renewals per annum—

Winding engine.....	£ 60 0 0
Cages, chains, safety hooks, etc.	50 0 0
	<u>£110 0 0</u>

Summary of cost per ton of coal raised—

Labor.....	d 0.737
Stores.....	0.737
Ropes.....	0.144
Repairs and renewals.....	0.132
	<u>1.750</u>

Aerial Tramways in B.C.

B. C. Riblet, of Sandon, gives a very interesting account of the building and operation of aerial tramways in West Kootenay. "The question of transportation," he says "will always be a prime factor in the working of mines. In mountainous country, where railroads are impossible and wagon roads or trails can be used for only a few months of the year, aerial tramways best solve the problem for the conveyance of ore, timber and supplies.

"In the Kootenay district of British Columbia, the steep and precipitous mountain sides, broken as they are by gulches and canyons, down which sweep the irresistible snowslides, preclude the use of surface trams or wagon roads.

"In the early days of mining, the pack train and rawhiding was the means of transportation. Lack of means, or the undeveloped condition of the mines being such that the investment of any great amount of machinery was not justifiable, so the trails were lined with pack mules or sacks of ore were being rawhided over the snow down the mountain sides to the railroads or smelter.

"The expense of rawhiding ore being about one half that of packing, mining operations were carried on most extensively during the winter months, the summer months being occupied in development work or blocking out ore. When the development proved the permanency of the ore body, and large quantities of ore were blocked out, the question of transportation became the prime factor. But the system of aerial tramway from the comparative small cost of construction, and in operation unaffected as they are by the elements, solve the problem for the economical transportation of ore from the mine to smelter or railroad. Many have been constructed, and it has been the good fortune of the writer to superintend the erection of most of them. In the Slocan District there are ten or twelve—aerial and surface.

"The first to be built was the aerial tramway for the Noble Five Mining and Milling Company, and is one of the best in the country. It transports by steel ropes and buckets ore from the mine near the top of Noble Five mountain to the company's concentrator a mile and a half away at the town of Coiy.

"Running parallel with this is the Last Chance tram, of an equal length, which crosses the dreaded Noble Five slide at an elevation of 700 feet in one long span of over a half mile.

"The Payne mine has its ore transported to its ore house by a surface tram and to the C. P. R. freight house by an aerial tramway.

"The Porto Rico mine at Ymir, the Idaho mines at Three Forks, and the Lucky Jim have tramways in successful operation.

"Near the City of Sandon, B.C., the Ruth mine is constructing an aerial tramway, which will carry the ore to its concentrator now being built within the city limits.

"There are many tramways in operation in the Kootenays, and they are the accepted means for economical transportation of ore. Aerial tramways may be divided into two general classes—the single rope and the double rope system. The single rope system has been largely superseded by the double rope, owing to its greater capacity, durability, simplicity and small cost of operation. During the past three years, I have designed or erected in West Kootenay several modifications of the double rope aerial tram, adapted to the topographical features of the country and the requirements of the mine. Opinions differ among mine operators in regard to the utility of the styles of tramways. There are a number that give entire satisfaction. Of the double rope aerial tram the Finlayson, erected by the writer two years ago, is perhaps the best type for long distance and large capacity. Buckets holding 700 pounds suspended by cranes attached

to trolley wheels, which are run on one-inch cables and hauled by a smaller cable, is the style of this tram. Fifty-two buckets are used, drawn by three-fourth inch cable, passing around grip sheaves of eight feet in diameter at each terminal. The buckets are loaded and dumped automatically at the mine and concentrator.

"The single rope system is not used in this country. The two-bucket, gig-back, tram for short distance haul and the Finlayson for long distance are the universal style adopted here. The Payne mine has been operating one of the former style for the conveying of ore from its crusher to the railroad for over a year. There is one span of 950 feet across a deep ravine and a short span of 350 feet. The difference in elevation of the terminals is 455 feet. The carrying rope is three-fourths inch crucible cast steel of flattened strand and the running rope is three inch steel of high tensile strength. The small tram, representing a very low cost, has a capacity of 150 tons in ten hours, and is operated by one man.

"For the Last Chance Mining Company has been recently constructed a double rope aerial tramway. From the mine to the ore house near the railroad is 6,500 feet, and a difference in elevation of 4,000 feet. At the mouth of the lower tunnel is located the upper terminal of the tram. Ore is dumped out of the car from the mine into the ore bin and the tram conveys it to the crusher where it is sacked for shipment in cars to the smelter. From the upper terminal there is one great span of 2,800 feet—the longest on record, I believe, —crossing a deep gorge reaching out to a tension station nearly half way distant on the line. The buckets, suspended in the air and so far from the supports, look like black specks. After the tension is reached the country is more regular, and towers for the support of the rope occur every 400 feet until the ore house and lower tunnel is reached, and the ore is automatically dumped into the company's bins.

"The Last Chance ships a carload every day to the smelter and hauls up all their supplies and material for the mine. The tram is operated by one man in hauling the ore. The same with the Noble Five, which has a capacity of 400 tons per day. But the Last Chance tram differs from the latter in the fact that the buckets are fastened permanently to the running rope and a stop is necessary whenever a load is placed in the bucket. With the Finlayson system no stop is necessary. The bucket is automatically detached and another attached without the stopping of the tram. It can be readily seen the advantages of the Finlayson system and the increased capacity of this tram.

"But a tramway must be built to meet the capacity of the mine and the condition of the country over which it must run.

"The following styles are used: For 2,000 feet or less when gravity is the motive power, the two-bucket, double-rope, gig-back is the most economical and serviceable tram.

"One hundred and fifty tons per day is an ordinary capacity and such is handled by the tram at the Porto Rico mine and the Payne mine. Another is being constructed by the Ruth, near Sandon.

"Where long distance is met but small capacity is required, the intermittent system used by the Last Chance Mining Company is an economical and satisfactory system of trams, and the Finlayson system for long distance and great capacity.

"An aerial tramway is not affected materially by the season of the year or the condition of the elements. The abundance of snow and the precipitous condition of the country makes the hauling of ore an impossibility in some of the winter months.

"A tramway will pay for itself in a short time. The following reasons are given: The low cost of transportation. One man is employed instead of a pack-train. It works the year round, night and day if necessary. Carries up supplies and material for the mine and

has a passenger service, if one has the necessary courage to ride them. Accidents to the tram are very few and break-downs seldom. The towers are built so that an even grade is maintained and the buckets are above the snow, and in little danger of fire in the summer. The cables are flattened strands so that the wear is on a greater surface and a change can be made by twisting the rope. Rope grease on both the cables is used and the wear is reduced to the minimum.

"All the tramways constructed by the writer are in successful operation and many facts and figures could be given on this subject of aerial tramways but no one will doubt the utility of cheapness of conveying ore who has tried or seen this method of transportation."

Losses of Gold in Mill Water.

By A. VON GERNET.*

A conversation with Mr. Hennen Jennings, on the subject of losses of gold, not generally recognized, in the treatment of ore, led me to a series of experiments, which gave results of sufficient importance and interest to be placed before this Society.

As is well known, all mine water-dams on the Rand and water used in milling, contain gold in solution, in quantities which vary from traces up to twelve or more grains per ton. Naturally, this gold represents an accumulation, and usually attains a maximum on mines returning their mill water direct from the slimes spitzkasken to the mill, without mixing it with the bulk of water in the main water dam. The question arose whether this solution of gold is due only to cyanide in the water, or to other salts, for instance, per-salts of iron, which dissolve minute quantities of gold. To determine this, fifty tons of ore were crushed in a three-stamp battery, the same water being used over and over again. The result was that at the end of the trial only traces of dissolved gold were found in the water; consequently, the dissolving of gold in practice may be considered due to cyanide only.

There are four or more places where cyanide may get into the mill water, and sufficient care cannot be taken to prevent this happening. The fact that tailings and slimes have become lower in value since the introduction of the cyanide process, and, especially, since slimes treatment has been generally adopted, may in some measure be due to the contamination with cyanide, accidental or otherwise, of the mill water, and not wholly to a change in the value of the ore. Before the general use of lime in mills, the presence of acid sulphates of iron in the water passing over the plates served to convert any small traces of cyanide into innocuous Prussian Blue, but with an alkaline mill-pulp the danger to be apprehended from cyanide contamination is considerably greater. It would have been interesting to have learned the assay value of the water leaving the plates immediately after the carrying out of the practice, which has occasionally been followed in the past, of periodically feeding solid lumps of cyanide into the mortar-boxes. Should such an accident ever have occurred, as the contents of a cyanide storage vat finding its way into a small water dam supplying the mill, it is probable that the rate of solution of the gold, not only in the ore being crushed, but also of the amalgam in the boxes and on the plates, would be remarkably rapid; the effects of such an accident differ but in degree from the results which necessarily follow from the practice already indicated, of crushing periodically for a while with dilute cyanide solution. The plan of regularly sampling and assaying the water entering mortar-boxes and leaving slimes spitzkasken, is a good one and serves as a check, the number of tons of water used per ton of ore crushed being taken into account in considering the results.

The four sources of danger of cyanide contamination are:—

(1) The Battery.—In dressing plates, cyanide is frequently used. Care should be taken not to run this solution into the main tailings-lander, but into a separate sump. I could mention a mine on which, some years ago, more cyanide was used during the month in the battery than in the cyanide works; the consequence naturally was extremely low grade tailings. This is of course an exceptionally bad case, and could hardly occur now-a-days; however, all millmen do not seem to realize that not only is gold in amalgam, of value, but in other forms as well, and that it is not to the profit of the Company to win a pennyweight more on the plates, if in so doing, an ounce of gold is lost, which might otherwise have been recovered. In other words, the reduction or gold-winning plant on a mine should be regarded as a whole, and not one portion only.

(2) Double treatment in sand plants.—This is no doubt a great improvement on former methods, but very great care has to be taken that slat-gates and pulp outlet doors are tight during the cyanide treatment in the upper vat. After transferring the charge from the upper vat the filter is saturated with strong solution, and should be washed out thoroughly before refilling commences.

(3) Slimes Plant.—The condensed spitzkasten pulp is delivered into and settled in slime collecting vats, from which, after settling, all the water possible is decanted off. In many plants the collecting vat is used for treatment also, cyanide solution being introduced into it previous to transfer, by means of a pump, to another vat. In such a case the collecting vat should be washed out thoroughly with water, and thus freed from all solution before refilling. However, to reduce the responsibility of shiftmen and avoid all danger of loss, it is preferable to use collecting vats for collecting only, and to arrange the plant in a way that allows of the removal of the pulp from the collecting vat to the treatment vats without introducing cyanide solution into the former. This can be done either by placing the collecting vat on a higher level and gravitating the slime pulp therefrom to the treatment vat, or by gravitating the pulp into a sump and pumping it with solution into the treatment vats.

(4) It is one of the principal rules in the cyanide works that no solution should be run to waste. More attention might with advantage be paid to carrying out this rule, as besides the gold actually lost in the solution, the danger of contamination of the mill water supply must be obvious.

To the majority of our members there will be nothing of special novelty in the foregoing remarks, but the importance of the subject and the perhaps not full appreciation at all times of the losses cyanide in the wrong place may cause, constitute, I trust, sufficient reason for placing this note on record.

Slate in Canada.

The slate quarried in Canada comes chiefly from the Cambrian rocks in Quebec, although agillites of various colors are known to exist in other parts of the Dominion. British Columbia has had two companies operating quarries by horse and hand power in recent years; one at Nanaimo, in Vancouver, and one at New Westminster. In Quebec at one time there were three concerns working quarries in Richmond County; one at New Rockland and two at Richmond, which produced principally roofing slates. In recent years, however, only one large concern has supported the industry.

One of the reasons why Canadian production has been small is because slate can be imported very cheaply from the Vermont region in the United States, notwithstanding the duty.

During the year 1894 to 1898, the total production of slate in Canada was \$271,411; the imports, \$119,366; the exports, \$13,097; and the approximate consumption, \$377,680.

*The Journal of the Chemical and Metallurgical Society of S.A.

To encourage the home industry the Canadian Government has imposed a duty of 25 per cent on all importations of roofing slate (not exceeding 75 cents per square), school slates and pencils 30 per cent. on mantles and other manufactures of slate. Notwithstanding this tariff, however, the domestic output has diminished 46 per cent. during the past five years and the consumption has fallen off nearly as much. On the other hand a small export trade was built up, but in the last two years little or nothing has been done in this line.

The total production of slate in Quebec in 1898 was 3,432 short tons, valued at \$37,374 as against 5,208 tons, valued at \$37,600 in 1897. The New Rockland Slate Company is the only one working slate quarries in Quebec. The company opened its property 35 years ago, and in 1898 it employed 85 men regularly; 50 in the quarry and 35 in the shops for preparing the slate for market. The average yearly output of roofing slate is used in Ontario. The National Slate Company, a small concern, abandoned its quarry in 1898, leaving the New Rockland Slate Company the only one in the field.

Of the total imports into Canada in 1898 the United States furnished \$21,762, or 87 per cent.; Germany, \$2,573, or 10 per cent.; Great Britain, \$362, or 2 per cent., and China and France the balance. The United States shipments consisted of 1,150 squares of roofing slate, valued at \$3,475, or \$2.30 per square; 302,744 pieces of school slate, worth \$10,334; mantels, valued at \$554; pencils, \$447, and all other manufactures of slate, \$6,952. In comparison with previous years, the imports from the United States show wide fluctuations, more particularly in roofing slate. In 1894 the total imports were 3,067 squares of roofing slate, valued at \$12,568; in 1895 they dropped to 1,470 squares, valued at \$5,276, but in 1896 the imports rose to 2,891 squares, valued at \$9,948. On the other hand the imports of school slates have grown from 140,139 pieces, valued at \$4,307; in 1894 to 302,744 pieces, valued at \$10,334, in 1898.

The small imports from Germany in 1898 included no roofing slate, but a small quantity of school slates. Little or no roofing slate has been imported from Great Britain for a number of years past.

COMPANIES.

Le Roi Mining Company.—Mr. Carlyle, mine manager for the British America Corporation, Limited, and the Le Roi Mining Company, Limited, writes under recent date, as follows:—"Le Roi—We have fine reserves of good ore in this mine, but it so happens that during these few weeks in all the faces where we are now working, either driving or extracting ore, the ore happens to be of a low grade. We undoubtedly have, however, fine bodies of high-grade ore, which we will extract just as soon as we can get proper access to by making cross-cuts and upraises, and preparing shutes and stopes, as is proper for the correct mining of it. Six weeks ago we were extracting some very nice ore, practically while doing development work, and now we are preparing to get out this ore, much of which remains above and below the drifts in which we found it. I am following the regular sequence in mining, and I have not attempted to rush values by robbing the good reserves, but have taken the ore just as it came, regardless of its grade, as long as it paid to handle. Realising the demands that will arise in the future, we are putting more stress on the opening up of the mine than the extraction of ore at the present time, and until we get the mine well opened out, with the large reserves blocked out and in proper mining shape, so that we can keep our shipments regular, both in amount and value, it will be impossible to maintain the even tenor of our way. In the 700 ft. level we have considerable ore in the face of the west drift, which we are pushing rapidly ahead, with about 200 ft. to go to get into the fine new ore shute found on the 600 ft. level. In the 600 this new shute was cut by a large dyke 100 feet thick, which we have traversed, and are now running to the left, as we are almost positive, judging from the work, that the vein is faulted a comparatively small distance in this direction. In the 800 ft. level we will start this week in an upraise to the 700, and now that timbering has been begun, we can begin a large slope at this point. As soon as this is done we will resume sinking for the 900 ft. level. In the west of the 600 ft. drift we are running a raise to connect with the 500 ft. level, after which we propose running a cross-cut to the south 200 ft., to explore the vein which shows parallel in the Black Bear tunnel, and will strike this at a depth of 170 ft. below the tunnel mentioned. What this work will develop we cannot tell, but this vein is certainly very promising. I will push the 600 ft. level, when we pick up the vein again to the end line, or about 120 ft. more, and if it passes into the Black Bear claim, one of the Le Roi properties, we will, of course, continue the drift; otherwise, it will pass into the Annie claim in the West Le Roi group, and help greatly in adding to the value of that property. I was recently down at our smelter in Northport, and found the plant in excellent shape and running very well. They are probably doing an excellent smelting work there as can be found in any part of the world. I might say that in

the Le Roi Mine its history shows that without any difference in the appearance of the ore fluctuations in the values have often occurred, but I hope that shortly the conditions will so change in the mine that the grade will rise to a higher value. Even the grade that we are shipping at the present time will pay handsomely, but with the present imperative development work in progress I am not trying to push the output. British America Corporation, Limited—In the No. 1, on the 300 ft. level, we have recently opened up a very nice ore shute that has now continued for 75 ft., with a width of 5 ft. to 6 ft. of high-grade ore (copper), that will run from 4 to 6 per cent. copper, and average for this distance and width \$25 to \$30 per ton in gold and silver. Some days the whole face has assayed as much as \$50 in gold, silver and copper. This ore is probably the best discovery that we have made on any of our properties. On the 200 ft. level we found a large amount of medium-grade ore that will be sent to the smelter when we are ready to ship. Shortly we will reach the 400 ft. level, and will push on quickly to see if this vein holds out there below the shute found on the 300 ft. level. On the Nickel Plate our new shaft will soon be ready to the 200 ft. level, when we will keep on sinking to the 400. In the Great Western we are getting ready now to put in our new plant, which has just arrived."

The Dominion Coal Company, Limited.—The stockholders of the Dominion Coal Company, Limited, took action at an adjourned meeting held in Boston last month, looking to the eventual leasing of the company's property in Cape Breton to the recently organized Dominion Steel and Iron Company. The shareholders, at the suggestion of the directors, voted both to enter into a contract with the steel company for the sale of a large amount of coal to it at \$1.20 a ton, and to give the steel company the option of leasing the property at any time between January 1 next and July, 1903, for a term of years contemporaneous with the existence of the Dominion Coal Company's leases on a basis of six per cent. dividends on the common stock. President Henry M. Whitney presided, and among the other officials present were Secretary B. F. Pearson, Treasurer J. S. McLennan and Auditor J. H. Wills. There was an unusually large attendance of stockholders. After calling the meeting to order President Whitney briefly outlined the plans for the building of the Dominion Steel and Iron Company's smelter works at Sydney. In order that the steel company may be certain of always having an abundant supply of coal, the directors of the company have decided that it would be expedient to lease the coal properties upon which it will be obliged to depend for its supply of fuel. Secretary B. F. Pearson read the memorandum of an agreement entered into between the directors of the two companies, which the stockholders are asked to ratify. Among other things, the proposed lease provides for regular payments on account of the Dominion Coal Company's sinking fund. The control of the Sydney and Louisburg railroad, as well as other plant and equipment of the coal company passes to the lessee. The charters of all steamers and barges now in existence shall be turned over to the leasing company. No disposition or sale of the property can be made by the lessees without the written consent of the lessor. Payments on account of the lease are to be made semi-annually, on the 15th day of June and December. Six months' notice of intention to cancel the lease shall be given by the lessee, and the sum of \$600,000 shall be forfeited to the lessor, the same to be deposited before the lease goes into effect. The lease shall come into effect on January 1 next, or on the first of January or July of any succeeding year up to 1903. President Whitney stated that the great consideration was not the amount of money to be paid down by the Steel and Iron Company, but the \$8,000,000 or \$10,000,000 to be expended by the steel company in developing its business, and incidentally enlarging the market of the coal company. The contract for supplying coal provides that the arrangement will extend over a period similar to that covered by the existing leases of the Dominion Coal Company. On the motion the stockholders voted on the question of ratifying both the contract and annexed lease. The meeting adjourned until 2 p.m. The agreement provides in case of a lease that \$25,000 per year would be allowed for expenses of management. If at any time the output of the coal company exceeded 3,500,000 tons the lessee is to pay the lessor an additional 15 cents per ton. The vote on the lease was unanimous—144,552 shares voting, of which 131,487 was common stock and 13,065 preferred.

British America Corporation.—Mr. Carlyle (the company's manager), writing under date Rossland (B.C.), July 1, reports as follows:—"Columbia Kootenay Mining Company, Limited—During the past month 864 ft. of new work was done in 29 days, with six machine drills. Tunnel No. 4: Total length, 1,324 ft. In crosscut No. 1, where the vein was first found in this tunnel, or 25 ft. of pyrrhotite ore, a raise is now being made along the hanging-wall side of the vein, and is nearly all in this ore, which is assaying 3 dwt. to 7 dwt. in gold. As very good values were got in a drift north along this body, we are hoping to get good values in this new working. Tunnel No. 5: Total length, 1,169 ft. This tunnel has been passing through a large amount of very low grade material. The vein is wide, containing much solid pyrrhotite. We will during the month start an upraise, immediately below the upraise in tunnel No. 4, in which we found such excellent ore."

"East Le Roi Mining Company, Limited—Great Western Mine: Foundations are now being prepared for the new boilers, and plans are about ready for a very plain but strong new gillows-frame and building, and by next month we will be ready to resume striking." "Nickel Plate Mine: In the new shaft, Mr. Stewart (surveyor) made an excellent connection, in that the shaft was begun on the 200 ft. level; raised 110 ft., timbered, and then sinking from the surface was done with the result that the two parts of this shaft joined perfectly. Sinking will now be pushed vigorously to open up the untouched ground below the 200 ft. level. No other work underground was attempted."

"West Le Roi Mining Company, Limited—No. 1 mine: The 200 ft. level has been extended 87 ft. along the vein, which has been from 1 ft. to 3 ft. wide, of ore assaying from 2 dwt. to 10 dwt. in gold, 2 oz. to 3 oz. silver, and some copper. We will shortly begin an upraise at a point where the vein is 12 ft. wide, with 4 ft. or 5 ft. of pay ore on the hanging-wall, and extend it up to the tunnel 200 ft. above, where the same ore shute was found. On the 300 ft. level we have drifted 105 ft. on the vein mentioned as having been cross-cut in my last report, and for 85 ft. of this distance we have had a body of fine ore 2 ft. to 5 ft. wide, average daily samples from which have given \$18 to \$25 in gold, 2 oz. to 5 oz. silver, and 4 to 7 per cent. copper. For the last 15 ft. the vein has been about 12 inch wide; but the last assay from this gave 32 oz. of gold, and at time of writing this streak is widening again. As the vein may be much wider than the drift, we are now cross-cutting to find whether there are other portions of pay ore in this vein. On the surface the high-grade ore taken out in running this drift has formed a very considerable pile. I am very much pleased with the way in which this property is opening up, as all our work done is constantly enhancing the value of the West Le Roi group. With our new hoists and pumps we will be able to develop all these claims quickly, and with greater satisfaction."

Canada Petroleum Oil.—The statutory meeting of the Canada Petroleum Oil Company was held at Manchester yesterday. Sir William Bailey, J.P., presided.

The Chairman having explained the formal character of the meeting, said that Mr. Bagnall would present an interesting report. The directors had thought it wise to obtain an independent opinion from an expert in oil wells, and accordingly Mr. A. B. Walker, of Gaspé, had furnished them with his views with regard to their property. Mr. Walker said that 31 wells had been drilled and two more were being drilled. Nearly all the wells visited by him showed such indications that he was of opinion that if the Gaspé Oilfield was handled in a practical way it would develop into a paying and successful property. He had advised drilling on a number of new wells.

Mr. Walter G. Bagnall, J.P., (managing director of the company), who has recently visited Canada, then gave his report of the properties as follows: I visited your properties on June 5th, and was accompanied by Mr. William Lees, of Manchester, a director of the Bagnall Oil Company and of the Mercantile Bank of Lancashire. I also called one of our representatives to secure an oil expert from the Pennsylvania Oilfields. We engaged Mr. A. B. Walker, principal of one of the first companies to successfully operate the Bradfield Oilfield. Mr. Walker has since then drilled and sunk wells in most of the oilfields of the United States, and is connected with oil properties in West Virginia, Ohio, and Indiana. He was Sheriff of McKean County, the county whose principal town is Bradford, Pennsylvania, for three years, vacating that office last year. From many independent quarters I was assured, and I am myself thoroughly convinced, that it would be impossible to secure a more reliable oil expert than the one whom we engaged. We made several surveys of the properties to verify the statements made by the vendors at the time this company was formed. We unanimously agreed that the said statements were more than justified. We found oil continuously on lands extending between 24 and 25 miles. Most of the wells had produced considerable quantities of oil, and hundreds of barrels of oil were lying about. We consider that at least 2,000 barrels had been lost from wells Nos. 11 and 27 before the same were controlled. Well No. 11 is now plugged down; but the oil and gas forces itself through the 2-ft. pine plug. Well No. 27 is now arranged for pumping, and we saw pumped between 300 and 400 barrels. We are decisively of opinion that the property will prove a successful oil-producing country, and that we shall have ready for export a cargo of refined petroleum products within the next nine months. Being thoroughly satisfied that the oil was of excellent quality, and that it was there in large quantities, we at once arranged that pipe-lines should be laid and the refineries erected. I applied to the municipalities for powers to lay the pipe-lines from our properties through the settled districts to the harbour at Gaspé. The powers were granted free of charge, and the pipe-line will be complete within the next three months. To facilitate quick erection and exploitation I connected the producing districts by telephone with the Gaspé offices, the resident manager's house, and the cable and telegraph offices. We also have contracted for the refineries to be erected at Gaspé, and the same should be delivered there within seven weeks, and the erection completed within three months. We commenced four new wells immediately surrounding well No. 27, and the directors have been recommended to drill four wells around No. 11; also that sites should be selected and the foundations laid for 20 additional wells along the oil-bearing line between wells Nos. 11 and 27. This is to enable the erection of derricks and the drilling of wells to be continued during the winter months.

We have given the transport of the oil from the wells to the refineries very careful consideration, because after an oil-field is proved to be a successful oil-producing country, the transporting and manipulating of the oil is a most important factor in making the field a financial success. We shall be able to bring our oil from the wells through the pipe-lines to the refineries and tankages, and ship the same from the port at Gaspé, at a cost, including the refining of the product, of less than three-eighths of 1d. per gallon. We have been most successful in placing our contracts on very favourable terms, and, despite the fact that the iron, steel, and pipe markets have advanced during the past three months, over 100 per cent., the total cost will not exceed 50 per cent of the amount we had originally decided must be spent upon these erections. We were so convinced that this oil-field has a successful future, that we approached the Canadian Government to secure assistance to bring the property in direct communication with the Canadian Railway system, and I interviewed Sir Wilfred Laurier and the responsible Ministers of the Dominion Government with the object of securing their help. I am pleased to say the Government substantially supported our request, and they have voted this session subsidies for the construction of the railway from Gaspé to Paspébiac. This railway will pass through the oil properties and will give an outlet for our products to all parts of Canada and the United States. The Government have also decided this session to erect wharfs and harbour facilities at Paspébiac, the ocean port of the Atlantic and Lake Superior Railway Company. This railway company possessed the line that connects our oil properties and the proposed new railway with the Intercolonial and Grand Trunk Railways, and the control of it would be beneficial for the successful development of the oil-fields. It is being reorganized under the control of an English majority of a new board of directors, and I am glad to say that this reorganization scheme has already met with such approval in England, since my return, that I am able to announce the survey through the oil property has been made by competent engineers. The contract for the construction has been let; steam excavators and plant are upon the land, and men are being engaged to construct the line. I believe 20 miles of the section from Gaspé can be constructed this year, and the connection with Paspébiac completed within twelve months. I am convinced the future of our company will be a successful one, and I hope to return to Canada in October next to personally superintend the first shipment of refined petroleum products from Gaspé. I am glad to know that so many Lancashire men are supporters of this company, because throughout the whole of Canada I noticed the present prosperity of the Dominion has been stability advanced by the business capability, commercial organization, and judicious expenditure of capital possessed by companies directly connected with Manchester and its Ship Canal. I firmly believe the developments of the Canada Petroleum Company and the construction of the proposed railway through the valuable wood-pulp districts of Gaspé, will further develop profitable enterprises, increase the prosperity of the Dominion, and unite closer the Mother Country with her nearest colonial possession.

The Chairman referred with satisfaction to the report presented by Mr. Bagnall, and said that it held out to them the prospect of a reasonable dividend. They would only have to wait a few months before they had some oil up the Ship Canal. At the present time their greatest profit would be in selling oil in Canada. Most of the oil sold there came from the United States oil-fields, and there was a duty of 5 cents in their favour. All they could do now was to wait patiently for the development of the property.

Mr. Bagnall, replying to a question as to why the oil could not be brought immediately to Manchester, said that the price in Canada would give them a profit two or three times greater than they would make by exporting to England. They

would, however be able to compete in Manchester when the time arrived, and would be able to deliver oil a pound at a ton less than any other company in the world.

The Chairman stated, in answer to further questions, that they had considerably more capital than they required at present. A special settlement had been applied for on the London Stock Exchange.

The meeting then terminated.

FROM THE SLOCAN.

The strike is still the all absorbing topic of conversation in these parts, and it must be confessed that a satisfactory solution of the difficulty still appears to be as remote as ever. Whilst almost everybody sympathises with the mine-owners in the altered conditions which have so suddenly confronted them through the hasty and ill-adviced action of the local legislature, the conviction is slowly being driven home that if the mines are to be worked at all it can only be on the \$3.50 basis, whatever the hours of labor.

The political horizon in British Columbia just at present is very uncertain, this being doubtless one of the elements which make for a continuation of the deadlock, the hope that the government may sustain a set-back and be forced to repeal the obnoxious clause being everywhere expressed.

Whether this even would mend matters is problematical, as judging by recent actions of the "Unions," backed by government precedent, a ten hour day, although giving every satisfaction when originally in vogue, is now deemed to be against the principle of the labor organizations, a condition which tends to further complicate matters.

In a few instances mine managers attempted to comply with the law by adopting an eight hour shift under ground and employing the same men on the surface for another two, paying the usual wage of \$3.50 per day.

By order of the Unions, however, a continuance along these lines has been denied, and they have even gone to the ludicrous extreme of calling out all men engaged on contract work who are not guaranteed a minimum of \$3.50 for the eight hour shift, a proceeding manifestly absurd. One is not to infer from this that lawlessness prevails, because in the three months during which operations have been suspended, not a single case of intimidation has been reported to the authorities, so that we would be doing an injustice in withholding credit where it is due.

To attempt a forecast of the final outcome is beyond the pale of human judgment, so many factors having lately sprung up which had no existence when the difficulty first threatened. The motto of the Unions evidently reads "No Compromise," for whenever overtures have been made to the men, no matter how reasonable or well intended, they have invariably been met with that imperturbable demeanor which signifies that they are content to wait until things "come their way" to use a colloquialism, although it is matter of common knowledge that individually a great many of the men would be quite willing to work eight hours for \$3.00 pending more satisfactory arrangements, which it is hoped may eventually result from a revision of the law.

The mine owners on the other hand appear to be getting very restless, as it is well known that the efforts to obtain men from outside points have not met with the success anticipated, and the need of doing something to appease eastern and old country shareholders becomes more pressing every day.

The ultimate solution of the difficulty, as I said before, is entirely beyond my powers, as the subject becomes more bewildering at each successive stage, and I frankly give it up.

Apropos of the depression existing in the Slocan, I notice that the London correspondent of the *Engineering and Mining Journal* in his contribution to the issue of that journal dated August 5th, takes a very pessimistic view of the future of mining investments in this province. He observes "that abundant proofs are coming to hand that British Columbia is a land of low grade propositions. With the exception of a few Slocan properties there are no bonanzas such as one might reasonably expect, judging from the proximity of so many rich districts in the Rocky Mountain States. The Le Roi is proving of lower grade than the buyers calculated on, and many of the other less developed properties of the Whitaker Wright Group are averaging very low values. The London and British Columbia Gold Fields, which has had the advantage of Mr. Fowler's advice in buying properties, are finding that some of their mines which showed well at first, are gradually coming into the class of concentrating propositions. This is turning out to be the case with the Whitewater mine in the Slocan Division, and considerable study is being brought to bear on the question of erecting suitable concentrating plants."

Now, with all due respect to the correspondent of that influential and usually reliable journal, I submit that he has been a little hasty, to say the least, in forming his opinion, and just a trifle unkind to the province, which has, as a rule, honorably discharged its indebtedness to investors, provided always, of course, that they have performed their part in exercising proper business judgment and discretion in laying out their money, a provision too often ignored by those ever ready to condemn without first of all making a thorough investigation into the circumstances attending the failure. I shall leave the Rossland correspondent and those from other parts to vindicate their respective districts from the aspersions thus ruthlessly cast upon the industry which is destined to be the mainstay of the province for many years to come; but in regard to the Slocan it is my duty to speak, and I emphatically assert that the percentage of dividend paying mines in proportion to those which have proven failures is greater than in any other district in the world where similar obstacles have been encountered and had to be overcome in their exploitation. The trouble is that too often the nearest prospects are reported and represented to the investigating public as fully developed mines, and the failure to secure returns on a ridiculously large capital causes dissatisfaction and loss, which not infrequently resolves itself into a savage distortion of facts, much to the discredit of the particular district in which the mine (?)—save the mark—was situated.

In speaking of the Whitewater it is unreasonable to suppose that an engineer of Mr. Fowler's experience was not aware that concentrating ore would have to be reckoned with here, as elsewhere, sooner or later; this, however, does not detract in any way from the record of the mine, nor alter the fact that immense quantities of clean ore have already been shipped and will continue to be in the future. The presence of concentrating ore instead of being regarded as a detriment ought in all conscience to be rather the reverse, as constituting an additional source from which revenue may be derived.

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FROM REVELSTOKE.

The past month has been quiet, from a mining point of view; but if nothing very startling has occurred, assessment and development work have been carried on assiduously in all the districts around. Perhaps in no locality has this necessary, valuable, but almost unseen work been carried on more vigorously than in the Lardeau, which surely stands very high in the list of ore producers, or at any rate ore bearers. It would be invidious to particularize any one claim, and indeed the one that seems best to-day may easily be eclipsed by the superior value of another to-morrow—so rich are the veins known to exist in the district—but we may mention the Silver Cup, one of the oldest locations and one of the best, which is still holding its own and said to be improving as depth is gained and the ore body more opened up. The advent of one if not two railways into the neighborhood is causing much attention to be directed to it, and properties are changing hands with most satisfactory rapidity; as the means of transportation, hitherto lacking, will add immensely to the value of the prospects and incipient mines that are so thickly scattered in the vicinity of Trout Lake, Fish Creek, and in the whole district known as the Lardeau. The Nettie L. is still developing, but the management expect very shortly to ship another carload or two of ore to one of the smelters; as stoping has been commenced in the upper tunnel where there is a large body of good ore available and easy to extract. The Old Gold and Primrose Mining Co. are also very actively opening up their property, and intend to increase their present staff of 25 men so as to get all possible work done during the short summer; and the Beatrice owners are congratulating themselves on the excellent value returned to them from their last shipment of ore—some 58 tons netting over \$6,000.

Quite recently some very promising prospects have been found on Hall Creek (not the Hall Creek near Nelson, but on the Duncan River) though the distance from transportation facilities will materially reduce the value of the discoveries. Still, the now practically settled railway will considerably improve that state of affairs, though it will not be very close to the claims.

A great deal of quiet work is going on in Fish Creek District, and some very fine free milling gold quartz has been found while the lucky finders were hunting for a galena or copper lead; they had taken no notice of the far more valuable quartz, through which they were slowly making their way in search of other mineral till an accidental inspection followed by an assay showed them what a bonanza was theirs. Running as Fish Creek does, nearly from Illecillewaet on the C.P.R. to the northeast arm of Arrow Lake, there would seem to be at least the possibility of a railway to tap that very rich district connecting with the C.P.R. on the north and with the now building extension of the C.P.R. on the south.

Trout Lake City itself, at the north end of Trout Lake is enjoying quite an unusually prosperous time just now; always a pretty place, and the chief town of importance, yet the increasing value of minerals discovered with the advent of the railway all combine to "make things hum" to the great advantage of the inhabitants. Owing to the exceedingly fertile soil that extends for miles near this prosperous little town, there is no reason why it should not possess in plenty all kinds of horticultural and agricultural produce, and be in a position to supply the other growing towns with the surplus over and above its own need.

From the Illecillewaet Camp we do not hear very much; but it seems tolerably certain that the Lanark mine will be re-opened under new management, as in the opinion of competent judges that property has been too hastily closed down. If appearances and the formation of the rock count for anything, there certainly should be a good vein there even if like others, it looks as if it had pinched out—most likely it will widen out again and prove valuable.

The Tangier mine is still calling for miners, so presumably the manager is satisfied with the showing, but on the Waverley—its near neighbor—no work is being done at present, or if so, no reports are to hand concerning it. In all likelihood, however, this will also prove valuable when more systematic work has been performed upon it.

From the Big Bend, (Revelstoke's hope and pride) however some very encouraging reports are to hand, and much work will be done in developing various properties this season, which are owned to a great extent by local men. In Ground Hog Basin alone there will be expended some \$2,500 on assessment, which looks as if the owners had confidence in their holdings.

On Smith Creek again there are some very good placer claims, and quite a large amount of work has been done on them, with so far the most gratifying results—indeed the owners say they expect to take out the precious metal by the pound rather than by the ounce when their workings are extended a little more.

What is most urgently needed for that district is improved communication, as in so many parts the river is not navigable except for a very few weeks every year. It seems as if a wagon road will have to be constructed till the worst part is passed, and then it would be quite possible for a steamboat to go the rest of the way; indeed a good many years back during the first excitement in the Big Bend, a steamer used to make the trip from Portland, U.S., right up to Goldstream. If the copper properties discovered during the last year or so on Keystone Mountain and in other places are ever to become of value to their owners, some improved method of communication will be absolutely necessary. Up to the time of writing this, nothing actually definite is known of those claims in the Standard Basin recently bonded to capitalists in the east, but the impression is very strong that the report of the expert who went to examine them was unsatisfactory. The surface showing was all right, but the prospectus issued would ruin better property than this, good as it may yet prove.

A. H. H.

LAKE OF THE WOODS.

Regina.—At time of writing all the work is stopped at the mine, except that the pumps are kept going; what the outcome will be no one here seems to know.

The Atwater.—On the west shore of Ennu Bay, at the north-west end of Crane Lake, and about twelve miles perhaps, south-easterly from the Regina mine, Col. Atwater, an experienced mining man of Cleveland, Ohio, is running a tunnel into a felsite (?) dyke about eighty feet wide; the tunnel is already in forty feet. After prospecting a little so as to ascertain the extent of the deposit, the character of the walls, &c., a shaft will be begun.

The Chemical Co.—Work has been suspended—temporarily no doubt—on this property. The east shaft was sunk 30 feet, and then closed up. Another was sunk not far from the old Gordon-James shaft. Stripping was done in preparation for the

starting a shaft on a strong vein that comes in from the Gold Reefs on the west, the shaft on that property on this vein being down about 30 feet, with the quartz the full width of the shaft, and the whole showing good values in gold.

The Chemical Company had Mr. T. Smith with his diamond drill on the property, but the results were unimportant. The company have made a very good wagon road into their camp from the head of Witch Bay, about a mile and a half distant.

The Boulder.—The shaft is down about 300 feet, and the vein below this point will be prospected with the diamond drill from the bottom of the shaft. Mr. Tom. Smith's drilling outfit having been engaged for the work.

Camp Bay.—The Boulder has already been referred to. Sinking is being vigorously pushed on in the two shafts on the Trojan, and work has been resumed on the Mascotte.

Cameron Island.—This property is starting up again.

The Nora.—Work has been resumed at this mine, Captain Geo. Gregg being in charge.

Reports have come in of a rich find in gold quartz north of Dinorwic, which is a little east of Wahigoon; also of the discovery of some good gold-bearing veins at Sturgeon Lake, about 70 miles north of Tache on the C.P.R., where it is said a number of claims have already been surveyed.

The sale of the Sultana has excited very little interest here, because the subject was threadbare already I suppose. But the transfer of this fine property to an English syndicate will, no doubt, have considerable effect in advertising the district amongst capitalists.

MINE CENTRE.

Golden Star.—The shaft is down 380 feet; there are five levels. The work of blocking out ore is being vigorously pushed, while at the same time the mill is kept going.

Randolph.—Shaft down 70 feet; the vein is a sort of felsite dyke. The mine is fully equipped with compressor plant, hoist, &c.

Randolph Junior.—This property is west of Golden Star, and is supposed to be on same lode. A deal is on with some Duluth people, and the preliminaries are arranged.

Headlight.—This is the old Swede Boy. Shaft down 100 feet; at 75 feet a cross-cut of 40 feet, located the vein which is looking very well.

Decca.—Shaft down 150 feet; at 100 feet cross-cut towards vein and struck it when 40 feet in; vein 4 feet wide, carrying good values.

Lucky Coon.—A shaft is being put down on No. 2 vein, and is down 110 feet. The shaft on No. 5 vein is down 85 feet. A compressor plant is being put in.

Manhattan.—Has recently been examined by John E. Hardman, M.E., and if his report is favourable a compressor plant will be put in. The shaft is down 106 feet, with 40 feet of cross-cut; vein about 16 feet wide.

Independence.—This concern is being reorganized under Ontario laws, after which work will be resumed. There is a five stamp mill here.

Alice A.—Shaft down 100 feet. They have a four drill compressor, and steam hoist; have had a Tremaine mill, but it is proposed to put up a mill with 100 stamps as there is a very large body of ore, low grade of course.

Ferguson.—This property is to be examined by Captain Angove, a West Australia mining expert.

Golden Crescent.—Are drifting at 90 feet.

F. D. Fowler is sinking on a vein on Bad Vermillion Lake, which shows considerable leaf native copper in the quartz.

Fighting Chance.—The shaft is down 42 feet.

RAT PORTAGE, 21st August, 1899.

CAPE BRETON NOTES.

A new slope on the Emery seam is being opened up about two miles from Glace Bay. This bankhead is designed to handle an output of 1,500 tons per day, and will be enlarged if the quality of the coal warrants it.

This is the first colliery to be worked on this seam by the present operators. Although the coal is not as thick as that of the Phalen seam where the greatest outputs are at present obtained it gives, from samples taken near the crop, analysis which show it to be a first class steam coal.

A new shaft to work the Phalen seam is to be sunk at a point midway between the Hub and International collieries, and will be known as Dominion No. 2. This shaft is 56 feet 6 inches x 11 feet, and will cut the coal at a depth of 850 feet. When finished it will consist of two coal divisions, each 7 feet 6 inches x 11 feet, two spaces of equal size for the man cages, a space of 6 feet for water tanks and space for pipes and haulage ropes. The bankhead will be partly steel, and in detail will differ from the present type. The coal will not be hoisted to the surface in mine cars, but will be tipped at the pit bottom into the weight scales, and then pass into the hoisting tank, which has a capacity of six tons. By this method the dead weight in hoisting is materially lessened. Owing to the depth of the shaft the water is to be raised in steel tanks and dumped at the surface.

This shaft will work an area having a radius of one and one-half miles, which will be divided into four parts by heavy barriers of coal.

Owing to the great increase in shipping, the Dominion Coal Company has purchased three new locomotives, which arrived early in the month. They are all over 100 tons, and one of them which is of the consolidated Mogul type is 120 tons.

The record for shipping at the International Pier was broken this month, when, on 17th inst., over 11,600 tons were loaded.

BOUNDARY DISTRICT.

PROVIDENCE CAMP.

Boundary Mining and Milling Co.—Gold Bug—The shaft is now down 50 feet. It is expected that it will be continued to the 100 foot level.

The rich lead recently discovered is being opened by an open cut and the ore sacked as soon as taken out. This property is looking very well.

SKYLARK CAMP.

Last Chance.—A cross-cut is being driven on the 200 foot level.

Crescent.—Five men are at work here. A shaft is being sunk on the lead and is now down about 50 feet.

DEADWOOD CAMP.

Mother Lode.—Drifting is in progress on the 200 foot level. Mr. Paul Johnson, the well known smelter man, is in Greenwood. He has a two years contract with this company to erect and operate a smelter for them in the vicinity of Greenwood.

Sunset.—Foundations are being prepared for the new plant to be installed.

Morrison.—The ore body on which the shaft was sunk has been met with in the tunnel. It is said to run from \$18 to \$35 per ton. They have cross-cut it 25 feet and are still in ore.

Buckhorn.—Sinking is still in progress.

WELLINGTON CAMP.

Golden Crown.—The shaft is being continued and is now down 250 feet.

Winnipeg.—Drifting on the ore in the 300 foot level is in progress and raising from the 100 to the 50 foot level.

Hartford Group.—This group is owned by Messrs. Jones and Rogers is under bond to Jay Graves and associates. Ten men are at work opening up a lead of pyrrhotite which is reported to be 3 feet in width and averaging \$25 per ton.

GREENWOOD CAMP.

Ironsides.—A cross-cut is being run at the 300 foot level.

Knob Hill.—Drifting on the ore in both directions is in progress.

War Eagle.—The lead has been opened up by a number of cross-cuts. The shaft is still being continued.

The company operating this property have bonded the Bald Eagle, an adjoining fraction, also the Red Rock and the Lulu.

Greenwood Mines, Ltd.—A force of men has been put to work on the Missing Link No. 2, one of the group of claims owned by this company. The extension of the War Eagle vein is being opened up here.

WEST FORK.

Carmi.—This property is looking very promising.

Main Kettle.—A rich strike of bornite has been made on Copper Creek, 50 miles above Rock Creek.

A very good waggon road is being made up the river and is completed to within a mile of the West Fork.

LONG LAKE.

Jewel.—Drifting on the lead on the lower level is going on.

Snowshoe.—The old shaft is being continued.

SUMMIT CAMP.

B. C.—The 50 foot level is being driven north and the 150 foot level both north and south.

Mount View.—Work has been commenced on this property, which has recently been bonded by Mr. Geo. Collins of Greenwood. There is a very good showing of chalcopryrite here.

Josie.—This property has been incorporated by a Grand Forks syndicate who intend putting a force of men at work shortly. There is a 70 foot shaft on the claim.

Rathmullen.—A 5-drill compressor is on its way to the property. Sinking and cross-cutting are in progress. The property is reported as looking very well.

Oro Denoro.—The shaft is now down 150 feet. A 5-drill compressor is being installed.

R. Bell.—A drift is being run on the lead at the 50-foot level. There is three feet of clean chalcopryrite in the face of the drift.

NORTH FORK.

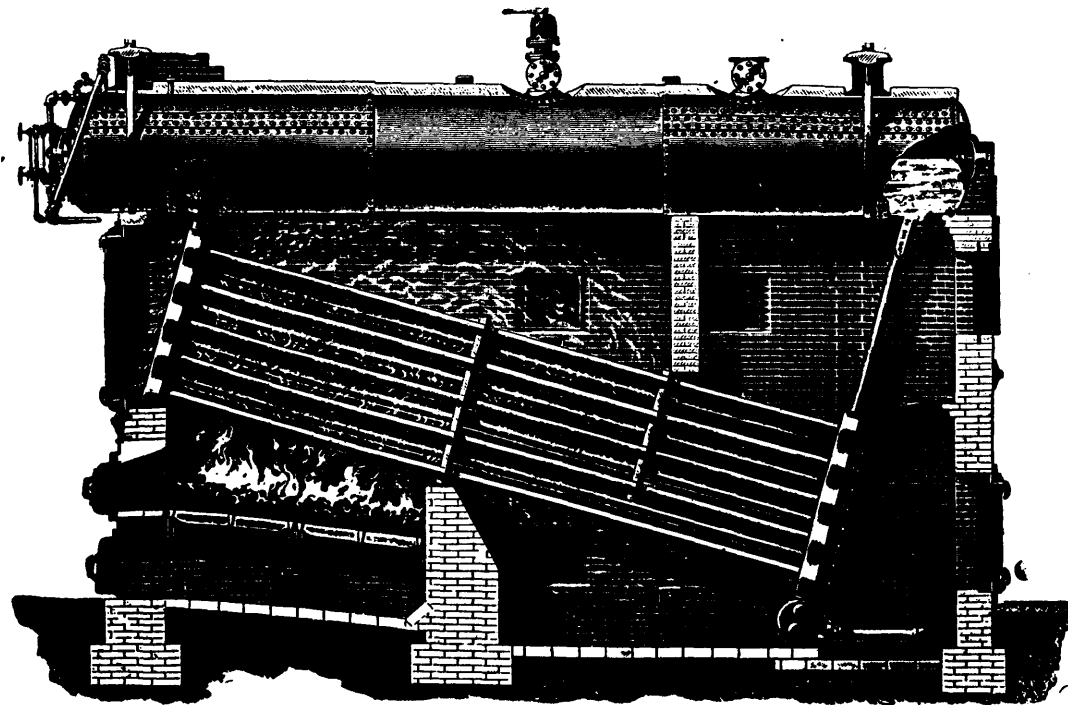
Golden Eagle.—Work is still going on here and some very high grade chalcopryrite is being taken out.

H. L.

GREENWOOD 15th August, 1899.

Anglo-Canadian Lead Syndicate, Limited.—Registered on August 2, by Le Brasseur and Oakley, 12 New-court, Lincon's inn, W.C., with a capital of £21,500 in £1 shares. Object, to adopt an agreement with the London and Dublin Finance Corporation, Limited, to search for, prospect, examine and explore lead and other mines, mining rights, etc. The first directors (to number not less than two nor more than six) are to be appointed by the subscribers. Remuneration, £50 each per annum.

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Fairfield Exploration Syndicate.—The following cable has been received from the manager: "Doratha Morton Mine—Output for the month ended 30th June. Gold 435 ozs., silver 862 ozs., total value £1,986; 1,257 tons treated, assay value per ton, gold £1 10s. 11d., assay value per ton silver, 2s. 6d. Calculated extraction, gold 89 per cent., silver 79 per cent. Ten stamps ran 16 days 10 hours, crushed 1,410 tons equal to 8'58 tons per head per day."

Mikado.—Clean up to 31st July for 27 days. Crushed 982 tons, yielding 372 ounces of gold, and from cyanide 851 tons yielding 253 ounces bullion,

Le Roi.—The manager cables: Have received the following returns from smelter Le Roi second half July—3,560 tons (shipped 13 days); 1,700 ounces of gold; 3,500 ounces of silver; 56 tons copper. Estimated gross value, \$50,000. Total estimated gross value for month, \$86,000." Manager further cables: "The ore is improving as developed. Systematic developments increasing ore in sight. Development of mine making good progress. There is manifest improvement in the mine at the end of the month."

London and Canada Syndicate.—Cablegram received July 25 from the manager in Boundary Creek: "Assay of samples from Gold Bug give 545 ounces of silver per ton of 2,000 lbs., 12 ounces of gold per ton of 2,000 lbs.; average width is 3 feet; forward by express still richer samples."

Ymir (British Columbia).—The following cablegram has been received from British Columbia dated August 10: "The yield from last month's working is: Gross estimated value concentrates, \$6,250; bullion, \$14,000. This yield is from 2,000 tons crushed during 21 days. Carbonate ore, 40 tons; galena ore, 22 tons. The estimated value is \$4,000."

F. H. MASON

Fellow of the Chemical Society, London.
Late Chemist and Assayer to the Newbery
Vautin Patents Gold Extraction Co., Limited.

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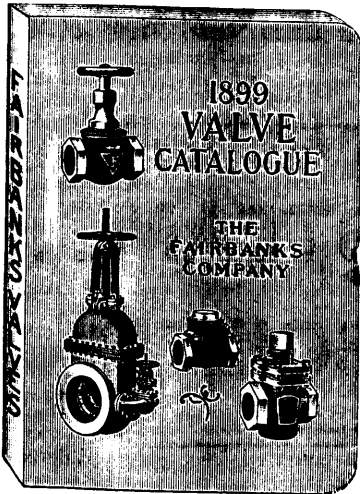
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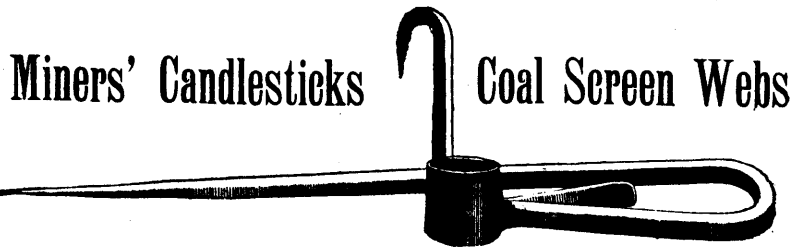
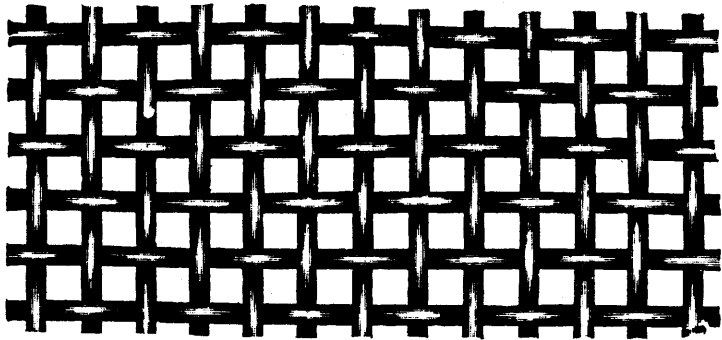
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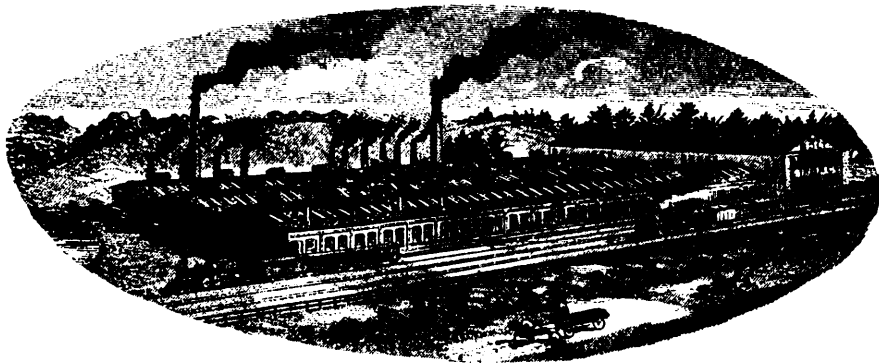
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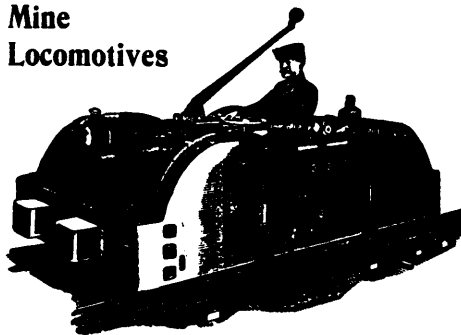
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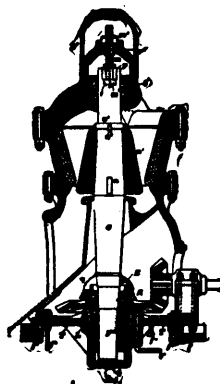
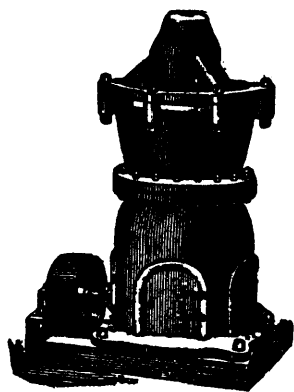
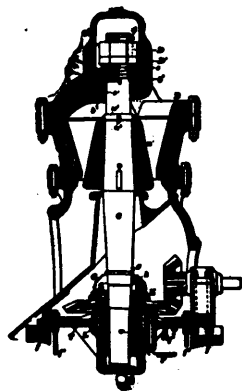
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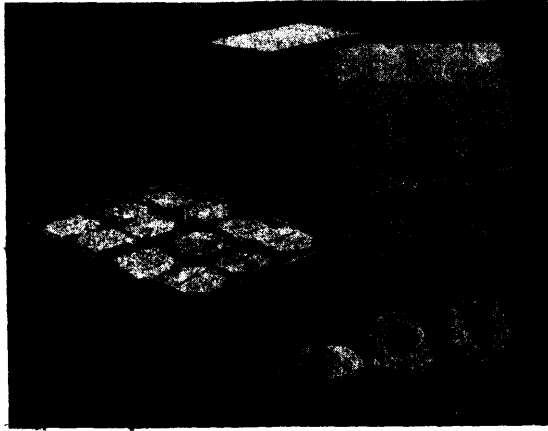
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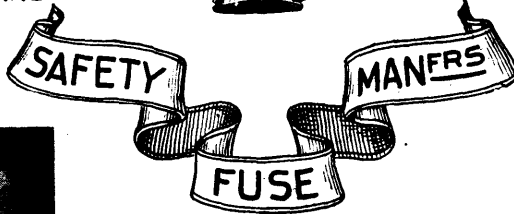
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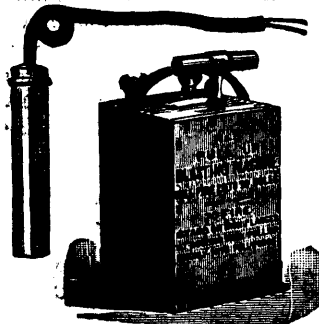
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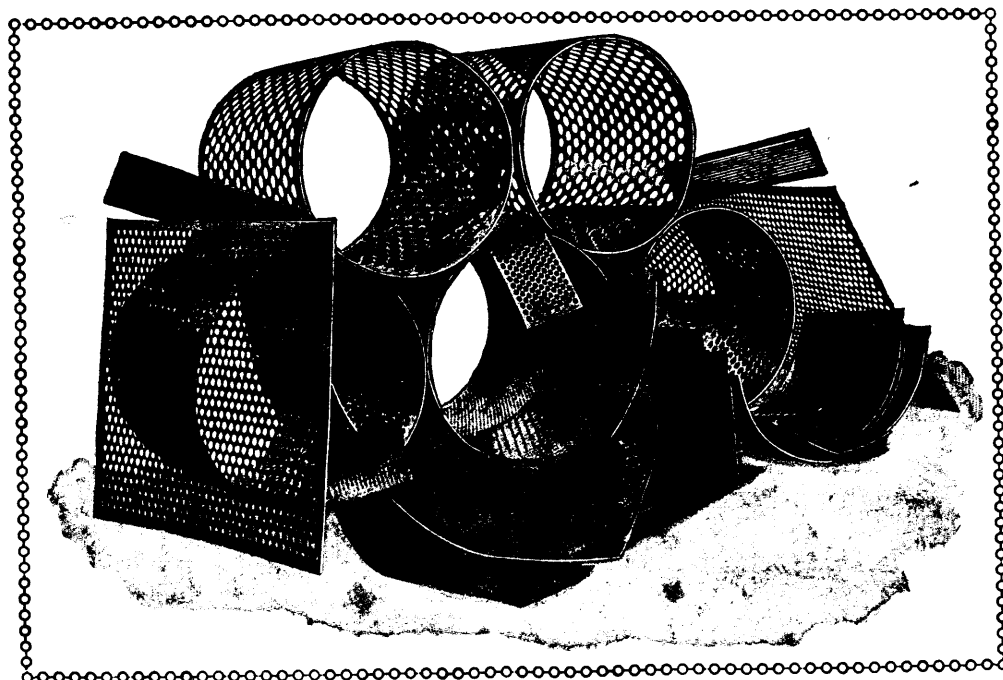
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