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The Canadian Mining Journal

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CIRCULATION.

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THE CANADA IRON CORPORATION, LIMITED.

We have before us the abridged prospectus of the Canada Iron Corporation, Limited, a document both interesting and significant.

The new organization, whose principal officers are gentlemen prominent in Canadian industrial life, is essentially a consolidation of going concerns. For a long time the Messrs. Drummond, of Montreal, have been identified with the growing iron industry of the Dominion. Gradually their holdings have increased and their interests have widened. They and their associates now control several blast furnace plants, pipe foundries, general foundries, and car-wheel foundries in Nova Scotia, Quebec, and Ontario, and almost inexhaustible iron ore deposits in Ontario, New Brunswick, and Nova Scotia. The contemplated addition of steel works will complete the cycle.

The capitalization of the corporation is $8,000,000. The estimated annual profits on the earnings of the mines, furnaces, and foundries is set down as approximately $600,000.

From October 26th to October 29th, inclusive, £364,000 of the issue of £500,000 of six per cent. first mortgage sterling bonds was offered for subscription in London.

We feel no hesitation in expressing our belief that the Canada Iron Corporation, Limited, deserves the support of British and Canadian investors. The assets of the corporation are positive, and will increase in value and earning power. The corporation's plants are so placed that they command a full share of our expanding market. It is, indeed, imaginable that ere long the corporation will become a controlling factor in our iron trade.

Apart from the commercial value of plants and mines and the strategic importance of location, the names of the Montreal and London directors inspire cinfidence.

If we may be permitted to indulge in metaphor, we shall liken the three Messrs. Drummond to a well-balanced engine, in which Mr. J. J. Drummond is the fly-wheel, Mr. George E. Drummond the lubricator, and Mr. T. J. Drummond the governor.

With this engine soundly installed, we shall hope for great things for our iron industry.

THE PREVENTION OF MINE EXPLOSIONS.

We reprint in this number of the Canadian Mining Journal the "Report and Recommendations" of the three foreign experts engaged by the United States Department of the Interior to investigate coal mine explosions.

The three men selected to undertake this task are authorities of the highest standing. They fill respectively the offices of Inspector-General of Mines, Belgium; Councillor of Mines, Germany; and H. M. Inspector of Explosives, England.

The report marks a turning point in the history of coal mining in the United States. Heretofore the most frightful accidents have created but a temporary stir. The authorities at Washington have been apathetic, and their apathy has cost the nation thousands of useful lives. Now that the awakening has come, there is little doubt that complete measures will be adopted for the prevention of coal mine accidents.

The first step to be taken is the close inspection of explosives. Without this preliminary, all precautions are meaningless. Not only should permitted explosives be limited to those that pass satisfactory tests as to safety, but the maximum charge should be fixed by law, and uniform regulations as to handling, loading, and firing of explosives should be enforced at every colliery.

The second important measure is the universal introduction of safety lamps. There is little doubt that this will meet with opposition, especially from the workmen whose safety is being considered. There is no doubt that safety lamps are essential to the prevention of explosions.

Thirdly, it is of the most urgent importance that rescue apparatus be installed at all coal mining centres. We need not reiterate the arguments that justify this recommendation. The history of the great coal mining disasters of the past few years is conclusive proof of the justice of this statement.

Fourthly, there is much misapprehension as to the applicability and efficacy of mine-watering as a preventive of coal-dust explosions. We have referred more than once to the strong position taken by Mr. James Ashworth, who has condemned the belief that watering is a universal remedy. The question is one that requires full and searching inquiry.

Lastly, the prevention of mine explosions is a subject of international importance. Difficulties will not be solved, dangers will not be removed unless there is earnest co-operation between governments, operators, and employees.

The recommendations of Messrs. Desborough, Meissner, and Watteyne are timely. They will serve as a nucleus for further work. But we are disappointed at their lack of completeness. The omission of all mention of rescue apparatus is a serious oversight.

Before leaving this subject we desire to impress upon Canadian coal mine operators the need of keeping pace with this praiseworthy movement. And it is to be hoped that our Federal Department of Mines will give the matter attention at the earliest possible opportunity. Canada must not be last in adopting measures for the preservation of life.

THE COBALT BOOM.

An apparently well-grounded hope was entertained by sane mining men that this autumn's boom in Cobalt stocks would not exceed the bounds of reason and propriety. It was foreseen at least ten months ago that a boom was inevitable. But there seemed to be scant room for a recurrence of the crude robberies and "raw deals" that characterized the first boom.

The boom, however, has attained dimensions that are distinctly dangerous. The lessons of the last two years have been ignored or forgotten, and Cobalt stocks are playing over the financial sky like mad northern lights.

One effect of the boom of 1907 was that the legitimate exploitation of the undeveloped portions of Cobalt and of the Montreal River districts was retarded. For a time Cobalt became an object of contumely. Then, gradually, the clean work of clean men brought results, and an output of six million dollars' worth of silver was an argument not to be ignored.

Of the several hundred mining companies incorporated up to and during the year 1907 only about thirty now survive on a working basis. Not more than twenty of these have paid dividends. Several of the companies that have paid dividends were totally unprepared to maintain payments. Every one of the hundreds of flotations appealed to the public with rosy promises and hectic adjectives. A large number of the worst of these received the support of the Toronto World.

Glancing through the advertising columns of the Toronto World, which has constituted itself the chief tout for all classes of Cobalt and Montreal River wildcats, we notice that several new flotations, especially those that occupy advertising space, are given warm commendation in the special mining columns of this obviously purchasable sheet. It strikes one as being lamentably significant of journalistic turpitude that a paper of the World's standing uses its reading columns to misdirect and delude those whom it is supposed to protect. The readiness with which the World declares that a youthful promoter is an "acknowledged expert," or that a case-hardened fakir is a "mining engineer of continental reputation," is pre-eminently painful.

The most enthusiastic friends of Cobalt and Montreal River will acknowledge that there are, especially in boom times, many crooked flotations foisted upon the public. Does the World ever damn any of these? Does it do anything but play into the hands of men whose dice are loaded and whose cards are marked?

This is a time when mining men and others are in duty bound to exercise discretion. There is nothing reprehensible in lending one's name to a mining project. But it is at least incumbent upon responsible citizens to make sure that there is no room for doubt as to the soundness of the concerns with which their

names are associated. Our attention has been drawn to the fact that Mr. James L. Hughes, Chief Inspector of Schools for Toronto, and Mr. J. Houston, superintendent of the Right of Way mine, have permitted their names to be used in connection with two recent flotations, one of which is considerably worse than the other. In all such instances as these the names of prominent men are of use to promoters merely as bait. And it is notorious that bait of this kind is most effective among doctors, school teachers, farmers, and laborers. Therefore a very grave responsibility devolves upon the shoulders of Mr. Hughes, who is an outstanding figure in educational circles, and upon Mr. Houston, who carries with him the prestige of a successful mine. In dealing with both of these gentlemen we wish to be frank. Of Mr. Hughes we say this: he is guilty of a major indiscretion when, as Chief Inspector of Schools, he uses his official standing to aid a precarious mining scheme. Mr. Houston's action we must deplore even more deeply.

In conclusion, it is obvious that the Ontario Companies Act is a dead letter. Not one of the mining advertisements published in Ontario papers conforms with the requirements of the Act. Not a few of the advertisements are direct breaches of the Act. Unless the Provincial authorities and decent mining men rise to the occasion at once, we shall have a recrudescence of such highway robberies as were perpetrated not long ago by Law and Russell.

RUSSIAN ASBESTOS.

It will be of interest to Canadian asbestos producers to learn that the principal asbestos deposits in the Urals have been sold to a German syndicate. The Korieff mine, the Pokleffsk mines, and the mines of Baron de Sukanton have passed into German hands. The Pokleffsk property includes the only mill operated in the whole region. The total annual output of the properties mentioned amounts to about 470,000 poods, or 8,460 short tons, which is more than eighty per cent. of Russia's whole yearly production.

This announcement gains an especial significance from the fact that Germany is the chief European consumer of Canadian asbestos.

A JAPANESE ENTERPRISE.

On Moresby Island, one of the Queen Charlotte group, lying off the shores of British Columbia, there is a promising copper mine. The ore deposit was discovered in May, 1906, by Mr. A. Ikeda, a Japanese merchant, who was at that time interested in the abalones fisheries. The history of the mine from that time to this is outlined by Mr. Ikeda on another page of this issue.

There are many unique features about the Ikeda mine. All of the employees, with the exception of five white men, are Japanese. The company was floated in Kobe and Osaka, Japan. One of its principal officers is Mr. Owaya, who is a member of the Japanese Diet. The company name is "Awaya-Ikeda."

Several residences and other buildings have been erected on the Awaya-Ikeda property. The Japanese miners, however, live in the old abandoned stern-wheeler "Dawson," built by the C. P. R. for service on the Stikine River. The manager, Mr. Ikeda, occupies the charthouse.

The Ikeda mine began shipping ore early. It is now producing at the rate of fifty tons per day. Its owners expect great things, and, apparently, they have made a healthy start.

NEOTERIC NICKEL.

Here is something new under the sun. A valued correspondent, whose letter is not printable, beseeches us to smite error in high places. He encloses, for our delectation, a clipping from our venerable London contemporary. The clipping is a paragraph on the metal nickel, and the paragraph is part and parcel of an article of a series entitled "The Recognition of Minerals."

Mr. C. G. Moor, M.A., F.I.C., the author of the article, disarms criticism by asking for correction and suggestions as to "a better way of dealing with the subjects touched upon." By way of proving that this request is not a superfluity, he writes thus of nickel:

> "One of the most important modern uses of nickel is to form the outer skin of rifle bullets. With modern rifles the rapidity of the bullet through the barrel is so great that a soft (lead) bullet would tend to strip and foul the rifling, and hence modern rifle bullets consist of a coating of nickel filled with lead.
>
> The principal ore of nickel mined at the present time is garnierite (also called noumeite).
>
> Garnierite (which has already been described under "Green Minerals") may also be greyish or nearly white, and sometimes a brown; to this variety the name "chocolite" has been given.
>
> Garnierite is mined in New Caledonia and at the Sudbury Mines, in Canada. Noumeite is essentially a silicate of nickel with magnesium silicate.
>
> The ore from Sudbury is silicate of nickel with some copper silicate. These are the two most important commercial ores."

One of the most important modern uses of education is to enable authors to ascertain a few facts about their chosen topics. Poets, lawyers, ladies, and promoters are privileged classes. But the man of science deals with ascertained facts. Ascertained facts concerning the occurrence of the nickel ores of Sudbury and New Caledonia are easily available.

Stern logic drives us to the conclusion that, since Mr. Moore is presumably neither a lawyer nor a pro-

moter, he must be either a poet or a lady. If the last alternative prove true, we forgive her. If the author be a poet, we demand hexameters in future.

"ROARING" STAMPS.

A writer in the Toronto Globe's special Cobalt supplement deals thus with the stamp-mill of the Muggley concentrator:—

"Every hour the 20 roaring stamps pounding down on the rock reduce 85 tons to pulp."

"Roaring" is good; "85 tons" per hour for 20 "roaring" stamps is better. Heretofore a duty of three to six tons per stamp in 24 hours has been accepted as a fair standard. But if the Globe's announcement be true, then are all other stamp-mills fit only for the scrap-heap. When each stamp has a crushing capacity of about 100 tons in 24 hours it is high time that laggards (who get only this duty out of twenty times one) and find out what's dong. Strange to relate, we believe that the Globe's announcement will be news to the proprietors of the Muggley mill.

After careful thought, we can attribute the remarkable capacity of the Muggley stamps (as announced by the Globe) to nothing but the "roaring" qualities of the stamps.

Thus science marches. In future all purchasers of stamp-mills will include in their specifications a carefully designed roar.

CANADIAN BANKING.

Collier's Weekly, American edition, for October 17, publishes this remarkable statement: "Canada guarantees bank-notes, but has not thought of guaranteeing deposits." Collier's is laboring under complete misapprehension. Canada does not guarantee bank-notes. Except in the case of the one dollar and two dollar notes (which are not bank-notes) issued by the Government, there is not one cent of gold behind our bank-notes. Depositors in the Postoffice saving bank are guaranteed. Depositors in chartered Canadian banks are not guaranteed.

IKEDA BAY MINE.

Written for The Canadian Mining Journal by A. Ikeda.

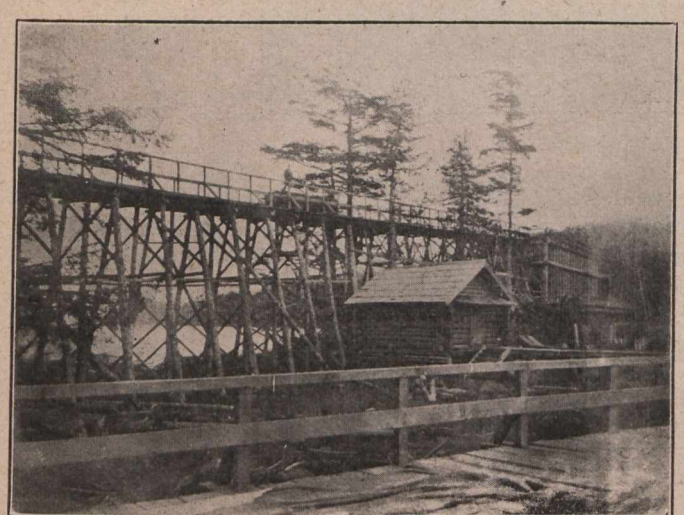
LILY MINE—FRONT VIEW OF No. 3 TUNNEL.

This property is situate on the southern end of Moresby Island in Ikeda Bay, one of the Queen Charlotte group, British Columbia. It is reached by C.P.R. steamer four times per month and is distant from Vancouver about 450 miles. It is distant from Jedway about three miles in the next bay north, which is now the seat of the Government Recorder and where all the claims on Queen Charlotte Islands are recorded. The town of Jedway has telephone connection with Ikeda Bay and is connected by good government trails. It also has a good sawmill, hotel, store, etc., all of which have been built within the last year or so. The Copper Queen, a very promising property, which is owned by Seattle people and where extensive drilling with dia-

mond drill is going on, also the Eagle Tree group of mines all are around Jedway, the latter property being under bond to the Tyee Copper Co., a wealthy English company. At Collison Bay, the next bay south of Ikeda Bay, there are some promising properties, notably the Meal Ticket, Thunder, and Maple Leaf groups, the latter, where development work is going on, being now under bond to some Bellingham Bay people.

Further north from Jedway, about 50 miles, is the "Swede" group, which is bonded for a large sum of money. This is a large low grade property having a very large vein of self fluxing ore and by some it is believed to be a larger property than even the Granby mines. Of course it will take development to prove this, but according to present indications it looks very favorable for it being another Granby. All the mines on the islands are blessed with easy transportation facilities, as the mountains come down fairly straight to the water where large steamers can load right from the bunkers. This fact alone makes these islands very enticing to mining people.

The climate on these islands is very mild, no snow or winter at all, although there is quite a bit of rain with high winds.



TRESTLE AND NO. 4 ORE BIN.

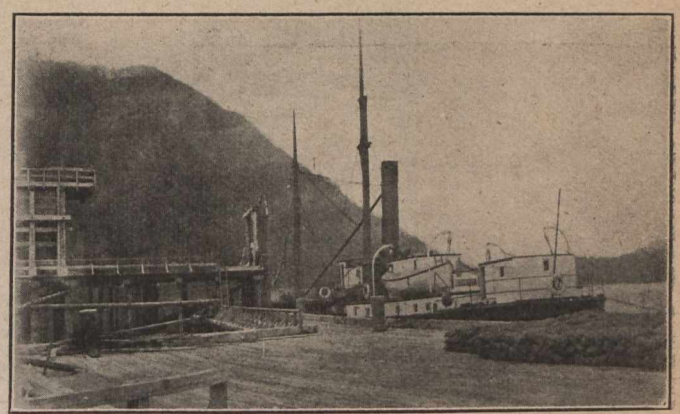
Geology.—Around Ikeda Bay and the south shore of Skincuttle Inlet are limestone and slate. The entire country surrounding Ikeda Bay is cut by dykes of greenstone and other igneous rocks, such as diorite. It has been subject to movements resulting in well defined fissures and also in slips or fissures at right angles to and between the main fissures. The main fissures are vertical, the others approximately horizontal. The horizontal fissures or slips are of great number and reach from one main fissure to another, following their plane along the main fissure. It is along the horizontal fissures that the largest ore bodies have been made.

The formation around Ikeda Bay is diorite and limestone.

Vein.—The vein is what is called a contact vein, having good and well-defined walls, carrying an average width of 5 feet and as wide as 30 feet in some places. The vein dips to the east at an angle of about 45 degrees.

Development.—The property is developed with four tunnels. The depth from the face of the lowest level to the outcrop is 300 feet. These levels are all connected with raises, etc. Greater depth than ever will now be attained on account of the elevation of the mountain. The faces of all tunnels will from now on make foot for foot in depth.

Area.—The entire number of mineral claims which this company own is 47, but the work is being almost entirely devoted to what is known as the Lilly group.



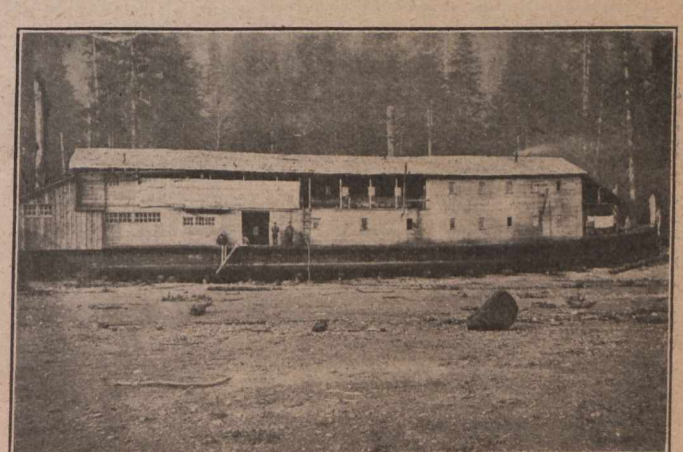
ORE BOAT LOADED WITH 1,000 TONS ORE.

All these claims are situate around Ikeda Bay and take up the whole water front.

Shipments.—From November 1906 to the 1st of September 1908, 5,608 tons of ore have been shipped from the mine. Twenty-one hundred tons of this ore was first-class and averaged 12 per cent. in copper, $6 in gold and $4 in silver. The remaining 3,568 tons was second-class ore and averaged 6 per cent. in copper, $3 in gold and $2 in silver. This is taken from smelter returns. All this ore was shipped to the Tyee Copper Company's smelter at Ladysmith.

Equipment.—The mine is distant from tide-water 6,100 feet and is connected with a surface tramway of the same length. The cars run down by gravity to the ore bunkers at the water but have to be hauled back by horses as the elevation from the water to the lowest level is only about 200 feet. Later on I expect to equip this tramway with an electric motor.

Equipment.—There is a new Ingersoll air drill with large new boiler capable of running three drills.



THE OLD "DAWSON."
Used by the Japanese miners as a bunk-house.

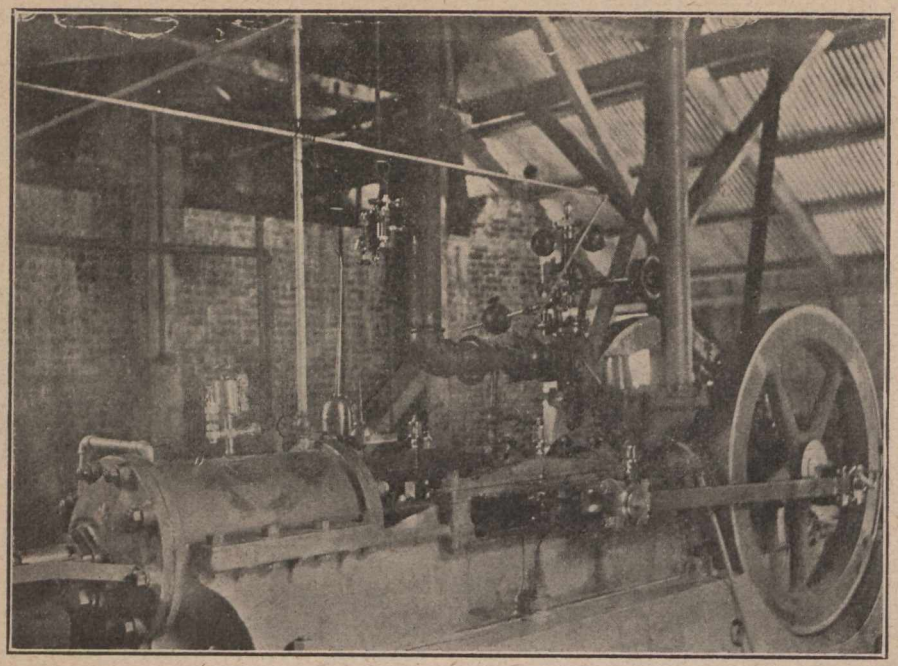
There is a large ore bunker at tide-water which has just been completed, capable of holding 1,000 tons of ore and the ore from this is loaded into the steamers almost automatically.

There are also two smaller ore bunkers at the mine, one of a capacity of 400 tons and the other of 100 tons.

The mine is well equiped with buildings, having a large bunk house and boarding house for the miners, engineer's house, superintendent's house, store house, assay office, stables, blacksmith shop, etc.

There are about 80 Japanese employed and 5 white men, the foreman and engineer, etc., being white men.

History.—This property was first discovered in May 1906 by the writer while he was engaged in the business of fishing for abelones. It is now a little over two years since the first pick was put in the ground and, considering the distance from supplies and the lack of facilities for getting things into the island, the advancement has been marvelous. The property has been shipping from nearly its infancy.



IKEDA MINE—ENGINE HOUSE.

REINFORCED CONCRETE FOUNDATIONS FOR STAMP BATTERIES.

Paper read before the Institution of Mining and Metallurgy, by S. J. Truscott, Member, and John P. Fuller, Associate.

The wooden mortar blocks for the stamp batteries at Redjang, Lebong, Sumatra, which dated from the year 1898, having become rotten around the bolt holes and above ground generally, it became necessary to replace them. Being imbedded in much concrete, it would have been difficult to have drawn them, nor was this course necessary, because they were found to be in good condition below, and would not interfere with the stability of the concrete blocks it had been decided to raise over them. They were accordingly cut down sufficiently to allow a base blocks of concrete 850 mm. (2 ft. 9½ in.) in depth to be rested upon them, with its upper surface level with the ground. The block was built to accommodate ten stamps, and was 4700 mm. (15 ft. 5⅛ in.) long by 2600 mm. (8 ft. 6⅜ in.) wide, and, outside the limits of the wooden blocks, it rested upon a levelled surface of crushed stone beaten down upon the boulder clay which constituted the country rock; there was no question of putting the battery upon a more solid bedding.

At the back and on the same level the foundations for the central and two outside sills were hung out for a total length of 1830 mm. (6 ft.), each having at its end an expanded base, in which rails were embedded to distribute longitudinally the weight brought down by the ore-bin posts.

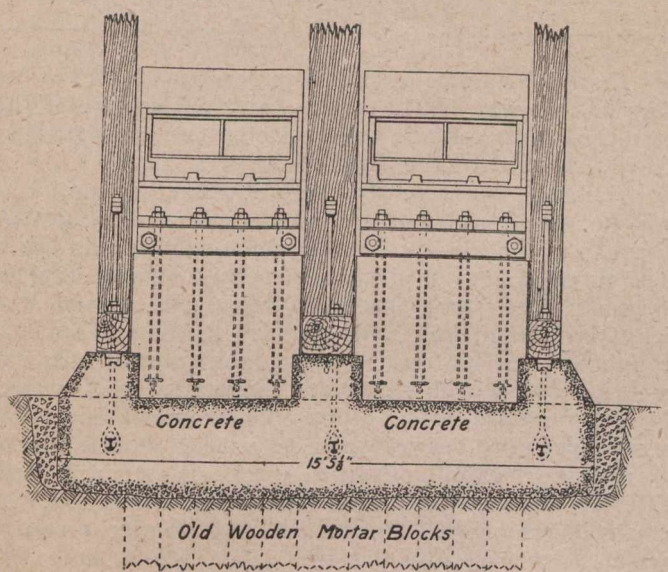
Into the main base block twelve 38 mm. (1½ in.) bolts, four under each king-post, were anchored on rails, to hold down the sills of those posts; and three other bolts of the same size were put down in the back foundations to secure the sills of the ore-bin posts.

It is pertinent here to give some description of the stamp and mortar box. The total weight of the falling stamp was 522 kg. (1150 lb.) and the number of drops was 96 per minute through 195 mm. (7¾ in.). The mortar box had, by reason of the difficulties of transport, to be sectionalised, the bottom being made up of seven cast iron cross sections having planed faces, drawn together by four longitudinal bolts of 45 mm. (1¾ in.) diam., with nuts recessed in the end sections. The upper parts of these boxes were of 13 mm. (½ in.) steel plate riveted together and to the bottom sections.

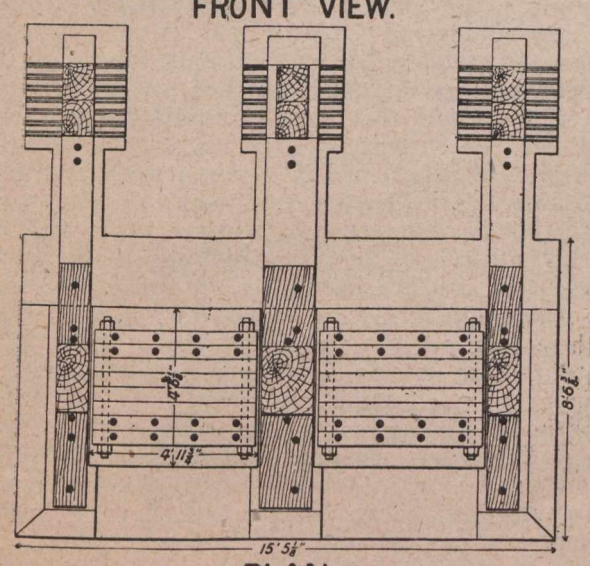
In order to relieve these longitudinal bolts of any undue strain which might come upon them by reason of irregularities of seating, each box was placed on an anvil block made up of longitudinal sections brought together by two transverse bolts of 57 mm. (2¼ in.) diam., the joints being planed and grooved; the bot-

tom of the box and the upper and lower surfaces of the anvil block were also planed.

The box had a width at its flanged base of 750 mm. (2 ft. 5½ in.), and, when using original wood blocks, six anvil sections were bolted together, making a total width of 760 mm. (2 ft. 5⅞ in.), the same as that of the blocks; one set of eight holding-down bolts then secured both the box and the anvil block. For the concrete it was decided to include eight sections in the anvil block to make a total width of 1015 mm. (3 ft. 4 in.), which would allow two sets of bolts, one of short bolts to hold the box on to the anvil block, and the other of long bolts to hold down the anvil block upon the con-



FRONT VIEW.



PLAN.

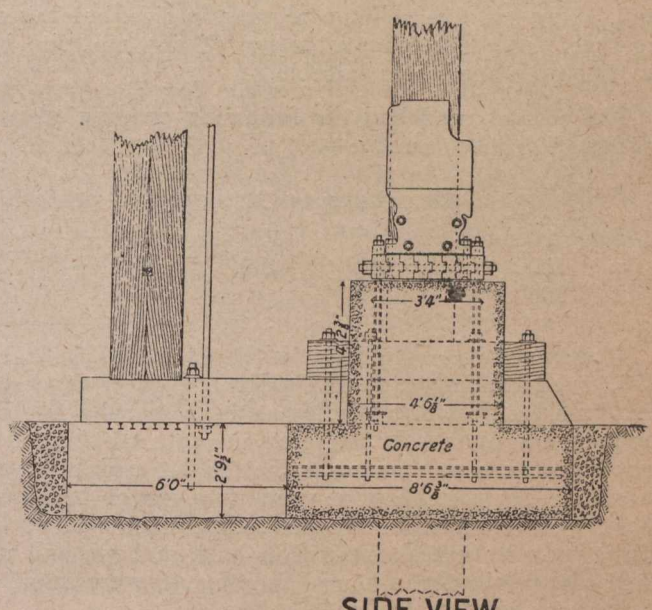
crete, which would then be given a width of 1375 mm. (4 ft. 6⅛ in.). The short bolts had countersunk heads which were winged to prevent rotation, but had there been convenience here they would have been so made that in case of breakage they could be withdrawn without the necessity of dismantling the box, which now exists, though the chance of breakage appears to be inconsiderable, special care having been taken to give them a true seating.

The usual design of concrete block has in transverse section a gradually increasing thickness towards the base, which design permits the holding-down bolts to be inclined, with their pocket holes removed from a position directly beneath the box, thus allowing the concrete there to be solid; another point of the usual design is that the bolts are laid in recesses from which they can be readily withdrawn in case of breakage.

In the case of the battery under description, such an increase of dimension towards the base would have encroached upon the freedom of the line shafting behind and have also thrust the pulp launder out of position in front, because there were no copper plates to carry the pulp well forward. The pulp dropped immediately into a launder set at a suitable inclination from both ends to the centre; the copper plates were kept in a separate house.

Further, the amount of metal in the flange at the base of the box and the shape of the anvil block did not allow of any departure from the vertical position for the bolts. With the material available, therefore, a straight up-and-down concrete block was determined upon.

Seeing that between the bottom of the box and the bolts in the concrete there were three intermediate bolts



SIDE VIEW.

to take up the jar of the blow, it was considered that those bolts were beyond reasonable chance of breakage. Their lower ends were therefore imbedded fast in the concrete, but in case a bolt should break it can still be withdrawn through the pipe casing in which it runs by first chipping away the concrete to free the cotter. when the vertical position of the bolt will allow it to be drawn up free of the box, whether front or back.

These bolts were 38 mm. (1½ in.) diam., but at the ends they were expanded to 42 mm. (1⅝ in.), to make good the loss of strength caused by the cotter hole or screw thread; they were also made long enough to allow the insertion of a deep cast-iron washer under the nut at the top, so that should a bolt break at the thread, or the thread become stripped, there would, upon removal of this washer, be space enough to cut another thread.

Such a mortar block for five stamps was 1520 mm. (4 ft. 11¾ in.) long, 1375 mm. (4 ft. 6⅛ in.) wide and 1280 mm. (4 ft. 2⅜ in.) deep; it rested upon the base block beneath to form with it one construction, of which the weakest plane was that where these two masses

met, across which plane a reinforcement was desirable, and was made by standing 25 iron rails so that one-third of their strength was in the base block below and two-thirds in the mortar block above, the average rail length being about 1500 mm. (4 ft. 11 in.). These rails were placed in five rows of five, and they were bound around and across with about 30 k. of twisted band-iron and 75 m. of barbed wire, the reinforcement being arranged in a manner prescribed for making concrete piles for general foundation work.

The crushed stone used in making the concrete was a hard andesite passed through a crusher set to a 38 mm. (1½ in.) ring. This material when screened over a bar screen set to 13 mm. (½ in.) spaces gave 43 per cent. coarse and 57 per cent. fine, the former containing 1 per cent. moisture and the latter 4 per cent. As this showed a good proportion of fines no such separation was made and the material was entered into the aggregate just as it was crushed.

The sand available was the well-washed residue from the cyanide works; this showed only about 10 per cent. remaining on a 40 mesh, so that in itself was not a good sand, being too fine and too regular in size, but taken together with the high proportion of fine material in the crushed stone it was suitable.

The cement used had the following grading, showing it to be rather coarse:—

			Remaining on	90	mesh	12.1 per cent.
Passing	90	mesh	"	150	"	3.3 "
"	150	"	"	200	"	17.2 "
"	200	"	"		"	67.4 "

It also showed alkalinity to the extent of 3.74 per cent., reckoned in terms of $Ca(HO)_2$, this presence of free lime being further indicated by a marked rise of temperature upon setting. But in spite of these departures from good character the tests to which it was submitted for soundness showed no signs of twisting, cracking, or distortion. In the actual process of working it took its initial set within half an hour and its hard set within three hours, thereby showing itself a convenient cement.

In order to arrive at the proper proportions of material to be used, determinations for voids were made with the crushed stone and the sand by loosely filling a measure having a capacity of ⅛ of a cub. m. without subsequent shaking, these being the conditions which would prevail at the actual mixing. The results showed the crushed stone to have 40 per cent. voids and the sand 47 per cent., these figures being higher than those generally recorded for such materials, which allow the measure to besettled by shaking, to reproduce the settlement caused during the transport of the measured material to the place of mixing. Allowing that the sand should fill the voids of the stone and the cement those of the sand, the proportions to make a good balance were determined as follows:—

Crushed stone	1000 parts.
Sand 40/100×1000	400 parts.
Cement 47/100×400=188, or say	200 parts.

or Cement 1. Sand 2. Crushed stone 5.

The actual amounts and proportions used for 10 stamps were as follows:—

	Cement.	Sand.	Crushed Stone.	Proportion.
	Cub. m.	Cub. m.	Cub. m.	
Back sill foundations	0·312	1·707	3·414	1 : 5 : 10
Bottom base block	0·500	1·500	4·000	1 : 3 : 8
Middle " "	0·625	1·250	3·125	1 : 2 : 5
Top " "	0·750	1·500	3·750	1 : 2 : 5
Bottom mortar block	0·500	1·000	2·000	1 : 2 : 4
Top " "	0·687	0·687	2·061	1 : 1 : 3
Shoulders for sills of king-posts.....	0·375	0·375	1·125	1 : 1 : 3
	3·749	8·019	19·475	1 : 2·1 : 5·2

The total volume of the loosely packed material before mixing was 31.243 cub. m., and the volume of the resultant constructions was 20.12 cub. m., or somewhat more than that of the crushed material alone.

The materials were very carefully hand-mixed, after which enough water was worked through the mixture to make a rather wet concrete, which was quickly taken and dumped into position into which it was further tamped. The work was not continued through the night but, when leaving it unfinished, the surface was roughened up, and on resuming next morning it was well sprinkled over with pure cement before the next lot was dumped on. The base block and other parts were formed up between boards, but the mortar blocks were more carefully shaped up in exact forms with interiors well soaped, and upon nearing the top, the concrete was added in smaller and smaller amounts which were carefully put into place before more was added, this care being to get a good surface free from any large pieces and not over-full. A cover was then put on and weighted down to remain over night.

Upon removal of the forms next morning, vapour rose off them, and they were perceptibly warm to the hand, the rise in actual temperature being about 20 degrees C., as determined by a thermometer, for which a hole was left in the top of a block.

The blocks were carefully washed down, and for a few days afterwards they were kept damp. Some small insignificant cracks appeared in the first blocks made, these being apparently due to contraction, and generally there was a slight sinking of about 1 mm. at the centre, but the outside dimensions were unaltered.

Beyond a good scrubbing down, very little further preparation was necessary; the surface was in every case good and true enough to allow the anvil block to be put on with only a layer of tarred blanket between, the mortar box above being seated upon a sheet of rubber.

The blocks were, of course, at once firm enough to allow the superstructure to be erected, and the stamps were allowed to drop one month afterwards, when each foundation showed itself to be satisfactory.

The cost for such foundations for ten stamps were as follows:—

	Fl.	£	s.	d.
5916 k. of cement, cost delivered	1395.36	116	5	7
75 m. of old steel rails.....	75.00	6	5	0
60 k. of band iron.....	7.20	0	12	0
150 k. of barbed wire.....	5.00	0	8	4
Wood. oil, carpenters' labour....	70.00	5	16	7
93 days coolie labor to mix, transport, and place concrete.....	93.00	7	15	0

	Fl.	£	s.	d.
6 days mason	12.00	1	0	0
6 days native overseer	15.00	1	5	0
4 days European overseer	32.00	2	13	4
Foreman's time	20.00	1	13	4
55 days' coolie labor bringing stone to crush	55.00	4	11	8
Labor, cutting rails, preparing reinforcements	15.00	1	5	0
	Fl. 1794.56	£149	10	10

From these figures it is obtained that 1 cub. m. of concrete cost fl. 89.19, or 7l. 8s. 7d., of which the cement alone fl. 69-33, or 5l. 17s. 6d.; or one cub. yd. would would take 7l. 15s. 0d.

Shortly before this work of concrete foundations was begun, thirty identical stamps, with identical mortars and anvil blocks as described, were erected and put to work on wooden blocks as part of the same battery, and the experience has been that the concrete blocks cost very considerably less both in money and in time. With these stamps on wood, a comparison with respect to crushing efficiency was made, however, from which it could not be said that the concrete foundations showed any decided superiority, as one lot of stamps appeared to do as well as the other. It was, however, noticeable that with the concrete the nuts and bolts did not so readily work themselves loose, a fact which will be mor enoticeable as the battery gets older. When, late,r the holding down bolts are drawn up into shrinking or rotting wood, or when the wood gives way to the strain on those bolts, then the cotter plates will get out of truth and bolts will be the more liable to break; the concrete gives freedom from this liability, and it may be expected that over their life those blocks will show a greater efficiency than will the wood ones.

With the wood foundations there are no mud sills as there are in the usual design for such batteries, but the streak sills are supported on masonry along their length with additional support in the middle upon posts which stand up from the concrete fundament of the blocks; this construction reduces to a minimum any springiness of these streak sills which the usual support upon mud sills allows. The king-post is also seated upon a stiffening sill which again reduces any possible vibration and provides a piece easy of renewal in case the seating of the king-post should wear or rot itself loose; this piece also occurs with the concrete foundations. Each king-post is held down by two 38 mm. (1½ in.) bolts on either side, which are held against the streak sill beneath, and which in their turn hold down a stiff bar piece which passes right through the post; during construction pocket holes were left in the masonry for convenience in inserting these bolts, which were afterwards filled up.

These notes are offered in the hope that they may be of service in other remote situations similar to that of the battery under consideration, where use has to be made of the material at hand. For new work in countries with good ordinary means of communication the design of concrete blocks as used in South Africa would be proper, to which some application of the principle of reinforcement might perhaps be added with advantage.

THE PREVENTION OF MINE EXPLOSIONS.

REPORT.

To the Honorable The Secretary of the Interior.

Sir,—In response to your request that we co-operate with the United States Geological Survey in the inauguration of its investigations looking to the prevention of mine explosions, and that we submit for the consideration of those connected with the coal-mining industry in the United States such recommendations as experience in our own countries and observation among American coal mines indicates may be useful in providing for greater safety, we beg to submit the recommendations given below.

Since coming to the United States, we have given careful attention to and approve the investigations in relation to this subject begun by the Geological Survey. We have visited typical mines in the more important coal fields of the United States, and have discussed the mining problems with many coal operators, miners, and state inspectors.

To be effective, investigations for the benefit of mining must be continuous. The opening up of new mines, the deepening of old mines, the meeting with new conditions, the changing of explosives, and the inauguration of new processes and methods will call for continuous investigations, to be followed by continuous educational work.

Our investigations and recommendations relate primarily to questions of safety in mining; but in this connection we have been greatly impressed with another closely associated phase of the industry, viz., the large and permanent loss of coal in mining operations in many portions of the United States. This is a serious, permanent, and national loss. It seems to be a natural outcome of the ease with which coal has been mined in the United States and the enormously rapid growth of the industry.

The active competition among the operators and the constant resulting effort to produce cheaper coal has often naturally led to the mining of only that part of the coal which could be brought to the surface most easily and cheaply, leaving underground, in such conditions as to be permanently lost, a considerable percentage of the total possible product. Certainly much of this loss can be prevented through the introduction of more efficient mining methods, such as the long-wall system, more or less modified, the flushing method. (See "H," 7, p. 10.)

In the preparation of these recommendations we have recognized fully the great differences between the mining conditions in Europe and those in America, where the industry has developed so rapidly that thorough organization has not yet been possible; where a large percentage of the men entering the mine are unfamiliar either with mining methods or the English language; and where the price of coal at the mine is less than half that in Europe. Nevertheless, we believe that these recommendations will be found useful in the

further development of the American coal-mining industry for safety and efficiency. The cordial reception everywhere accorded us leads us to believe that these recommendations will be received by the operators and miners in the same spirit of good will as that in which they have been prepared. But the success of this movement for greater safety and efficiency will depend upon the hearty and patient co-operation of the operators and the miners, working together for the accomplishment of this purpose.

RECOMMENDATIONS.

A. Selecting the Explosives to be Used.

(1) We recommend that the Government of the United States examine the explosives now and hereafter used in mining, with a view to eliminating the more dangerous explosives and to improving and standardizing such explosives as may be considered most suitable for such use, these to be designated by the Government "permissible explosives."

The term "permissible explosives" is suggested for the reason that no explosives are entirely safe, and all of them develop flame when ignited; and we advise therefore against the use in the United States of the terms "safety explosives" or "flameless explosives," as these terms may be misunderstood and this misunderstanding may endanger life.

(2) We recommend that the operators and miners of coal use only such explosives as are included in a list of "permissible explosives," when the same has been published by the Government, in all mines where there is risk of igniting either dust or gas, selecting that one which their own experience indicates can be used to the best advantage under local conditions.

(3) We also recommend that investigations be conducted to determine the amount of charge of such "permissible explosives" which may be used to the best advantage under different conditions with a view to reducing danger to the minimum.

B. Carrying the Explosives into the Mines.

(1) All explosives should be made into cartridges and placed in closed receptacles before being carried into the mine, and the quantity carried into the mine during one day by any miner should be limited as nearly as practicable to the quantity needed by him for use during that day. Handling loose explosives and making them into cartridges by an open light in the mine should be prevented.

(2) Detonators or caps should be handled with great care, and should be carried only by a limited number of responsible persons.

C. Use of Explosives in the Mine.

(1) Shooting in or off the solid should not be practiced.

(2) The depth of the shot hole should be less by at least 6 inches than the depth of the cutting or mining. The use of very deep shot holes should be avoided as unnecessarily dangerous.

(3) The overcharging of shots (the use of a larger charge than is required to do the work satisfactorily) should also be avoided as unnecessary and dangerous. The proper standardization of explosives used in coal mining will greatly facilitate the carrying out of this recommendation. (See also "A," 1, p. 7.)

(4) Shots should never be tamped with fine coal or material containing coal. Clay or other suitable material should be supplied and used for this purpose.

(5) The firing of two or more shots in one working place, except simultaneously by electricity, should not be allowed until a sufficient interval has elapsed between the firings to permit an examination of the working place in order to see whether any cause of danger has arisen.

(6) Before a shot is fired the fine coal should be removed from the working place, as far as practicable, and the coal dust on the floor, sides, and roof, for a distance of at least 20 yards from the place where the shot is to be fired, should be thoroughly wet, unless it has been demonstrated that the dust in the mine is not inflammable. (See also "E," 1, p. 9.)

(7) If gas is known to occur in the mine, no shot should be fired until, in addition to the watering, an examination made immediately preceding the time for firing, by a competent person, using a lamp which will easily detect 2 per cent. of gas, has shown the absence of that amount of gas from all spaces within 20 yards of the point where the shot is to be fired.

(8) Believing that such will be one of the greatest advances which can be made in safeguarding the lives of the miners, we recommend the adoption of a system of electric shot firing, in all mines where practicable, by which all shots in the mine, or in each ventilation district of the mine, may be fired simulanteously, at a time when all miners and other employees are out of the mine.

D. Keeping the Mine Roadways Clean.

(1) The roadways of the mines should be kept as free as possible from loose coal which may be ground into dust and of rubbish in which such dust may accumulate, in order to facilitate the removal and wetting of the dust.

E. Wetting the Coal Dust.

(1) In all coal mines where explosives are used it is desirable, and in all mines containing gas it is highly important, that the dust on the walls, timbers, and floors of the working places and roadways should be kept continually wet prior to and during the work in the mine. If, however, conditions of roof or lack of water render this general watering impracticable, at least the dust within 20 yards of each shot should be wet before each firing, and other precautions against explosions should be practiced with unusual care.

It is our opinion that a system of watering which occasionally sprinkles the floor only and leaves dry the dust on the walls and timbers of the roadways is useless and is also dangerous in that it may generate an unwarranted feeling of security against an explosion.

F. Special Precautions for Mines Containing Gas.

(1) In any mine where as much as 2 per cent. of gas can be detected by suitable method only locked safety lamps of an approved type should be used so long as such condition exists or is likely to recur.

All safety lamps should be maintained in good condition, cleaned, filled, kept in a special room at the surface, and carefully examined both when delivered to the miner and when returned by him at the close of each day's work. A defective safety lamp is especially dangerous because of the false feeling of security it engenders.

In the filling of lamps with benzine or other low-flash oils, which should always be done at the surface, special precautions against fire or explosions should be taken.

G. Use of Electricity.

(1) Electricity in mining operations offers so many advantages, and has been so generally adopted, that no reasonable objection can be made to its use under proper restrictions. The electrical equipment, however, should be installed, maintained, and operated with great care, and so safeguarded as to minimize danger from fire or shock. The fact that the effectiveness of some insulating materials is soon destroyed in most mines should not be lost sight of.

We recommend the following precautions: For distribution underground the voltage should not exceed 650 direct current or 500 alternating current, these voltages being intended for transmission to machinery operating at 500 volts direct current and 440 volts alternating current, respectively. Even lower voltages are preferable. The trolley wires should be installed in such manner as to render shocks least likely; that is, placed either high enough to be beyond easy reach or to one side of the track and properly protected.

Where current at a potential of more than 650 volts is employed for transmission underground, it should be transmitted by means of a completely insulated cable; and where a lead or armored covering is used, such covering should be grounded.

In all mines having electric installation special precautions should be taken against the setting on fire of coal and timber. Inclosed fuses of cut-outs are recommended, and each branch heading should be so arranged that the current may be cut off when necessary.

No live electric wire should be permitted in that part of any mine in which gas is found to the amount of 2 per cent.

In all mines producing gas in dangerous quantities, as indicated by a safety lamp which will detect 2 per cent. of gas, the working places should be examined for gas by a qualified man, using such a lamp, immediately before any electric machine is taken or operated there.

H. Precautions Against Miscellaneous Accidents.

(1) In all new construction, shaft lining and superstructures about the entrance of the shaft (or slopes or drifts) should be built as far as practicable of noncombustible materials.

About the entrances to mines, every possible precaution should be taken to prevent fires or the injury of the equipment for ventilation and haulage. Ventilating fans should be placed to one side of the mine opening, and hinged doors or light timbering should render easy the escape of the explosive force in direct line of the shaft of slope.

Proper precautions should be taken for immediately preventing the entrance into the mine of heat and gases and for facilitating the escape of the men in case of surface or shaft fires.

(2) The surface equipment for handling the coal should be so arranged as to prevent coal dust entering into the mine shaft.

(3) In all new mines, and in all old mines as far as practicable, suitable man roads should be provided for the men separate from the main haulage roads.

(4) In connection with the system of venilation it is recommended that in the more frequented roads connecting the intake with the return air centres, two doors be provided, these doors to be placed ot such a distance apart that while one is open the other is closed.

(5) In view of the large number of accidents from falls of coal or roof, under the existing practice with single props, more attention should be given to the introduction in mines where the roof is bad of better systems of timbering, such as have been long in use with economy and safety in many well managed mines.

(6) In undercutting coal by hand, the premature fall of the coal should be prevented by sprags or other suitable supports.

(7) We believe that the difficulties and dangers encountered in the working of coal seams which are thick and steeply pitching, or of which the coal is highly inflammable in character or subject to firing from spontaneous combustion, and in mines where the subsidence of the surface must be avoided, may be successfully and economically overcome in many cases through the adoption of the fiushing system of mining—that is, the filling with sand or other similar materials of the space from which the coal is removed. The system originated in the United States and is now successfully practiced in portions of Germany, Austria, Belgium, and France.

I. Mine Supervision and Inspection.

(1) We can not too strongly emphasize the fact that thorough discipline about the mine is absolutely essential to safety, and that thorough discipline can be brought about only through the hearty co-operation of the operators, the miners, and the State.

(2) We are of the opinion that the responsibility for safety in the mine should primarily rest with some person, such as the manager or superintendent, clothed with full authority; and that such person can greatly facilitate the attainment of safety through the employment of a sufficient number of foremen, and also of one or more inspectors whose special duty it shall be to see that the regulations are strictly enforced.

(3) The State can not exercise too much care concerning the experience, technical training, and selection of its inspectors. Their positions should be made independent of all considerations other than that of efficiency; and their continuance in the service should be coexistent with good behavior and proper discharge of official duty.

J. Training for Mine Foremen, Inspectors, Etc.

We are of the opinion that the cause of both safety and efficiency in coal mining in the United States would be greatly aided through the establishment and maintenance in the different coal regions of special schools for the training of fire bosses, mine foremen, superintendents, and inspectors. The instruction in such schools should be practical rather than theoretical.

The work of these schools would supplement most effectively that of the colleges already established in many parts of the country for the more thorough training of mining engineers.

Respectfully submitted.

VICTOR WATTEYNE.
CARL MEISSNER.
ARTHUR DESBOROUGH.

THE NORTON HILL COLLIERY EXPLOSION.

The report of H. M. Inspector of Mines Joseph S. Martin on the Norton Hill Colliery explosion indicates that the explosion was due to the presence of coal dust. No perceptible amount of fire-damp was present. The explosion resuled in the death of ten persons. The report lays stress upon the necessity of attacking the coal-dust problem and of watering dusty sections. The conclusion is reached that if there had been even a small percentage of gas in the air the explosion would have been much more violent.

THE MINING OPERATIONS OF THE DOMINION COAL COMPANY.

By F. W. Gray.

(Continued from last issue.)

The Fire Fighting Organization and Equipment.

The Dominion Coal Co. have in the past suffered severe losses through fire, both above and below ground. In 1903 a fire occurred in Dominion No. 1 mine, and in 1906 a fire broke out in the pit bottom of the Hub Colliery. In both cases the mine had to be flooded before the fire could be extinguished. At the Hub the surface erections were all destroyed. In October, 1906, the old bankhead at Reserve was completely destroyed by fire, and in 1908 the wash plant at Port Morien was burnt down.

The monetary loss suffered by the company through these fires, while serious, was not so great as that occasioned through the stoppage of their operations. For some years past the company have been perfecting a system of fire protection, and at the present time they have an admirable and effective organization.

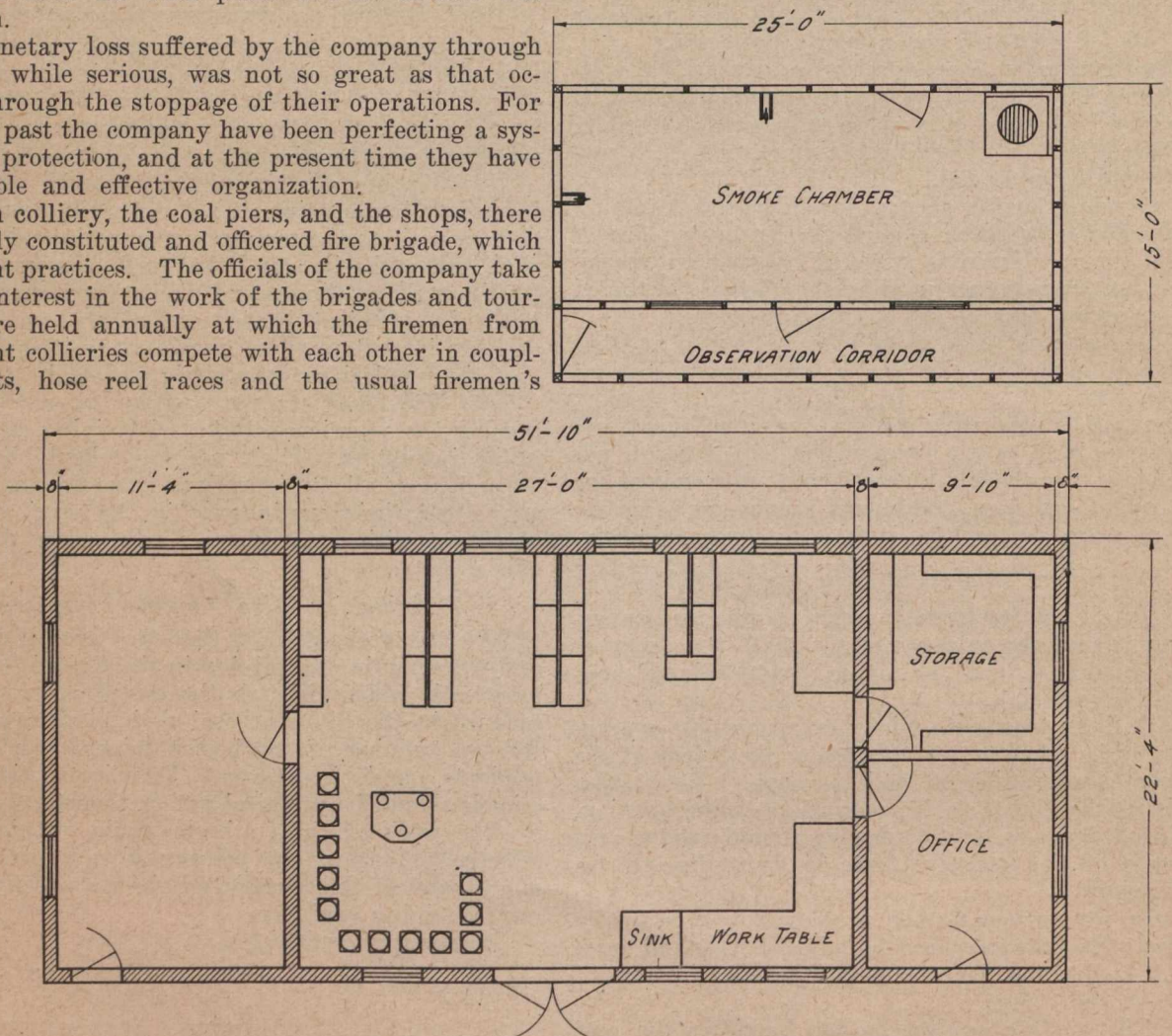
At each colliery, the coal piers, and the shops, there is a properly constituted and officered fire brigade, which has frequent practices. The officials of the company take an active interest in the work of the brigades and tournaments are held annually at which the firemen from the different collieries compete with each other in coupling contests, hose reel races and the usual firemen's sports. Each colliery also has a building, generally known as the firemen's hall, which is set apart for the social use of the firemen in the evenings. In this building is also stored the fire-fighting equipment, which consists of fire hose, reels, rubber boots, rubber coats and sou'westers.

Each colliery has a system of fire hydrants, and standpipes are placed throughout the bankheads and other large wooden structures, with coiled fire hose coupled up in readiness for instant use. The buildings are all supplied with chemical fire extinguishers, hung up in convenient situations.

Particular attention is paid to the matter of cotton-waste and oil. Drip pans are placed beneath all lubricating bearings and shafting in positions where the oil drips, keeping the wooden erections from becoming oil soaked and thus dangerous as a fire risk. Cast iron receptacles, sufficiently heavy not to be easily moved about or overturned, are provided to hold the waste. These receptacles contain two compartments, one to contain the clean waste and the other for the oily waste. Loose rubbish and oily waste are not allowed to be promiscuously thrown around.

A separate building at each colliery is provided for the storage and distribution of oil. These buildings are placed in an isolated position, and buckets of dried sand are always kept near at hand.

Particular care is taken to keep live steam pipes from coming into contact with wooden structures, and where



A—Plan of Central Rescue Station, showing Apparatus Room, Emergency Hospital and Smoke Chamber.

Draeger Apparatus—Helmet Type.

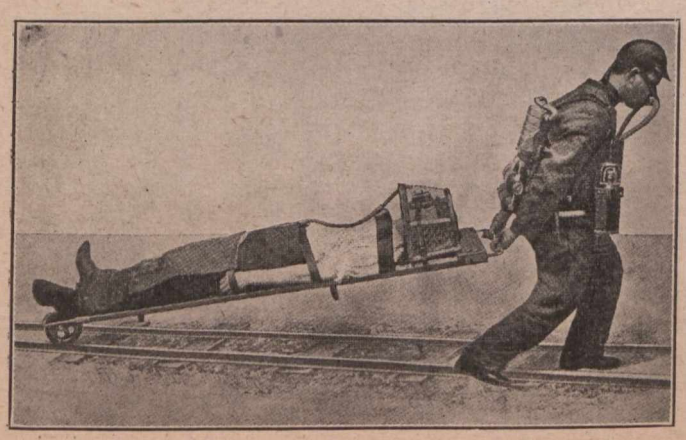
steam pipes pass through wooden partitions the wood is protected by the regulation bushing. Wherever high tension electrical current passes near timber structures instructions are given that dried sand is to be kept in a handy situation.

Similar precautions are taken underground. Where compressed air is carried into the workings arrangements are made to allow the discharge of the mine pump or some other adequate water supply to be turned into the air pipes, which thus become water mains extending into the interior of the mine. The fire stations are plainly marked, and the underground firemen, known as the Rescue Corps, are expected to know the position of these mains and connections in the same way that the surface fire brigade know the position of the colliery hydrants. Plans are kept on file showing the position of all the air and water connections both above and below ground.

In collieries where the workings are dusty, periodical sprinkling takes place, and in some instances the dust is swept up and taken out of the mine.

As on the surface, all the underground engine houses are provided with chemical fire extinguishers. Special electrical rules and warnings are placed in all electrical engine and pump houses.

One of the most interesting features of the company's scheme of fire protection is the Central Rescue Station, near No. 2 colliery. This is a substantial brick building, with concrete floor, containing four rooms. (See plan accompanying "A").



Method of transporting injured or unconscious man on oxygen stretcher.

The main room of the building contains a series of wooden cabinets (photos 1 to 5) on which are stored the breathing apparatus, which form the equipment of the station. These are all of the Draeger type, which consists briefly of a helmet, two flasks of compressed oxygen and two potash regenerator cartridges. The mode of operation may be seen from the accompanying diagram, and is shortly as follows:

The oxygen is contained in the twin cylinders at a pressure of 225 atmospheres. When released by turning the valve it passes out through a reducing valve at a pressure of 1-5 atmospheres through a side tube and into the air space of the helmet, emerging immediately in front of the mouth of the wearer. The helmet connects with two bags lying on the chest, one for the oxygenized air supply and the other for the expired air. These bags serve merely as a reservoir and to equalize the circulation. The expired air passes through a tube on the opposite side of the helmet and is passed through the re-

Draeger Apparatus—Mouth-Breathing Type.

generator cartridges. These consist of tin cylinders containing layers of finely granulated potash or shelve so arranged as to present the greatest possible superficial area of absorbing surface. The potash takes up the carbon di-oxide of the expired breath, and the purified air passes through a cooler, finally joining the main oxygen stream issuing from the cylinder. The process is continuous, and the apparatus is designed to enable the wearer to work for two hours quite independently of the nature of the outside atmosphere.

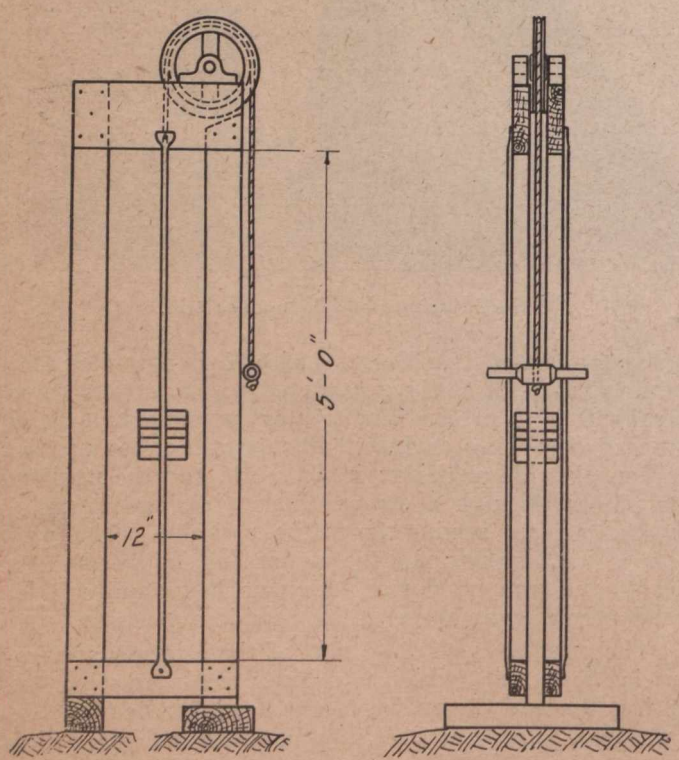
The most characteristic part of the Draeger apparatus is the helmet, which is a brass mask covering the entire face and the crown of the head, but leaving the ears free. Inside it has a collapsible rubber lining which may be inflated and deflated in the same manner as the tire of a bicycle. By inflating the pneumatic

lining the helmet can be made to fit exactly into all the crevices and curves of the facial outline, and entirely exclude the outside atmosphere. The front of the helmet consists of a large circular pane of mica which affords unobstructed vision. The entire apparatus fully charged weighs about 38 pounds.

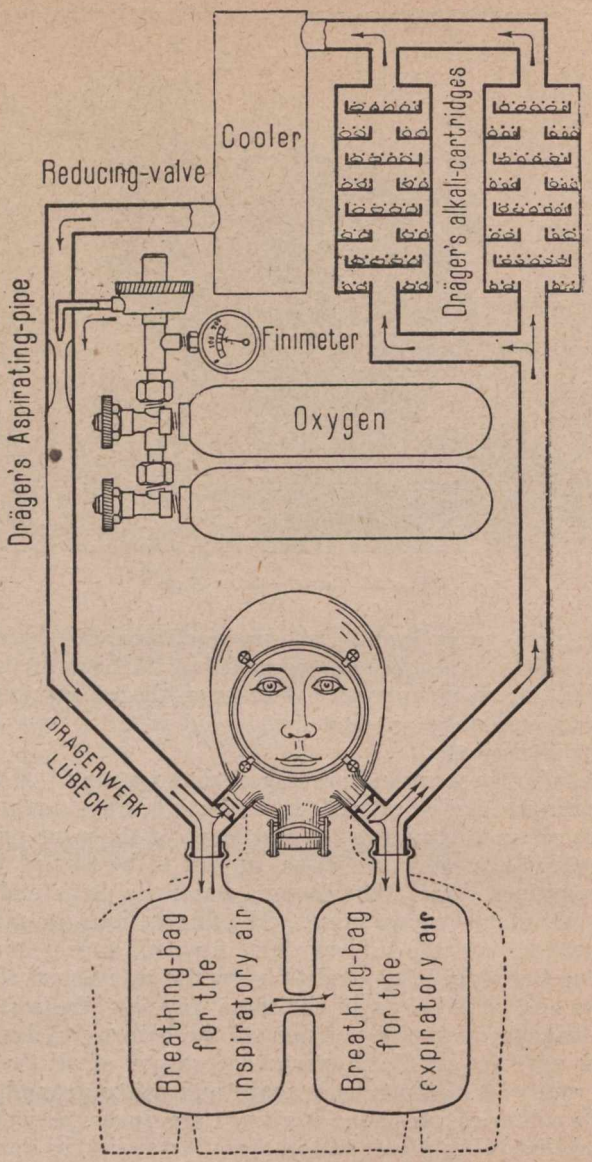
The station is equipped with 20 apparatus and 15 auxiliary sets are kept at the collieries. The oxygen supply, which is never allowed to fall below 1,000 feet, is kept in the main room in crucible steel cylinders, each holding 100 cubic feet at a pressure of 80 atmospheres. The small cylinders of the apparatus are charged by a refill pump, which compresses the oxygen from 80 atm. to 225 atm., the pressure for which the apparatus is designed. Electric hand lamps, corresponding in number to the apparatus, are kept on hand in the station, already charged for immediate use. The station has a small independent charging arrangement for the lamps, the current being obtained from the colliery wires. In addition to the Draeger apparatus the station has a Konig Smoke Helmet. This is a leather and mica hood connected by hose with a bellows to pump fresh air to the wearer. The hood has a mouthpiece, and a receiver is held by the man operating the bellows, enabling them to speak to each other. This device is useful for work in foul air at a short distance from fresh air, such as building stoppings. It was bought before the station was erected.

The station is connected by telephone, on its own special circuit, with all the collieries, and by means of an extension instrument is connected with the instructor's residence, close by the station. The instructor keeps in constant touch with the central of the coal company's private telephone system.

Adjoining the station is the practice smoke chamber. This is a rough-wooden shed, consisting of an observation corridor divided from the main building by a partition with glass windows.

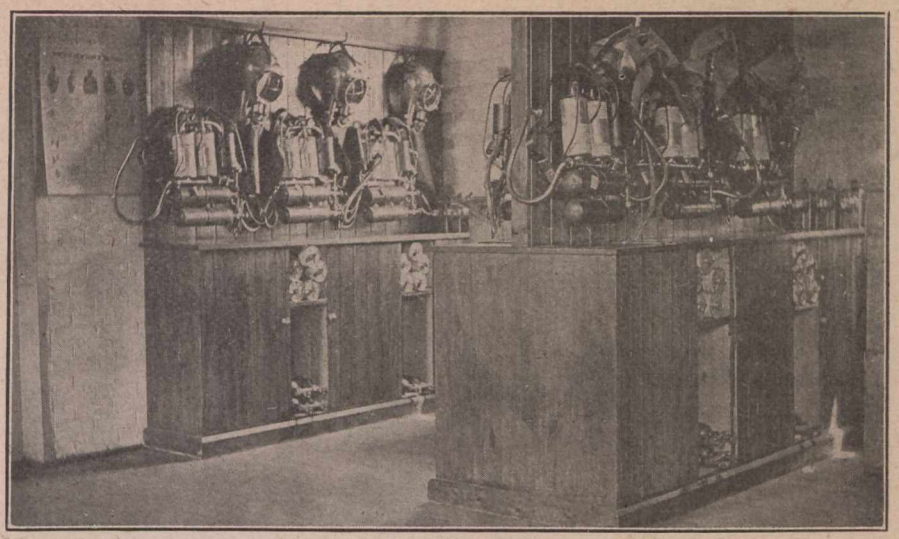


Weight and Pulley Exerciser used in the Smoke Chamber.

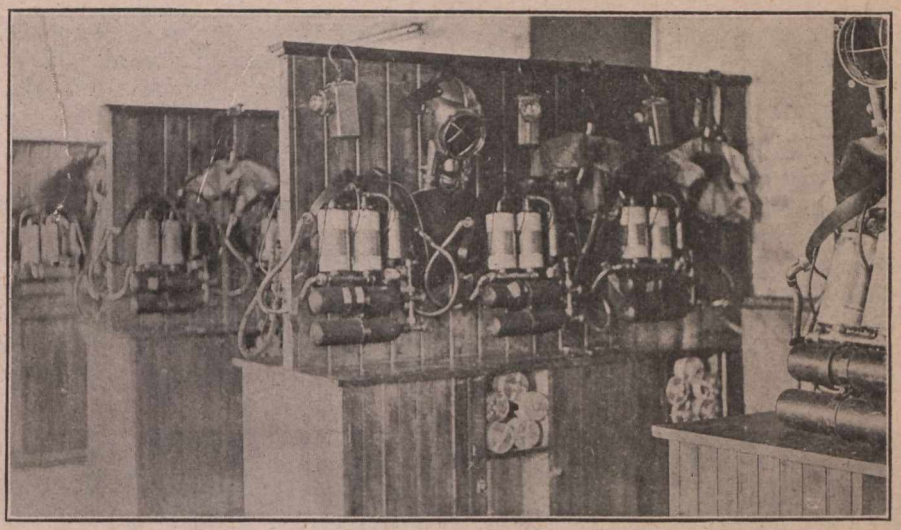


The smoke chamber proper has no windows, and has a fire grate in one corner on which materials are burnt to make a stifling smoke. There are two weight lifting machines for exercising, consisting of a rope passing over a pulley attached to a weight of 45 lbs. Men training in the use of the breathing apparatus enter the smoke wearing the apparatus and carrying electric lamps. Each man does a certain amount of work on the exercisers, and they thereby become acquainted with the working of the apparatus, and its effect upon them individually. The instructor is able to gauge the effectiveness of a man, as shown by the number of times he can lift the weight, and his behavior under the physical strain, and is able also to judge of the suitability of each man for the work. This training and testing process is quite necessary, as not all men are fitted to wear the apparatus or to perform the exhausting work which in case of emergency they will be called upon to do.

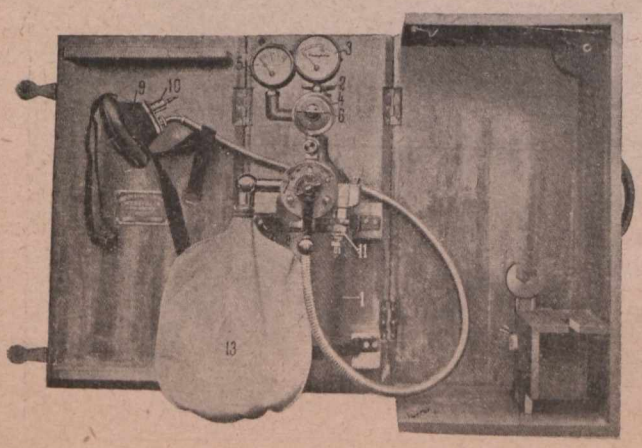
Among the equipment of the station is a "Dr. Bratt" resuscitator. This is a device for inducing artificial respiration and administering oxygen. It consists of a flash of oxygen connected by the tube with a mask for the mouth and nostrils. By moving a handle to and fro the lungs of an unconscious person may be inflated and deflated as in natural breathing. The device



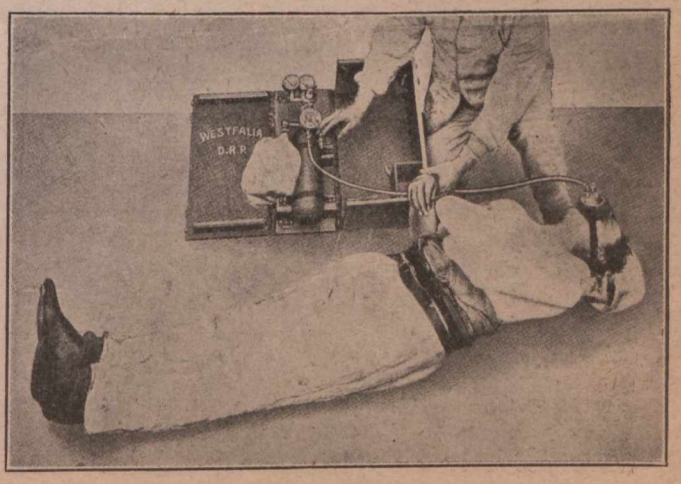
Corner of Rescue Station, showing Helmets, Back-pieces, Spare Cartridges, etc., all ready for use.



View inside Rescue Station, showing the four cabinets to store 20 sets of apparatus.

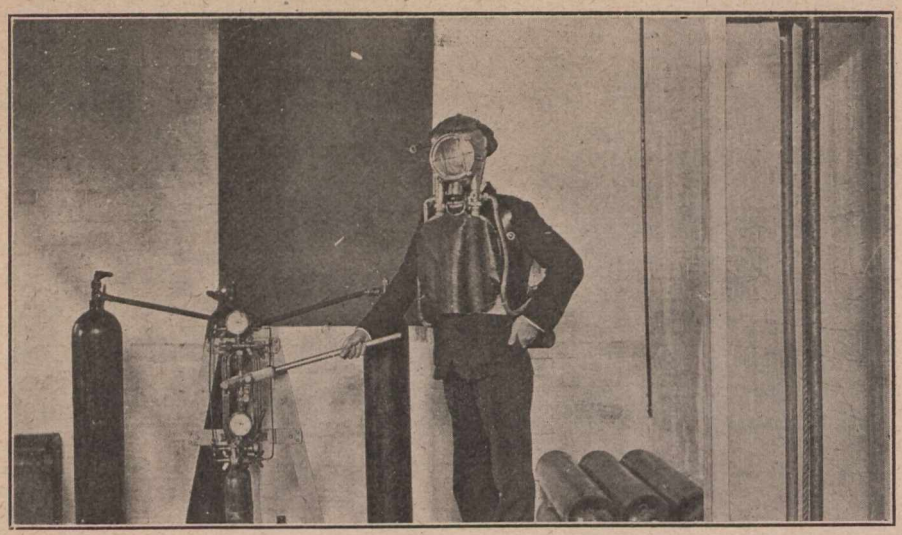


"Bratt" Resuscitator.



"Bratt" Resuscitator in use.

is of special value for reviving men who have been "gassed," particularly those suffering from the carbon-monoxide poisoning which so frequently kills the survivors of a mine explosion. The station has also a auxiliary apparatus are kept at some of the outlying collieries. These are intended for use by the colliery Rescue Corps pending the arrival of a detachment from the Central Station, if this should be found necessary.



Another corner of Rescue Station, showing refill pump, portion of exercising device and 6 oxygen cylinders.

similar arrangement mounted on a special stretcher fitted with a deep grooved wheel which can be run along the mine rails, thus facilitating transport. By means of this device, in conjunction with the Draeger apparatus, it will be possible for a party of rescuers to penetrate into deadly gases, to revive the unconscious survivors and carry them to the outer air.

One end of the Rescue Station is fitted up as an emergency hospital and dressing room. It contains a wash-basin, spring couch, table and rubber sheet. First aid requisites, blankets and stimulants are kept on hand.

In addition to the apparatus in the Central Station,

The whistle signals at the different collieries, which at one time varied, have now been standardized. The ordinary whistle is used for the "work" and "no work" signals, and siren whistles only are used for fire alarm purposes. The sirens at the collieries are to be distinguished from each other by their varying pitch. The following is the standard code of signals now in use:

Fire in the mine—2 toots and a pause, repeated.

Fire on the surface, or in colliery buildings—3 toots and a pause, repeated.

Fire in the dwellings—One blast of siren, with a number of short blasts to indicate Ward number.

ONE OF THE RESCUE CORPS OF THE DOMINION COAL COMPANY. BRICK BUILDING IS ONE END OF STATION.

Each colliery has either two or three Rescue Corps, consisting of men who are resident at the colliery and acquainted with the workings. These men are chosen because of their knowledge of the underground workings, ventilation and position of air roads, pipe lines and connections, but they are first of all passed by the instructor as being suitable. The names of the men composing the corps and the periods for which they are detailed for duty are posted in the Firemen's Hall, near the apparatus. As far as possible the corps are so arranged that the trained men at one colliery shall not all be underground at the same time.

The instructor makes periodical rounds and exchanges the colliery apparatus for others that he brings from the Central Station. This is done so that the apparatus may always be in good working order.

Up to the present time (December, 1908) there has been no call upon the Central Station from the company's own mines, but a detachment of 25 men in charge of the Superintendent of No. 2 District and the Instructor went to Sydney Mines on the 11th of September, 1908, and were of considerable assistance in extinguishing a fire in Sydney No. 1 Mine, which was burning at a point 2¼ miles from the pit bottom. On this occasion both the training of the men and the effectiveness of the apparatus was put to the severest test with extremely gratifying results.

At the end of 1908 the Central Rescue Station of the Dominion Coal Company was the only one of its kind on the American continent, and it is superior in the extent of its equipment and the number of trained men to any station outside of Germany or Austria.

THE SEPARATION OF METALLIC ORES BY JIGGING.

Read before the Institution of Mining and Metallurgy, by Arthur Taylor, Member.

Where ores are carefully classified, the lowest size that can be jigged satisfactorily is above a 16-mesh sieve, and the writer thinks he is right in saying that jigging is not often applied even to such a fine size. When less careful classification is resorted to, and fine stuff is allowed to pass over a jig with the coarser, much ore is lost.

In the ordinary mechanical jig a speed of 300 rev. per minute is about the maximum, with a minimum stroke of, say, 2 mm. to 4 mm.; and even with this, there is much strain on the parts and corresponding wear and tear. The regular beat of the plunger causes too great a rush of water, and that carries upwards the minute particles of ore.

In the opinion of the writer, the finest slimes that can be treated by any mechanical means can be treated with excellent results in jigs, more conveniently, and with less working expenses and less cost in plant than by any other apparatus, provided the jigs are of a suitable construction.

In the first place the pulsating action must be reduced to a minimum, and the rapidity of the stroke increased up to the point of a simple vibration, and the supply of water should be regulated to be just sufficient to keep the matter in a state of semi-suspension, like a quicksand; enough to prevent packing and to allow of the shifting of the particles one on the other, but not enough to lift them and allow the finer particles to be carried up by the current.

A constant movement is indispensable to prevent the establishment of uneven currents, to produce an even distribution of the minerals and the water, as well as to provide the interchange of position of the particles one on the other, quite distinct from the regular rise and fall of the particles produced by the even beat of a plunger. Also a most important point is that in the case of fine slimes the vibration certainly promotes the more rapid settling from the water of the suspended matter. This diminishes the loss in the case of impalpable slimes flowing over jigs.

The writer has met the requirements of the case by a complete modification in the form of apparatus and the substitution of a vibrator for the plunger, thus suppressing the portion of the hutch in which the plunger works. The vibrator is fixed to the hutch which carries the screen; or it can be attached to the screen by arranging this so as to have free motion in the hutch.

The action of the vibrator depends on the fact that a rapidly revolving mass tends to rotate round its centre of gravity, and if the centre of rotation is uncontrolled it will coincide with the centre of gravity.

The vibrator designed by the writer is as follows: A shaft provided with weights in the form of discs or flywheels attached, and constructed in such a manner that the journals of the shaft do not coincide with the centre of gravity of the mass. On a rapid rotation being imparted to the whole, the tendency of the mass to rotate on its centre of gravity transmits the vibration through the journals and their bearings to the supports, or connecting rods, which communicate it to the required point.

The details of construction will be seen on the accompanying illustration, Fig. 1, which shows the vibrator more or less in diagrammatic form.

The steel vibrator shaft A has eccentric journals B at each end (the centre of the journal being 2 mm. from the centre of the shaft). On the shaft are firmly keyed two collars or sleeves C provided with shoulders, and on these sleeves are fixed the eccentric discs or flywheels D, the centres of which are 2 mm. from the true centres of the discs. The position of the disc in relation to the centre of the journals is regulated by turning the disc on the collar, to which it can be firmly fixed by means of bolts E. The collar is pierced by several holes, pairs of which correspond with the two on the disc in such a way that any desired amount of eccentricity can be given.

The holes are numbered so as to insure correct setting. At zero the discs are practically concentric with the journals of the shaft, at No. 4 they have the maximum eccentricity of 4 mm. In the centre of the shaft is fixed the driving pulley F, the boss of which is also eccentric and provided with several keyways in order that it can be set in such a position that it will rotate as nearly as possible concentrically.

The vibrator is supported on two spring connecting rods H. They are forged out of one piece of spring steel and provided with metal bushings I. The two bushings are practically the only parts in the whole apparatus subject to any wear, and they will last several months if made of ordinary white metal.

The connecting rods are firmly bolted to crossbars or bridge pieces K fixed to the sides of the hutch L. The method of attachment and the relative position of the vibrator and hutch are shown in Figs. 2, 3, and 4.

The hutch L is a hopper-shaped box from 60 to 75 cm. long and 35 to 40 cm. wide. The upper part is parallel and built of 3 or 4 mm. steel plate. The lower part, hopper-shaped, is of the same material but thinner. The two large sides of the hopper are rendered flexible by the insertion of sheets of india-rubber or strong canvas, M, to allow of the freer vibration or pulsation of the hutch by liberating it from the inertia of the mass of water. A trial was made of a hopper constructed of very thin steel or phosphor-bronze plates, but, although they worked satisfactorily, the metal could not stand the strain, and at the end of a few weeks the plates would crack or break away from the thickness of the bed above the grating. In some cases, such as when there are more than two jigs in a set, or in dealing with very firm slimes, it has been found advantageous to draw off part of the water coming off the jig apart from the material under treatment. If this was not done, the increased flow of water over the lower jigs in the set would carry the ore away. The lip can therefore be made in two stages. Above the lower one are placed a series of holes through which the material escapes with a certain quantity of water and flows into the next jig, while the superabundant water flows over the top lip and is conducted away to waste. This arrangement also has the advantage of checking the flow and leaving a certain depth of water on the bed.

The wire gauze of the screen should be far coarser than the material under treatment, say, 10 mesh for stuff passed through a 14-mesh sieve, and never less than 50, even for stuff that will pass through a 250 mesh, that is to say, the finest slimes. On the gauze screen is placed a thin bed, from 25 to 50 mm. deep, of lead shot, "small dust" for the finest ores, up to Nos. 6 or 8 for the coarser sizes. On the shot is placed the

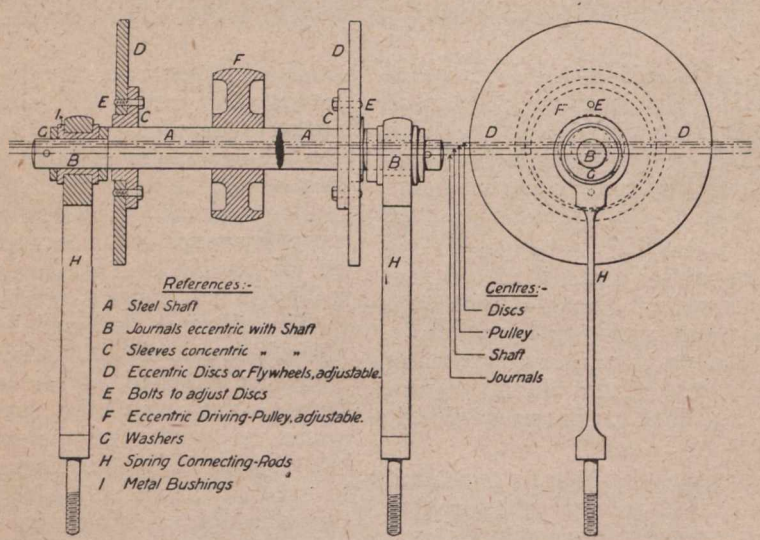


FIG. 1.

the rivets. At the bottom of the hopper is a valve N for drawing off the concentrates.

On the sides of the hutch are four rectangular lugs or supports O, on which the whole apparatus is hung, on two parallel beams, P. Four bolts or spindles are fixed in the beams, passing through holes in the lugs to keep the whole in place, the lugs being supported by stiff spiral steel or india-rubber springs, both above and below. In Fig. 2 are shown the alternative fittings with spiral and india-rubber springs. On the spindles are nuts to tighten or loosen the springs as may be required for the proper working.

Inside the hutch at the top of the hopper is a ledge on which is supported a cast steel grating R, which carries the wire gauze, with another similar grating above to keep it in place, all being firmly fixed with hardwood wedges and iron lugs on the inside of the hutch. Around the grating is packed with slips of soft wood or cord to prevent leakage.

At one end of the hopper and under the grating is fixed a short pipe S, connected by a flexible tube to a tap, for the introduction of water.

An overflow lip T is placed at one end of the hutch, arranged so that it can be raised or lowered to regulate true bed on which the separation takes place. The chief use of the shot is to keep the bed off the screen, as it would otherwise get choked, and it allows of a much coarser gauze being used.

The construction of these jigs is entirely the same for coarse or fine ore, and all parts should be interchangeable, the only exception being that the discs are made heavier for the coarser ores, the weights varying from 2½ k. to 5 k., the lighter ones being driven at about 1,500 rev. a minute, with perhaps 1 mm. eccentricity, the heavier ones at 500 rev. with the maximum of 4 mm. eccentricity. Of course, the length of stroke is far less than the amount of the eccentricity. The speed is governed by the size of the pulleys driving each jig and is not adjustable.

The most important and entirely new features in the construction consist in obtaining the required movement by a rapidly rotating eccentrically balanced weight, so constructed that it can be adjusted with ease and rapidity. The revolving weight is only supported on two journals. There are no cranks, eccentric straps, or other moving parts held rigidly to a bed or other fixtures by bearings and supports. The spring connecting rods allow of free uncontrolled lateral vibra-

tion, and only transmit the required vertical vibration. There are thus only two bearings subject to wear. The whole of the power is usefully applied, none is lost in rigidly-held parts transmitting thrust and vibration to bedplates, supporting frames or other surroundings.

The whole apparatus is hung on springs, and has to vibrate. It may be objected that it will require considerable power to set in motion the whole weight of the hutch, the water and the heavy charge it contains. This is not the case. The hutch, which is not heavy, vibrates independently. That is to say, that at the down stroke it is relieved of the weight of water and ore, etc. The flexible sides of the hopper bulge inwards as it comes down, the grating being forced down into the water, and the bed remains suspended. On the up-stroke the water returns through the grating and the flexible sides bulge outwards and the bed comes down into the grating. There can be no doubt that should the vibrator be fixed to a solid "dead" mass of the same weight, the power required would be incomparably greater.

Other modifications of the principle have been constructed and proposed, as, for instance, a flexible joint, V, connecting the upper and lower parts of the hutch, as shown in Fig. 2, instead of the flexible sides. This works well and is especially useful for coarser material where the stroke should be larger and slower. Another modification is to have the vibrator attached simply to a frame in which is fixed the screen. The frame is hung on springs, and is partially submerged in the hutch of water, as in the old hand jigs, the waste being carried off over a flexible overflow attached both to the hutch and the frame. (See Fig. 3.) This gave excellent results, but is not such a neat and compact apparatus.

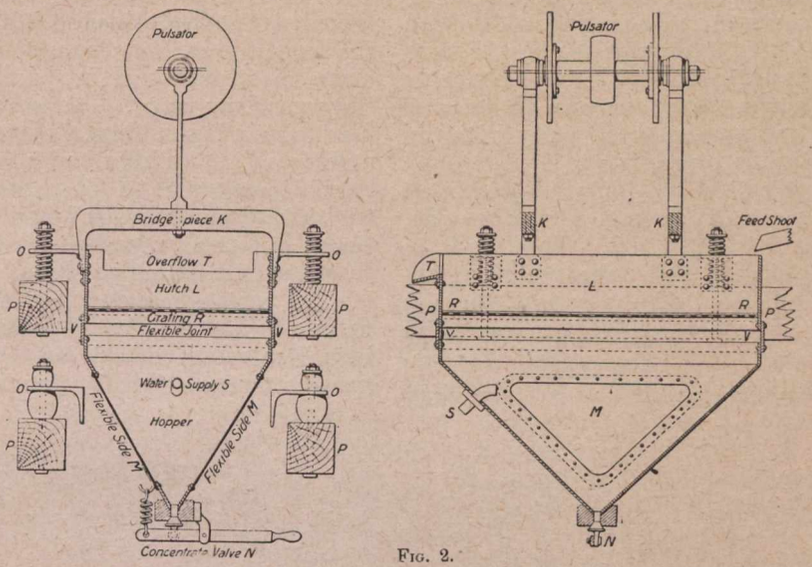


FIG. 2.

NOTE.—The flexible sides MM and flexible joint V are alternative, and are not employed together.

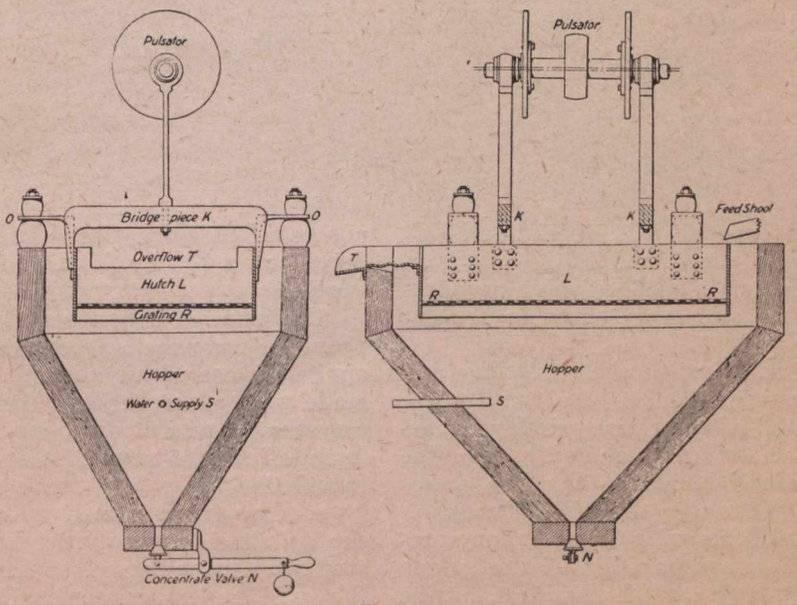


FIG. 3.

Another proposed modification is the application of the vibrator to a plunger in a jig of similar construction to those in general use. This modification is shown in Fig. 4, and would be designed to work with a much heavier vibrator at a slower rate of speed.

Before going into further details as to the working of these jigs it will be well to describe the nature of

the stuff they have been treating and the generol conditions under which the concentration of ore is carried on at the Calamon Mine, near Cordoba, Spain, where the trials were made.

The ore as it comes from the mine is composed of galena and blende in the proportion of about 1 of the former to 4 of the latter, mixed with carbonate of lime, slate and clay, as well as small quantities of carbonate of lead, iron pyrites, quartz, etc. The carbonate of lead is troublesome, as much of it goes with the blende, also sometimes the slate is impregnated with the carbonates and tends to give an undue lead assay in the waste. The small quantity of iron pyrites goes mostly with the galena, but it is a negligible quantity.

The quartz is generally hard and flinty, impregnated with blende, and often closely resembles good blende, though only containing 5 to 20% zinc. This tends to lower the value of the blende and raise the zinc contents of the waste. The lodes being very soft, there is an exceptionally large proportion of fine ore and slimes. As the galena and blende are somewhat intimately mixed, fine crushing is necessary. The galena is

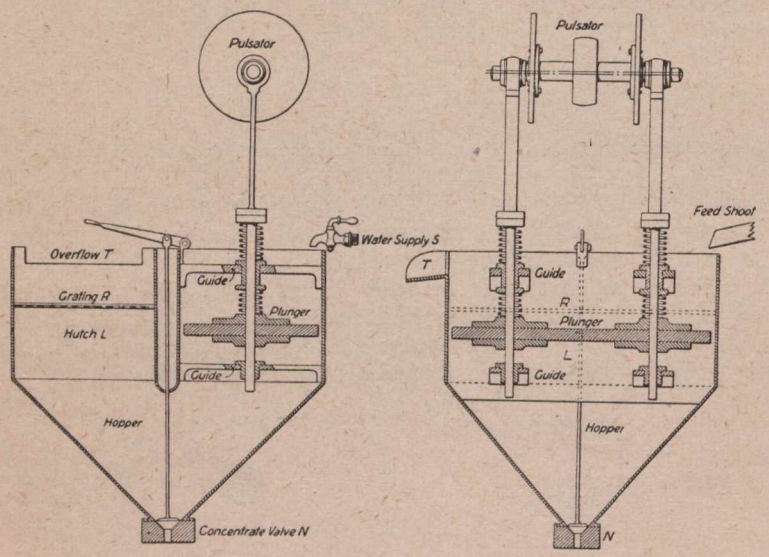


FIG. 4.

concentration up to an average of 70% of lead and 7°/₀₀ of silver; the blende is 40% zinc and 1.5°/₀₀ of silver. It will be understood that with such valuable products most careful manipulation and every effort to prevent loss are necessary.

The writer was entrusted with the designing and erection of a concentrating plant to deal with these ores. The plant consisted of the usual grizzley, stone-breaker, crusher rolls, classifying trommels, machine jigs, spitzkasten and round buddles. The ore passes automatically by gravity through the whole series. A secondary complete plant deals with the secondary products. To obtain as clean a separation of the galena and blende as possible, a very careful classification was adopted and the stuff divided into eight sizes for jigging in eight four-compartment jigs of the ordinary plunger type, the first jigs treating stuff under 12 mm. and the last taking stuff passed through a 14-mesh gauze and through a spitzkasten. Thus the last jig of the old type treats stuff below 1mm., a large proportion, the galena especially, being very fine for that class of jig. Originally the stuff from over this first spitzkasten passed into another feeding the first buddle and flowing on over three ordinary conical slime separators, of increasing dimensions, each feeding a round buddle, and finally to clarifying pits.

All the jigs give clean galena in the 1st compartment, mixed galena and blende in the 2nd, clean blende in the 3rd, and mixed ore and waste ore chatts in the 4th. The waste contains about ½% of lead and 2% of zinc. The clean ore goes straight to the stores. The mixed galena and blende are first treated by hand in a jig, and give a good proportion of clean ore of each class, the true mixed ore is crushed and re-treated in the secondary plant. The chatts from the 4th compartment are all put through the secondary plant. The stuff from the buddles had all to be re-treated, even the "tails" required to be passed a second time. The "middles" and "heads" had to be treated over many times and finally washed by hand in strips or sluices to get even a fair separation of the galena and blende.

The average amount of stuff passed through the floors per day of 9 hours is 80 to 90 tons. The amount of water required is 4 or 5 cub. m. per minute, the greater part of which water is returned by centrifugal pumps after clarifying. The whole of the plant is driven by a 100 hp. high and low-pressure condensing engine.

The want of a better system of treating the slimes provided an excellent opportunity to the writer to apply the use of his new jig. Experiments were first made with a single jig. The results were so satisfactory that it was at once decided to put up a complete installation of 4 sets of 4 jigs; each set corresponding to one large jig of 4 compartments of the ordinary type. They were placed to take the stuff passing over the spitzkasten supplying the last large jig., i.e., the stuff which was before sent on to the buddles, being all the sand and slimes below 14 mesh, deprived of the greater part of their coarser ore and the coarsest sand.

By the time the stuff arrives at this point there is a large quantity of water to deal with, as at each successive operation some water is added from the grizzley down to the spitzkasten of the last large jig. The spitzkasten have, therefore, to be of large dimensions.

A separate spitzkasten supplies each set of 4 little jigs with a different size stuff; the 1st coarse silt, the 2nd fine silt, the 3rd finest silt, and the 4th almost mud.

Naturally, on account of the action of the spitzkasten, the galena contained in the different sizes of stuff is far finer than the waste. Even in the 1st jig nearly the whole of the galena will pass through a 40-mesh sieve and a large proportion through a 100 mesh. That from the last jig will nearly all pass through a 100-mesh sieve, and 50% of it through a 250 mesh.

The galena obtained runs from 75% to 65% of lead with 5 to 10% of zinc, and the blende from 45 to 30% zinc and from 5 to 10% lead. The proportion of lead and zinc in the mixed ores from the 2nd jigs varies much. The ores are separated as far as possible by hand washing. The product from the 4th jigs is turned back to pass through the same jigs again or to the secondary plant.

The waste contains about 2½% of lead and 3 and 4% of zinc. Nearly the whole of the lead contained is in an impalpable powder, for if sifted on a 250-mesh sieve, that which passes through will assay as much as 12% and what remains in the sieve only ½%.

The amount of stuff treated in these 4 sets of small jigs is from 750 to 1,000 k. per hour. They complete a consecutive series treating 12 different sizes in which the first 8 are 4-compartment jigs of the ordinary type and 4 sets of the little jigs (each set of 4 corresponding to one 4-compartment jig), beginning with 12 mm. down to below 250 mesh. The whole of the 80 to 90 tons per day is treated in the series. The average assay of the waste is less than 1% of lead, most of which is practically irrecoverable.

It may be added that the mud that will not settle in a conical slime separator 2 m. square is collected in large clarifiers and settling pits, and assays 8% of lead, 5% of zinc and 1.5‰ k. of silver. This is dried, burnt and sold to the smelters.

The cost of running the little jigs is small, two men and two boys being sufficient to run the series of 16. The power required is estimated roughly to be about 1-3 hp. per jig, or, say, 5 hp. for 16. About ½ cub. m. of water is required per minute over and above that coming down with the stuff. The cost of lubrication and repairs is also light, as there are few parts to wear, and those cheaply renewed.

Recently another complete series of 16 jigs has been erected in such a manner that they can either form part of the secondary set of jigs for treating the by-products or else be used apart for re-treating fine products from other sources, or for experimental purposes. The arrangement is the same as in the first set. They dress stuff below 14 mesh at the rate of 1 ton dry per hour. With coarse stuff the quantity would be greater. For some time they were profitably employed re-treating old dumps from the tails of buddles. In this case 50% of the galena recovered will pass through a 100 mesh. The waste carries 2½% lead, but 50% of that would pass through a 250 mesh, and 75% through a 100 mesh.

There is no doubt that these jigs will work admirably with sizes up to 8 or 10 mesh or even higher, especially as in these grades classification can be made according to size by sifting.

The jigs occupy but little space, in fact, little more than the useful surface of the grating. Complete they weigh from 40 to 50 k. each, and are thus easy to transport, and pay but little import duty in foreign customs. They can be managed by any intelligent operator, although, like all other concentrating plant, they require care and attention, especially at first. They should be applicable to all classes of ore in which the differences of specific gravity will allow separation by weight. Sizing is not all-important, although advantageous, especially in the separation of ores of little difference in specific gravity. If a classification by size could be satisfactorily made in the material for the finer sizes, in the place of the spitzkasten, there is no doubt that the separation would be nearly perfect.

The writer is confident that with some little modification the aparatus described should be applicable to the washing of very small coal. Experiments will shortly be carried out with that end in view.

EXCHANGES.

Mines and Minerals, November, 1908.—Dr. A. M. Comery, director of the Du Pont Laboratory at Chester, Pa., writes most interestingly of safety blasting explosives in Mines and Minerals for November. The term "safety explosive" is relative. A charge of 1-6 ounce of black powder may bring about a gas explosion, while under similar conditions a charge of 2 pounds of carbonite can be used with impunity.

The compulsory use of safety powders in all Belgian coal mines has reduced the number of deaths by gas or dust explosions per 100,000 miners employed from 24.5 to zero.

There are three classes of safety powders:—

1. Those containing large quantities of volatile salts.
2. Nitrate of ammonia explosives.
3. Nitro-glycerine powders.

Carbonite is the principal example of the last class. It is a slower explosive than dynamite, gives less flame, and generates less heat. It is not affected by moisture, and will detonate with a small cap.

The tests to which explosives are subjected are highly interesting. One test for strength is performed in the ballistic mortar, a device by which the recoil of a suspended steel mortar is measured on a circular scale. To determine the safety of a powder the temperature and heat of detonation are measured, the length and height of flame, the duration of flame, and the velocity of detonation.

Mining and Scientific Press, October 31st, 1908.—The Robinson mine, near Johannesburg, Sopth Africa, is the most productive gold mine in the world. Mr. J. B. Pritchard presents some facts about it in the current number of the Mining and Scientific Press. The Robinson, from a total production of 2,711,345 ounces of gold, has paid $30,000,000 in dividends. Crushing was commenced in January, 1888. In that year 7,486 tons of ore yielded 22,345 ounces of gold, an average of 59.70 dwt. per ton. Ten stamps were then dropping. The history of development is epitomized in the contrasting returns for 1907. In that year 410,927 tons of ore yielded 303,801 ounces of gold, an average per ton of ore of 14.79 dwt. Two hundred and ten stamps are now in commission. The rate of dividend payments has increased from 5 per cent. in 1888 to 24 per cent. in 1907.

The Colliery Guardian, October 23rd, 1908.—Mr. James Ashworth, in a letter to the Guardian, discusses the influence of damp air on coal dust. After pointing out the impracticability of dampening dust in a coal mine by saturating the air with moisture, Mr. Ashworth states that he "would like to have the term 'dry

air' defined authoritatively, because if air is absolutely dry no explosion is possible, but as it cannot be rendered absolutely dry, the best mode of procedure is to do as is already done in the deep mines of this country, viz., to reduce spraying to a sanitary point and thus preserve the health of our underground labor without attempting the impossible task of limiting a possible explosion by any application of water."

The South African Mining Journal, Oct. 3, 1908.—In answering enquiries concerning the most suitable form of crushing equipment for small tributing propositions, the South African Mining Journal states that small mine workers in Rhodesia favor Tremain steam stamp mills and Chilian mills. The Tremain mill weighs but 4,100 pounds. Its capacity ranges from eight to twenty tons of ore per day. It requires no engine since it is direct connected. It is self-contained and requires no frame. It can be erected speedily and as speedily dismantled. It is claimed to be an ideal mill for the prospector. In charterland, Chilian mills are greatly in favor on large and small properties.

The Mexican Mining Journal, November, 1908.—According to the Mexican Mining Journal, the deletion of Article 144 of the new Mexican mining law was due largely to "the vigorous and remarkable campaign against the law which has been waged since May by the mining interests of the country, and by those who saw the necessity of encouraging the continued investment of foreign capital for the development of Mexico's great and unrealized resources. . . . The future will demonstrate the wisdom, expediency, and necessity of the action which the Government has taken in this matter."

PERSONAL AND GENERAL.

Mr. A. J. McMillan, managing director of the Le Roi, has left for England.

Mr. W. Carlyle is expected to pay a visit to Le Roi Mine, Rossland, B.C., early in the new year.

Dr. Milton L. Hersey is visiting Toronto on business connected with the testing of railroad supplies.

Dr. Barrett, medical officer for the Guggenheims in the Yukon, is visiting Kingston, his former home.

Dr. R. W. Brock, acting director of the Canadian Geological Survey, returned to Ottawa on Oct. 28 from a three-months' visit to British Columbia.

Mr. H. W. Hardinge, of New York, has returned from Cobalt where he superintended the installation of a specially devised concentrator on the Cobalt Central property.

Mr. Robt. Mond, son of Dr. Ludwig Mond, and a prominent British metallurgist, was in Toronto recently on his return trip to England, after a three-weeks' visit to the Sudbury nickel district in connection with important experiments now in progress in the electrical treatment of nickel-copper ore.

INDUSTRIAL PAGE.

THE SULLIVAN CORLISS STRAIGHT LINE AIR COMPRESSOR.

This machine consists of a tandem compound steam engine, equipped with full Corliss valve gear on both high and low pressure cylinders, connected to and operating the two stage air cylinders, which are mounted on a frame, together with the fly-wheels, forming a "straight line" machine. This air compressor embodies the most desirable features of both the Corliss cross compound and the straight line types of construction.

The reason for adopting Corliss valve gear for this machine is that it is much more economical in steam consumption than the slide valve, with the Meyer hand adjustable cut-off. In air compressor practice the demand for air and the steam pressure vary constantly. The Corliss engine is equipped with an automatic dashpot cut-off, under the control of the engine governor, which regulates the admission of steam to the cylinders, and, therefore, the steam consumption, exactly to the load, viz., the demand for air, and the steam pressure.

Slide valve engines are fitted with a cut-off regulated by hand, which may be set at any desired point, but cannot adapt itself to changing conditions. Under the circumstances of a test, the steam pressure and air requirements are constant, so that the cut-off may be set at a point which will give favorable steam economy. But in ordinary, every-day service these factors are constantly varying. They may be low or high together, or their extremes may oppose each other, and it is on this account that the Corliss valve gear, with its automatic regulation, secures so much high efficiency.

As an indication of the steam economy of the Corliss compressor it may be said that when operating condensing, a horsepower may be generated on 14 to 16 pounds of feed water per hour, and on 20 to 22 pounds when running non-condensing. This means that the Corliss machine will use one-third to two-thirds less coal in the course of a year than the compressor with hand regulation, resulting in a saving, in that time, often sufficient to more than pay the difference in cost between the slide valve and the Corliss machine. When new plants are being installed the boiler capacity to be figured on for the Corliss type will be much less than that needed for a slide valve machine, and this item must also be taken into account. To put it in other words, the Temiskaming compressor will need a 185 hp. boiler, while a simple slide valve compressor with two-stage air cylinders, of equal capacity, requires a 295 hp. boiler.

The expense of a Corliss cross-compound plant frequently causes intending purchasers to install the less costly slide valve compressors, even when the hgih price of fuel renders strict economy of steam desirable. The Sullivan Class "WC" Compressor overcomes this objection, by reason of the well known structural economy of the straight line type, as compared with the duplex pattern.

The former type avoids duplication of heavy parts, such as frames, crossheads, and bearings, and lighter construction is permissible because the strains are direct

and continuous, instead of indirect and intermittent, as in duplex machines. Friction is diminished, because of the smaller number of working parts. Straight line compressors are simple and compact, and require less than one-half the house-room and foundations needed by duplex machines.

The compressor purchased by the City of Cobalt Company has a capacity of 909 cubic feet of free air per minute at 125 R.P.M. The Temiskaming machine will deliver 1,843 feet of air per minute at 100 R.P.M. Both machines compress to 90 lbs. per square inch.

The Sullivan Class "WC" Compressors, as has been stated above, consist of tandem compound steam cylinders, connected by massive cone-shaped distance pieces, in rear of which are attached the high pressure and low pressure air cylinders, crosshead and fly-wheels, mounted on a substantial iron frame. The piston rods for all four cylinders are attached, end to end, in a straight line by couplings, which permit the clearance in the cylinders to be adjusted.

The steam valve gear on both high and low pressure cylinders is of the Corliss type, with dash-pot cut-off under control of a speed and pressure governor. When the speed of the compressor reaches a point at which the air supply exceeds the demand, the speed element of this governor slows the machine down. Also, when the air pressure exceeds the point at which the pressure element is set to act, this element operates to reduce the speed of the compressor at its most economical point.

Steam passes from the high pressure to the low pressure cylinder through a pipe conduit of large diameter, heavily covered with con-conducting material.

The steam and air ends of the compressor are connected by means of a heavy foot plate and tie rods.

The inlet valves on both air cylinders are rolling valves, driven from an eccentric on the fly-wheel, through steel motion rods. The discharge valves are of the automatic poppet type, located in the cylinder heads, and so arranged that they can be removed, together with their seats, or cages, by hand, for inspection or regrinding. The design of the air cylinders, ports, and valves, is such as to reduce the elements of clearance, heating, and leakage to the smallest possible amounts, thus securing high volumetric efficiency.

The water jackets on the compressor cylinders are of unusual area, and the intercooler, through which the air passes from the low pressure to the high pressure cylinder, is so arranged that the air passes back and forth a number of times across the cold water tubes, thereby reducing its temperature to an unusually low point.

All working parts of these compressors are readily accessible while the machine is in operation. There are no parts inside the fly-wheels which require the attention of the engineer when the machine is running.

The system of oilers and lubricators on these compressors is very complete and convenient. Sight feed lubricators are employed for the cylinders and principal bearings, and other parts are oiled from a central cluster of oilers at a point convenient for the engineer.

The compressors of this class are built very substantially. All bearing surfaces are of large dimensions, and the frame, fly-wheels, crosshead, etc., are of unusual weight and solidity. These compressors will run continuously for long periods, and require only usual attention and care.

Compressors (Air and Gasoline). Canadian Rand Company, Limited... This excellently done catalogue is designed as an aid to purchasers and operators. In addition to the usual trade list of specifications, etc., there are pages of information that will prove invaluable to workers. On pages 10 and 11 are outlined the requirements, initial costs, and operating costs of compressed air installations of various sizes. There follows two pages on "Altitude Compression," in which a table of relative volumetric efficiencies is included. Following this the integral parts of the air compressor are dealt with in order. The description of the large range of types is thorough and clear. The catalogue is a credit to all concerned.

Catalogue No. 5 of the American Spiral Pipe Works, Chicago, Ill., has been received. This company manufactures, among other specialties, Taylor's spiral riveted pipe and forged steel flanges. In manufacturing this pipe, a strip of sheet steel is wound into helical shape with one edge overlapping the other for riveting the seam. The sheet is drawn and formed in such manner that a metal to metal contact in the spiral seam is obtained stretching the steel on the outer lap slightly offset, in order that pipe may be more nearly smooth inside. The riveting is done cold under enormous pressure, and not by percussion, thus insuring complete filling of the rivet holes with slight countersink. The pipe comes from the machines in a continuous piece, and is cut to any desired length.

Electrical Mining is a monthly pamphlet published by the Electrical Mining Publishing Company, Chicago. It is devoted to the interests of electric mine equipment, more especially that manufactured by the Goodman Manufacturing Company, Chicago, Ill. Each number describes the equipment and working features of some one large coal mine. The information given is timely and instructive.

Catalogue No. 127 of the Buffalo Forge Company, Buffalo, N.Y., is an exceedingly creditable publication. It deals fully with the heating, ventilating, humidifying, and drying devices of the above company.

Heretofore infusorial earth has been largely used for abrasive purposes, in the form of polishing powders, scouring soaps, etc., but of late its uses have been considerably extended. Its porous nature has adapted it to use in the manufacture of dynamite, as a holder of nitroglycerin. This same structure renders it a non-conductor of heat, and this property in connection with its light weight, has extended its use as a packing material in safes, steam pipes, and boilers, and as a fireproof material in general. In southern California the material is quarried for building stone, for which purpose it seems to be well adapted in that region of earth tremors. The Missouri tripoli finds its most important use in the manufacture of filter stones, but it is also ground and utilized as an abrasive. The Illinois product, called "silica" by the Illinois Geological Survey, but considered as tripoli for the reason that its origin is regarded as essentially the same as that usually assigned to the Missouri tripoli, is employed in the paint industry, as a wood filler, for enameling purposes, etc.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

St. Lawrence Shipments.

Glace Bay, Nov. 5.—Delays to shipping were numerous and persistent throughout the whole of October. A combination of forest fires and fogs brought about a condition of affairs that has probably never occurred before. The outputs of the Dominion Coal Co. were much curtailed in consequence, and amounted only to 265,000 tons, which is 80,000 tons less than were raised in October, 1907.

Sympathy or Superstition.

A regrettable fatal accident occurred recently at Sydney No. 1 Colliery, in connection with which the following resolution was passed by Drummond P.W.A. Lodge: Whereas the body of our late brother was taken out of the mine by means of the endless haulage, as if a dead miner deserved no more reverence than a dead horse. All this with an eye to cause the least possible loss of coal to the company, at the expense of degrading our dead brother and humiliating his fellow-workmen; whereas, The Nova Scotia Steel & Coal Company broke its agreement with the men in trying to hide from the miners of No. 1 Colliery on Thursday last the fact that one of their fellows had met a sudden and fearful death, and thus sordidly tried to increase its gains at the expense of beating down the natural sympathy that our common humanity feels and would give expression to, by suspending the chase after material gains in the presence of such a calamity to a fellow human being. Therefore, be it resolved: That Drummond Lodge will in future, should such an accident occur, and the management act as it has done in this case, throw the mine entirely idle till after the funeral of the deceased.

Be it further resolved that a copy of this resolution be placed in the minutes and another sent to the management of the Nova Scotia Steel & Coal Co.; also copies be sent to the press.

Is there any real justification for the common practice of laying a mine idle whenever a fatal accident occurs? We think not. It does not help the poor fellow who has gone to his last account. It does not help the widow, nor does it provide for the children. Would it not be more to the point if work were continued and that portion of the wages which otherwise remain unearned were given to those who, through the accident, might be brought to poverty? Such a procedure would be practical sympathy, the kind of sympathy that working men should extend to their fellows. Conditions are better in this respect than they used to be. At one time after the occurrence of a fatal accident the mine would not resume work until the funeral had taken place, causing two and three days successive idleness. It is but natural that colliery officials should endeavor to hide the news of a fatal accident, because they know that it will be the signal for all hands to leave work. This attitude of the colliery officials is forced upon them by the custom referred to. We do not think, however, that any of the Cape Breton mine officials would be guilty of irreverence to the dead, for the great majority of them are men who have wielded the pick themselves, and their sympathies are not extinguished because they bear official titles. The news of a fatal accident is at first known only to the workers in a small section of the mine and the majority of the men underground would finish their shift without this knowledge did not some person circulate the news around the mine. It is but natural that the immediate witnesses of an accident or the men in the section affected should wish to leave their work, but no argument can be adduced why everyone in the mine should go out, or should be told of the fact. We think that much more practical and effective ways of expressing sympathy can be found. The present custom is not an expression of sympathy. It is rather the slavish and unthinking following of a custom that has become a superstition.

Keir Hardie vs. John Burns.—Reference was made in these columns to the recent visit of Mr. Kier Hardie to Glace Bay. This same gentleman has been telling the British House of Commons that he was going to take the stump among the Suffragettes to wake the country from its lethargy. From recent events one would hardly imagine that the ladies in question needed any help from Mr. Hardie. In view of Mr. Hardie's solicitude for the workless and the starving in England—and they are a mighty army—we wonder why he should stay at the "Sydney" when down here. Would not a cheaper hotel have served the purpose of a gentleman who refuses to press his pants because he poses as a "workingman"? Mr. Burns gave this globe-trotting firebrand a rather cold crack recently when he informed Mr. Hardie that he (Mr. Burns) had been arranging relief works in Mr. Hardie's own constituency while that same gentleman was making the grand tour. We hope Mr. Hardie will take the hint and stay at home. He may be needed there, but he certainly is not needed here.

"Breathers" or "Pneumataphors."—Now that oxygen breathing apparatus are coming into a well-deserved prominence the need is being felt of some suitable and comprehensive name that can be applied to all types of mine rescue apparatus. At present one hardly knows what to call them "for short." Several prominent gentlemen in England seem to favor the word "pneumataphor." Prof. Redmayne uses this word in his Report on the Hamstead Fire. Mr. Blake Walker, of the Tankersley Station, used the word in a paper read recently before the Institution of Mining Engineers in Edinborough. Other names are legion. We have, for instance, "oxygen breathing apparatus." This represents one distinct type of apparatus. Then there is the "Pneumatogen" and the liquid air apparatus "Aerolith." Proprietary names will tend to become fixed in certain districts according to the type of apparatus introduced in the first instance. For example, here in Glace Bay the word "Draeger" is being used to describe all and sundry, although it is but one particular make of one type of breathing apparatus. The general name "breather" has been suggested, and although it may not be the best word, yet it is properly derived English, and describes generally the main object of all of these breathing devices. The word "respirator" has been appropriated for another purpose and is not available for our present needs. A word is required which the layman can understand and at which the learned grammarian will not recoil, nor the unlettered miner laugh. We therefore suggest the word "breather" as a generic term to include all types of self-contained breathing apparatus for supporting life in irrespirable atmospheres.

ONTARIO.

Montreal River—Silver Lake Mining Company, Limited.—Mining operations have recently been commenced by the above named company on properties situated at Silver Lake, which lies about six miles west of Elk Lake City, in the Montreal River Mining Division. The manager, A. G. McNaughton (brother of G. F. McNaughton, superintendent of the Trethewey Mine) arrived about two weeks ago from Nova Scotia with a gang of men, by whose efforts a complete camp outfit and supplies were rushed through from Latchford to Silver Lake notwithstanding the congested condition of traffic on Montreal River route. Camps are now being built and preparations being made for an active winter's work.

The directors of the company are Alex. M. Hay (president of the Trethewey Mining Company), President; Robert E. Harris, K.C. (President of the Nova Scotia Steel & Coal Co.), Vice-President; J. Strachan Johnston, Solicitor, Toronto; Thomas Cantley (general manager of the Nova Scotia Steel & Coal Co.), New Glasgow, N.S., and Gilbert Stairs, of Halifax, N.S.

The company has purchased outright mining location T. R. 597, and has acquired under Working Bond mining locations T. R. 598, T. R. 35 and T. C. 54. The first three claims are known as the Gorman and Micmac claims, T. R. 35, discovered by the Indian Micmac, being the first discovery in the Silver Lake district T. C. 54 covers mining rights under Silver Lake, and lies between T. R. 597 and T. R. 598, which are situated at each end of the lake. T. R. 35 adjoins T. R. 597 to the south and the group of properties, which embrace about 150 acres, cover a range of about a mile and a half in length on what appears to be a very promising silver belt.

BRITISH COLUMBIA.

Rossland.

The fortnight that has just passed was one of heavy shipments for this district. The big copper furnace at the Trail Smelter was put into operation recently which necessitated the Consolidated Company making heavier shipments from the Centre Star Group at Rossland, while they are also shipping from the Snowshoe and Phoenix Amalgamated Group at Phoenix. The ore shipments from the Centre Star mines for the week ending Oct. 17th amounted to 5,070 tons, making 144,767 tons sent from this mine so far this year. The Le Roi is shipping about 1,500 tons of ore per week that will return the company approximately $12.50 per ton gross and which will leave them a neat profit after treatment charges have been deducted. It is understood that Mr. W. A. Carlyle will visit the Le Roi again in the impending future in connection with the plan of operation that he has laid out for the development of the mine.

The Le Roi 2, Limited, is shipping 500 tons per week of rich ore and are carrying on extensive development at different parts of their property.

Mr. A. B. W. Hodges, local manager of the Granby, and W. Y. Williams, consulting engineer, were in the camp one day last week inspecting the work now being carried on at the Giant-California. At the present moment considerable diamond drill exploration is being done.

While considerable development work was done on many of the smaller properties here during the past two weeks, some good ore being taken out in the course of the work, still none of the lessees shipped any ore to the smelter. There are several lots of ore about ready for shipment that will be sent away during the next few days.

The Le Roi 2, Limited, has just declared another dividend of two shillings per share. This last division of profits on the operation of the Josie and adjoining mines of the Le Roi 2, Limited, makes a total of six shillings per share paid by this company in dividends so far this year. The Le Roi 2, Limited, has not only paid dividends which amount to 18 per cent. on the present value of the stock this year, but they have been doing it for years past even though they operate on a smaller scale than other copper producers in the camp. The management is to be commended for this most satisfactory result.

Phoenix.

P. F. Roosa, provisional liquidator for the Dominion Copper Co., is seeking power from the court to borrow $20,000 on behalf of his company with which to pay the men to whom wages are still owing and settle other obligations. It is stated that the solvency of the concern is beyond question, the assets far exceeding the liabilities, but the company is badly in need of some ready money to settle accounts that are now due. It is figured that the mines of the Dominion Company are worth about $2,000,000. The National Trust Co. of Toronto is trustee for the bondholders. The new company is now being organized in the East, and is expected to take over the property of the old company in a couple of weeks, when operations will be resumed.

A property that has come to the front recently in Greenwood camp, in consequence of the increased activity, is the Johannesburg, where development work has been going on all summer. The ore body is easily traced 1,500 feet across the claim and averages 60 ft. in width. The ore assays 1½ per cent. copper, $8 in nickel and a small quantity of gold and silver. The ore could be placed in the bins of the B. C. Copper Co. smelter with a tramway half a mile long, which will no doubt be the method by which it will be handled as soon as shipments are begun. On the Colorado Group, Copper Mountain, an ore body has been opened up after much perseverance, and in the face of many discouragements that assays $9.10 gold and 18.97 per cent. copper.

J. Langeloth, of New York, president of the Granby Con. Mining, Smelting & Power Co., with J. C. Graves, of Spokane, general manager, and A. B. W. Hodges, local manager, inspected the Phoenix mines last week. The president was pleased with the way things looked around the mines. The smelter was also visited by the party and the important work now in progress there gone over.

The augmentation of one of the smelter furnaces has now been completed. This furnace is four feet longer and wider than the other seven, which will be enlarged in turn one at a time. The capacity of this furnace has been increased about 25 per cent. The building for the two big convertors on order is about ready for them. These convertors are large enough to handle the matte from all eight furnaces after being enlarged, when they are running full capacity. The ore shipments from the Granby are running from 21,000 to 22,000 tons per week. As the mines are closed down on Sunday lately this affects the shipments to some extent.

The Consolidated Company is producing about 2,500 tons per week from the Snowshoe, and small shipments are also being made from the War Eagle group, which, as the company already has a War Eagle group at Rossland, are known as the Phoenix Amalgamated group, for purpose of distinction. Development work is being pushed on both of the Phoenix groups, and in the course of work on the Phoenix Amalgamated they have opened up a 70 ft. ledge of copper ore of similar grade to that found in the Granby, which adjoins this property.

About thirty men are employed at the Oro Denoro, and approximately 700 tons of ore per week have been sent out during the past fortnight.

Work has been discontinued on the Little Bertha, North Fork. Considerable stock changed hands on the basis of work being resumed on this property, and there will be a few disappointed buyers if development is not continued and some tangible results obtained.

A 200-ft. tunnel is to be driven on the ledge at the Bell mine, Wallace Mountain.

The operators of the Sally mine, who have shipped 108 tons of valuable ore already this year, have a carload of rich ore about ready for shipment. Nine men are working at the mine.

The tunnel is in on the Woodburn 280 feet now, and some likely looking stringers and other indications are being exposed.

Work has been resumed on the Kingston at Hedley. This group consists of the Kingston, Metropolitan, War Horse and Grand View claims, which are nearer to Hedley than the rich

Nickle Plate properties. A strong 30-ft. vein exists on the Kingston, where most of the development has been done. This ledge carries chalcopyrite and pyrrhotite, and on the foot wall there is 8 to 10 ft. arsenical iron ore carrying gold. Assays range from $17 to $40. Most of the stock of this company is owned in Quebec. The property is regarded favorably, but much development work yet remains to be done. A force of eight men is now at work.

Nelson.

The leading feature of the mining situation here during the past week has been the heavy shipments of zinc made by the Whitewater mine. This company shipped 180 tons of zinc during the week, making a total of 6,375 tons for the year to date. Nearly all of this has been sent to Antwerp. The Whitewater properties now rank second in the shipping list for this section, the St. Eugene heading the table, and shipping over 900 tons of silver lead ore per week. The Silver Hustler, Rio, Maestro, and Black Diamond have lately joined the list of shippers, having sent out their initial shipments this year. Several more mills have started up as well.

The operators of the Aurora mine at Moyie have bought the boiler and compressor formerly used at the Dominion Copper Company's Brooklyn mine, Phoenix. There is a two foot ledge of clean shipping ore in the mine. As soon as the machinery is installed this ore will be taken out and shipments will be made across Moyie Lake as soon as the ice forms upon it.

Vancouver.

J. Cronin, formerly with the St. Eugene Co., has returned after a season's work on the property he has bonded in the Babine district. About 280 feet of development work in tunnels and shafts was done on the rich surface showing, the deepest shaft being 53 feet, but very little was determined as to how the ore will look at depth. In fact, the results were rather disappointing in some places. Another season's work will show the value of the group.

A find of ore assaying 287 oz. silver, 50 per cent. lead and $5 in copper has been made by H. Harris, of Rossland. The find is eight miles from Hazelton in the hills. It is the intention of the owners to ship from the property next year. There is a considerable quantity of ore in sight.

The Ingenica Mining Co. have taken an 8-ton plant into their mines over a rough road.

A large body of iron ore, similar to Swedish iron has been located on Douglas Channel.

Heavy snowstorms have driven the prospectors out of the Northern hills for this season. Most of the men have left their claims and have come out to the coast cities. Those who have taken up land have prepared for the winter and will remain in the valleys on their locations until spring.

An extensive deposit of bornite, carrying $50 to $60 in values, has been exposed in the Cornell mine.

R. C. Campbell-Johnson, of this place, has returned from a visit to the Queen Charlotte Islands, and says that these islands will excel as copper producers the famous Coeur d'Alene district of Idaho with its lead. Of course, that remains to be seen, but there is no doubt these islands are very rich and will undoubtedly revolutionize the mining industry of this coast.

GENERAL MINING NEWS.

NOVA SCOTIA.

Amherst, Nov. 3.—James Carson, a native of Halifax, died at Chignecto mines to-day. Carson was injured in attempting to prevent a box, which had become unbalanced, from running down the shoot. Carson was 27 years of age.

Stellarton.—The Allan shafts of the Acadia Coal Company are now well equipped. The new cages, when installed, will hold four boxes, and will permit of hoisting between 2,500 and 3,000 tons of coal per day. The present output is about 370 tons per day.

Cobalt.—On October 27th a train of 13 cars, loaded with medium and low grade silver ore, left Cobalt for Denver. The following mines contributed to this special shipment:

La Rose, 4 cars.
Kerr Lake, 2 cars.
Temiskaming and Hudson Bay, 2 cars.
O'Brien, 2 cars.
Temiskaming, 1 car.
Crown Reserve, 1 car.
Chambers-Ferland, 1 car.

This shipment is to be a speed trial. It is hoped that time will be saved by the mines joining hands in this way.

The Northern Customs smelter, formerly the Muggsley concentrator, has since July 15, treated over 4,000 tons from the Silver Queen dump, 1,000 tons from the Townsite, and over 1,500 from the City of Cobalt.

Sudbury.—Mr. R. Hedley has thirty men employed at the Leckie mine, Long Lake. Work will be carried on throughout the winter.

Major R. G. Edwards Leckie has left for Pedro Lake, north of Wahnapitae, prospecting for gold. W. Errington accompanies him.

Port Arthur.—There is talk of reopening the Foley mine, near Mine Centre, Rainy River district.

ALBERTA.

Lethbridge.—The new slope of the Royal Collieries is down 200 feet. The water system is completed, work on the tipple has been completed, and a large rooming house for the accommodation of the men is being erected.

BRITISH COLUMBIA.

Nelson, Oct. 31.—The total zinc ore shipments for the year from the Whitewater mines, near Sandon, amount to over 6,000 tons. All but 300 tons have gone to Oklahoma. The remainder has been shipped to Antwerp.

Rossland.—The Canada Zinc Company started work on October 15. Construction of the plant has taken two years.

Phoenix.—Towards the last of October the Phoenix Amalgamated, heretofore known as the War Eagle (not to be confused with the War Eagle of Rossland), became a shipper. It is the property of the Consolidated Mining and Smelting Company.

Victoria.—The steamer "Princess Ena" reached here on October 30 from Ladysmith. At Ladysmith she landed 1,000 tons of ore from the Japanese mines of the Awaya-Ikeda Company at Ikeda Bay. The Ikeda Company expect to ship 1,000 tons per month.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

The annual report on the mines and quarries of the United Kingdom for 1907 gives the total value of the mineral output at £135,279,008, being an increase of £29,436,096, as compared with 1906. This is attributed to the increased production and higher price of coal. The total output of coal amounting to 267,830,962 tons, valued at £120,527,378, is the highest hitherto recorded, the figures for 1906 being 251,067,628 tons, valued at £91,529,266. Other leading items are iron ore, 15,731,604 tons, valued at £4,433,418; clay and shale, 14,827,895 tons, value £1,850,387; and limestone, 12,509,142 tons, value £1,323,624.

A large new coal-washing plant, designed for an ultimate capacity of 3,000 tons per 24 hours, has been built at Cardiff by the German firm of Meguin, for the Carbonifera Industriana Italiana of Genoa, Italy. The latter company have large briquett works in Italy, for which the Cardiff plant will supply material, the present power of production being 1,500 tons daily.

GERMANY.

Owing to the increasing price of wooden railway ties the management of the Prussian Government railways has decided to make an exhaustive series of tests as to the suitability of ferro-concrete ties.

The German Government has sent invitations to all petroleum-producing countries to take part in an international congress, which will probably be held at Karlsruhe, for the purpose of unifying the methods for testing and analyzing petroleum.

The use of the electric furnace for steel manufacture is increasing, especially in localities where mineral fuel is not available. Herr Georg Fischer has erected at Schaffhausen an electric steel works for the manufacture of steel castings by the Heroult process, in which castings up to one ton in weight can be produced.

AUSTRIA.

A number of anciently-worked gold mines in Bohemia and Moravia have been acquired by a company in Pribram, and will shortly be reopened.

AUSTRALASIA.

New South Wales is apparently destined to become an important shale-producing country. A wealthy British syndicate is making large expenditures in preparing for the development of enormous shale deposits in the Wolgan Valley, west of Sydney, and another with a nominal capital of £300,000 is being organized in Australia and England to develop the extensive shale-bearing district near Murrurundi, in the northern part of the State, where a lease of 3,000 acres has been secured.

The discovery of gold at a depth of 4,504 ft. in the Victoria Quartz mine, Bendigo, Victoria, is giving an impetus to deep sinking.

RUSSIA.

The South Russian coal market has been considerably affected by the decision of several southern railways to give up the use of coal and return to petroleum fuel, which they abandoned some years ago. The export trade is consequently likely to be increased.

NORWAY.

A concession to mine 36 iron ore claims at Fughestrand and Skravlaa in Hemnos Herred, Nordland, has been granted to Sixtus Sjoberg, of Stockholm, for 75 years. Very rigid conditions are laid down, including the payment of royalties, the satisfactory working of the properties, and the employment of Norwegians only, and it it stipulated that the concessionaire must not join any combination for "bulling" ore prices.

SOUTH AFRICA.

The average working cost per ton of sixty Rand companies for August was reduced to 17s. 4d., being 5d. less than for July. In January working costs stood at 19s. 7d. per ton, the saving effected in the meantime amounting to 10 per cent. This has been largely secured by substantial reductions in the pay of native laborers.

The South African Option Syndicate, Limited, is offering rewards up to £20,000 and an interest in the claim for the discovery of a diamond pipe in the Somabula diamond area of about 65 square miles in extent.

UGANDA.

A new gold field has been found in the territory west of Lake Albert, Nyanza, where gold has been discovered in Kakoi River gravel, and in the Adz Valley. The country is easily accessible.

UNITED STATES.

A new gold district has been discovered in New Mexico and named Sylvanite, from the character of the ore, which is a gold-silver telluride. Several rich properties have been opened up.

A stratum of sulphur 325 ft. in depth has been tapped in Liberty County, East Texas, which is believed to be the richest deposit known anywhere.

The Idaho Smelting and Refining Co.'s plant at Ponderay, Idaho, which has been reconstructed in the interests of the small mine owners of Idaho and Montana, has started operations.

A controlling interest in the Bullion-Beck mine, one of the oldest silver-lead mines in Utah, which has been operated since 1876, has been secured by the United States Smelting, Refining and Mining Company.

COMPANY NOTES.

THE HASTINGS (BRITISH COLUMBIA) EXPLORATION SYNDICATE, LIMITED.

Directors' Report.

The Directors have the pleasure to present the Tenth Annual Statement of Accounts and Balance Sheet for the year ended 31st May, 1908.

It will be seen that the financial position of the Company shows considerable improvement. The Cash on hand and at Bank amounts to £2,693 13s. 4d., being an increase of £1,009 19s. 4d., as compared with the corresponding period of 1907. The Administration Expenses for the year in London and British Columbia, which include Income Tax, Fire and Accident

Insurance and Government Ore Tax, exhibit a decrease of £87 6s. 7d., and there is a reduction of £1,274 11s. 3d. in the cost of Development Work.

The Ore shipped to the Smelters during the period under review netted £10,146 1s., that is after deductions for freight and treatment; the figures for the past four years being—

For the year ended	31st May, 1905	£10,099	16	10
" "	31st May, 1906	10,070	5	8
" "	31st May, 1907	9,574	9	1
" "	31st May, 1908	10,146	1	0

The accompanying advices from Mr. Leslie Hill, Local Representative and Consulting Engineer in British Columbia, will be read with niterest by Shareholders. The practice of publishing extracts from his Annual Report has been adopted by the Directors for several years and forms a continuous and descriptive history of the Company's mining operations. Mr. Hill writes:—

"Arlington Mine and Group.

"The development work done during the year at the Arlington Mine consisted of drifts 504 feet, crosscuts 25 feet, winzes 4 feet, and raises 430 feet. On the Micawber Claim the development work done was drifts 235 feet, raises 119 feet. There was also a raise of 46 feet put up on the ground of the Canadian King. The total development work amounted to 1,188 feet, and the cost of labor was $9,314.63, or $7.84 per foot.

"1,220 mine-cars of Ore and 7,110 mine-cars of waste were taken from the mine, and the stopes were filled with waste as far as practicable.

"Hauling by wagon commenced on 11th June, 1907, and ceased on 20th November, during which time 169 wagon loads of Ore were hauled to Erie and 26 car loads of Ore were shipped to the smelter at Trail, B.C. Sleighing commenced on 24th December and lasted up to March 11th, 1908, and 126 sleigh loads of Ore were hauled to Erie and 28 car loads of Ore shipped to Trail.

"In 1908 we commenced to haul by wagon on 25th May and 3 wagon loads of Ore were hauled to Erie during the month, the returns for which will appear in the accounts for 1908-1909.

"During the year 1,241.6 tons of Ore were shipped, which realized $53,143.20 net smelter returns, and $81.04 for Government Bounty on Lead Smelted, making a tital of $53,224.24, or $42.86 per ton.

"The cost of mining, sorting and shipping, including development work, was $27.06 per ton, made up as folls:—

Development (labor)	$7.51
Stoping	8.54
Sorting and Tramming	3.87
Assaying, Surveying, Surface and General Expenses	1.67
Supplies	2.25
Hauling to Erie and Loading on Cars	2.03
Insurance	.38
Ore Tax	.71
Miscellaneous Expenses, less Boarding House credit of $34.50	.10
	$27.06

"Total cost per ton of Ore, sorted and shipped, $27.06, leaving a gross Mine profit of $15.80 per ton, being 37.05 per cent. of the net Smelter Returns. This compares favorably with the results of the previous year's operations, as the Smelter Returns were $5.90 per ton higher and the expenses $1.49 lower, but the tonnage shipped was 167.38 tons less.

"Development.—The No. 7 North Drift was extended 259 feet, the No. 8 North Drift 97 feet, and the No. 9 North Drift 33 feet. A shoot of Ore was found on the No. 7 North Level, north of the Canadian King line and on the Directorate Claim. Some Ore was stoped from this shoot and there is still Ore in the raise. A raise has been put up from the No. 7 North Drift to a point south of the Canadian King line. This raise crosses the line of the Canadian King and connects with the old No. 4 Level which has been extended northerly. There appears to be a considerable shoot of Ore exposed by the raise, partly in the Company's ground and partly in Canadian King ground.

"A second and higher Adit was driven on the Micawber Claim a distance of 250 feet, and then raised to surface. At 50 feet up the raise we encountered a vein, and are now driving on this vein. It would seem that this should be the Arlington vein, but so far we have not found any pay Ore.

"East Kootenay Claims.

"No work has been done on these claims during the year. It is reported that a small vein of pay Ore has been found on a claim adjoining one of our claims and also joining a claim of the North Star Mining Company. Also it is stated that a large lead containing low grade Lead and Zinc Ore runs from the North Star workings diagonally across to the Mine of the Sullivan Mining and Smelting Co., and that this lead crosses some of your Claims. The value of the low grade Ore on this lead depends upon the Zinc situation—that is to say, whether Zinc Ore is to be admitted free into the United States, and also as to the success of some new methods of Zinc smelting which are about to be tried on a commercial scale in British Columbia."

Blairmore Coal Lands.

It is with much satisfaction the Directors announce that the final instalment on these important properties has now been paid to the Dominion Government of Canada, and the Patents for the lands have accordingly been applied for. This asset appears in the Company's books at £7,348 15s. 4d., an amount commensurately small with the estimate placed upon the property by experts who have visited the Coal Fields. There have been several local enquiries during the past twelve months by parties desirous of opening negotiations to purchase, but your Directors have not entertained any of the proposals submitted to them.

In April last your Directors had the advantage of a visit to this country by Mr. Leslie Hill, your Manager in British Columbia, and derived much benefit from the opportunity thus afforded for an interchange of views regarding local affairs of the Company, which it is gratifying to repeat, continue to be most carefully conduetcd under his able supervision.

It is with sincere regret that the Directors have to record the death of Sir Edward Birkbeck, Bart, who was identified with this Company from its inception, and the loss of his services is much to be deplored.

In conformity with Clause 66 of the Articles of Association, the Directors have elected the Hon. C. Melton Astley to fill the vacancy on the Board, and at the Meeting the Shareholders will be asked to confirm his appointment.

In accordance with Clause 69 of the Articles of Association, Mr. James Head retires by rotation from the Board, and, being eligible, offers for re-lection as a Director.

By Order of the Board,

E. HOLT,

Secretary.

Registered Office of the Company,
163/4, Dashwood House,
New Broad Street,
London, E.C.
9th October, 1908.

The Hastings (British Columbia) Exploration Syndicate, Limited.

Balance Sheet, 31st May, 1908.

CAPITAL AND LIABILITIES.

	£ s. d.	£ s. d.
Capital Account—		
Nominal £100,000 0 0		
(100 Shares of £1 each.)		
Issued—		
60,375 Shares of £1 each, fully called up.....		60,375 0 0
Sundry Creditors in British Columbia		776 17 5
Carried forward		£61,151 17 5

ASSETS AND EXPENDITURES.

	£ s. d.	£ s. d.
Purchase Account		3,500 0 0
Property Account—		
Mining Claims at East and West Kootenay, as per last Balance Sheet		10,543 9 3
Blairmore Coal Lands (Expenditure in respect of Interest in), as per last Balance Sheet...	6,530 5 10	
Expended since	1,478 9 6	
	8,008 15 4	
Less—Amount of Deposit received on option to purchase	660 0 0	
		7,348 15 4
Plant, Machinery, Buildings, Live and Dead Stock at cost, as per last Balance Sheet....	9,730 6 9	
Less—Compressor sold	70 0 0	
		9,660 6 9
Canadian Publishing Company, 10 Shares of £2 each, fully paid		20 0 0
Cash at Bank—		
London (Current Account)..	213 6 8	
London in hand	7 14 1	
British Columbia (Deposit Account)	2,386 9 8	
British Columbia (Current Account)	85 5 0	
British Columbia in hand...	0 17 11	
		2,693 13 4
Expenditure—		
Balance brought forward from last Balance Sheet	23,104 2 1	
Expenditure from 1st June to 31st May, 1908—		
London Office Expenses..	350 0 0	
Audit Fee, 1907 (London)	31 10 0	
Petty Cash, Stationery, Cablegrams and Miscellaneous Expenses (London)	68 11 9	
Income Tax	55 0 0	
Insurance, Accident and Fire (British Columbia)	99 15 3	
Government Ore Tax (British Columbia)	91 10 9	
Salaries in British Columbia and Nelson Office Expenses	1,519 2 10	
General Expenses	149 3 11	
Carried forward	£25,464 16 7	£33,766 4 8

The Hastings (British Columbia) Exploration Syndicate, Limited.

Balance Sheet, 31st May, 1908.

CAPITAL AND LIABILITIES.

	£ s. d.
Brought forward 61,151 17 5	

Auditors' Report.

In accordance with Section 19 of the Companies Act, 1907, we report that we have audited the Balance Sheet of the Hastings (British Columbia) Exploration Syndicate, Limited, dated 31st May, 1908, as above set forth. We have obtained all the information and explanations we have required with reference thereto. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs, according to the best of our information and the explanations given to us, and as shown by the Books of the Company.

TINGLE, COMBER & CO., Chartered Accountants.

110, Cannon Street, London, E.C.
2nd October, 1908.

ASSETS AND EXPENDITURE.

	£ s. d.	£ s. d.
Brought forward	25,464 16 7	33,766 4 8
Development Expenses—		
Arlington Group	5,746 8 5	
Fort Steele Claims	15 16 0	
Sunlight	1 7 0	
Canadian King	258 6 8	
	31,486 14 8	
Deduct—interest and Exchange £55 17 5		
Transfer Fees... 0 10 0		
	56 7 5	
	31,430 7 3	
Less Bullion Account, proceeds of Ore Shipped to Smelters. £10,639 8 11		
Deduct Expenses 493 7 11		
	10,146 1 9	
		21,284 6 3
Sundry Debtors, Government of British Columbia		63 16 6
Dividend of 1s. per Share on 60,375 Shares (March, 1902).	3,018 15 0	
Dividend of 1s. per Share on 60,375 Shares (March, 1905).	3,018 15 0	
		6,037 10 0
		£61,151 17 5

JAMES HEAD, Chairman.
G. L. WHATELY, Director.
E. HOLT, Secretary.

The Buffalo Mines, Limited, will more than double its dividend after the new year. Shareholders in the Buffalo now receive three per cent. quarterly, but this will be increased to five per cent. quarterly, making a regular annual dividend of twenty per cent. per annum. In addition a bonus of one per cent. per month will be paid, increasing the return to the shareholders to thirty-two per cent. per annum. The Buffalo has already paid almost a quarter of a million dollars on a capitalization of $1,000,000.

Directors of the Silver Queen have declared the third quarterly dividend of 2 per cent. payable December 1 to shareholders of record November 15. Comment was occasioned by the fact that this quarter the Queen is only paying three per cent., whereas in the two previous quarters it paid in addition a bonus of two per cent. a quarter. The Silver Queen management explain that the two bonuses referred to were paid for the purpose of bringing the dividend return on Queen up to 12 per cent. per annum for the past two years. Last year there was one dividend of 8 per cent., which, with the two bonuses this year, gives the holder 12 per cent. Three per cent. quarterly is being paid, and the management are not likely to increase it while silver remains so low.

The regular monthly meeting of the directors of the Granby scheduled for Nov. 4th in New York was postponed for one week.

An interim dividend of two shillings per share has been declared on Le Roi.

FOSTER COBALT MINING COMPANY.

The annual meeting of the Foster Cobalt Mining Company was held at McConkey's on the afternoon of November 4. The meeting was exceptionally free from acrimony.

The financial report submitted showed a cash balance on hand and in the bank of $17,342.18. There is a further sum of $24,185.42 due from ore sales.

The president's report, reprinted below, indicates that no high-grade silver ore is on hand for shipment. A parcel of thirtytons of ore high in cobalt is ready to send to the smelter. Ore on the dumps is valued at from $15,000 to $50,000. The dump stuff will be shipped to a custom concentrator during the winter.

Following is the report presented by the president at the meeting: In presenting the financial statement of the company for the year ending September 30, 1908, your directors do so with that natural regret which must be felt when any limited company does not report dividends paid upon its share capital. However, your board has the consciousness of having accomplished everything that was possible under the circumstances. The year's development has been extensive, though not productive of results in high silver values that reasonably had been looked for. During the year every economy has been practised and the operations have been conducted along most approved mining lines. During the past sixty days your Board has sought the advice of three eminent mining engineers who have examined the property. Their examinations having been made as a matter of courtesy and compliment to individual members of the Board, it is not possible to use their names in connection with their reports. However, they are men of such standing in their profession that your Board transmits to the shareholders the results of their examinations with the assurance that their reports may be relied upon. In brief, their conclusions are as follows:—

The main workings of the property (veins 5-1) have been carried to a depth of 225 feet. While the fissure vein continues strong, indicating possibly one of the strongest fissure veins in the district, no high values in silver have been encountered, and therefore it has been determined not to sink any lower in this shaft at this time. It is strongly recommended by all engineers hat our work of drifting out under Glen Lake be continued and prosecuted as rapidly as possible in order that the diabase contact believed to exist under the lake may be fully evplored. It would only be possible to make this drift from the 225-foot level, because of the depth of water in the lake and the fact that the top of the main shaft is at a considerable elevation above the lake.

The cross-cutting from vein No. 8 in the direction of veins 6 and 2 is also strongly endorsed, and since this cross-cutting has been undertaken one additional vein has been discovered which, while still running only in cobalt values, indicates the wisdom of this method of development. Only the actual work of drifting and cross-cutting can demonstrate the existence or non-existence of high values.

Your directors have aimed to make public every reasonable statement concerning the property, but are constantly confronted with the difficulty of making statements which might be too encouraging on the one hand or on the other hand would not do full justice to the possibilities of the property. It is just such a condition that confronts them to-day. There may be great possibilities as a result of the present outlet development. Eqaully true, this development may not be productive of any greater results than during the past months, therefore it but remains for your Board to pursue operations along lines clearly indicated by the best engineering advice available. That it will be done expeditiously and economically is the only warrant that the Board can give.

You will observe that since the last annual statement there have been no sales of treasury stock.

The present stock or ore on hand ready for shipment consists of about thirty tons of ore high in cobalt, but low in silver. The prospect for early shipment of high-grade ore is uncertain, depending entirely upon the results of the development indicated above.

The results of some concentration done on ores from the dumps confirm the belief that these dumps contain values variously estimated at from $15,000 to $50,000. During the coming winter months, when transportation is cheap, large quantities of this ore will be sent to the concentrator, where arrangements are in effect under terms distinctly favorable to the company.

Should the shareholders conclude to re-elect the present Board of Directors, a policy of rigid economy and some further reduction in cost of operation will be adopted.

The officers were re-elected as follows: John T. Kent, President; E. F. B. Johnston, Vice-President; Directors, Mayor J. Oliver, Simon Dyment, C. Jackson Booth, W. H. Fisher, and George H. Doran.

STATISTICS AND RETURNS.

The output of the collieries of the Crow's Nest Pass Coal Company for the week ending October 23rd was 19,287 tons; daily average, 3,214 tons. For the corresponding week of last year the output was 21,996, a daily average of 3,666 tons.

The output of the collieries of the Crow's Nest Pass Coal Company for the week ending October 31 was 18,835 tons, a daily average of 3,139 tons. For the corresponding week of last year the output was 21,172 tons, a daily average of 3,529 tons.

The output of the Crow's Nest Pass Company's collieries for the week ending November 6th was 19,634 tons, a daily average of 3,272 tons.

Nova Scotia Steel & Coal Company's output for October was 70,160 tons of coal, against 57,200 tons in September and 57,480

in October a year ago. The total for the year to date is 574,670 tons, against 528,720 tons in 1907. The pig iron output this October was 5,800 tons, and steel 7,750 tons. This is a record for both coal and steel.

The Dominion Coal Company's October shipments were 263,000 tons, compared with 339,573 tons in October, 1907. A large decrease was due to the boats' delay in getting up the St. Lawrence owing to the heavy fog and smoke prevailing. For ten months coal shipments were 1,257,370 tons, contrasted with 990,492 tons in 1907, an increase of 266,878 tons.

Dominion Coal's output was light for October, election day being practically a holiday at the mines. Up to date, however, the output is approximately 203,000 tons ahead of a year ago. The output in tons follows:—

	1908.	1907.
January	314,108	252,248
February	285,649	225,988
March	346,529	212,831
April	298,745	316,384
May	332,588	237,269
June	347,000	319,000
July	368,000	321,000
August	310,000	316,302
September	263,000	296,889
October	264,959	339,573
Totals	3,130,578	2,927,484

The output of the Dominion Iron & Steel Company for the month of October is as follows: Pig iron, 21,000 tons; steel ingots, 22,500 tons; shipments, 18,000 tons.

COBALT ORE SHIPMENTS.

Following are the weekly shipments from Cobalt camp for the week ending October 24th:—

	Ore in lbs.
*Coniagas	64,498
Cobalt Lake	62,940
Crown Reserve	126,000
Chambers-Ferland	140,000
Drummond	125,000
La Rose	335,000
McKinley-Darragh	57,000
Nipissing	189,380
O'Brien	192,140
Silver Leaf	114,870
Temiskaming & Hudson Bay	60,000
*Trethewey	132,000

*Partly concentrates.

The total shipments for the week were 1,600,128 pounds, or 800 tons. Total shipments from January 1 to date, 35,340,743 pounds, or 17,670 tons.

Cobalt ore shipments were heavy for the week ending October 31st, due no doubt to exhibition trainload sent to the Denver smelter. Thirteen mines shipped 1,706,690 pounds, or 853 tons of ore. The shipments from the camp for January 1 to date were 36,589,559 pounds, or 18,294 tons.

Shipments for the week and year were, in pounds:—

	Week.	Since Jan. 1.
Buffalo	.....	912,950
*Coniagas	.....	1,032,853
Cobalt Lake	.....	404,623
Crown Reserve	127,000	594,688
*Cobalt Central	43,000	487,075
Chambers-Ferland	60,440	383,890
City of Cobalt	42,000	1,239,300
Drummond	100,000	1,291,520
Foster	.....	297,300
Kerr Lake	184,050	1,091,394
King Edward	.....	127,240
La Rose	386,330	7,331,970
McKinley-Darragh	.....	2,54,770
Nipissing	187,260	2,941,610
Nova Scotia	55,400	447,675
Little Nipissing	.....	40,110
Nancy Helen	.....	367,427
O'Brien	190,370	5,846,157
Peterson Lake	.....	41,237
Right of Way	81,840	1,238,620
Provincial	.....	143,210
Silver Leaf	.....	372,900
Silver Cliff	.....	52,000
Silver Queen	.....	1,555,990
Townsite	.....	251,700
Temiskaming	63,000	931,620
Temiskaming & Hudson Bay	185,160	2,073,666
*Trethewey	.....	2,042,476
Watts	.....	561,680

*Partly concentrates.

Cobalt ore shipments for the month of October fall below those of September and August, but lead every other month in the year. The La Rose was far away ahead of the other mines, with total shipments for the month of 1,$92,120 pounds, against 822.040 pounds for the Nipissing, 665,160 for the T. & H. B., 673,770 for the O'Brien, and lesser amounts for the others.

Some well-known mines do not appear in the list at all. Shipments from the camp by months, in tons, were:—

Month.	1907.	1908.	Inc.
January	980	1,325	345
February	903	1,174	270
March	1,027	1,832	805
April	533	1,317	784
May	1,158	1,601	443
June	1,939	1,581	*358
July	1,327	2,022	695
August	1,139	2,366	1,227
September	760	3,322	2,562
October	1,292	2,325	1,033
Total	11,058	18,864	8,806

*Decrease.

B. C. ORE SHIPMENTS.

Nelson, B.C., October 24.—The following are the detailed shipments from the various mines and the receipts of the smelters of the districts of Southeastern British Columbia for the past week and year to date:—

BOUNDARY ORE SHIPMENTS.

Mine.	Week.	Year.
Granby	21,840	842,684
Mother Lode	9,074	198,810
Oro Denoro	680	51,686
Snowshoe	2,492	16,831
Phoenix Aamalgamated	120	205
Other mines	....	22,248
Total	34,206	1,132,464

ROSSLAND.

Centre Star	4,007	139,003
Le Roi	917	63,400
Le Roi No. 2	479	24,02.
Other mines	....	982
Total	5,403	227,414

SMELTER RECEIPTS.

Grand Forks	21,840	842,684
Greenwood	9,754	253,036
Boundary Falls	....	21,872
Trail	8,025	254,990
Northport	1,179	69,468
Marysville	....	5,730
Total	40,798	1,447,780

The following are the ore shipments for the week ending Oceober 31st, and year to date:—

BOUNDARY SHIPMENTS.

Granby	22,493	865,177
Mother Lode	7,958	206,768
Oro Denoro	650	52,336
Snowshoe	2,691	19,522
Phoenix Amalgamated	25	230
Other mines	....	22,248
Total	33,817	1,166,281

ROSSLAND SHIPMENTS.

Total	6,255	234,989

SLOCAN-KOOTENAY SHIPMENTS.

St. Eugene	942	21,243
Whitewater	75	1,570
Whitewater, zinc	180	6,375
Whitewater, milled	280	13,180
Poorman, milled	250	9,300
Queen, milled	400	8,500
North Star	124	3,488
Arlington, Erie	47	2,239
Second Relief, milled	145	2,200
Richmond	97	2,025
Blue Bell	17	1,260
Standard	21	1,123
Rambler-Cariboo	19	1,006
Silver Cup	57	799
Reco	36	371
Westmont	256	347
Kootenay Belle, milled	25	275
Slocan Sovereign	7	70
Nugget, milled	35	70
Alpha	13	29
Silver Hustler	20	20
Other mines	....	12,441
Total	3,046	87,931

EAST OF COLUMBIA RIVER.

Total	2,025	80,636

The total shipments for the week were 42,118 tons, and for the year to date 1,489,201 tons.

GRANBY SMELTER RECEIPTS.

Grand Forks, B.C., Oct. 31st.

Total	22,493	965,177

B. C. COPPER CO.'S RECEIPTS.

Greenwood, B.C.

Total	8,608	261,644

CONSOLIDATED CO.'S RECEIPTS.

Trail, B.C.

Total	8,936	263,836

LE ROI SMELTER RECEIPTS.

Northport, Wash.

Total	2,173	71,641

The total receipts for the past week were 42,210 tons, and for the year to date 1,489,900 tons.

MARKET REPORTS.

Connellsville coke, f.o.b., ovens:—

Furnace coke, prompt, $1.60 to $1.70.
Foundry coke, prompt, $2.00.

Metals.

Tin, Straits, 31.10 cents.
Copper, prime Lake, 14.625 cents.
Lake arsenical brands, 14.625 cents.
Electrolytic copper, 14.50 cents.
Copper wire, 15.50 cents.
Lead, 4.45 cents.
Spelter, 5.05 cents.
Sheet zinc, 7.50 cents.
Antimony, Cookson's, 8.25 cents.
Aluminium, 25 cents.
Nickel, 40 to 47 cents.
Platinum, $19.50 to $20.50 per ounce.
Bismuth, $1.75 per lb.
Quicksilver, $47 per 75 lb. flask.

Silver Prices.

		New York. cents.	London. pence.
October	24	51 3-8	23 11-16
"	26	51 3-8	23 11-16
"	27	51 1-4	23 5-8
"	28	51 1-4	23 5-8
"	29	50 7-8	23 7-16
"	30	50	23 1-16
"	31	50 3-8	23 1-4
November	2	50	23 1-16
"	3	..	23
"	4	49 5-8	22 15-16
"	5	49 5-8	22 15-16
"	6	50 1-8	23 1-8
"	7	50	23 1-8
"	9	49 5-8	22 15-16