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### CIRCULATION.

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### ONTARIO'S NEW SCHOOL BOOKS.

Time was, and is yet, when the purchase of school books constituted a serious annual drain on the resources of the wage-earner. The old "readers," "spellers," "jographies" ("geography" is a modern corruption), "arithmetics," "grammars," and so on, were costly. Indeed the prices charged for them were squares or cubes of their intrinsic value. Often these stilted volumes would descend progressively through each member of the family. Hence, by the time they got into the hands of the youngest of a large brood the school books were in a shocking state of disrepair.

If our memory does not mislead us, it is within bounds to assert that the only enjoyment extracted from the "readers" of a generation ago arose from their use as missiles and from an interchange of transfer-pictures and other amenities on the fly-leaves. Our instructors probably would have developed a brain-storm had their pupils shown symptoms of deriving pleasure from their allotted stint. In short, the function of the teacher was to crowd into the child's mind as many facts and figures as possible—very much as the farmer packs hay into the mow. And, at stated intervals, under the artificial pressure of oral and written examinations, the pupil was supposed to exude these facts and figures. Ability was judged by the facility with which youthful victims could string off the names of countries, monarchs, and political divisions, or jabber the meaningless "dates" of irrelevant events in history. It is not surprising then that many luminaries in the firmament of letters, such as Sir Walter Scott and Robert Louis Stevenson (and others whom we refrain from mentioning) should have been branded as unsuccessful students. It merely meant that boys possessed of any degree of originality were instinctively averse to surrendering their intellectual independence, and were unable to find in the school-room anything to inspire either their interest or their respect.

But the old order has changed. The eyes of pedagogues have been opened. Continued study and observation of the psychology of the child, and closer attention to the laws of hygiene, have wrought marvels in our educational system; although no one can truthfully affirm that many and manifest defects do not yet exist. Morally, mentally, and physically, the conditions of school children to-day is vastly better than it ever has been. And, perhaps, the most striking outward and visible manifestation of this growth in grace is in the modern school book. This brings us to the subject on hand.

The Ontario Department of Education has recently issued a series of school "readers." These books are



durably bound, beautifully printed, and decently illustrated. In price they range from four cents for the "primer" to sixteen cents for the "fourth reader." These prices are little less than marvellous. The enterprising firm that took such a low contract may be credited with some species of legerdemain, and the Department is certainly to be felicitated upon the price and appearance of the new readers.

But as regards the matter contained in the books, there is room for much difference of opinion.

While we believe that in general the compilers are on the right track, we think that they have fallen short in one essential. On the frontispiece of each reader is a coloured reproduction of the British flag. Throughout the reading matter there is an ample sprinkling of incidents and exportation calculated to inspire sentimental loyalty. But there is a marked paucity of readings that tell of Canada as it is, of our fisheries, agriculture, mining, and manufactures.

Possibly we have an overplus of sentimental loyalty in this country. Vociferations do not build empires. Flag-waving does not develop our nationhood. What every Canadian needs, what should be one of the first prerequisites of citizenship, is an intelligent knowledge of Canada. This has not been kept in view in compiling the Ontario Readers. In fact, this is the point of our argument. We believe that those who are responsible for the "readers" have given too little attention to things Canadian, and too much to conventional literature.

The half-tones that embellish the text are good. They are distinctly Canadian. But there is nothing to correspond to them in the text. Some, at least, of the material purporting to deal with our great Northwest is fearfully inaccurate. Many sources, from which profitable material could have been obtained, have been overlooked or neglected. The compilers need to be reminded that in our progress towards nationhood the building of a railway is of infinitely greater significance than any political or military episode. And surely our children should be taught the meaning of our railways, our mines, our forests, and our farms.

Glancing through the two more advanced "readers," we can see nothing that would indicate to a child that Canada possesses minerals and mines. This is an inexcusable omission. The neglect of one industry might be excused, but when practically no mention is made of industrial phases of life, then we claim that the point-of-view is radically wrong.

Briefly, the new Ontario Readers, excellent though they be in many regards, still conform to the outworn and artificial standards of thirty years ago. While they are probably the best school books that we have yet seen, still they fall very far short of what they should and could be.

### QUARTERLY DIVIDENDS.

The first few years in the life of a metalliferous mine or of a colliery are normally apt to be non-productive of net profits. The bonanza mine may be able to render dividends in its first year. But, even when this is possible, it is seldom good business. The exigencies and risks of mining demand that positive reserves of ore and cash be developed before dividends are thought of.

It is often the case that a mining concern, flushed with early success, commits itself definitely to the policy of paying quarterly dividends. Almost always such a course necessitates the occasional or frequent passing of dividends. Cobalt has provided several disturbing instances of this.

Other things being equal, it appears to us that annual declaration of dividends is certainly preferable to quarterly distributions. Temporary setbacks frequently disturb the operation of a mine to an extent that renders extraordinary expenditure necessary, or curtails for a period the output of ore. These passing difficulties may be felt keenly for a month or longer, but may be entirely overcome during the year. Hence, when quarterly dividends would seriously inconvenience the management, yearly dividends would not affect operations. We prefaced the last paragraph with the conditional phrase. Other things are not equal. The quarterly dividend is looked upon as a spur to the mine manager. The shareholder becomes accustomed to claiming it as his right, and the mine suffers. Moreover a dividend expected every three months provides an effective instrument for the stock manipulator.

We shall be glad to receive and publish expressions of opinion from our readers. The subject is important from more than one point of view.

### ORGANIZED LABOUR.

The constantly increasing efforts of labour leaders in the direction of international confederation are pregnant with significance. It requires no flight of the imagination to discern a settled design beneath the visit of prominent American labour-socialists to Europe. It is quite as improbable that the incursion of the United Mine Workers into Canada arose from the unselfish desire of certain demagogues to aid the miners of the Dominion. Whatever the ostensible objective of the labour propaganda may be, its ultimate purpose is the widest and closest possible inter-union of labour societies.

And in this aim, per se, there is little to condemn. Individuals and societies alike, who strive to ameliorate the conditions of human life, are deserving of praise and sympathy. But it is a patent fact that the majority of labour leaders on this continent are demagogues, imbued with the dogmata of a crude form of socialism, which is in reality a variant of anarchism modified by



opportunism and illiteracy. To demagoguery, for instance, and to demagoguery alone, is to be attributed last weeks episode in a coal mining district in the United States. Here a strike was imminent because of the proposed introduction of safety explosives. The incredible folly of the miners in opposing a measure calculated solely to reduce the risks under which their daily work is performed, is due, of course, to ignorant prejudice. But their leaders, often profoundly ignorant themselves, foster and encourage the ignorance, prejudice, and passions of their followers. Anyone who will take the trouble to read the official utterances of labour periodicals—and the U. M. W. A. Journal is an outstanding example—cannot but admit the justice of this indictment.

As a general proposition, it is true that the leaders of mining labour are antagonistic to the introduction of regulations, devices, and methods that are calculated to prevent loss of life. This is especially true of coal mining.

In Great Britain a temporizing government has pandered consistently to the most radical section of labour-socialists. Whilst the militarism of Germany can hold revolutionary tendencies in check, in Great Britain no such corrective is either possible or desirable. Great Britain, and all Anglo-Saxon countries, must depend primarily upon the controlling influence of educated public opinion.

Now, since mining labour is highly organized, there is present an essential need that operators and owners organize. But this organization must not be called into being as a corporate entity hostile to labour bodies. On such a foundation success would not be worth attaining. The basic problem is not one of warfare, but of co-operation—co-operation, national and international, as between mine owners first, and then as between owners and labour.

The first step in this desired consummation must be local and national union of mine owners or operators. Never was the need so apparent as it is to-day in Canada. Indeed, the value of mining investments depends more to-day upon labour conditions than ever before; and no other factor is so uncertain. Hence, if only as a business precaution, it is incumbent upon mine owners to get together and stay together. Only by mutual trust and concerted action can mine owners hope to guard their interests adequately. And only by temperate methods, wise forbearance, and the dissemination of right knowledge can the confidence of organized labour be won.

Meanwhile it is pertinent to observe that Canadian mine owners will never have as fair an opportunity of organizing as is offered them by present conditions.

### EDITORIAL NOTES.

The latest news from Gow Ganda is encouraging. Four new substantial discoveries are announced, one of which is that of a silver vein encountered at a depth of one hundred feet.

It is rumoured unofficially that the royalties exacted by the Ontario Government from certain Cobalt mines are to be reduced considerably. This is unquestionably a move in the right direction. Apart from all consideration of business ethics, it is and has been a doubtful method of raising income for the province.

The cost of mining coal in Great Britain is fast reaching a point when the profit to the operator will disappear. When that time shall have arrived, it appears probable that power will be generated at the pit-mouth and distributed over Great Britain from enormous central stations. Some such change must take place within a comparatively short time.

The Elmore vacuum-flotation process is based primarily upon the selective action of oil for metallic mineral particles in a flowing pulp of crushed ore and water. The addition of acid materially increases this action. The air or gases dissolved in water are partly or wholly liberated upon lessening the pressure below that of the surrounding atmosphere. Gases, also, may be generated in the pulp, or by introduction from an external source. The bubbles of gas attach themselves to the oiled mineral particles and cause them to float to the surface of the liquid. The quantity of oil and acid necessary ranges from 3 to 10 lb. per ton of ore treated. A large variety of cheap oils and residuums have proved suitable.

About 70 machines are now in use or under construction. An extraction of 98.8 per cent. is recorded on a 3.48 per cent. copper ore in which barytes formed the gangue. For a 3.40 per cent. molybdenite ore, feldspar gangue, an extraction of 93.2 per cent. was obtained. Gold, silver, lead, antimony, zinc, graphite, ores and tailings have been successfully treated. In one copper mine where three units are installed, the working costs are about 75 cents per ton of ore treated. At another mine, one unit handles from 120 tons to 200 tons per week. The ore in this instance carries 0.75 per cent. copper and is concentrated to 16 per cent., leaving 0.14 per cent. in the tailings. The approximate working cost (not including general management) is 24 cents per ton. Other much lower costs are recorded.



# MODERN PRACTICE OF ORE-SAMPLING.

Advance Copy of Paper to be Read Before the American Institute of Mining Engineers, Spokane Meeting, September, 1909.

By David W. Brunton, Denver, Col.

From the old-fashioned "grab-sample" to the modern timing-device, which takes a machine-sample with mathematical precision, there is a wide gap which was only crossed by many years of toil and unremitting endeavor. Even to-day, notwithstanding the advancement in the art, "grab-sampling" is still practised—some times to afford the unscrupulous mine-promoter a basis for fairy-tales with which to entrap the too-gullible investor, and often by milling and smelting companies to determine the amount of moisture in custom ores. The latter practice is almost as reprehensible as the former, and it causes more trouble and ill-feeling between seller and buyer than all other factors put together. No reputable concern to-day would think of attempting to determine by grab-sampling the amount of gold, silver lead, or copper contained in an ore, and yet many buyers expect the miner to accept the results of grab-sampling in the determination of the amount of water contained in the ore, forgetting that accurate results are just as necessary here as in the determination of the metals, because the result determines the percent-

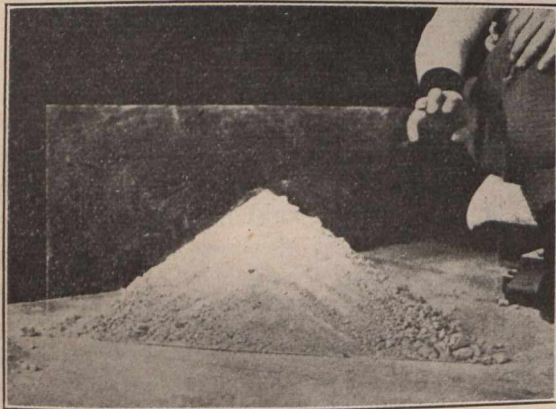


FIG. 1.—SAMPLE BISECTED BY A SHEET OF GLASS, SHOWING PROPORTION OF COARSE AND FINES.

age of weight of the ore which shall be excluded and considered to have no value whatever.

Samples for the determination of moisture should be taken with as great care as samples for the determination of metallic content, and in order to avoid the extra expense of a separate operation moisture-samples should be taken from the sample-safe. As the sample reaches the sample-bin in a smaller stream and by a more circuitous route than the "reject" travels in its path to the outgoing car, it loses more moisture en route, and a constant should be added to compensate for this difference. Carefully conducted experiments have shown that the difference in loss of moisture between the two routes does not exceed 10 per cent. in summer and 7 per cent. in winter. For instance, a lot of ore shipped during the summer months, in which the machine sample showed 5 per cent. of moisture, would have an actual moisture content of 5.5 per cent. Grab-sampling by an interested party, at its best, is only a prejudiced conjecture, while at its worst it gives rise to the most unscrupulous practices with which the ore producer and the mining investor have to deal.

Shovel sampling, another archaic method which is still used in some localities, consists in throwing out from the car or wagon every third, fifth, or tenth shovelful for a sample. As the portion of the pile from which the

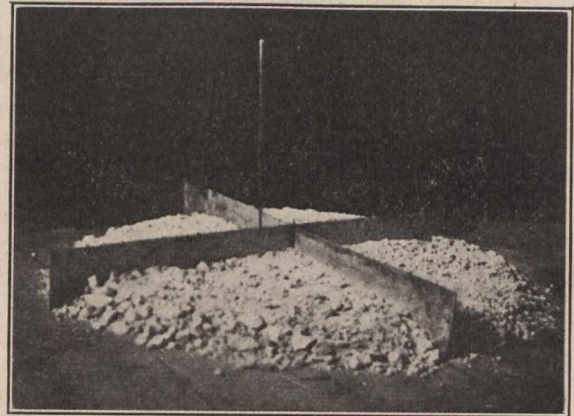


FIG. 2.—SAMPLES SPREAD OUT INTO A PANCAKE.

sample is taken is entirely at the discretion of the operator, the process would be more properly named fifth-shovel selection than fifth-shovel sampling. Between the conscientious workman who endeavours to be absolutely upright, and often becomes, as the Scotchman said, "maer than plumb," and the scheming labourer who, desiring to make his "job solid," takes a "safe sample," there is little room for truth or accuracy in this method, and the sooner it is consigned to oblivion the better for every one concerned.

Thirty years ago Cornish quartering was the almost universal method of sampling in use, and it is still employed to a considerable extent in cutting down machine samples and in mine examinations where no machinery can be had. When properly carried on with skill, care, and common honesty, fairly good results may be obtained by quartering, but between the possibility of accidental

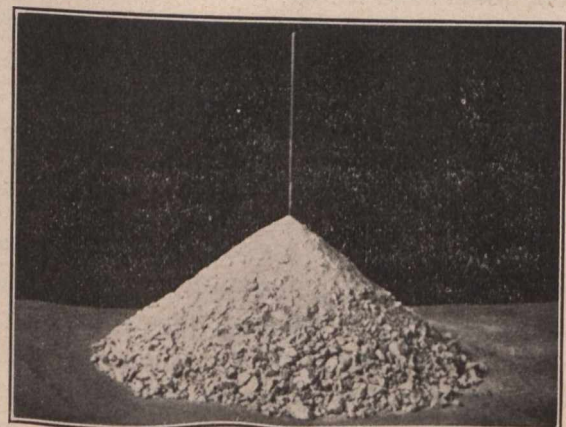


FIG. 3.—SAMPLE CONED AROUND A ROD.

mistakes and the opportunities which it affords for skilful and unscrupulous operators to manipulate the sample, it has fallen almost into disuse, and should have been completely abandoned long ago. The inherent



defect of this system lies in the fact that piling a lot of ore in the form of a cone does not mix it, as the advocates of this system claim. Dropping shovelful after shovelful of ore on top of a cone, instead of building up a homogeneous pile, actually produces a very perceptible sorting action, whereby the fines build up where they fall on the center of the cone and the coarser particles roll outward and down the sides. This is illustrated in

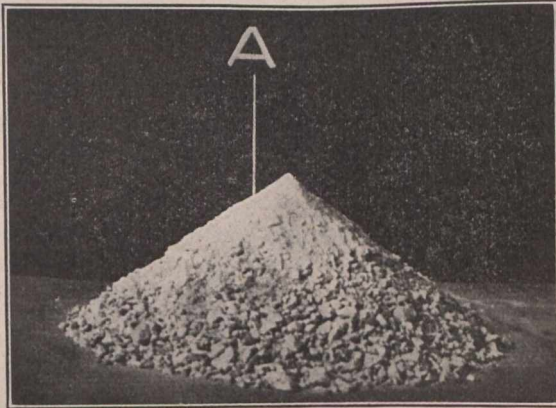


FIG. 4.—SAMPLE CONE WITH DRAWN CENTER.

Fig. 1, which is a half-tone from a photograph of a cone built up in actual sampling practice and bisected by a sheet of glass. This section shows conclusively the great difference in the relative proportion of coarse and fines between the outer and inner portions of the cone, and also makes it perfectly clear that even after the cone has been spread out into a pancake, as shown in Fig. 2, the fines in the lower portion of the cone will be entirely undisturbed. The most uniform and best results are obtained by ecning around a rod, as shown in Fig. 3. By this means the center of the cone is maintained in a vertical line, and if care is taken in working down the cone to a "pancake," as shown in Fig. 2, and separating the quarters by steel blades, so that there is no difference between the quadrants taken for the sample and those thrown into the reject, the results give a fair approximation of the truth, though it is not possible to duplicate results very closely by this method, even at its best.

It would take altogether too much space here to enumerate the different schemes which unprincipled

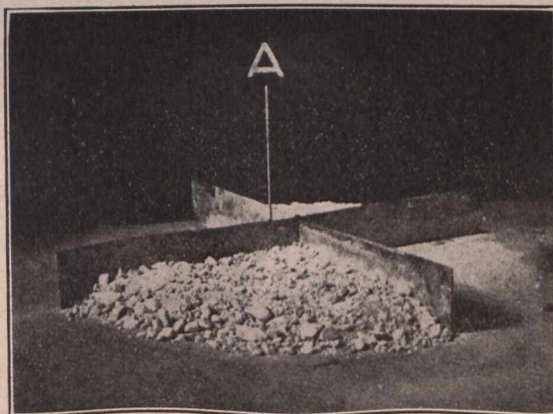


FIG. 5.—SAMPLE WITH DRAWN CENTER SPREAD OUT.

operators have introduced into this method for the purpose of "throwing" the sample, and description of one of them will suffice.

The most ingenious of these plans, and one which is so difficult to detect that it can be carried on directly

under the eyes of a skilled observer without detection, is what is known as "drawing the center." The cone is started on the floor, as shown in Fig. 3, but without any rod to determine the position of the center. The operator in charge of the work, in dropping his shovelfuls of ore on the top of the cone, does it in such a manner as to draw the center of the cone imperceptibly in a certain direction, so that by the time the entire sample is piled and ready for spreading, the apex of the cone, shown in Fig. 4, is several inches, we will say, to the SE. of the original center, which is indicated by the perpendicular line, A. The ore may now be spread as usual with shovels or with a board, and cut and marked into quadrants by steel blades in alignment with the four points of the compass, as shown in Fig. 5, where the rod, A, indicates the original center of the cone, which, of course, has been entirely undisturbed by the mixing and spreading of the upper portion. By rejecting the NW. and SE. quarters an excess ratio of the fines is eliminated, and since these are generally the richest ore the metallic contents of the two retained quadrants, shown in Fig. 5, will be somewhat less than the average of the original pile. Suppose a 2,000-lb. lot is to be reduced to 62.5 lb., it would mean that the "quartering" (really halving) would have to be repeated five times, and if at each stage the sample taken represented 98 per cent. of the actual value of the cone, the final sample would only give 90.3



FIG. 6.—U-SHOVEL SAMPLING.

per cent. of the true value of the cone, as shown in the following tabulation:

Weight, lb.,	Original Lot,	First Cut,	Second Cut,	Third Cut,	Fourth Cut,	Fifth Cut,
	2,000	1,000	500	250	125	62.5
Percentage of true value,	100	98	96	94.1	92.2	90.3

The shifting of the cone-center is easily carried out; in fact, it is difficult to avoid it unless some definite means of preventing it is adopted. Fig. 1 shows very clearly the structure of a cone with a "drawn" center, and in this instance the effect was entirely unintentional.

The irregularities in the results obtained by Cornish sampling, together with the cost of operation and the amount of room required, soon brought about what is known as "split-shovel" sampling, in which the ore is thrown from a broad shovel, handled by one operator, upon a narrow "U"-shaped shovel, held by another workman, usually directly over a car or wheelbarrow, as shown in Fig. 6. This method, while it requires two men to do what normally appeared to be the work of one, was cheaper than Cornish quartering, but it proved no great improvement over the latter in point of accuracy, since carelessness in almost any direction interferes seriously with the results.



The earliest attempts at mechanical sampling were made by subdividing a falling stream of ore; a process based on the supposition that an ore-stream could be mixed so as to be perfectly homogeneous. Both analysis and experience have shown that this ideal condition is impossible, and mechanical devices for taking a portion of the ore-stream all of the time have been almost entirely displaced by machines designed to take all of the ore-stream for a portion of the time. It is not practicable to produce a stream of ore which shall be continuous in value through every part of its length any more than

Almost coincidental with the discovery of the fact that accurate samples could be obtained by taking all of the stream for a portion of the time, came a very considerable improvement in rock-crushing machinery, so that the modern engineer has a much better opportunity to construct a satisfactory plant than the builder had 20 or 30 years ago. Not only are the rock-breaker and rolls of to-day greatly improved in design, but the manufacturers have availed themselves of modern cheap steel to give all parts an excess of strength over any possible strain, while the use of alloy-steels for the wearing surfaces permits the machines to be kept in much better repair, and requires fewer stoppages for renewals. For sampling-work, crushers and rolls can now be had which are almost as well made as the ordinary steam engine, and so designed as to give complete accessibility for renewals and for cleaning.

Gyratory breakers of the Gates type have the advan-

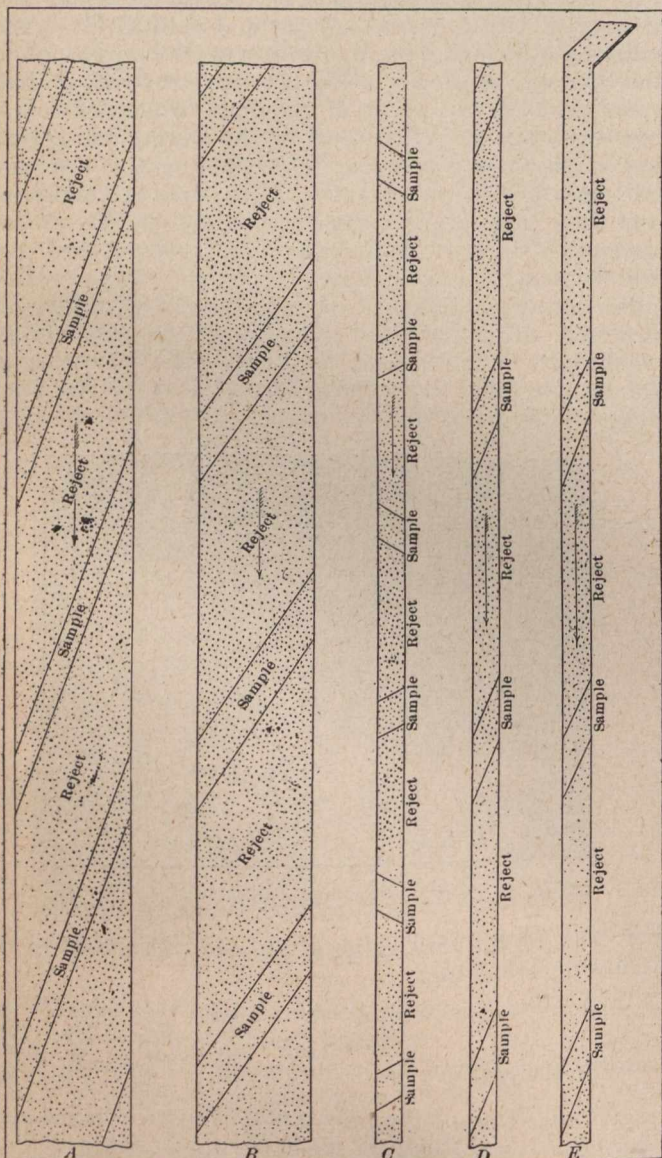


FIG. 7.—SHAPES OF SAMPLE-SECTIONS TAKEN BY THE CHARLES SNYDER, BRUNTON, AND VEZIN SAMPLERS.

it is possible to produce a stream of ore that is constant in value throughout its width; but by taking a small sample entirely across a falling stream at very short intervals it is found that, while no single cut would give an exact representation of the composition of the entire lot, the average of thousands of these small samples is so nearly correct that results can be duplicated within very narrow margins, or, in other words, that individual errors are balanced. This was not the case with the devices used for taking a portion of the stream all the time, since the errors due to feed, inclination of spouts, or wear on the bottoms of the spouts are constant, and do not vary during the time the samples are being taken.

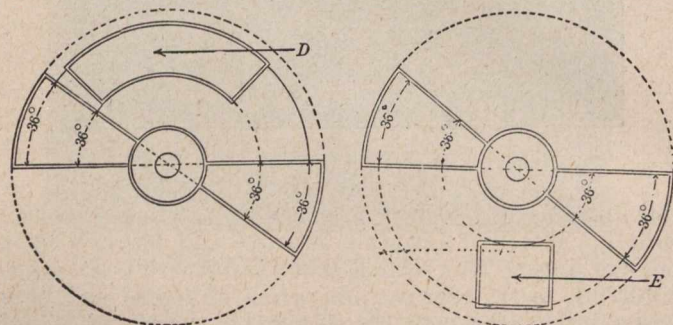


FIG. 8.—DELIVERY-SPOUT OF CHARLES SNYDER SAMPLER. CUTTING-EDGES RADIAL. FIG. 9.—DELIVERY-SPOUT OF VEZIN SAMPLER. CUTTING-EDGES RADIAL.

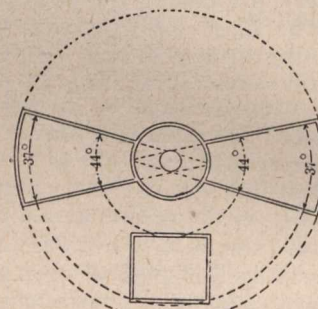


FIG. 10.—CUTTING-EDGES NOT RADIAL.

tage of delivering a very uniform product, and in crushing ores that are hard and dry this type forms by all odds the best initial crushing machine; but with ores that carry wet clay, slate or other substances which will "pack," it is necessary to use a swinging-jaw crusher, preferably of the Blake type. Rock-breakers may be set to crush to any desired fineness, but it has been found that too great a reduction in the size of the product very materially reduces the capacity. In large crushers it is not usually advantageous to attempt to crush below 2 inches in size.

First-class rolls are now always belt-driven, which eliminates the noise and danger attending the operation of the old-fashioned trains of gears. The best practice in roll-crushing is to crush not smaller than half the diameter of the particles fed to any given machine. This rule gives approximately the maximum crushing capacity with the minimum production of fines and the lowest expenditure for power and metal. Rolls require a steady feed, and one which is uniform across the entire width of the shell; consequently, nearly all modern rolls are



equipped with some feeding device. In sampling mills the shaking-tray is generally used on account of the ease with which such feeders can be cleaned after each lot of ore has been run.

For fine-grinding machines, the coffee-mill type still successfully holds its own against most of the newer devices, although the modern sample-grinder is much heavier, better built, and more easily cleaned than its predecessors.

The first mechanical samplers were imitations of Cornish quartering, the "whistle-pipe" being the most common type. With ore finely crushed, fairly dry, well-mixed, and entirely free from strings and rags, and with the dividers new and exactly centering the pipe, fairly good results could be obtained by this method; but as these conditions never existed in practice, and as the edges of the cutters wore rapidly, thereby moving the dividing-line back from the center, this form of sampling-machine was soon discarded, and I believe has now fallen into absolute disuse.

Following the whistle-pipe sampler came the various forms of mechanical split-shovels; but as there was no place in a spout, no matter how wide or carefully built, where a single "U"-shaped spout could be placed to take a sample which would represent the entire width of the stream, this form also was soon discarded.

More recently this splitter has been revived by an adaptation of the ordinary hand-operated splitter (see Fig. 12), in which numerous small spouts are so arranged across the entire width of a larger one that the main ore-stream is divided into a great number of smaller ones, the even numbers being deflected to the right and the odd numbers to the left. This plan works very well on the first division, but as it effects a reduction of only 50 per cent. in the volume, the operation must be carried further, and the streamlets forming the sample centered into a broad stream, which, in turn, passes over another set of splitters, the operation being repeated as often as necessary to reduce the sample to the desired size. It has been found, however, that the mixture of the streamlets after their union is far from perfect, and that there is a considerable difference in the amounts of coarse and fines taken by the sample side of the second cutter, depending on its position relative to the cutter above. If the sample-compartments in the second cutter are directly below the sample-compartments in the overlying splitter, they receive the centers of the streamlets, while the "spread" passes into the reject, and the sample at each step in the bank of cutters receives an amount of fines slightly in excess of the average, thereby seriously affecting the value of the sample, provided there is, as is usually the case, a difference between the metallic contents of the coarse and the fines. Conversely, when each cutter in the bank is placed so as to take the "spread" from the cutter above it, the sample will have less than its due proportion of fines. This disadvantage could be obviated by placing a shaking-tray between each set of dividers, or perhaps even better by moving one divider horizontally across the other, so that each set of cutters would take all parts of the streams from the cutters above them. This arrangement, however, would require considerable head-room, and give a machine which would make a large amount of dust—a feature which is always objectionable in a sample-room.

The latest types of samplers are designed to overcome the difficulties just described, and are usually known as "time-sampling machines," from the fact that they deflect the entire stream into the sample-compart-

ment for a varying portion of the time, depending on the percentage of sample required. Treating the falling stream of ore as a ribbon, they cut sample-sections directly across its entire width, these portions varying in shape and size with the mechanism employed. Of the many types that have been invented and patented, only three have come into general use, and Fig. 7 shows the shapes of the sample-sections taken by these three machines.

A represents a sample cut from the falling stream of ore by the Charles Snyder 20 per cent. sampler, with four radial intake-spouts, making 7.5 rev. (or 30 samples) per minute; delivery-spout 5 by 25 inches. (This sampler is not to be confounded with the Snyder sampler.) It will be seen, on this machine, that an attempt has been made to combine the old-fashioned continuous sample with the time-sampling system by arranging the delivery pipe and intake-spouts so that as one intake-

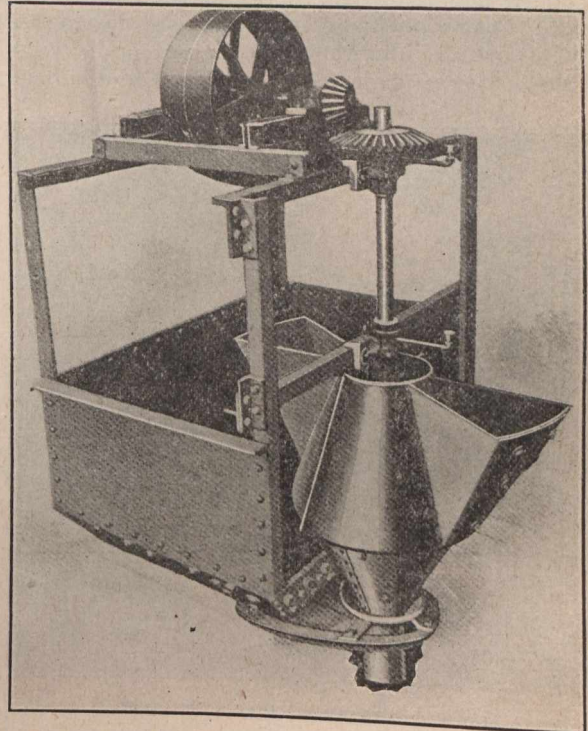


FIG. 11.—VEZIN SAMPLER, SHOWING HORIZONTAL CUTTING-EDGES

spout passes out of the stream another enters it on the opposite side.

B represents a Charles Snyder 20 per cent. sampler, with two radial intake-spouts, taking 15 samples per minute; delivery spout 5 by 25 inches. This machine does not take a continuous sample, but has the advantage that the intake-spouts, for a given percentage of sample, have double the width, and are therefore much less liable to throttle or choke; at the same time there is no reason why the sample should not be as accurate as that taken with the other type of Charles Snyder sampler.

C represents the sample taken by the Brunton 20 per cent. sampler, taking 54 samples per minute; delivery-spout 5.75 by 5.75 inches, cutting edges parallel.

D represents the sample from a Vezin 20 per cent. sampler with two radial intake-spouts, taking 30 samples per minute; delivery-spout 6 by 6 inches.

E shows the sample taken by a modified form of sector sampler, which, often through accident and sometimes by design, has come into too general use.

Both the Charles Snyder and the Vezin samplers have sector intake-spouts revolving on a vertical axis,



the only difference between the machines being that the delivery spout in the Snyder sampler is an annular quadrant, *D*, in Fig. 8, while the Vezin delivery pipe is either square or rectangular, *E*, in Fig. 9. In order to take a correct sample the cutting edges of the sector intake-spouts on both of these machines must be exactly radial, as shown in Figs. 8 and 9, otherwise they will include more degrees of arc at one part than at another; and consequently the percentage of sample taken from all parts of the delivery pipe will not be the same, as is shown by Fig. 10, in which the cutting edges are not radial to the center of rotation. This, while by no means an exaggerated example of this form of distortion, shows a 74/360, or 20.8 per cent., sample taken on one side of the ore-stream and 88/360, or 24.4 per cent., on the other. If the falling stream of ore were perfectly homogeneous this arrangement would not make any difference, but it is well known that the ore-stream is not uniform, especially in an inclined spout, in which the coarse, rapidly moving particles go bounding along on the top, while the finer portions hug the bottom, and on leaving the spout the coarse is projected a considerable distance and

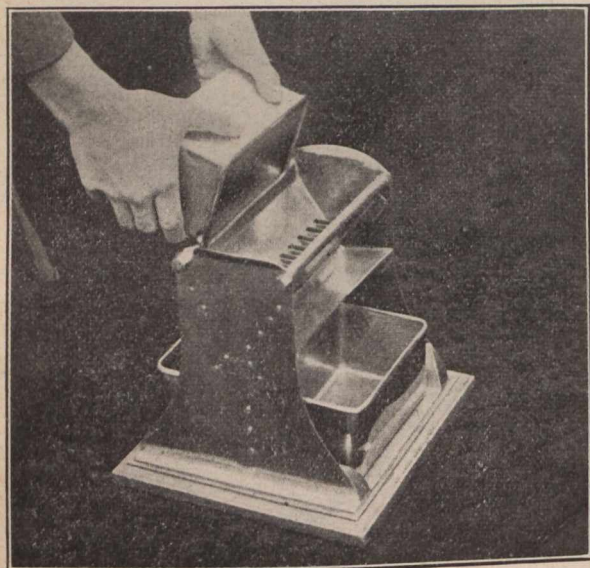


FIG. 12.—TAYLOR & BRUNTON SPLITTER.

the fines drop almost vertically, which gives a sorted falling stream, with coarse on one side and fines on the other. With a tangential feed to a sector intake this sorting machine does not seriously affect the sample if the delivery spout is perfectly level and free from ridges which would deflect the particles across the stream; but with a radial feed used, as shown in Fig. 9, and the intake sample spout edges not radial, as shown in Fig. 10, it will readily be seen that a larger proportion of coarse than of fines is taken into the sample.

Since the cutting edges of this class of samplers, Fig. 11, are necessarily maintained in a horizontal position, they are very liable to become overhung with strings, burnt fuse, and drill rags, which the mill attendants often endeavor to remove by pounding the sides of the spout while the machine is in motion, thereby distorting the form of the intake-spout very considerably from a true sector, and rendering it impossible to obtain a correct sample unless the delivery-stream is perfectly homogeneous, which is never the case. The great length of the radial edges of the sector intake-spout renders them, of course, peculiarly susceptible to be thrown out of alignment, and manufacturers of this class of machines

should do something to shorten up the length of the radial edges, or stiffen them to prevent accidental distortion. At first sight it might be thought that this could be accomplished by reducing the size of the sector, but experience has shown that the width of any spout, deliv-

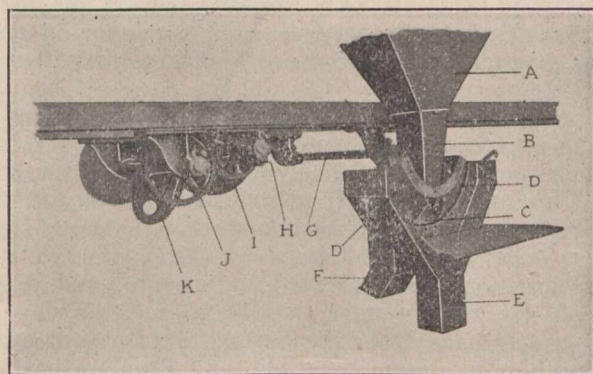


FIG. 13.—THE BRUNTON TIME-SAMPLER. FRONT VIEW.

ery, or intake should be something more than three times the greatest diameter of the coarsest particle passing through it; otherwise, a bridging effect occurs which affects the flow and often chokes up the spout. It is, therefore, good practice to make the width of the feed and intake-spouts four times the diameter of the coarsest particles passing through them.

The Brunton time-sampler oscillates in a vertical plane through an arc of 120 degrees instead of revolving in a horizontal plane like the sector-intake machines, an arrangement which permits the use of a rectangular intake-spout with cutting-edges so short that accidental distortion is impossible, while the tilting of the cutters at the end of the swing materially assists in dislodging any rags or strings which may have fallen on the cutting-edges. This construction requires less head-room than any other system, which effects a great saving in the cost of mill construction, since it not only reduces the necessary height of the building, but shortens all spouts and conveyors. The design of this machine cannot be very clearly shown in a linear drawing, but may be readily understood from Fig. 13, which is a front view of the sampler, having the housing open for cleaning, and Fig. 14, which is a rear view. The various parts are explained as follows: *A*, receiving hopper from crusher or rolls; *B*, delivery-spout; *C*, sample-intake; *DD*, "reject"

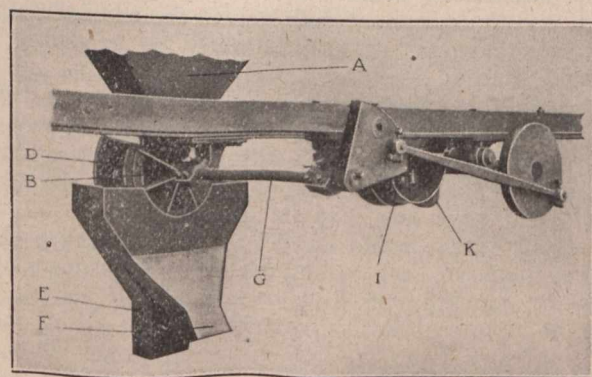


FIG. 14.—THE BRUNTON TIME-SAMPLER. REAR VIEW.

divisions; *E*, housing-spout leading to the sample-bin; *F*, reject-spout leading to the shipping-bins; *G*, oscillator-shaft; *H*, gear-shift; *I*, driving-pulley; *J*, spur-gear; *K*, eccentric gear. Ordinarily the machine is driven by the spur-gear, *J*, in which case a 20 per cent. sample is taken,



but when a 5 per cent. sample is required the gear is slipped along the shaft, disengaging the spur and bringing the eccentric gear, *K*, into play. Another advantage in the use of this machine is that, as the discharge of the ore from the sampler is assisted by centrifugal force instead of being retarded thereby, as is the case with all sector machines, it can be run at a much higher rate of speed, thereby increasing the number of samples per minute. This arrangement insures greater accuracy, since the more samples which can be cut from the falling ribbon without "batting" the ore too vigorously with the sides of the cutters, the better are the chances for obtaining an exact average of the stream. A study of

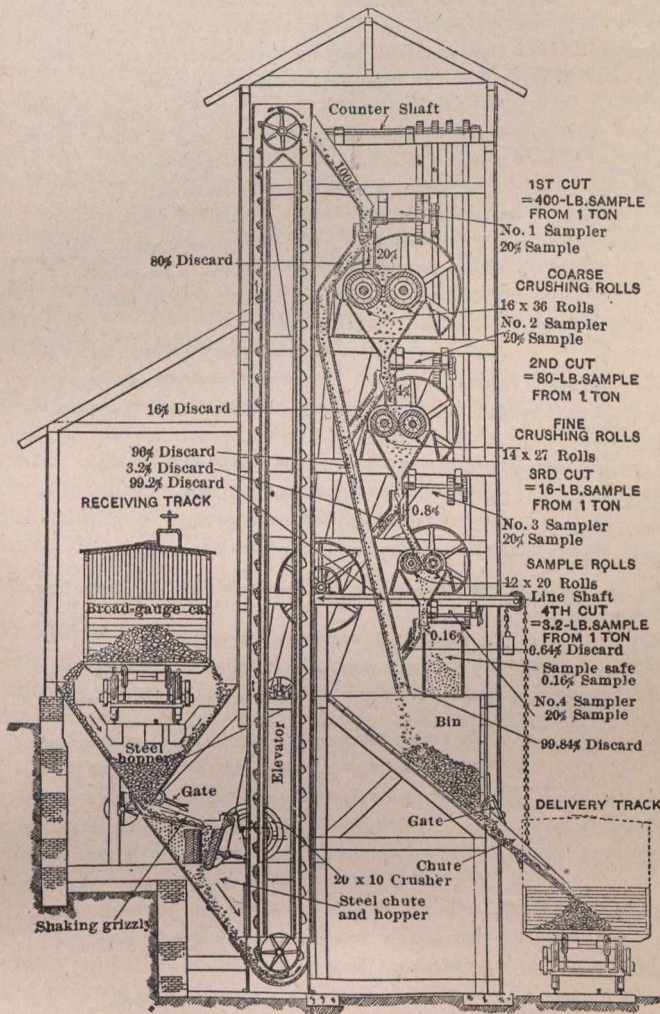


FIG. 15.—TAYLOR & BRUNTON SAMPLING-SYSTEM.

the relations between oscillator, rocker-arm, and disc-crank, Fig. 14, will show how this device takes a comparatively small sample with a large intake-spmout.

While there seems to be a general impression among mining men that high-grade ores are more difficult to sample correctly than those of low grade, there is no reason for this assumption. The difficulty of sampling accurately increases directly as the difference between the value of the highest and the lowest grade material contained in the lot, and is at its maximum when the values are carried in large masses of metallics or crystals of very rich minerals occurring in barren rock.

If we imagine a lot, for instance, of Cripple Creek ore, composed entirely of barren gangue and one solitary piece of calaverite, it would be manifestly impossible to

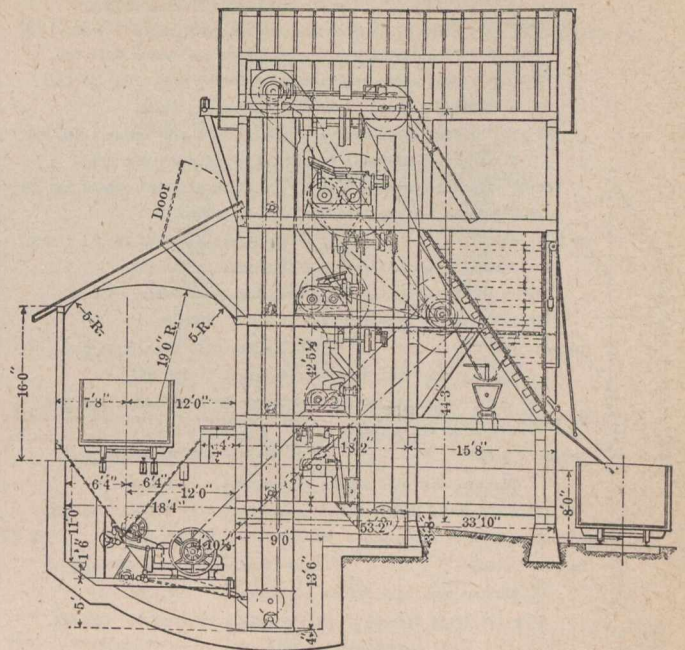


FIG. 16.—VERTICAL SECTION OF THE TAYLOR & BRUNTON SAMPLING-MILL, SILVER CITY, UTAH.

sample such a lot of ore without crushing, since in any subdivision either the sample or the reject would contain all of the mineral.

Suppose this lot to be subjected to a slight crushing and the solitary piece of mineral broken into three fragments, then dividing the lot into halves would at the best throw 50 per cent. more value into the one half than into the other; it is therefore clearly manifest that in order to obtain a sample which shall correctly represent this or any other lot, it is necessary to crush it to such a degree of fineness that one particle more or less taken into the

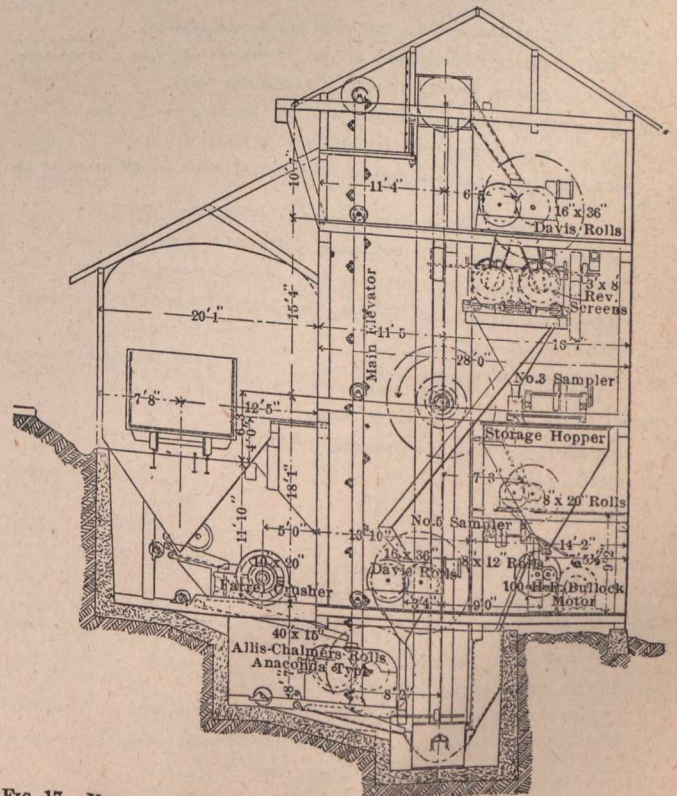
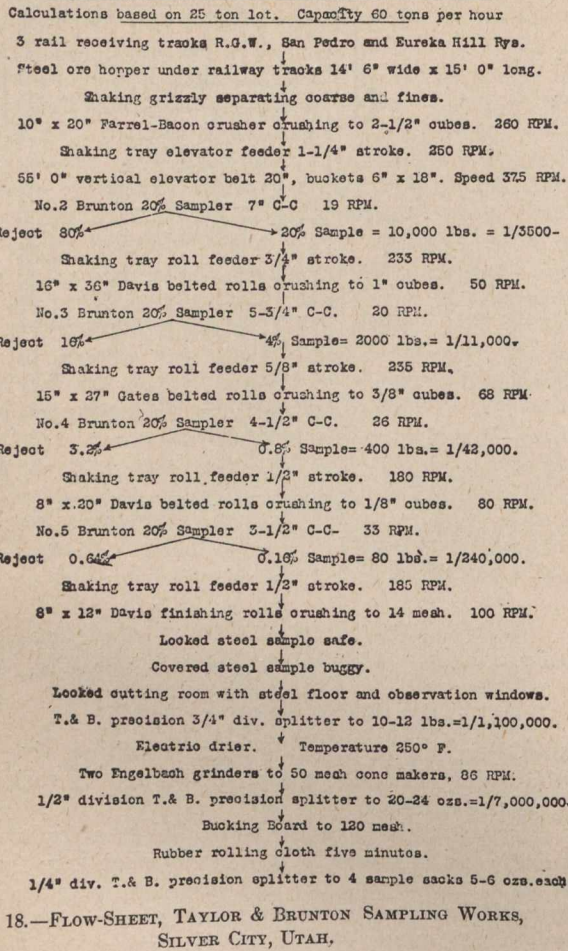


FIG. 17.—VERTICAL SECTION OF THE MATTE AND SULPHIDE SAMPLING-MILL OF THE TINTIC SMELTING CO., SILVER CITY, UTAH.

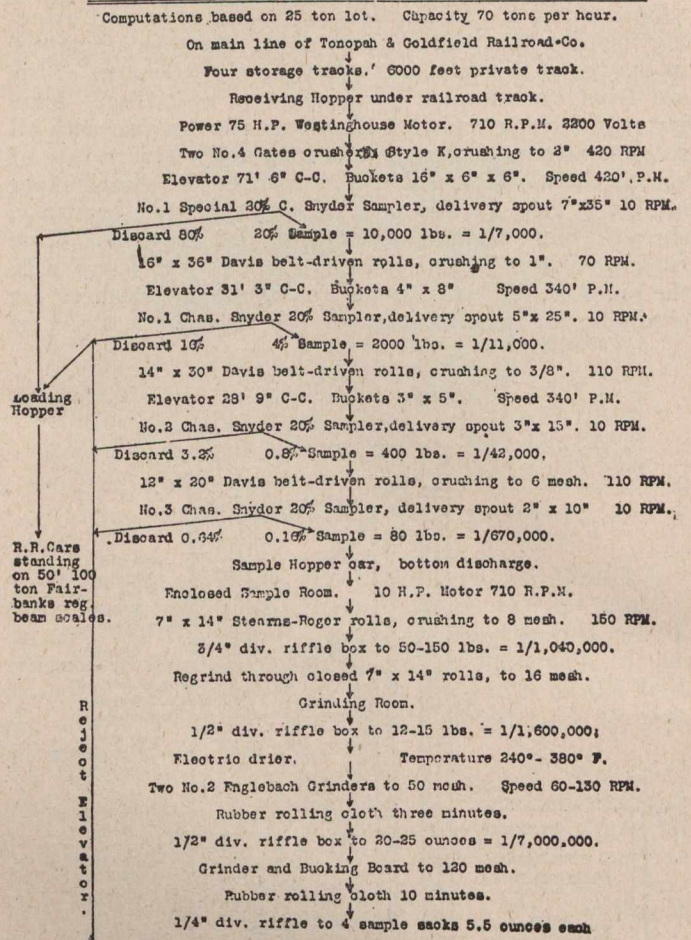


TAYLOR & BRUNTON SAMPLING WORKS, SILVER CITY, UTAH.



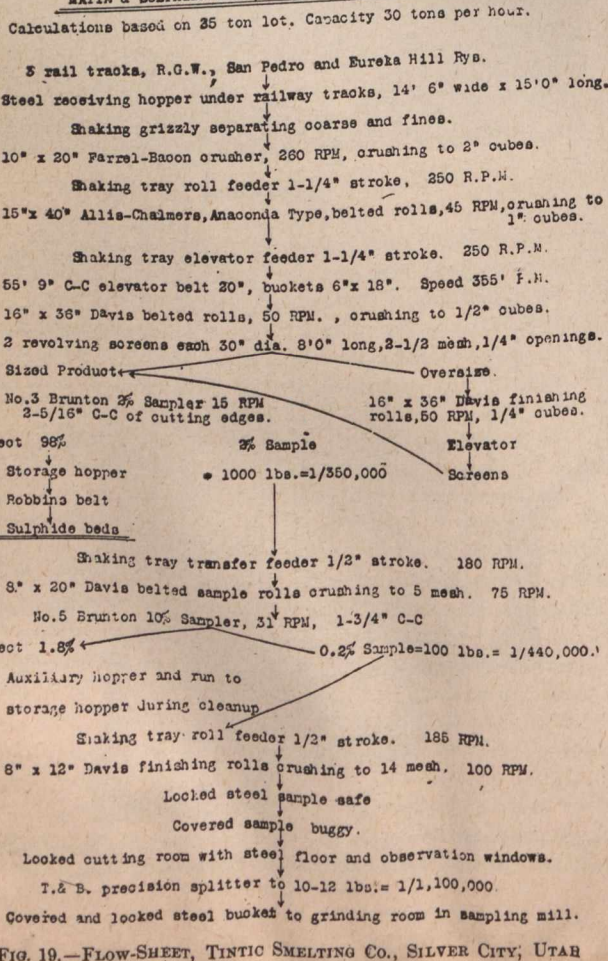
SYNOPSIS OF MACHINERY & SAMPLING SYSTEM

AT THE WESTERN ORE PURCHASING CO.'S WORKS, MILLERS, NEVADA.



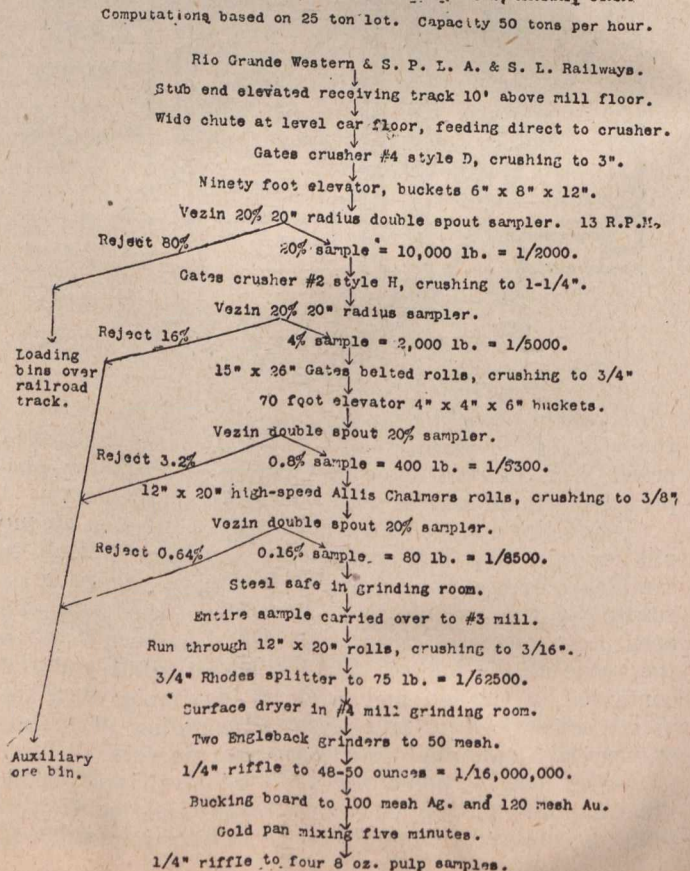
SYNOPSIS OF MACHINERY AND METHODS.

MATT & SULPHIDE MILL, TINTIC SMELTING COMPANY.



SYNOPSIS OF MACHINERY AND METHODS AT

THE AMERICAN S. & R. COMPANY SAMPLER No. 2, MURRAY, UTAH.





sample shall not materially affect its metallic content. In other words, the maximum error is determined by the ratio of the weight of the largest particle of metal or high-grade mineral to the weight of the entire lot. At this point another condition must be considered. In any lot of ore it is easy to see that the chances of finding a full-sized piece of the highest grade material would be much greater on a lot of ore crushed to 0.25 inch cubes than in a lot crushed in 1-inch cubes, therefore accuracy demands that the ratio between the weight of the largest particle and the entire lot shall increase directly as the fineness.

In this particular, practice and theory are in complete accord, and all of the latest and most improved mills practise alternate crushing and subdivision from the coarsest size down to the finest. It is customary at each successive stage to reduce the diameter of the coarsest particles one-half, thus decreasing the volume to one-eighth, or 12.5 per cent. The usual sample taken at each successive stage is 20 per cent., so that while the size of the particle at each step has been reduced 12.5 per cent., the amount of sample taken is 20 per cent., consequently the ratio between the weight of the largest particle and the weight of the sample rises steadily from the beginning of the series of operations to the end, thereby meeting the conditions theoretically necessary to an accurate determination of value.

An ideal sampling mill, where the situation and nature of the service will permit this form of construction, is shown in Fig. 15. This plant is entirely automatic, and when the ore is received in hopper-bottom cars no manual handling is required at any stage, while the sample is automatically delivered into a locked steel safe. To simplify the drawing, the roll-feeders have been omitted.

Fig. 16 is a vertical longitudinal section of the new Taylor & Brunton mill at Silver City, Utah, completed January, 1909. Like the plant shown in Fig. 15, it is automatic throughout, electric driven, and contains every modern device for facilitating crushing, sampling, and cleaning, the latter operation being performed by compressed air.

A good example of a modern crushing, screening, and sampling plant is shown in Fig. 17 which is a longitudinal section through the new matte and sulphide mill of the Tintic Smelting Co. at Silver City, Utah.

In order to show the methods of operation in vogue in different districts, I present Figs. 18, 19, 20 and 21, which contain the flow-sheets of a number of the newest and largest sampling works, clearly showing every detail of the process, and the machinery employed in the alternate operations of crushing and subdivision, as well as the increase of ratio as the final stages are reached. This style of flow-sheet was originally typewritten on ordinary 8.5 by 13 inch paper, perforated for a loose-leaf binder. In this way flow-sheets of many classes of operations may be preserved in convenient form.

These flow-sheets show considerable differences at all stages, and a great divergency in the methods of subdividing the final sample. Too many manual operations are in use, and there is no doubt that the complete elimination of the personal equation by using a small Taylor & Brunton splitter with 3/8-inch riffles (shown in Fig. 12) gives by far the most accurate subdivision.

To show how closely results between different mills and repeat-sampling in individual mills may be made to check, the following examples, taken at random, should suffice:—

TABLE I.—Sampling-Results, Taylor & Brunton Sampling Co., Cripple Creek, Colo.

Lot No.	Sample.	Resample.
	Gold.	Gold.
	Ounces per Ton.	Ounces per Ton.
3192	3.62	3.64
3198	5.04	5.015
3219	2.70	2.67
3235	3.18	3.16
3310	1.17	1.17
3324	6.52	6.51
3340	0.71	0.78
3388	1.70	1.84
3424	9.24	9.20
3471	30.64	30.52

TABLE II.—Sampling-Results, Taylor & Brunton Sampling Co., Cripple Creek, Colo.

Lot No.	Mine.	First Sample.		Resample.		Settlement.
		Gold.		Gold.		
		Mill-Assay.	Mine-Assay.	Mill-Assay.	Mine-Assay.	
		Oz. per Ton.	Oz. per Ton.	Oz. per Ton.	Oz. per Ton.	Oz. per Ton.
4514	Sacramento.....	2.22	2.24	2.22	2.23	2.225
4604	Little Clara.....	115.05	115.25	114.90	115.20	115.03
4705	Mary Cashen.....	1.11	1.10	1.07	1.09	1.08
4726	Midget.....	1.27	1.30	1.30	1.35	1.325
4853	Independence, Ltd.	1.36	1.35	1.29	1.30	1.295
4914	Bon. King.....	0.53	0.55	0.55	0.56	0.555
5062	Little Clara.....	1.77	1.72	1.75	1.74	1.745
5272	Old Abe.....	1.27	1.24	1.27	1.28	1.27
5753	Independence, Ltd.	2.33	2.34	2.34	2.36	2.35
5913	Little Clara.....	12.62	12.58	12.69	12.68	12.695

TABLE III.—Sampling-Results, Taylor & Brunton Sampling Co., Cripple Creek, Colo.

Lot No. of Mixture.	Original Purchase.		Mixture.	
	Weight.	Gold-Assay.	Mathematical Average.	Mechanical Sample.
	Pounds.	Ounces per Ton.	Ounces per Ton.	Ounces per Ton.
5394	17,538	0.98	0.996	1.00
	9,646	1.17		
	11,348	0.875		
5496	17,405	0.98	0.972	0.975
	6,615	0.895		
	17,123	0.995		
5799	422	8.24	2.099	2.14
	12,851	2.225		
	175	8.50		
	21,278	1.85		
5890	19,090	1.925	1.927	1.93
	8,761	1.97		
	8,852	1.89		
3465	5,274	2.10	1.937	1.97
	17,935	1.89		
3678	3,795	1.88	1.481	1.52
	17,122	1.49		
	11,357	1.345		
	6,592	1.465		
3850	3,633	3.365	7.252	7.24
	16,803	4.675		
	8,360	5.82		
	11,222	3.73		
	3,731	36.445		
4170	18,605	0.83	0.954	0.92
	18,621	0.77		
	11,937	1.42		
	8,593	0.98		
4292	17,848	1.165	0.982	0.96
	15,435	0.615		
	17,436	1.12		
4319	4,014	2.835	2.71	2.75
	15,611	2.24		
	13,334	3.35		
	11,712	2.58		



TABLE IV.—*Sampling-Results, American Smelting & Refining Co., No. 2 Sampling-Mill, Utah, Using Vezin Samplers.*

Number.	Size of Lots, Tons Dry.	First Sample.		Resample.	
		Gold.	Silver.	Gold.	Silver.
		Oz. per Ton.	Oz. per Ton.	Oz. per Ton.	Oz. per Ton.
1	131	5.18	1.1	5.02	1.1
2	138	4.67	trace	4.82	trace
3	85	2.45	1.0	2.45	1.0
4	75	3.49	5.3	3.45	5.5
5	104	2.48	1.0	2.41	1.0
6	133	2.31	trace	2.39	trace
7	97	2.43	2.0	2.31	2.0
8	96	2.43	1.4	2.38	1.2
9	83	2.47	1.5	2.48	1.7
10	91	5.08	trace	4.94	trace
Average.....	103.8	3.299	1.33	3.265	1.35

TABLE V.—*Sampling-Results, Western Ore Purchasing Co. Plants. Using Charles Snyder Samplers.*

Miller's Plant :	First Sample.		Resample.	
	Gold. Ounces Per Ton.	Silver. Ounces Per Ton.	Gold. Ounces Per Ton.	Silver. Ounces Per Ton.
Lot No. 4979, Assayer A, .	0.21	36.45	0.21	36.35
Assayer B, .	0.20	36.35	0.20	36.85
Average, . . . . .	0.205	36.40	0.205	36.60

Columbia Plant :	First Sample.		Resample.	
	Gold. Ounces Per Ton.	Silver. Ounces Per Ton.	Gold. Ounces Per Ton.	Silver. Ounces Per Ton.
Lot No. 844, average of two assays, . . . . .			5.393	5.37

Hazen Plant :	First Sample.		Resample.	
	Gold. Ounces Per Ton.	Silver. Ounces Per Ton.	Gold. Ounces Per Ton.	Silver. Ounces Per Ton.
Lot No. 1131, . . . . .	1.76	4.50	1.743	4.65

TABLE VI.—*Sampling-Results, Columbia Plant.*

Lot Mixture No. 473.					
Lot Number.	Dry Weight.	Assay Gold.	Assay Silver.	Gold-Content.	Silver-Content.
	Pounds	Oz. per Ton.	Oz. per Ton.	Ounces.	Ounces.
972	78,884	1.91	1.10	75.33	43.38
961	78,408	1.82	0.90	71.35	35.28
974	78,837	1.69	0.80	66.62	31.53
979	37,352	4.23	.....	79.00	.....
1145	7,119	0.30	161.40	1.07	574.50
	280,600	.....	.....	293.47	684.69
Mathematical average.....		2.09	4.89		

Actual sample of mixture :					
280,364	2.07	4.83	290.17	676.29	

Table VII. gives a comparison on a lot of Bullfrog Pioneer ore sampled at Columbia plant, and afterwards screened through a 3/8-inch screen at Hazen; fines sold to reverberatory and coarse to blast-furnace smelters, actual weights and moistures having been determined both on the fines and the coarse, which makes a showing of a slight loss in weights.

TABLE VII.—*Sampling-Results, Columbia Plant.*

Lot No. 1017	Dry Weight.	Assay Gold.	Total Gold-Content.
	Pounds.	Ounces per Ton.	Ounces.
	122,189	3.71	226.66
		After screening :	
Fines.....	36,909	6.06	111.83
Coarse.....	84,760	2.75	116.55
	121,669		228.38

Table VIII. gives a comparison of assays and total ounces of gold contained in four lots of Engineers' Lease ore from the property of the Florence-Goldfield Mining Co., in Goldfield, Nev., sampled at Columbia plant and afterwards screened through 3/8-inch screen at Hazen plant, and the coarse and fines sampled separately after screening.

The dry weights show the same in each case, due to the fact that the fines after screening at Hazen were actually weighed and moistured, thus determining the exact dry weight, which was deducted from the total purchased dry weight, making a figured dry weight of the coarse.

TABLE VIII.—*Sampling-Results, Hazen Plant.*

Lot No.	Dry Weight of Ore.	Assay Gold.	Total Gold-Content.
	Pounds.	Ounces per Ton.	Ounces.
861	70,636	7.26	256.41
872	72,682	7.45	270.74
	143,318		527.15
		After screening :	
Fines.....	57,425	7.12	204.43
Coarse.....	85,893	7.42	318.66
	143,318		523.09
829	79,916	8.92	356.43
834	81,210	8.91	361.79
	161,126		718.22
		After screening :	
Fines.....	58,396	9.83	287.02
Coarse.....	102,730	8.44	433.52
	161,126		720.54

TABLE IX.—*Sampling-Results, Copeland Sampling Co., Victor, Colo.*

Using Oscillating Time-Samplers.			
Mill Mixes on Cripple Creek Gold-Ore:			
Lot No.	Weight. Pounds.	Assay Gold. Ounces per Ton.	Gold. Ounces per Ton.
603	2,237	17.81	
	1,223	25.685	
	1,705	67.07	
	5,183	1.25	
	6,846	2.59	
	10,015	0.485	
	18,488	1.545	
Mathematical average,	5.322		Machine-sample of mix, 5.35
907	1,759	1.795	
	13,220	2.54	
	19,271	1.72	
Mathematical average,	2.04		Machine-sample of mix, 2.04
941	16,696	1.28	
	17,179	0.79	
	15,066	1.50	
	2,729	1.39	
Mathematical average,	1.187		Machine-sample of mix, 1.23
976	7,645	2.80	
	11,117	1.97	
	2,828	6.69	
	2,899	4.925	
Mathematical average,	3.124		Machine-sample of mix, 3.12
669	18,005	1.83	
	22,534	1.48	
Mathematical average,	1.07		Machine-sample of mix, 1.62
791	8,254	4.93	
	10,130	2.38	
	8,346	2.08	
Mathematical average,	3.073		Machine-sample of mix, 3.12



TABLE X.—*Sampling-Results, Copeland Sampling Co., Victor, Colo.*

Using Oscillating Time-Samplers.

Cripple Creek Gold-Ore		
Lot No.	First Sample. Gold. Ounces per Ton.	Resample Gold. Ounces per Ton.
260	14.065	13.96
270	1.01	0.99
606	0.56	0.54
639	0.59	0.60
692	1.28	1.30
777	1.30	1.25

The most convincing tests of correct valuation in ore-sampling are those in which numbers of small lots are bought and paid for individually, and stored for a considerable time, until a sufficient quantity of ore has been collected to form one large lot. When this period arrives the individual lots are not mixed, but run through the mill in succession, and it is usually found that the mechanical sample of the mixture agrees with the calculated average as determined by the values in the original purchases as closely as the best control-assays.

The small lots when originally received, sampled, and purchased were coarse and generally wet, but when run through the mill the second time they are both fine and dry, giving thereby the greatest possible dissimilarity in conditions of size of particles and moisture-content. The excellent checks obtained on this class of work show conclusively that with "time-sampling" the results obtained are in no way affected by the physical conditions of the ore, and may be implicitly accepted as correct.

The art of sampling has now reached a stage where a standardization of methods is both desirable and possible, and it is to be hoped that the Mining Congress, or the proposed Bureau of Mines, will take the matter under consideration and appoint a thoroughly qualified commission which will give the subject the study and investigation its importance demands. Recommendations by an unbiased, competent board would do much to eliminate faulty methods, and bring about the adoption of standard systems of valuation which would prove of inestimable benefit to the mining and metallurgical industries from both a business and a scientific standpoint.

**AGALMATOLITE—PSEUDO TALC.**

On the south shore of Conception Bay, some ten miles from St. John's city, is a small settlement named Manuels, and three or four miles inland from this a quarry has been opened on a mountain for the working of outcroppings a deposit of substance sometimes referred to as talc. Properly speaking this terminology is incorrect seeing that the deposit referred to is silicate of alumina and potash with little or no magnesia. In fact it more nearly approaches in composition a material known as agalmatolite the figure-stone of the Chinese. The deposits extend over a big area forming the great bulk of two mountains and must contain some millions of tons. The concern operating this deposit is known as the North American Talc Co. They have had an overhead tramway constructed from the mine to the railway, a distance of about two miles. Their pier is at Seat Cove, some ten miles further up the bay, this being the nearest safe harbor for shipping. In 1905 they shipped about two thousand tons to Portland, Me., where the company have a large establishment for grinding the material and converting it into marketable condition.

Samples of the material were shipped to Messrs. Little & Walker analysts, of Boston, who reported as follows: "We find this to consist essentially of a silicate of alumina, containing only 0.05 per cent. iron oxide. This material is unique among those suggested for use as paper fillers in that it closely resembles clay while having the smoothness and other desirable physical properties of talc. We have examined your samples critically with reference to their use as a filler for paper. We consider the colour of the material unusually good, even remarkably good. It is very clean, has a particularly good feel, and is entirely free from mica. In view of these facts and the exceptionally good feel of the material, we feel justified in saying that in our opinion you have produced in the samples submitted to us an exceptionally good filler for the better grades of paper, and one which combines in a unique way the good properties of both talc and clay. The analysis resulted as follows:

Silica .....	53.11
Oxide of Alumina .....	40.22
Iron .....	.29
Lime .....	.69
Magnesia .....	.90
Loss of ignition .....	4.72
Moisture .....	.07
Alkalis .....	Trace

Experiments were also made with the substance as a filler for paper and a summary of the result of the mill test follows. Two lots of paper were made, one loaded with clay and the other with the Newfoundland "talc." The paper with the "talc" gave 22 per cent. ash and retention 77.5 per cent.; that with the clay, 16 per cent. ash and 72 per cent. retention. On the whole the "talc" seemed to work about the same as the clay, the finish with it being, if anything, a little better. The sample lot was also tried for coating and gave satisfactory results, the paper appearing to calender quite easily.

As this material is said to be of great industrial importance in the manufacture of porcelain, china and other wares, as well as possessing many of the desirable qualities of talc, it would appear that when fully developed this area is likely to prove of value.

**A Dictionary of Chemical and Metallurgical Material**, a neat paper-bound pamphlet, has been published by the Electrochemical and Metallurgical Industry, New York. Part I. is a list of machinery, appliances and material used in the chemical and metallurgical industries, with the names and addresses of the manufacturers. Part II. gives an alphabetical list of measuring instruments and laboratory supplies, also manufacturers' addresses in each case. Part III. is a professional directory. The price, 50 cents, is modest. The booklet is well worth having.

The tailings from the St. Eugene concentrator, Moyie, B.C., are being used as ballast by the Canadian Pacific. Four hundred tons per day is the amount of this product accumulating at the mill.

German colliery companies have adopted, almost unanimously, the system of quarterly dividend payments.



# THE MAPLE MOUNTAIN MINING DISTRICT OF ONTARIO.

By J. D. Ramsay.\*

Amid all the excitement and noise of successive booms in Elk Lake, Miller Lake, Gowganda and elsewhere, one district has quietly and persistently, without outside assistance or newspaper advertisement, gone ahead until it has asserted its right to be looked upon as one of the most promising silver mining regions outside of Cobalt. This is the Maple Mountain District, situated in the Township of Whitson, Van Nostrand and Speaight, in the Temagami Forest Reserve, and extending northwards from Anvil Lake for a distance of about nine miles. It is flanked on the west by the high ridge of Maple Mountain, which forms a kind of "Hog's Back" parallel to the diabase outcrop. The district is excellently illustrated in the geological map of the Montreal River district, published by the Mines Department.

It is not altogether easy, in view of the good surface showings from many different properties in the district, to understand why prospectors and others should have overlooked it, and rushed in to much less accessible regions, such as Miller Lake and Gowganda, to say nothing of Shining Tree Lake. A glance at the aforementioned map will show that the southern end of the region can be reached, at Anvil Lake, by no more than five portages, the longest of which is only three-quarters of a mile long, while the rest are "just a jump." However, this summer has witnessed a certain revulsion of feeling among many prospectors and the district is now receiving a little more of the notice which it deserves.

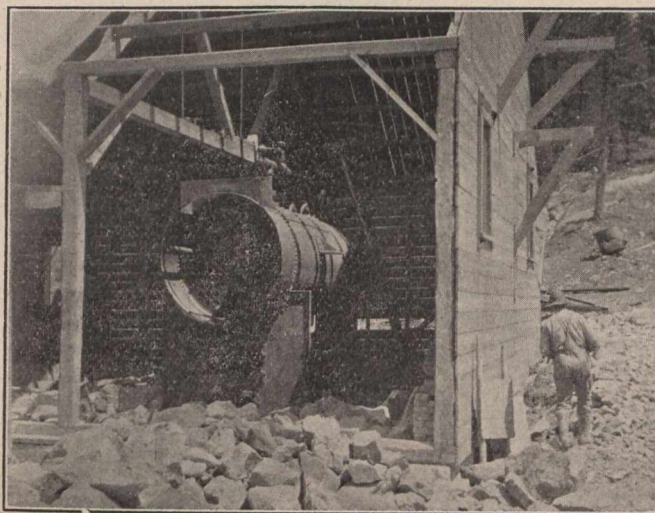
Leaving the River Steamer at Mowat's Landing, a short paddle brings the traveller to Mattawapika Falls, a distant view of which is familiar to those who have been up the Montreal River. Here the first portage, a short one, is encountered; but the tedium of



ROCK DRILL IN CUTTING, WHITE MINE.

packing canoe and kit is amply made up for by the beauty of the falls, and of the succeeding stretch of river above them. Mattawapika River gives place to Mattawapika Lake, a broad and shallow sheet of water

surrounded mainly by muskeg; and this in its turn gives place to Lady Evelyn Lake at the "Narrows," where the lake contracts for half a mile or so between high bluffs of sandstone and quartzite of Lower Huronian age. On emerging from the narrows, the course leads up the north-west arm of the Lake and round



BOILER ON WHITE RESERVE MINE.

Sucker Gut to the portage to Emily Lake, which is just below Willow Island Falls; this portage is three-quarters of a mile long, and very rough; and the writer hopes that none of his readers may have a similar experience to one, which in company with two companions, he recently fell a martyr to, when he had to make it during a total eclipse of the moon. This is however the only bad portage; and a convenient creek and chain of small lakes lead northwards from Emily Lake to Anvil Lake, on whose western shore the diabase ridge may be said to commence.

Like all the occurrences of this rock in northern Ontario this diabase is a laccolite of fair thickness, which appears to have been forced up from below Maple Mountain. The outcrop shows unmistakable escarpment on the east, and a dip slope of about 26° to the west, and runs almost due north and south. From Anvil Lake to Duncan Lake, it forms two high ridges, 200 to 300 feet above the sandy plain lying to the east, and the base of Maple Mountain to the west, these ridges forming a striking feature in the landscape. From conversations with prospectors and others, the writer gathers that this laccolite is probably the same as that found on Lost Bear Lake to the west, where it occurs dipping to the east in the direction of Maple Mountain. The latter probably owes its origin to this upheaval.

The diabase presents the usual features; it varies in texture from fine grained diabase to coarse gabbro, and in composition from ultra-basic almost to acid-intermediate; in one place on the property of the White Reserve Mines Limited it has all the appearances of syenite.

The veins are markedly parallel, running due east and west across the outcrop, and can in some cases be

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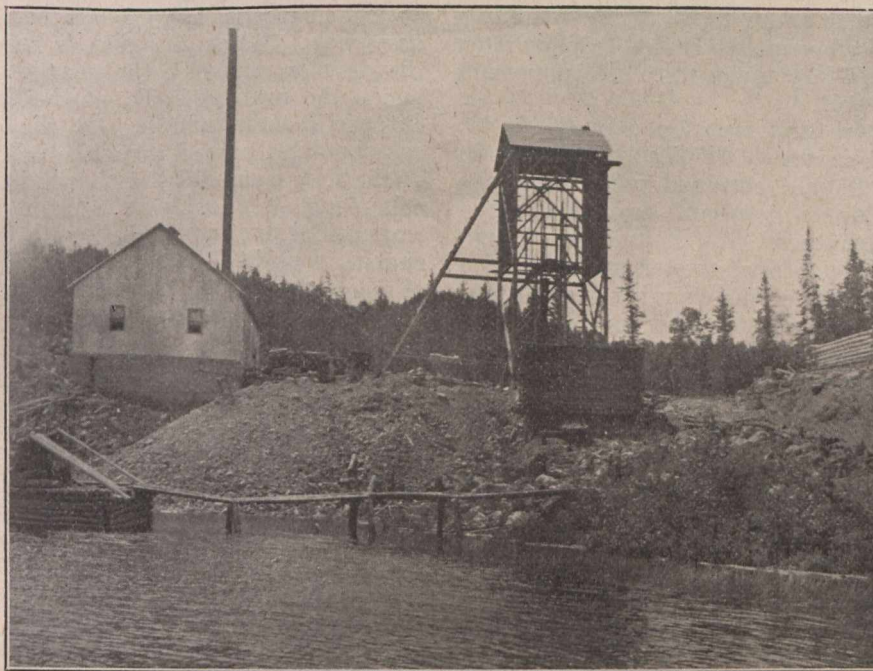


traced on the surface clear from one side to the other, a distance of a quarter of a mile and upwards. They are of frequent occurrence, and almost invariably show signs of mineral, while from some, high grade ore has been mined and sacked. Alpite veins, so called, are not frequent, but there are many strong leads of smaltite; and in some cases, a kind of impure asbestos is found. Many of the veins take the form of lenses of fine grained diabase enclosed within walls of comparatively coarse grained rock, amounting almost to a gabbro; and on one or other of the faces, lie the smal-

one 80 ounces, the other 90 ounces, per ton. This may be said to be one of the most pleasing features of the district, indicating that a large body of low grade milling ore may be expected.

All the rock is highly mineralized and very magnetic, a compass survey being impossible. Practically every vein shows cobalt bloom, and frequently the mixed bloom of cobalt and nickel; but chalcopyrite is not of such frequent occurrence as in some other parts of the Montreal River district, notably Bloom Lake.

As mentioned previously this region has never had



SHAFT AND POWER HOUSE, WHITE RESERVE MINE.

tite and associated minerals. The walls are so clean, and the natures of the vein rock and country so different in many cases, that it is hard to reconcile this particular mode of occurrence with the now generally accepted theory that the veins in diabase owe their origin to magmatic segregation. Veins having this structure have usually proved the richest in this district, since, in addition to the actual small lead carrying silver, the fine diabase of the lens is often impregnated with leaf silver; and two samples carefully taken which showed no visible metallic silver at all assayed,

a boom; perhaps for that very reason it is better off; for those who have claims in it have been content to do honest work and to prospect the area thoroughly, instead of promoting "Wild Cats" and shaking the confidence of the mining investor yet once more.

The photographs accompanying this article will demonstrate much more clearly than oceans of ink and reams of paper, that mining in this little-heard-of district is being carried on upon legitimate lines, and not with the view of filling the pockets of the company promoter.

## GENESIS AND DEVELOPMENT OF THE COKING OVEN\*

By W. Galloway.

The preparation of coke from pit coal appears to have been practised for at least 250 years. It was probably first begun owing to the increasing difficulty of procuring supplies of timber for making charcoal for metallurgical, malting, and other purposes in which the more easily obtainable and therefore cheaper coke was substituted for the more expensive charcoal. To commence with, and for many years afterwards, in fact far

into the last century, coke was for the most part made in exactly the same way as charcoal.

Large coal was stacked in circular or oblong piles in the open, partially or wholly covered over with a wet layer of fine coke-dust and with certain channels for the passage of air formed in them just above the level of the ground, and extending from their periphery to one or more vertical chimneys or holes in their centre. The circular piles were from 15 to 20 feet in diameter and 3 to 3½ feet high; the oblong piles 12 to 18 feet wide, 3 to 3½ feet high, and 30 to 50 feet long. The

\*From paper read before the South Wales Institute of Engineers.



ends of the air channels next to the periphery were sometimes formed with inverted cast-iron troughs with holes in them; their ends next to the chimneys with the largest blocks of coal, and their intermediate parts with "dry" bricks.

The chimneys had cast-iron lids with handles for closing them air-tight when required. Ignition was effected at the bottom of the chimneys, or vertical holes, by dropping burning coal and pieces of wood down through them; and the fire gradually spread from the centre towards the periphery, or in the opposite direction to the air-currents. Care was taken to keep the mantle of damp coke-dust as air-tight as possible while this was going on, and when smoke ceased to issue from the chimneys or holes all openings were sealed up and the heaps allowed to cool.

Ovens for coking are first mentioned in the latter half of the eighteenth century. In 1773 Horne and in 1782 the Earl of Dundonald obtained patents for the recovery of the by-products obtainable from coal coked in closed vessels or chambers. The Dundonald patent provided for the admission of a restricted and regulated supply of air to the interior of the chamber for the purpose of creating sufficient heat to carry on the process of distillation by the partial combustion of the gases. From that time forward, ovens worked upon the Dundonald principle (but, except in rare cases, without arrangements for the recovery of the by-products) have been in constant use. The more ancient ovens were circular, elliptical, or ovoid in plan, with a dome or cupola for a roof, the more recent, square or trapezoidal, with a cylindrical arch for a roof.

One of the former was provided with an air passage, which entered the masonry on each side of the doorway, passed all round about the chamber, and was connected with its interior by branches; a circular outlet for the products of combustion, which was probably also used for introducing part of the charge; and a cast-iron door. Its vertical walls were from  $2\frac{1}{2}$  to  $3\frac{1}{2}$  feet high, in some cases more; and its diameter or other dimensions varied from those required to accommodate a charge of  $1\frac{1}{2}$  tons up to those required for several tons.

Each oven was provided with a doorway at one side or one end, with an outlet for the gases in the top, and with one or more inlets for air. The charge was introduced through the doorway, or partly through the doorway, partly through a hole in the roof, and both of these openings were afterwards more or less completely closed.

The escaping gases passed into a short chimney and thence into the atmosphere. Circular ovens of this class, known as Beehive, have persisted up to the present day. The coke was drawn out through the doorway by means of a long iron rod bent into the form of a ring at one end to serve as a handle, and at right angles to itself at the other to serve as a hook.

The time required for coking varied from 48 to 72 hours, according to the magnitude of the charge; and the yield of coke varied from 50 to 65 per cent., according to the quality of coal and other circumstances. Many of these ovens produced a very fine, much-prized quality of coke. After a charge had been drawn out, the walls, as a rule, retained sufficient heat to ignite the following charge.

The work of drawing the hot coke out through a narrow doorway, in an oven of any shape whose diameter, or width, is greater than that of the doorway, is, as can be imagined, a most laborious and exhausting operation. This consideration led to the construction

of rectangular ovens of greater length than width, with a doorway of the full width of the oven at one end, and later, as will be seen further on, with a doorway at each end. When ovens of this shape with a doorway at one end—some of which are still in use—are about to be charged, an iron frame—frequently made of two pieces of old permanent-way rail, one as long, the other nearly as wide, as the oven, one end of the longer bar fixed at right angles to the middle of the shorter bar, and its other end provided with a strong link—is pushed in along the floor until the cross-bar touches the back wall.

The charge is then introduced and coked in the ordinary way. When the coke is ready to be drawn out, the door is removed, the charge is cooled with water inside the oven, a hook, at the end of a chain which extends from a windlass at the opposite side of the coke-bank, is passed through the link at the outer end of the long bar, and the charge is drawn out on to the coke-bank in one block. With long rectangular or trapezoidal ovens, which have a door at each end, the charge is pushed out by means of a ram with a shield at one end, and cooled with water, partly as it emerges from the oven, partly after it has fallen in pieces on the coke-bank.

Up to the year 1840 no attempt appears to have been made to apply heat generated by the combustion of the gases to the outside of the oven walls, with the object of coking the charge in its interior. At that date Cox obtained a patent for an oblong rectangular oven, with two cylindrical arches over the coking chamber, one above the other, with an empty space between them. The lower arch extended from the back to near the front, where it terminated, leaving a communicating passage between the space below it and the space above it, and air was admitted through holes in the back walls into the space between it and the top of the charge.

The products of combustion thus passed from back to front under the lower arch, then up into the space between the two arches, then back over the lower arch into the flue, and so up the chimney. This appears to have been the first attempt made to increase the heat of the chamber by circulating the hot gases on the outer side of one of its walls.

It would be difficult to trace the exact course of events during the next twenty years, but the following extract, translated from the writings of a contemporary writer, will serve the purpose of throwing some light upon it.

Writing in 1858, Hartmann says: "Improvements in the process of coking have, during recent years, been the object of many experiments and investigations, in Belgium and Rheinland, which are not yet terminated. . . . The object of these improvements has been to produce better coke, to reduce the time required in coking it, and to obtain a better yield, so as to be able to compete with English coke, which is made of the best materials, and is of exceptionally good quality.

"In the whole of these investigations one principle, whose practical application has been steadily kept in view—namely, to employ the waste heat in order to effect the distillation of the charge. . . . It stands to reason that this object can be effected only by means of more or less complicated apparatus.

"In all these improvements the main problem has been to prevent the consumption of coal through contact with air outside the oven, and to subject every part of the oven to a uniform temperature. . . . This object



was sought to be obtained in Belgium by the construction of ovens of very small dimensions, and by associating a number of ovens together in one system, in which the waste heat of one oven could be employed in heating the coal newly charged into another oven. . . . This was effected by conducting the gases through flues below and in the side walls of the ovens, and extracting as much heat from them as possible before allowing them to escape into the air.

"It must be remarked in this place that the actual combustion of the gases was not contemplated, except in the case of a few ovens. At first, apparently, the contact of the hot gases with the walls of the ovens was all that was thought of, although it is obviously in the combustion of these gases that their greatest heating power lies; and in the case of most ovens even now without this being the intention of their constructors, combustion takes place by the leakage of air through the open joints of the brickwork at the ends of the horizontal flues. . . . The Talbot and Dulait ovens constitute an exception to this rule, as provision is made in both for the complete combustion of the gases.

"The construction of the flues in detail can naturally be carried out in many different ways; for instance, ovens have been placed one above the other, one alongside the other, or end to end, or two or three ovens, or a whole row, have been built in a range and so on.

"This principle was obviously carried too far in Belgium, as is best illustrated by the greater simplicity recently introduced in the suppression of many of the flues whose useful effect upon the ovens did not appear to compensate for their great cost.

"Nevertheless, heating the floor and side walls of the ovens by means of the waste heat must continue to be the guiding principle in all cases."

After expressing himself thus, Hartmann proceeds to compare the results of coking coal in the newer with that of coking it in the older ovens, and draws the conclusion that the newer ovens are really cheaper in first cost than the older ones, since they occupy less space and yield a greater quantity of coke than is necessary to compensate for their higher first cost.

During the years of experiment and investigation spoken of by Hartmann, the retort-oven proper was thus evolved and brought into active use, and all the improvements that have been added to it since then have been simply modifications in its structure and dimensions.

Writing in 1846, Scheerer described certain coking ovens in use at that time at some of the ironworks in Germany (Gleiwitz in particular), from which the volatile products were led away in pipes to condensers for the purpose of recovering a certain quantity of tar from them, which could be usefully employed on the spot.

Each oven stood alone, was cylindrical to about two-thirds of its height, and was covered in by a hemispherical dome. It had a doorway on one side, extending from the floor to about one-half of its internal height; a second circular opening in the dome, of a little less than one-half its diameter; an outlet pipe say 9 inches in diameter, extending horizontally through its walls from the apex of the dome on the side opposite to the door, to the condenser; five rows of holes equally spaced radially round about its periphery, all the holes of each row being in the same horizontal plane, the lowest row close to the floor, the highest row near the apex of the dome, and the intermediate rows spaced equally between the highest and the lowest; and lastly, some similar holes in its floor, communicating with a space excavated

for this purpose below the latter, into which air could be drawn from the outside. Each of the holes in the sides and floor was formed by building a cast-iron pipe of 1½ inch internal diameter in the masonry.

The oven was charged, partly through the doorway, partly through the opening in the dome, with 35 to 40 cwt. of large coal. The largest pieces were placed next the floor and built together in such a manner as to enclose a hollow space into which fire could be introduced from the doorway. The charge extended up to the lower side of the outlet pipe, and thus almost completely filled the oven. After the charge had been introduced the doorway was then built up with masonry to the level of the kindling hole, all the radial holes except those of the lowest row were closed with well fitting plugs, and a cast-iron door was placed on the hole in the dome and made air-tight. Soon after lighting the charge the upper part of the doorway was built up and luted with clay.

When the coal opposite the lowest row of holes showed an orange-coloured glow, that row was plugged and the next higher one opened, and so on with the others. About 36 or 40 hours after ignition the time had arrived to plug the highest row. Then the oven was allowed to cool for 12 hours, the door was pulled down, and the coke drawn out and extinguished with water. The yield of coke is said to have been 53 per cent, but the quantity of tar obtained is not mentioned. This oven appears to have been a modification of Lord Dundonald's, and it would therefore be interesting to know whether it was in reality a survival from the closing years of the eighteenth century, when the patent for its use was granted.

In 1862 Pernolet obtained a patent for an oven which he described as intended to "utilize the products of distillation of coal so as to reduce the price of coke," and in 1864 he read a paper on the subject before the Institution of Civil Engineers. It was a beehive oven into which no air was admitted; the heat was applied only underneath its floor; the volatile products were conducted in pipes to condensers and scrubbers, in which the tarry matters and ammonia were separated from the permanent gases; the latter could then either be used for lighting purposes or returned to the ovens and burnt in the flues beneath them—or partly one, partly the other. The quantity of gas thus obtained was obviously thought or found by experience, to be insufficient to generate all the heat required, for each oven was provided, in addition, with a furnace and fire-bars underneath its floor, on which coke breeze, waste coke, and, if necessary, small coal, could be burned so as to supply the deficiency. Pernolet claimed that his ovens gave the following results:—

	Per cent.
Coke .....	69.3
Tar .....	3.0

Sulphate of ammonia (10 lb. per ton of coal) . . . . . 0.44  
 Mr. A. L. Stevenson (vide Transactions of the North of England Institute of Mining and Mechanical Engineers), who employed 36 Pernolet ovens in the North of England for a number of years, and experimented with various modifications of ovens of the Pernolet type, says he found that the beehive shape, 11 feet in diameter, gave the best results, namely:—

	Per cent.
Coke .....	68
Tar .....	2.40
Sulphate of ammonia (4.14 lb. per ton of coal) . . . . .	0.185



He remarks further that the coal was soft and the expense of repairs great, and that, as a consequence, the system was abandoned. He also states that he examined 120 Pernolet ovens employed at the Wigan Coal and Iron Company's works, and that they appeared to give somewhat better results than his own. A good many Pernolet ovens are said to have been erected on the Continent.

Enough has been said to show the genesis of the modern coking oven, including its use as a retort and hence as a source of liquid by-products and gas; it would therefore serve no particular purpose, however interesting it might be from an historical point of view, to minutely describe the process of coking on circular and oblong heaps or piles. The Schaumberg kiln, Smet's, Appolt's, Talbot's, E. Jones's, and many other ovens now passed into oblivion, some of which have contributed one or more of the details of construction and methods of working embodied in modern practice. The long, narrow, high retort-oven, heated by the combustion of gas in its flues; the method of charging through holes in the top; the door constructed of fire-bricks held together in an iron frame, and raised and lowered by means of a chain; the ram for discharging the coke; the employment of waste gases under steam boilers; and the condensation and collection of liquid by-products were all in operation before the year 1860; and the last link in the chain—Pernolet's system of returning the non-condensable gases to the ovens, with the object of burning them in the flues beneath their floors, and thereby coking, or assisting to coke, the charge—was patented in 1862.

During the years that have elapsed since 1862 much skill and ingenuity have been exercised in perfecting the details of the modern coking oven, which is now gradually eliminating all its more ancient rivals from the field. The success of these efforts is best illustrated by the fact that in the most recent type of ovens the economy of heat is so great that after the tar and ammonia have been extracted only one-half of the permanent gas is required to coke the coal, and the other half is available for steam-raising or for use in gas engines. The yield of these ovens per ton of coal coked is given by Mr. Hann as follows:—

	Per cent.
Coke .....	80
Breeze .....	1.75
Tar .....	1.63
Sulphate of ammonia (19.5 lbs.) .....	0.87

### WESTERN COPPER COMPANY'S MINES, NEW-FOUNDLAND.

By H. V. Smythe, Mgr. Western Copper Co.

The mines of the Western Copper Company are situated at York Harbor, bay of Islands, on the west coast of Newfoundland. The harbor is safe and ample, about six miles in length by three in breadth, and is surrounded by very high land, except at its head, where there is a wide and level stretch of country reaching inland. A large island, Governor's Island, lies in the centre of the harbor, and affords complete shelter to shipping of any size.

The hills on the eastern side of the harbor, where the Western Copper Company's mine is situated, rise abruptly from the waterside, and attain an elevation of 2,125 feet at a little distance inland in what is

known as the Blow-me-down Mountains. The western slope has several minor ridges or foothills, intersected by ravines, through which brooks of considerable size flow out into York Harbor.

The mine is located at the head of what is known as Eagle Nest Brook, is about three-quarters of a mile from the shipping, and is at an elevation of about 1,000 feet above tidewater. The geological structure of this district is similar to that of Notre Dame Bay, which has proved a profitable copper-producing district. The rocks consist of the metamorphic metalliferous zone of eastern North America. Wherever this series occurs in Newfoundland it has proved highly metalliferous, all the copper deposits of Notre Dame or White Bays being in the same series. The copper-bearing rock forming the ore channels is a dark green to black serpentine, being an altered diorite, which is the common or country rock. The serpentine band is of unknown width, and contains superimposed, lenticular masses of low-grade chalcopyrite. These ore-masses vary in size, being found crushed or broken near the surface and in solid masses of many thousands of tons as depth is attained. The ore is compact and close-grained, containing about 4.5 per cent. copper and 38 to 41 per cent. sulphur. It is in demand in both Europe and the United States as a fluxing medium, the sulphur being extracted and used in the manufacture of sulphuric acid.

The general trend of the ore-bearing serpentine belt is northeast and southwest with a dip of about 73 degrees southeast, the ore-masses practically conforming to the same trend and dip.

The Western Copper Company's mine is 360 feet in depth. It has three shafts, one of which, the main, is used for hoisting, the other two for pumping and ventilating purposes only. The main shaft is sunk at an angle of 72 degrees southeast, or practically the dip of the ore lenses. At every 60 feet levels have been driven to the southwest along the strike of the ore bodies, and where they occur mining has been carried on by means of overhead stopes. As these stopes average from 10 to 30 feet in width, heavy 12 x 12 inch timbers are used in "square setts" to support the back or roof where the ore has been removed.

At present the company is not actively mining the property, but are locating and developing new ore bodies, shipping what is taken out during development. They have now between 30,000 and 40,000 tons of ore in sight, added to which another series of lenses is being opened up of sufficient depth to more than double that amount.

The plant is well equipped with machinery for both mining and transportation, and there are good shipping facilities. Air drills are used, compressed air being supplied by a Norwalk high-altitude compressor. The ore is hoisted from the mine in an automatic self-dumping skip of one ton capacity by means of a 50 hp. Flory hoist. The ore goes through a crusher, which reduces it to size that will pass through a ring of 6 inches diameter. From the crusher it passes to cars on the main tramway, and these are then lowered to the main tramway by means of powerful winding engines.

The tramway is 5,400 feet in length, dipping 1,000 feet in that distance. The track is 3 foot gauge, and a train consists of two steel self-dumping cars carrying 3 tons each. These cars shoot the ore into a pocket, the capacity of which is 2,000 tons. Underneath the pocket is a double-tracked tunnel, both sides of which are fitted with shute gates. This tunnel connects with the superstructure of the pier, over which cars carrying one ton each are pushed and tipped into the hold of the steamer.



By means of this apparatus about 700 tons of ore per day can be loaded into the hold of the steamer.

Besides the property described, the Western Copper Co. has two adjoining areas both having extensive surface indications of copper. To the west and adjoining this

property an English and Canadian syndicate have taken up several square miles, and are engaged in prospecting. The results have been satisfactory, and warrant the expenditure of a considerable amount of money on its further development.

## THE ACTION OF ORGANIC SULPHUR IN COAL DURING THE COKING PROCESS.

By A. L. McCallum, B. Sc., Halifax. Read 12th February, 1908.

I was led to undertake this investigation by the conflicting statements of the authorities as to the action of organic sulphur during the coking process. Some say that the whole of the organic sulphur remains in the coke, others that part is volatilized, and still others that all the organic sulphur is driven off in the coking process. It is barely possible that all these statements are true of different coals, but I wanted, if possible, to find out what was the case with a typical Nova Scotia coking coal.

It occurred to me that if I could get a series of samples with a decreasing amount of inorganic sulphur and an increasing amount of organic, I would be able to get some data on the above subject, by determining the amount of inorganic and organic sulphur, and at the same time the amounts of volatile and fixed sulphur in the various samples.

It might be well at this point to say a few words as to the manner in which sulphur occurs in coal. To the best of our knowledge sulphur occurs in three forms in coal:—(1) as sulphates; (2) as iron pyrites; (3) as organic sulphur.

The coal used in this investigation was practically free from sulphates so that we have the two latter forms only to deal with.

The action of iron pyrites when subjected to heat without access of air is well known. There is loss of one atom of sulphur according to the equation  $Fe S_2 = Fe S + S$ . The coke oven presents ample time and the necessary conditions for this reaction to be complete.

Not knowing in what state of combination the organic sulphur occurs in coal, it is impossible to say what effect the heat of the coke oven will have. It was, as previously stated, in an attempt to throw some light on this question, that the investigation was undertaken.

Now to return to our coal samples. The only way to obtain such a series of samples as previously mentioned, viz.: with decreasing inorganic and increasing organic sulphur was to fractionate the coal on the basis of specific gravity, that is to separate it into several fractions of gradually decreasing specific gravity. The means used to accomplish this were solutions of calcium chloride of varying specific gravities. The coal used was crushed to pass through 1-12 inch mesh screen and was then placed in a vessel containing a solution of calcium chloride of slightly higher specific gravity than that of coal.

For instance, the raw coal was found to have a specific gravity of 1.323. For this a calcium chloride

solution of 1.35 specific gravity was used. This separated the coal into two fractions having the following specific gravities: the lighter material 1.275, and the heavier 1.731.

Part of this lighter or floating fraction was reserved for analysis and the remainder was treated with a calcium chloride solution of lower specific gravity. This procedure was kept up until, at a specific gravity of 1.24, there was no floating fraction.

Between these two extremes I obtained five fractions of the following respective specific gravities:

No. 1 .....	1.323
No. 2 .....	1.275
No. 3 .....	1.261
No. 4 .....	1.253
No. 5 .....	1.243

The proximate analyses of these samples are as follows:—

TABLE I.

No.	Volatile matter.	Fixed Carbon.	Ash.	Sulphur.	Sulphur in Coke.
1.....	35.10	59.74	5.16	2.06	1.80
2.....	35.92	61.57	2.51	1.29	1.17
3.....	36.10	62.27	1.63	1.09	.85
4.....	37.47	61.50	1.03	.95	.78
5.....	37.75	61.35	.90	.88	.68

The only method at present available for the determination of the organic sulphur in coal is by difference, and there is one inherent source of error which, however, I think is not material. The method referred to is as follows:—The percentage of iron is determined. Then this iron is combined with the necessary amount of sulphur to form iron pyrites ( $Fe S_2$ ). This amount of sulphur is deducted from the total amount in the coal and the balance is called organic sulphur.

The error referred to in this method is due to the fact that it is almost certain that there is some iron present as silicate in the "stone and shale" which are always present in the coal. But as the percentage of iron in the "stone and shale" rarely exceeds 3 per cent. and the percentage of stone and shale in the coal under consideration rarely exceeds 5 per cent. of the coal by weight, it will readily be seen that any error introduced will be exceedingly small.

Applying this method to the samples under consideration, we obtain the figures given in the Table II.



TABLE II.

No.	Organic sulphur.	Inorganic sulphur
1 .....	37.86%	62.14%
2 .....	56.59%	43.41%
3 .....	71.56%	28.44%
4 .....	83.16%	16.84%
5 .....	85.23%	14.77%

We have thus clearly obtained a series of samples with gradually decreasing inorganic and increasing organic sulphurs.

There is also another way in which the total sulphur may be distributed, viz.: as volatile and fixed sulphur; meaning of course, that sulphur which escapes during the coking process and that which remains in the coke. The method used in obtaining this information is to first determine the total sulphur in the coal and then the total sulphur in the coke produced from that particular coal. From this it is easy to calculate the amount of sulphur volatilized.

Table III. gives the figures thus obtained.

TABLE III.

No.	Volatile sulphur.	Fixed sulphur.
1 .....	33.49%	66.51%
2 .....	42.64%	57.36%
3 .....	50.46%	49.54%
4 .....	49.47%	50.46%
5 .....	52.27%	47.73%

There is not the same regularity as shown in Table II, but there seems to be an increase in the amount of volatile sulphur in those samples having a high percentage of organic sulphur.

Now if the only sulphur volatilized was the one atom of sulphur in pyrites according to the above mentioned equation, we can calculate what the percentage of volatile sulphur should be; because the sulphur called inorganic is assumed to be present as iron pyrites. So that if we take half the inorganic sulphur it should correspond with the percentage of volatile sulphur if the above supposition is true, and also if there is no organic sulphur volatilized.

The result of this calculation is given in Table IV.

No.	One half the Inorganic sulphur.	Volatile sulphur	Difference.
1.....	31.07	33.49	2.42
2.....	21.70	42.64	20.94
3.....	14.22	50.46	36.24
4.....	8.42	49.47	41.05
5.....	7.38	52.27	44.89

This would seem to indicate that when the inorganic sulphur was in excess the above supposition is approximately true, but that it does not hold at all when the organic is in excess. It seems rather strange why this should be so unless it is due to mass action.

I think we are perfectly justified in concluding that in the coking process a very considerable part of the organic sulphur is volatilized.

In 1907 Canada exported 7,419 tons of coal to the Hawaiian Islands. During 1908 only 1,548 tons were exported.

## COAL-CUTTING MACHINES.

Mr. R. D. Bain, the Chief Inspector of Mines in the Durham District, England, states that there is an increase of 23 coal-cutting machines as compared with the previous year, the total now being 175 for the district. Both electricity and compressed air are used, but the larger number use compressed air, as it is more easily handled, assists ventilation and is less liable to accidents in fiery mines, but the leakage is greater when working at a long distance from the face. With the eight-hour day established I anticipate a much larger use of coal-cutting machinery in collieries, as all labour-saving devices must be used to enable British coal-owners to compete with Continental mines, where labour is cheaper and the hours worked greater than in this country. It has been found in Rand experience that the loss of air is less when it is transmitted in large piping, the pressure being much heavier when small pipes are used, and this factor should not be lost sight of in the utilization of compressed air in collieries.

It has also been found that when the coal seams and other conditions are favourable, the output per man may be doubled when machines are used, while the cost of production is appreciably reduced and an increased value of the output per ton is obtained, the proportion of round coal being increased with machines by 25 per cent. Besides, the coal mined is firmer and in better condition, and a more regular line of face is obtained by machines, and fewer explosives are required in breaking down the coal.

Although coal-cutting machines were introduced in Great Britain 50 years ago, in 1902 there were only 166 machines used, while in 1907 there were 1,493 machines in use. In the United States of America there were 10,212 machines in use in 1906, and the percentage of the total coal mined by machinery was more than 30 per cent. Each machine used in the United States showed an average annual production of 11,638 tons, as compared with 8,630 tons in Great Britain. In the United States the total number employed in coal mines was 940,618 persons; in Great Britain a total of 1,059,028 persons were employed in the industry. With fewer men the United States produced 60 per cent. more coal than was produced in Great Britain, largely due to the more extensive use of coal-cutting machines and the larger output of coal per machine.

## NEW MEMBERS—C.M.I.

The following gentlemen were elected to membership at a Council Meeting held on July 15th, 1909.

### Members.

Anderson, Glenn, Mgr. King Edward Mine, Cobalt, Ont.  
 Bailey, Frank, Merritt, Nicola Valley, B.C.  
 Brown, H. L., Mgr. Silver Cross Mine, Giroux Lake, Ont.  
 Burnett, A., B. C. Copper Co., Greenwood, B.C.  
 Cameron, John A., Nugget Mine, Giroux Lake, Ont.  
 Chipman, K. G., Geological Survey, Ottawa, Ont.  
 Colvocaresses, G. M., Mgr. Blackburn Mine, Box 607, Gowanda, Ont.  
 Dickerman, Allan G., 60 State St., Boston, Mass., U.S.A.  
 Fournier, A., Mgr. Selkirk Mining Co., Ltd., Box 474, Kaslo, B.C.  
 Graham, Chas., Box 269, Nanaimo, B.C.  
 Gray, F. W., Box 225, Sydney, N. S.  
 Groch, Frank, Box 780, Cobalt, Ont.



- Groch, Nicholas, C., Box 780, Cobalt, Ont.  
 Hamilton, W. L., Mgr. Leitch Collieries, Ltd., Passburg, Alta.  
 Hinton, R. W., Nelson Iron Works, Nelson, B.C.  
 Little, B. P., Box 1439, Vancouver, B. C.  
 MacMillan, John H., Mgr. Royal Collieries, Lethbridge, Alta.  
 McLaren, Geo. R., Box 247, Perth, Ont.  
 Mavor, Sam, 47 King St., Bridgeton, Glasgow, Scotland.  
 Meek, H. C., Supt. Crean Hill Mine, Crean Hill, Ont.  
 Muller, Alfred, Canadian American Coal and Coke Co., Frank, Alta.  
 Neilly, B., Silver Queen Mine, Cobalt, Ont.  
 Oliver, Chas. E., Dominion Mine Corporation, Hedley, B. C.  
 Ramsay, J. D. 1305 Trader's Bank Building, Toronto, Ont.  
 Rennie, Jas., Mgr. Casey Cobalt Silver Mining Co., Ltd., Box 88, Cobalt, Ont.  
 Robert, L. P., West Canadian Collieries, Blairmore, Alta.  
 Stilwell, Geo., Mgr. Hewitt Mine, Silverton, B. C.  
 Stovel, Jas. H., Supt. Cobalt Central Mines, Cobalt, Ont.  
 Taylor, R. F., Supt. Nova Scotia Mine, Cobalt, Ont.  
 Thorne, Stuart M., Supt. Silver Leaf Mining Co., Giroux Lake, Ont.  
 Watson, Chas. E., Mgr. Chambers-Ferland Mining Co., Cobalt, Ont.  
 Whitto, E. P., Mgr. Standard Lethbridge Coal Co., Lethbridge, Alta.  
 Woolsey, Wm. J., Thetford Mines, Que.  
 Wright, Sidney B., Supt. Deloro Mining and Reduction Co., Deloro, Ont.

**Associates.**

- Castleman, S. J., Box 1162, Vancouver, B.C.  
 Dempsie, E., Mgr. Maple Leaf Coal Co., Bellevue, Alta.  
 Jemmett, D. L., Mgr. Northern Canada Supply Co., Cobalt, Ont.  
 Richardson, Chas., Box 161, Haileybury, Ont.  
 Skill, Albert, Mining Recorder, Elk Lake, Ont.  
 Smith, A. A., Mgr. Badger Mine, Box 751, Cobalt, Ont.  
 Wheaton, W. A., Mgr. Royal Bank of Canada, Cobalt, Ont.  
 Wilkie, John B., Royal Collieries, Ltd., Lethbridge, Alta.

**Students.**

- Campbell, Angus D., c-o O'Brien Mine, Cobalt, Ont.  
 Grant, Russel R., 106 Warren Road, Toronto, Ont.

**THE RAND A GREAT MINING MACHINERY MARKET.**

According to the President of the Johannesburg Chamber of Trade, the value of the machinery and stores consumed by the mines and works in the Transvaal during 1908 amounted to almost nine and a-half millions sterling, an increase of £930,000 over 1907. Only about £300,000 was imported direct by the companies, the remainder being obtained through local firms. Practically all the principal manufacturers of mining machinery in the world are represented on the Rand through their agents. The manufacturers are kept in close touch with the consumer. The engineers and managers are regularly informed as to the developments which take place in the design and manufac-

ture of special machinery, tools, &c., and the manufacturers are kept fully advised of the requirements of this important market. This is done to a degree that would be impossible through any other source than that of the manufacturers' own representatives.

Mr. Niven, the President, added:—"It must be remembered that we are living in times of extraordinary and rapid advancement in technical matters, and the mining engineers and managers have neither the time nor the opportunity of closely following these. The local merchant or agent, however, makes it his business to do so; that is one of the reasons for being here, and if no other object were attained than that I have indicated, then I say he has justified his existence as a most important factor in the development of this huge industry. There are, however, other reasons why any change as suggested would not be in the best interests of the mines. Few manufacturers abroad, if any, will undertake to deliver goods in Johannesburg or on the mines, 6,000 miles away. They require payment in full for goods supplied, against bill of lading in London, and will accept no responsibility after shipment has been made. If, on the arrival at destination, as not infrequently happens when orders are sent direct, the goods are not up to specification or are from any reason unsuitable, the mine has no redress, having already paid for them, and the result is trouble, inconvenience, delay and loss. This does not occur where orders are placed locally. The firm here takes good care that their principal supply is exactly what is wanted. They are responsible for delivery in good order on the mines, and up to the time promised; and the mine authorities have someone here on the spot to whom they look for the due fulfilment of the contract. I am sure that the men who control the mining industry, as well as the engineers and managers, would be the first to acknowledge that the position is as I have stated it, and I think we need have no fear that any change in this respect is ever likely to take place."

**MINING IN ATLIN, BRITISH COLUMBIA, 1898-1908.**

In the July Quarterly Bulletin of the Canadian Mining Institute, Rosalind Watson Young, of Victoria, B.C., writes interestingly of mining in Atlin.

During the past ten years (1898-1908) about six million dollars has been obtained from streams draining an area of less than fifteen square miles. The Provincial Government levies a tax of two per cent. upon all outputs exceeding two thousand dollars. Each year a great deal of gold passed out of Atlin without being declared for royalty, and without being in any way recorded. Hence the following figures are merely approximations.

Output Atlin Mining Division for years 1898-1908:—

1898	.....	\$75,000
1899	.....	800,000
1900	.....	450,000
1901	.....	300,000
1902	.....	400,000
1903	.....	440,000
1904	.....	530,000
1905	.....	475,000
1906	.....	455,000
1907	.....	408,000
1908	.....	200,000
Total	.....	\$4,533,000



This total furnished by the Government is considered too low by Mr. Young, who places it at \$6,000,000. The average number of men employed each year has been about 600. This gives a per capita yield of one thousand dollars.

The small yield recorded in 1908 is attributable to the fact that one of the three largest operating companies did not operate, and the remaining two devoted part of their time to improving their water systems.

Gold was discovered in Atlin first by two partners, Fritz Miller, a German, and Kenneth MacLaren, a Canadian. Six miles from the mouth of Pine Creek they made their discovery. This area has proved the richest in the district. Before autumn, three thousand men had found their way to the camp. It is noteworthy that all the creeks that have been gold producers were staked during this first summer. Only four hundred people wintered in Atlin, but in the following spring there were thousands of new arrivals.

At first there was uncertainty as to whether Atlin was in British Columbia or the Northwest Territories. A placer claim in the latter was 250 feet, and in British Columbia 100 feet. When it was established that Atlin was in British Columbia, the 250-foot claims were "jumped" and abundant material was prepared for years of litigation.

More trouble ensued when, in 1899, the B. C. Government passed an amendment to the Placer Act, excluding all who were not British subjects from holding claims. Although this "Alien Bill" was disallowed within a year, much harm was done. Hundreds of aliens left the camp; experienced miners became scarce, and capital was withdrawn and has ever since been shy.

At first all disputes had to be referred to Victoria; but in 1899 a Special Commissioner was sent to Atlin. Later, a Supreme Court judge visited Atlin each summer, and in 1904 Atlin was made a county for judicial purposes. After the first few years the Gold Commissioner was empowered to adjudicate upon many mining matters.

#### Gold-Bearing Creeks.

Practically all the placer gold of Atlin, except that from McKee Creek, has been derived from the Pine Creek valley, which is a wide valley extending some twenty-five miles eastward of Atlin Lake, and flanked to north and south by low ranges. The valley is drained by Surprise Lake and Pine Creek with their tributaries.

#### Geological Formation.

In 1899 Mr. J. C. Gwillim, then of the Geological Survey, made a log and compass traverse of the lakes, and a paced survey of the surrounding country. In his excellent report he shows that the gold series consists of magnesite, serpentine, pindolite, and actinolite slate. Intrusions of granite cut this series off on the north; to the south are quartzites, slates, and lime-stones. Most of the gold has been found in the gold series, a little in the slates, and almost none in the granite.

Practically no work has been done by the Survey since 1899. Geological investigation of the old water courses would be of great assistance to the miners. There have been several runs of gold; but the richest and most widespread occurs in the "old yellow deposit" of pre-glacial origin. At first, blue gravel was found overlying the yellow; but as work advanced on the benches the blue gravel disappeared, leaving only the yellow. The average value of the gold is twenty dollars an ounce.

#### Relative Value of Creeks.

The leading creeks in order of production, have been Pine, Spruce, and Boulder. In 1899 Pine Creek paid royalties on \$276,564; Spruce Creek, \$45,405; and Boulder, \$48,000. In 1904 the figures were: Pine, \$107,318; Spruce, \$101,557; and Boulder, \$107,906. In 1908 returns showed: Pine, \$46,719; Spruce, \$41,235; Boulder, \$15,200.

From Pine Creek the bulk of the gold has been won by companies; from Spruce Creek by individuals and partnerships.

For the first three years, 1898, 1899, and 1900, ordinary placer methods were employed. Especially for two and a half miles on Spruce Creek, Chinese pumps, water-wheels, drains, ditches, sluice boxes, and wing-dams crowded each other. Pick and shovel worked with good results.

#### Size of Placer Creek Claim.

The 100-foot claims soon proved too small to mine and stack tailings upon. So in 1901 the size of the placer claim was made 250 feet square. In 1906 the Placer Act was amended to make the width of the claim from base to base of the hill and 250 feet in the direction of the stream. An amendment in 1908 made the placer claim 1,000 feet wide and 250 feet in the direction of the stream.

In the years 1899, 1900, and 1901 two hundred and fifty-eight hydraulic leases were issued. Many of these conflicted with placer rights. During the last five years the Government has enforced rigidly the cancellation of all leases that did not comply with statutory conditions. Two hundred and fifty leases have been cancelled, and thus much ground has been thrown open for re-staking.

#### EXCHANGES.

**The Colliery Guardian, July 30, 1909.**—A calamitous explosion occurred at the Maypole colliery, near Urgan, on August 18, 1908. The enquiry has just been concluded. The opinion that the explosion was caused by a blown-out shot seems to have most reason. The Colliery Guardian refers to the folly of treating the "permitted" explosive as a "safe" explosive. While admitting fully the need of more inspectors, our contemporary emphatically declares "that one of the lessons of this enquiry is to strengthen the belief that the 'practical' man is by no means fitted, simply as such, to fill responsible positions in which he is called upon to exert his critical faculties." . . . "As regards the suggestion that the offices of foreman and shot-lighter should be kept separate, we are somewhat at a loss to understand the line of reasoning that has prompted the jury to make this suggestion; the duties are very nearly akin in many respects, and the foreman is probably the official best acquainted with the conditions under which a shot has to be fired." If the fireman is to be relieved from an excessive burden of work, the Guardian intimates that this can best be done by reducing the size of his district.

**The Iron and Coal Trades Review, August 6, 1909.**—The averting of a general coal strike in Great Britain is dwelt upon editorially by the Review. A strike of this kind would have been "a national calamity of the worst kind." Moderate counsels prevailed during the



closing negotiations. Notwithstanding the good offices of Mr. Winston Churchill and Mr. G. R. Askwith, K.C., a basis of agreement was not easily found. "Happily, however, it was eventually recognized . . . that concessions by both parties to the dispute were inevitable if industrial war was to be avoided."

Although partly of a provisional nature, says the Review, the agreement certainly provides a broad and substantial basis for the permanent settlement of the questions at issue. "On the main issue of the 50 per cent. minimum, or 6s. per day wage, the miners have been entirely successful having secured the recognition of that principal. . . . On the other hand, an arbitrator is to decide upon a basis price to govern the 50 per cent. minimum, and is to revise the scale of increments," taking into consideration the effect of the new minimum upon the relation between wages and prices.

The crisis is now over, and the outcome, while it certainly does not favour the colliery proprietors overmuch, may be described as "peace with honour." To these proprietors "the thanks of the country are due . . . for the way in which they have surrendered clearly established rights without getting much in exchange. . . . On the other hand, the action of the Miners' Federation of Great Britain cannot be regarded in a very favourable light." Labour leaders and officials have been guilty of "an arrogant parade of power which accords but too well with the truculent attitude taken up by labour and many of its self-styled leaders of late."

#### PERSONAL AND GENERAL.

Mr. H. Mortimer-Lamb was in Toronto on August 23rd.

Mr. Martin Nordegg has returned from a visit to the coal areas of the German Development Company in Alberta.

Mr. Paul S. Couldrey was presented with a silver loving cup on August 14th on the occasion of his resigning the post of general manager of the Josie Mine, Rossland, B.C. Mr. Couldrey has accepted a position with the British Columbia Copper Co., at Greenwood.

Mr. Allan Greenwell, editor of The Colliery Guardian, London, Eng., is in Toronto. Mr. Greenwell will probably visit Alberta and British Columbia before returning to England.

Mr. F. C. Armstead, supervising engineer of the stoker department of the Westinghouse Machine Company, who for a number of years, has been located at East Pittsburg, Pa., has moved his headquarters to the Westinghouse Works, Attica, N.Y., where the stokers are manufactured.

#### OBITUARY.

Andrew Colville, who died on July 15 at Nanaimo, Vancouver Island, British Columbia, was born in Blairtown, near Peterborough, Ontario. For several years he was a school teacher in that province, and there, too, attended a business college for a year. Leaving Canada in 1886, he proceeded to North Dakota, where for two years he engaged in farming, going thence to Montana to put in a year at railroad construction. In 1889, at Lethbridge, Alberta, he commenced coal mining, working there as a miner for four years. In 1897 he was appointed superintendent for the Electric Peak Coal Company, at Hoar, Montana. During 1898-9 he was in charge of the outside operations of the Diamond Coal Company, Diamondville, Wyoming, and in 1900 those of the Carbon Coal Company, Carbonado, Montana. In 1901 he went to the Crow's Nest Pass coal field, British Columbia, where, after having been for about two years overman of Nos. 2 and 3 mines, Coal Creek, he was made superintendent of the Crow's Nest Pass Coal Company's Coal Creek colliery. He filled that position satisfactorily for four years, when he resigned and went to Eastern Canada for six months. In July, 1908, he returned west, going to Nanaimo, but he did not again undertake the responsible duties of a coal mine superintendent. He died among friends (fellow-members of the Canadian Mining Institute), who had known for many years his worth as a man and his competency as a mine manager.

## CORRESPONDENCE.

Editor Canadian Mining Journal:

In the railway article in issue of August 15 reference is made to copper in the Eastern Townships in such a way that a stranger would understand that none of these deposits have been successfully worked, while as a matter of fact we have at Capleton, within a few miles of Sherbrooke, two of the biggest copper mines in Canada—the Capleton and the Eustis. The former is owned by the Nichols Chemical people, the latter by Col. Eustis, of Boston.

They have been in successful operation for around forty years. The Eustis is down over 3,000 feet, employs 150 to 175 hands, and produces about 1,500 tons of ore per week. The ore contains as high as 45 per cent. sulphur, and much of it is shipped to chemical firms in Boston, who take the sulphur, and the residue goes to the Eustis smelter in Norfolk, Va.

The Nichols Chemical Co. also take several hundreds of tons each month. No better equipped mine can be found, and men and property are well cared for, but as with the Capleton it is a close corporation, and no stock for sale, consequently is not advertised in the stock columns of our daily papers. The Capleton mine extracts the sulphur from its ore, and makes glauber salts, nitric and sulphuric acids, etc. These mines have made millions for the owners—Americans in both cases.

Over the range to the west is the Norton property, owned by A. O. Norton, the well-known manufacturer of ball-bearing jacks, of Boston. He has been systematically blocking out, not extracting ore, for a long time, and has a large tonnage in sight. He is said to be contemplating the erection of a smelter. To the north is the pioneer mine of the region, the Ascot, a well-



equipped property, under the management of John McCaw.

At Lake Memphremagog is the Smith property, now being actively developed, by the same people who are working the McDonald property in Weedon.

In Ditchfield a new property has recently been opened.

What the district needs is not ore, but a custom smelter, at some central point, like Sherbrooke. The ore in the Sherbrooke belt is pyrite, and not rich enough in copper to pay for shipping to England, but, as proved by the Eustis and Capleton, with proper capital and smelting facilities, can be made to pay handsomely.

K.

To the Editor Canadian Mining Journal, Toronto:

Sir,—In view of the recent attacks made in the London Mining Journal on mining administration in India, and also both directly and indirectly on the Director of the Geological Survey, we have deemed it advisable to send you the following extracts, one of which is taken from the Mining Journal of June 26th, 1909, page 801, and the other from the published evidence given by Sir Thomas Holland before the Royal Commission upon Decentralization, and published in Blue-book Cd. 4369 (Vol. X. of Minutes of Evidence, p. 47):—

From the Mining Journal of June 26th, 1909, p. 801, leading article headed "Mining Administration in British India."

"We cannot close our observations on the evidence tendered to the Commission without noting the light thrown by the report on the sincerity of Sir Thomas Holland's attempt to suggest that we had imputed corruption to Government officials in India. As an argument against the establishment of a separate Provincial Survey, the Director of the Geological Survey said:

"If I transferred an officer, say, to Burma, or any province beyond my control, and he was the officer who governed the granting of mining concessions, I have not the slightest doubt that within a year, if he had only ordinary intelligence, he would discover that his salary *would*\* be only a fraction of his income." We do not remember even to have seen the Chief of what is professedly a scientific body so frankly confess his distrust of his colleagues' honesty and professional pride."

Evidence of Sir Thomas Holland, Director Geological Survey of India, published in Blue-book Cd. 4369, being Vol. X. of the Minutes of Evidence taken before the Royal Commission upon Decentralization in India, p. 47:

Question No. 43455: "Is not an officer who has to deal with mining concessions in any part of the world subject to great temptation?"

"Yes; if I transferred an officer, say, to Burma, or any province beyond my control, and he was the officer who governed the granting of mining concessions, I have not the slightest doubt that within a year, if he had only ordinary intelligence, he would discover that his salary *need*\* be only a fraction of his income."

(\*The italics are ours.)

By changing one word in quoting the Blue-book, the Mining Journal has altered the whole meaning of the remarks made by the Director. In view of the comments made, it is for the Mining Journal to prove that this misquotation is accidental. Having regard to the claim of the Mining Journal that it "circulates all over the world," the writer of the article must know that it will be read by many to whom the blue-books are not accessible, for no assistance has been given by a reference to the particular volume in which the Director's evidence is recorded. As the inaccurate quotation has already received a start of some weeks before reaching us in India, we shall be glad if, by publishing this letter, you will assist in preventing any further dissemination of a grossly unjust insinuation.

With this sample before them, we can safely leave your readers to estimate the value of the attacks on the Indian administration recently made in the Mining Journal.

Needless to add, the relation between us and Sir Thomas Holland is one of perfect and mutual confidence.

We have been unable to communicate with three of our colleagues who are at present absent in the field, but we are convinced that if they had the opportunity they would join with us in appending their signatures to this letter.

T. D. LATOUCHE, Supt. Geol. Sur. of India.  
H. H. HAYDEN, Supt. Geol. Sur. of India.  
P. N. DATTA, Asst. Supt. G. S. of India.  
E. VREDENBURG, Asst. Supt. G. S. of I.  
L. L. FERMOR, Asst. Supt. G. S. of I.  
G. E. PILGRIM, Asst. Supt. G. S. of I.  
G. H. TIPPER, Asst. Supt. G. S. of I.  
H. WALKER, Asst. Supt. G. S. of I.  
K. A. K. HALLOWES, Asst. Supt. G. S. of I.  
G. DE P. COTTER, Asst. Supt. G. S. of I.  
J. J. A. PAGE, Asst. Supt. G. S. of I.  
H. C. JONES, Asst. Supt. G. S. of I.  
A. M. HERON, Asst. Supt. G. S. of I.  
M. STUART, Asst. Supt. G. S. of I.  
N. D. DARU, Asst. Supt. G. S. of I.  
W. A. K. CHRISTIE, Chemist, G. S. of I.

Editor Canadian Mining Journal:

In your issue of August 15th, I note among the personals from Sherbrooke, Que., reference to a visit of myself and the president of a dredge building company to the property of the Compton Gold Dredging Company, by which it would appear that the placing of a dredge on this property had been decided upon by the company, and this statement is somewhat misleading, although, I am quite aware, unintentionally so.

This property was tested last summer and considered to contain sufficient values in gold to possibly justify the placing of a dredge thereon. Further investigation, however, this year has caused serious doubts as to the advisability of going ahead without further tests, and it would perhaps be well to suspend judgment until such time as these further tests are made.

I might mention further that the company have sufficient funds subscribed to build a dredge, but in the



event of these further tests being unsatisfactory, such subscriptions will be returned in full, and the company is not offering any stock for sale at the present time.

Trusting that I am not imposing on your generosity in asking for space in your valuable columns for the above, I remain,

Yours very truly,  
COMPTON GOLD DREDGING COMPANY.

J. F. McKenzie, President.

Montreal, August 24, 1909.

**The Mining Journal, August 7, 1908.**—Gold stealing on the Rand is the subject of renewed discussion. The Mining Journal supports certain preventive measures advocated by Mr. Albu. Chief among these measures is the arrangement of all amalgamation plates and extraction boxes under the control of the salaried staff. "In any case," says the Mining Journal, "whatever measures be taken, there can be no finality. As in all campaigns against fraud, it is a constant struggle of wits."

## SPECIAL CORRESPONDENCE

### NOVA SCOTIA.

**The U. M. W. A. and the Nova Scotia Coal Trade.**—The general situation that has been brought about in Nova Scotia by the policy of the United Mine Workers of America is a serious one for this Province, and it has already resulted in grave and permanent injury, not only to Nova Scotia, but to the Maritime Provinces as a whole. The question, however, is not a provincial one, nor is it one that is confined to the coal trade alone. It has a far wider import, and touches particularly the political independence of Canada. One feature of the U. M. W. A. platform is International Socialism, and it is this that has attracted to the ranks of the U. M. W. in Nova Scotia the miners who come from the countries of the Old World. The dream of the International Socialist of "The Parliament of Man, the Federation of the World," is an attractive one, and the arguments of the International Trades Unionists are seductive and plausible to the unthinking. But, after all, they are but dreams. Everything in a sovereign country must be subordinated to the national entity. Trades unionism is merely one of the components of the political life of this country, and it has no more right to override the limits of our frontiers than have the main divisions of our national political parties, nor has trades unionism any right to divorce itself from national economics. If it attempts to do so, disaster must surely result, as it has already resulted in Nova Scotia.

The legislators of our country, recognizing that the coal mines of the United States and those of Canada are competitors, or, to use a more fitting word, opponents of each other, imposed a protective duty on imports of coal from the United States into Canada. Our legislators, also, for the protection of the Canadian workman, passed the law known as the Alien Labor Act, which forbids to Canadian employers the opportunity of engaging workmen in the United States in competition with the citizens of this country. Our law also forbids any United States corporation from operating in Canada to the detriment of Canadian trade, and, before it will allow them to do business here, these corporations must be incorporated under our "Companies Act," and they must obey the constituted authority of this nation. These barriers, along with many others, have all been laboriously erected by our Parliament to protect Canadians and to consolidate our national growth. What has happened in Nova Scotia? This has happened: Under the name of trades unionism every one of the protective barriers erected by our legislators against the encroachments of the United States has been swept away; a direct attack has been made upon our coal industry by alien strike leaders engaged and paid in the United States out of the funds of a United States corporation, and the result is that American coal is now being unloaded in Sydney Harbour, while some three thousand Nova Scotia miners are idling on the streets of Glace Bay and of Springhill. We have said that all this has been done in the name of trades unionism,

but in reality what has happened is tantamount to sedition and to treason, which has been fomented by alien enemies who have conspired against our trade and to destroy our native institutions. That these enemies of our country have been helped in their work of destruction by some misguided citizens of Canada may add to the irony of the situation, but does not minimize the menace.

The policy and the actions of the United Mine Workers of America in Nova Scotia have not been those of a legitimate trade union, but they have been predatory, and foolish withal, and are calculated to work great harm to the proper aims of trades unionism. It is not calculated to advance the interests of labour for a powerful union to embark upon a policy of extermination against a smaller one, and this is what the U. M. W. A. have done. The claim of the Provincial Workmen's Association to represent the workmen of Cape Breton has been shown to be well founded. At Inverness and Port Hood the attempts of the U. M. W. to call a strike were abortive from the beginning, and to-day the president of the Inverness U. M. W. Local is working in the mines at Glace Bay. Despite all the assertions of the U. M. W. A. leaders to the contrary, we are in a position to know that the U. M. W. A. strikers at Glace Bay number less than one-third of the mine's force of the Dominion Coal Company, and less than one-fourth of the total number of that company's employees in Cape Breton. Taking into consideration the disparity in numbers between the U. M. W. sympathizers and the P. W. A. members, to the great disadvantage of the U. M. W., the fact that the Dominion Coal Company has a binding contract with its workmen, which precludes any possibility of change until 1910, the fact that a Board of Conciliation has strongly advised against the recognition of the U. M. W. and has upheld the position of the Coal Company in every particular, and the fact that the workmen of the Coal Company have no grievances which need redress, what should a wisely advised trades union have done in the case of the Glace Bay dispute? They should have retired in favor of the older union, or until a more favorable opportunity for success presented itself. But the U. M. W. A. leaders would not do this; instead they have engaged upon a useless and foregone struggle, in which they will find it necessary to dissipate a large portion of the accumulated funds which were contributed by American miners for the defence of their union in the coal fields of the United States. The leaders embarked upon the Glace Bay strike with the full knowledge that in order for the U. M. W. A. to succeed, the P. W. A.—a Canadian union—must be destroyed. In Inverness County the U. M. W. A. have thrown money away foolishly and without any return. At Springhill they have declared a strike for higher wages after a Board of Conciliation had proved absolutely that higher wages were impossible if the Cumberland Coal Company were to continue in business. At this place they withdrew the pumpmen and firemen, and but for the per-



sonal efforts of the officials of the company the Springhill mines would have been allowed to fill with water and gas, and the horses would have starved in the pit. Had they been able, the U. M. W. A. would have done the same thing at Glace Bay, and they did attempt at several of the mines to stop the operation of the boilers and pumps.

At Springhill the apparent result is going to be the closing of the mines of the Cumberland Coal & Railway Company, and eventually a reduction in the wages of the workmen.

What is the net result to Nova Scotia so far? First, a partial paralysis of the coal trade of the Province, coincident with the replacement of Nova Scotian coal by United States Coal.

Second, the harassing of the Provincial Workmen's Association, and financial loss to the workmen of the Province.

Third, a large expenditure of union funds for purposes altogether outside of unionism, this expenditure being made by men who are well aware that the money might just as well be thrown into the sea.

The attitude taken by these American strike-breeders towards Nova Scotian unions and Nova Scotian methods of doing business may be illustrated by quoting a few statements which have appeared in the public press from U.M.W.A. sources: The "Standard" recently taunted the management of the Coal Company on its inability to run a strike properly, giving as a reason for its opinion the inexperience of the Coal Company in strikes. On the other hand, the "Standard" praised the methods of the U.M.W.A., which, they stated, much practice had made perfect. If the worst that can be said about the management of the Dominion Coal Company is that this company's officers have had no experience of strikes, most sensible people will wish there were more such companies, and will regard the taunt as a genuine testimonial to the tactful management of the Coal Company, and the excellent relations which have existed hitherto between the workmen and the heads of the company.

Mr. McCullough, in attempting to defend his action in calling out the firemen and pumpmen at Springhill, writes: "The policy of the operators is to operate the mines of Nova Scotia with non-union labor, or the P.W.A., which means the same thing in the final analysis." This same gentleman, in a speech at Sydney, referred to Canadian soldiers as "paid pimps," and in a letter to the U.M.W. Journal he wrote that Nova Scotian newspapers were raising the cries of "Canada for the Canadians, Canadian National Unionism, and 'such rot.'" We wonder what would be the fate of any Canadian who said and did the things in the United States that Mr. McCullough and his colleagues have done in Nova Scotia. A Vigilance Committee, a fence-rail, and some tar and feathers would likely assist his ignominious exit.

#### QUEBEC.

Sherbrooke—It is reported that the Spalding iron property has just been bonded for \$500,000, the leasers to expend \$50,000 in development work. Yet the deposit has been known for years. Those who might have taken it up didn't think it worth while, as good mines are always way off West.

The new Megantic copper property seems to show improved values in both gold and copper, as depth is gained.

The New York Engineering Co. is looking into the possibilities of gold placer ground in the Eastern Townships, particularly in Compton Co. Several other dredge-making concerns are endeavoring to get a contract from the Compton Gold Dredging Co., but the latter may naturally favour a concern that will get a good part of the machinery put up in Quebec.

Mr. John McGaw is pushing work vigorously on his property in Brampton.

The management of the Eastern Townships Agricultural Association has kindly granted space for a mineral exhibit at the

coming Fair, and all interested can send specimens, properly labelled, to Mr. Kenneth E. Kennedy, Sherbrooke, Que., with any particulars desired, and they will be taken care of, and arranged, also returned when desired.

In spite of all the newspaper space devoted to asbestos news, there are more properties that can be bought at reasonable prices than cash purchasers. All the present producing mines, not so very long ago, were prospects with no better surface showing than many of these. The claims so often made by self-styled authorities or "experts" that Thetford has all the good stuff, or that the present producing mines control all the good ground, is pretty likely to be exploded. Of course a prospect is not a mine, but all mines were once prospects. To hear some of these people talk, one would think that mines were found, not made.

It is true the Eastern Townships has no Alex. Gray to write of its mineral possibilities, and the larger city dailies, while devoting much space to Ontario mines, and even prospects, cater more to the stock selling side than to real mining.

These papers no doubt know which side their bread is buttered on, and having in mind some premature booming done for the higher lights, when British Columbia was to the fore, now do not dare refer to any new or promising region until it is vouched for by some gentleman eminent in some line quite apart from mining, but sufficiently well known to qualify as an authority, on account of his financial standing, on any old thing.

And yet it is more than edifying to read some of the stuff they do print. And in whose interest is it? Not that of the ordinary country reader, nor of the little old Province of Quebec.

#### ONTARIO.

Cobalt—The Baily Mine has ordered a complete plant, excavations are now being made, and the ground is being cleared preparatory to erecting the necessary buildings. The plant consists of a compressor, a 100 horse-power boiler, a hoist, drills, and other necessary equipment.

A winze is being sunk from the 400-foot level of the Kerr Lake Mine, and will be continued 100 feet. This will give a total depth of 500 feet and will be the deepest working in the camp. So far as they have gone there has been no change in formation, and the ore continues to carry its high values. When the winze is completed a cross-cut will be run under the shaft, and the two levels will be connected at that point.

The Nancy Helen has struck high-grade ore in three new veins. Two of these are about an inch in width and carry ore assaying about 1,000 ounces in silver. These veins come off the Buffalo. The other one is about five inches in width and carries higher grade ore. This latter vein is apparently making for the City of Cobalt property. These finds were made on the sixty-foot level. The Nancy Helen resumed underground operations a short time ago, having been closed for some time while diamond drilling was going on.

Mr. George Taunt who is largely interested in the Lucky Boys and Chesterfield properties in the Larder Lake district, has interested some English capitalists in the Harris-Maxwell, on which they have an option. Mr. H. P. DePencier has been appointed manager of the Reddick. There are four steam drills working on this property testing the surface. The shaft is now down 120 feet, and there are said to be good values in the bottom. The Cleopatra, adjoining the Harris Maxwell, has a force of men working on the surface, and the results obtained so far have been very satisfactory.

The new surface vein found recently on the Nipissing has now been trenched for a distance of 200 feet and it shows a width of about six inches of high-grade ore. This is the most



valuable discovery for this company, since the big vein was found in the No. 64 shaft. Further development on vein No. 127, carrying smaltite and niccolite, has shown it to contain some values in native silver.

The Coniagas will build a shaft house over their working on the corner of Prospect avenue and Silver street, which is right in the centre of the town. The shaft will be sunk to a depth of 86 feet and at that point it will correspond to the 150-foot level of the main shaft.

The Temiskaming has good ore on the 300-foot level and is drifting on the No. 1 and No. 2 veins, while a crosscut is being run to catch the No. 3 vein. Good progress is being made with the concentrator, and the company hopes to have it completed about the end of December.

Much trenching is being carried on on the lots of the Gillies' Limit purchased from the Government, the finds recently made on the Waldman and Young-O'Brien lots, having given great encouragement to the owners of the other properties. The Waldman vein has been traced on the Young-O'Brien lot for a distance of 90 feet, and the values are very good. Next week forty men will start trenching the surface of the Cleopatra, which is owned by Mr. Bannell Sawyer, of Montreal.

A good discovery was made recently on the Silver Alliance property in the Elk Lake district. At a depth of twenty-five feet in the shaft the vein widened from a mere stringer to between six and eight inches of calcite carrying good values in native silver. The Silver Alliance property is situated in Tudhope Township about four miles from Elk Lake, and is owned by Montreal people. Another good find was made on the Haentschel claim in the Township of Farr on Panty Lake. It consists of a vein of calcite carrying values in native silver. The York claim, which is located near the Otisse Currie, located a vein on the surface carrying smaltite, niccolite and native silver. The vein was stripped for a considerable distance and is found to average about four inches in width.

The dispute between the Nova Scotia Mining Company and the Peterson Lake Mining Company has culminated in the issue of a high court writ against Edward and D. M. Steindler, in which the Peterson Lake people claim the following:

1. \$1,000,000 being the amount of shares of plaintiff's stock wrongfully issued to the defendants.
2. \$50,000, monies of the plaintiff's wrongfully appropriated by the defendant, Edward Steindler, with the aid and consent of his co-defendant.
3. In the alternative the like sums by way of damages for misfeasance and breach of trust on the part of the defendants as trustees for and directors and officers of the plaintiffs.
4. Delivery up and cancellation of the certificates now held by the defendants or either of them for stock of the plaintiffs.
5. An injunction restraining the defendants from acting as shareholders in respect of the stock issued to them and from selling, charging, parting with, or otherwise dealing with the shares of the plaintiffs' stock issued to them and still held by them, and also restraining the defendant, David M. Steindler, from acting as a director of the plaintiff company.
6. Such further and other relief as the plaintiffs may be entitled to.
7. Costs of this action.

In sinking on the No. 3 vein of the La Rose, the Keewatin came in at the 100-foot level, but the shaft was continued and is now thirty-five feet below the contact. The ore was found to continue and the high values were maintained. On the other side of the line the O'Brien is working on the same vein and is still taking out good ore. On the latter property the vein has been in the Keewatin all the way.

There is to be another sale of the mining lands of the Gillies' Limit comprising 393 acres remaining from the total of 870

originally offered. The bids previously put in for these lots were not considered high enough by the department but in view of the finds recently made on the Waldman and Young-O'Brien lots, they will probably now command higher prices. The Provincial Mine is also to be sold. This property consists of forty acres and is situated in the Savage and Silver Bar group near Cart Lake. It was closed down some time ago while some diamond drilling was being done. A hole was bored near the Savage Mine and at a depth of about 165 feet from the surface a vein carrying high-grade silver values was cut. Tenders for the lots and the mine will close on September 13th.

About two hundred feet from the Foster boundary and half way between the north and south lines a new find has been made on the Lawson that for width and values closely approaches the original silver sidewalk. When first found it was not considered remarkable, but a little development showed it to contain a good width of very high grade ore. In one place there is fifteen inches of cobalt assaying very high in silver. When the vein had been trenched for a short distance it was found to split at both the north and south ends, the branches being about six inches in width. This find was made in the Keewatin. This makes a total of seven veins found on the surface up to date and the probability is that underground development, as has been the case in other mines, will show up still more. Development on this property is at present limited on account of the small capacity of the compressor. The main working shaft will be the one that has been sunk on the main vein, and which is now down 98 feet.

Further development on the new find made at the Foster shows the vein to be from three to five inches wide. It is a cobalt vein and carries high values in silver. The opening up of the Lawson has led to a much more thorough prospecting of the Foster, and had the former properties not been tied up in litigation for so long these finds would probably have been made years ago.

Considerable interest continues to be manifested in the gold claims of Munroe Township, and work has been done on some of them. The principal properties there are the Green claim, the Kennedy claim, the Guelph Syndicate, the Surprise claim, the Painkiller Lake Mines, and the Wigwam claims. It is stated that the Kennedy claim has been sold to Mr. P. Farah.

The camp buildings of the University Mine were destroyed by a fire, which is supposed to have originated in the bunk house. The shaft house and power house were fortunately untouched, so that the work will be able to proceed without interruption. The University was an independent company until the original owners of the La Rose acquired control. The results obtained were not very encouraging and the mine closed down, until the La Rose Consolidated took charge and started work again. Since that time the outlook for the mine has been much improved.

The Northern Customs Concentrator, formerly known as the Muggley, is making progress with the addition to the mill. The buildings will shortly be completed and the machinery in place.

The district of South Lorraine continues to attract more and more attention, and the reports that come from there are very encouraging. A great amount of work is being done, and if the success obtained so far is any criterion it is safe to assume that this district will eventually become one of the most important outside of Cobalt. During the coming week the Keeley will ship one car of high-grade ore and one car of medium grade. So far this company has experienced considerable trouble with the plant that they installed a short time ago, but they expect to have it in good running order in a few days. The main development of the property is being carried on at the 130-foot level. The west shaft is being pumped out and when that is completed work will be started there also. The Wettlaufer will also ship forty tons of high-grade ore and probably a car of medium. Drifts are being run at the 60-foot level on



the vein on which the shaft was sunk. The vein is about six inches wide and carries a good amount of high-grade ore. A cross-cut was run from this level to a parallel vein on which drifts have also been run. This vein is about twelve inches wide with six inches of maltese carrying silver.

#### BRITISH COLUMBIA.

**Rossland.**—Once again there is some stir and activity about the Le Roi mine, a small crew having been put to work getting things in form for the extensive development that will be done in the big mine during the next several months. It is stated that a fund of about two million has been raised by Managing Director McMillan and the Board of Directors, in order to carry out a big plan of development that was suggested by Mr. Carlyle. While the main work will be done from the 1,650 to the 2,650-foot level by diamond drill, operations will not be confined to that particular territory, but other promising regions of the Le Roi ground will be opened up. It is certainly pleasing to Rosslanders to see work once more going on at what we termed the "premier mine of the camp" until the Centre Star group forged into the lead.

Twenty tons of picked gold ore was shipped from the once prominent I. X. L. mine during the past week. The lessees keep working away in the altered depths of this property in a state of semi-excitement. While the ore they are extracting is about paying expenses, it is a gamble. Any day they may open up one of the old-time bonanza pockets, when they, the mine and the West belt will spring into sudden prominence. Every one in Rossland believes some one will strike it in O. K. Mountain some day, but the fates hold the secret as to who the lucky one will be. Both the O. K. and I. X. L. mines have been worked every few months by lessees, each party striking new ore and making their venture pay, but the expected grand coup is still to come off.

The Consolidated M. & S. Co. of Canada is making things hum about the Centre Star group here, and Dame Nature is doing her share by pushing goodly quantities of pay ore into the various workings of the mines. For the week ending July 24th the shipments from this property reached a new record figure for the current year, 4,680 tons having been sent to Trail smelter. This exceeded the prior high figure (4,280 tons for week ending May 1st) by 400 tons. The low shipment mark for the Centre Star this year was 2,950 tons during the week ending January 9th. The Consolidated St. Eugene mine at Moyie also broke a record in the early part of July, shipping for the week ending July 19th 975 tons, exceeding the week ending June 29th, when 807 tons were shipped. The Snowshoe mine of the Consolidated, not to be outdone, also made a new high record, shipping 4,083 tons for the week ending July 31st, the heaviest tonnage from the mine this year. These heavy shipments pouring into the bins of the company's smelter at Trail naturally make things lively at that point. The gross value of the output of this reduction works for the past month was over \$800,000. As everything points to heavier shipments than ever in the very near future, the plant is being enlarged as rapidly as possible, so that the anticipated work may be fully met when the proper time arrives. During the fiscal year ending June 30th this works produced gold, silver, copper and lead to the value of approximately five and a half million dollars. About 45,000 tons more of ore was treated than during the preceding year. From the electrolytic refinery \$2,700,000 of the output named above was derived. There is little doubt that the figures for the current fiscal year will far exceed those of the past year, provided, of course, no great drawback occurs. It is worthy of note that this modern refinery on the silvery Columbia has supplied the Mint at Ottawa with over 250,000 ounces of gold for

coins. Nearly 200,000 ounces of .999 fine silver is shipped from Trail each month to the Orient for coinage. To digress: What a strange story an ounce of this Canadian silver might tell could it speak and should it return to Canada years hence; a story of happiness and misery, cruelty and mercy, of life and death—it is more likely, however, to meet the fate of being buried in the ground by some wretched Oriental miser.

**The Boundary.**—Wheels are again getting into motion at the property of the British Columbia Copper Co., part of the crew having been put to work. As yet smelting operations have not been resumed, but there is little doubt the furnaces will be blown in as soon as ore and fuel conditions are in regular shape. As is the case with several of the other big mines of Southwestern British Columbia, the outlook for the B. C. Copper Co. is very good for the immediate future. It is very likely that a profitable arrangement will be made to smelt the ores of the mines of the New Dominion Copper Co., and with railway facilities to mines in nearby camps controlled by the Copper Co. a busy and profitable season of work is promised.

The mines of Phoenix have shipped over half a million tons of ore of a good average grade already this year and while the figures run somewhat below last year to this date, still if present plans here carry it is likely that last year's record will be passed easily. As is generally known, Boundary ore yields about 24 lbs. copper to the ton, so that the recovery thus far during the current calendar year has been over 24,000,000 of the red metal. Both the Granby and B. C. Copper Companies are turning out a good grade of crude copper from their smelting and converting plants, and can lay it down at Eastern refineries for approximately ten cents per pound. There have been months when this cost has dropped as low as eight cents per pound, but this figure cannot be counted on as a year in and year out cost just at this time. Men who ought to know, however, predict an average eight-cent cost for copper from the Boundary in the not distant future; this will be made possible by improved conditions both in the mines and in the smelting and converting plants; the converting itself figuring prominently in saving on freight.

The reorganization lately of several local mining and reduction companies of more or less prominence has ended disastrously for those of the shareholders who did not feel like complying with the "freeze-out" conditions laid down by the reorganization committees. In many cases investors bought stock at par for an "investment," figuring that the prominent men connected with the companies assured exemption from wildcat tactics, and that in due course of time they would receive some of the substantial profits which the mining industry as a whole is yielding to-day. The day is coming when a man who buys one share of stock in an incorporated company will have his interest protected but what can we do to hasten this state of things? It does not seem just that a wage-earner who stints himself of luxuries, we will say, and puts his savings into a corporation, in an effort to provide for that "rainy day" that we all fear, should lose that estate which in a crisis may mean life or death to himself and family, in order that certain predatory interests may acquire a valuable property at a mere pittance. When the show-down comes it is an uneven battle, an organized force versus a disorganized and helpless lot of shareholders. As a general thing, stock in a company is sold the first thing, and stands a paramount first mortgage against the concern; then those "inside," with the aid of their promoters' stock and the proxies which the innocent shareholders send them, vote to mortgage everything, giving a first mortgage, and the stock that was previously secured by certain assets is converted into worthless paper, while the friends of the "insiders" get a strangle hold on the company that was put on its feet by the money of the small investor. The question is, who, or what organization, that is in the right position, is going to start the



work that will place the mining industry and the capitalization of its different branches on a plane that is above wildecating? We have in our midst predatory trusts, workmen's unions and farmers' unions; the next big movement will be for a Consumers' Protective Association, for the others are getting too high-handed altogether, so what's the matter with an organization for investors that will fight their battles in Parliament and throughout the land? Its eye, if vigilant, might strike fear to the hearts of those Black Knights who would make a little easy money by aerial financial tactics.

**Nelson.**—Several of the French capitalists who are interested in the historic Blue Bell mine visited the district during the past week. It is announced that French capital is being consid-

erably attracted to British Columbia, and that large sums of money from Parisian capitalists will find their way to the mines of this country in the future. It would surprise most people to know how many coal and mineral properties are now controlled by French capital in this Province.

The old Fern mine has again been reopened, and is to be worked on a good scale. Another good strike is reported from the Westmount. A 3-foot vein has been uncovered in one of the lower levels. About twenty men are working on the property. Auriferous gravel that is said to run from \$10 to \$20 to the pan has been found on Summit Creek. This is not surprising when it is known that so much gold-bearing rock exists in the vicinity of this rivulet.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Sydney.**—The excavation work for the Dominion Iron and Steel Company's four batteries of new coke ovens is reported to be well advanced.

The four new batteries will comprise 30 ovens each, and the cost will be about a quarter of a million.

**Sydney, Aug. 24.**—More skilled miners went into the Dominion Coal Co.'s mines to-day. Of these, twenty-six arrived at Sydney last night from Inverness County and were taken immediately to Glace Bay by train. While this train was passing through Gardiner, near No. 1, two rifle shots were fired at it from the neighboring woods. Fortunately no one was hit. Yesterday's output at the mine was the best since the beginning of the strike, 6,470 tons being taken out of the pits and 4,862 from the banks, a total of 11,332 available for shipping. The steamer Dominion has sailed for Philadelphia to load a cargo of coal for the Steel Company.

Last week's shipments by the Dominion Coal Company were 60,011 tons, 48,071 by steamers; 3,079 by schooners, and the remainder, 8,869, by rail. Last week's shipments were the largest since the strike began.

**Glace Bay, N.S., Aug. 24.**—John Moffatt to-day answered the charge that the Provincial Workmen's Association brought about the present industrial strike in the Province by sacrificing their members' interests, when he issued a statement showing what that organization has done since he has become its head. To the charge made against him by a section of the Conservative press, that he has been the tool of operators, he replies showing the concessions he has secured for the men since he became grand secretary of the P. W. A. eleven years ago, including two general increases in wages and numerous partial ones.

The local industry was, he claims, materially aided by wage agreements whereby labour troubles were obviated for periods of years; double as much work secured, increased business thereby brought about, and improvement in working conditions, until the miners in Nova Scotia now labour amid surroundings unsurpassed anywhere for safety and sanitation. These are the main features of his administration which he points to in answer to the assertion that he has betrayed his trust.

### QUEBEC.

**Sherbrooke.**—The New York Engineering Co. has shipped two drillers, an Empire and an Empire, Jr., to be used in testing placer ground in Compton. On one property, this will be the final test prior to installation of machinery, on others, more of a preliminary nature.

**Thetford Mines.**—Notwithstanding the apparently quiet state of the asbestos market, all the mines in this district continue to work to their full capacity day and night shifts, and there are

probably more men employed at present in connection with the mines than ever before

Some of the mines have nearly completed large additional storage sheds, some are in course of construction, while others are contemplated. All of which would indicate that there will be no material cessation of operations during the coming winter.

A noticeable feature of the past few months, and particularly so considering the large number of men employed, is the fact that there have been very few strikes, either of a slight or serious nature. This is worthy of note, for an erroneous impression has existed that there are numerous and frequent accidents attendant to the mining and milling operations. In comparison with the many other extensive industries of the Province, in proportion to the number of men employed, the asbestos mining district will be found to show up most favourably with a very small percentage of accidents.

### ONTARIO.

**Cobalt.**—The Provincial Mine is supplying compressed air to the Waldman property near it on the Gillies' Limit and to the Gould Consolidated on Cart Lake.

**Cobalt.**—Both the Keeley and the Wetlaufer mine, South Lorrain, will ship ore this week (Aug. 21st).

The Page brothers, of Butte, Montana, who hold the world's championship for hand drilling, won the recent drilling contest in Cobalt. They drilled 43 1-8 inches in 15 minutes. The first prize was \$1,000.

**Cobalt.**—At the Nancy Helen mine three good veins were cut in the second week of August. None of these veins outcropped on the surface.

**Dryden.**—There is a probability that the Baden-Powell mine at Eagle River, which has been closed down for some time past, will again be re-opened, the management of the property having recently received instructions from headquarters relative to an early resumption of operations.

### BRITISH COLUMBIA.

**Fernie.**—The coal miners in the Crow's Nest country are forming a Canadian Mine Workers' Union being dissatisfied with the late strike called by the American officials and by the fact that the unions refused to financially aid the strikers called out under their rules.

**Coal Creek.**—On August 15 fire destroyed 16 buildings at Coal Creek, including the Coal Creek Club.

**Nelson.**—The compressor plant of the Hall mines was destroyed by fire on the morning of August 20. The loss will exceed \$15,000.

**Rossland.**—Reports from the property of the Fife Mines, Ltd., indicate that a fine body of gold-copper ore has been found.



**Nelson.**—The mining outlook in Kootenay continues to improve. The latest deal of importance has just been closed whereby a Nelson syndicate has purchased the well known Athabasca mine and mill situated on Toad Mountain. The property has yielded large returns in the past but has been closed down and in litigation for some years. The vendors were the Bank of Montreal. The property is equipped with a ten-stamp mill, ten-drill compressors and 35-ton cyanide plant and a half-mile of tramway. Electricity is the power used. The mine contains over two miles of workings. This is only one more instance of valuable properties being reworked.

An important strike of high-grade ore is reported on the Mother Lode mine at Salmo, which indicates a large body of rich ore. Interest in the Slocan is steadily reviving, seventy men are busy at the Vancouver at Silverton. The Hewitt of Silverton will be on the shipping list once more, while reports from the Mollie Hughes at New Denver are decidedly good. Twenty men are at work on the famous Payne mine at Sandon, and many mining properties are being worked. Miners are hard to get and are wanted all over the district.

Ore shipments for the week are up to the best average for the year, and a further increase may be expected next month. The Consolidated Smelter at Trail received 11,000 tons this week, a record for the year.

## YUKON.

**Dawson, July 31.**—Klondike never saw such activity in its quartz properties as to-day. The quartz recording office has been so crowded of late with applications, renewals, and the like, that an extra clerk has been put on to assist Bert Brown, the quartz recorder.

Last month 110 quartz claims were located, and this month nearly 150 have been applied for to date.

Each quartz claim is 1,500 feet square. Taking this area 150 times, one will see that the quartz properties located during the present month will cover an immense area.

One point about the quartz activity is that the new staking is not confined to any one locality. The boom is on in every part of the district from Twelve-Mile to Sixty-Mile, from the high ridge dividing the camp to points along the Yukon; from Dawson to White Horse; in fact, everywhere throughout the territory.

While the quartz locations are going on, the owners of promising quartz also are spending not a little in development. The Davison people are pushing their large tunnel with the big hydro-electrical plant on the Dome and the Lone Star properties soon will have their stamp mill at work. A number of others are talking of putting in small stamp mills, and some are convinced that they can make their expenses out of their rock with a stamp mill right from the start.

# MINING NEWS OF THE WORLD.

## GREAT BRITAIN.

The wages dispute in the Scottish coal trade was settled on July 31st.

The following are some of the terms of settlement:

A minimum wage of 6s has been conceded to the miners.

An agreement has been made for three years.

The amount of the equivalent of the minimum is to be referred to arbitration.

The amount of advances by steps is also to be arbitrated upon.

The masters, it will be remembered, asked for a reduction in wages of 6d per day, making them 5s 6d per day. This led to the dispute now happily ended.

### Text of the Agreement.

1. The Conciliation Board shall be continued with the provision that there shall be obligatory a neutral chairman (whose decision in cases of difference shall be final and binding), to be selected by such method as shall be mutually agreed upon by the parties, and, failing agreement, by the Speaker of the House of Commons, and the Board and this agreement shall remain in force until the 1st of August, 1912; and unless six months before that date notice of termination is given by either party, it shall remain in force thereafter subject to six months' notice of termination given by either party at any time.

2. The principle of the 50 per cent. on 1888 basis as a minimum wage is conceded, and wages shall not be reduced below that point. In respect of the concession of an immediate 50 per cent. minimum, it is agreed:

(a) That the basis price for the 50 per cent minimum and the subsequent steps shall be referred to an arbiter. The reference to the arbiter shall be adjusted by parties and shall be on the footing that the relation between prices and wages in the past is recognized as equitable for the purposes of this arbitration and that the new basis price shall not be below the recent basis price—namely, 7s 5.45d. In fixing the new basis price and steps, consideration is to be given to the effect which the granting of an increased minimum wage would have on the re-

lation between prices and wages and also any other new circumstances bearing on increased or decreased costs since the agreement of 1904 was entered into which the arbiter considers relevant.

(b) That if for any month or months during the period from the date of this agreement to 31st March, 1910, the ascertained prices do not warrant a 50 per cent. wage under this memorandum, then for a like number of months any increased percentage in wages accruing under the memorandum shall be diminished by six and a quarter.

3. The neutral chairman, in giving his decision as to alterations in the rate of wages, shall take into account the state and prospects of trade.

4. Any difference regarding the interpretation of this memorandum or any difference regarding the terms of reference under clause 2 hereof, shall be referred to the decision of a neutral chairman to be mutually appointed by the parties, or, failing agreement, by the Speaker of the House of Commons.

5. The arbiter to act under clause 2 hereof shall be mutually appointed by the parties, and, failing agreement, by the Speaker of the House of Commons.

An interesting case occurred recently at Castleford Police Court, when 25 workmen of the Glasshoughton Colliery Company claimed damages from the company for breach of contract by refusing to allow the plaintiffs to descend the pit. An agreement had been signed by the colliery company that in the event of a pit gate meeting being held the men would be allowed an extra half-hour to get their lamps and descend on 28th June. The men contended that the agreement had not been carried out. The colliery company were ordered to pay 7s 6d each damages and the court costs in each case.

## SOUTH AFRICA.

The new 100-stamp mill being erected by the .Roodepoort United will consist of stamps weighing 1,901 lbs., which will be the heaviest stamps so far put down on the Rand. The record capacity is at present held by the Cinderella Deep, which in May



crushed 9.17 tons per stamp per day with stamps of 1,650 lbs. Other innovations in the Roodepoort United plant are that five tube mills, or one tube mill for every 20 stamps, are to be installed; shaking tables are to be substituted for plates and the cyanide plant is to be of more than the usual capacity to secure low value residues. The capacity per stamp per day is estimated in excess of 12 tons, or approximately 36,000 tons per month, but in view of the results obtained from the Cinderella Deep mill the cyanide plant will be designed for an even greater quantity of tailings and slimes—namely 40,000 tons per month. A substantial reduction in present milling and cyaniding costs is expected. The new plant should be running in about May next.

**WEST AFRICA.**

Mr. W. A. Pritchard a rubber planter, has reported to the Government his discovery of a banket formation in the Birrim district, Akim, 100 miles behind Accra, extending over a large area.

It is understood that a Government expert has visited the district, the precise locality of which is kept secret, and that the reef is similar to the Tarquah formation.

The news is regarded in Government circles as of great importance and likely to accelerate the extension of the Accra-Akwapim Railway towards Kumassi.

The line is making steady progress and is expected to have trains running as far as Nsawam—28 miles—by October this year

**UNITED STATES.**

Within a month a hearing will begin in Seattle, Wash., that Denver Government officials assert will disclose proof of gigantic frauds in connection with coal lands in Alaska. The facts pointing to alleged frauds are known to Secretary Ballinger, of the U. S. Department of the Interior, and Fred. Bennett, Commissioner of the General Land Office. That more than 200,000 acres of rich coal lands in Alaska, some of them having veins 65

feet in thickness have been filed upon by dummy entrymen, procured through agents of six large corporations, the land office has evidence to prove, according to information made public.

The view of the General Land Office Commissioner Bennett, as given out, is that all entries found to be fraudulent should be canceled at once.

One of the coal companies involved in the alleged fraud is located in Seattle, another in New York, and still others in San Francisco, Omaha, and Chicago. The so-called dummy entrymen were recruited principally from the docks of Seattle, the mine of Butte, and the laboring classes of Chicago.

**Company Notes.**

**NEW DOMINION COPPER.**

The last payment of the underwriters of the Dominion Copper Co. was made last Friday and the securities of the new company delivered to what now constitutes the present bond and shareholders, the old bondholders having received bonds and stock to which they were entitled.

The new company now has outstanding \$500,000 of bonds and 250,000 shares of stock. By the purchase of the old bonds, which have been exchanged for stock in the new company, and also by purchase of stock in the new company that has been delivered to the underwriters, the British Columbia Copper Co. interests are now large shareholders in this company.

An interim dividend of 1s per share has been declared by Bell's Asbestos Company, Ltd. The dividend was last raised in 1906 from 12 1-2 per cent. to 15 per cent. This latter rate has been maintained since then. The company has accumulated a reserve of £65,000 invested in high-class securities outside the business. Of this amount £50,000 is allocated to a special reserve fund for the equalization of future dividends. The carry-forward has gradually risen from £9,480 in 1906 to £15,266 in 1908.

**STATISTICS AND RETURNS.**

**STATISTICS AND RETURNS.**

L. Vogelstein and Co. report the following figures of German consumption of foreign copper for the months January to June, 1909:

Imports of copper .....	80,061 tons
Exports of Copper .....	3,913 "
Consumption of copper .....	76,148 "

as compared with consumption during the same period in 1908 of 79,090 tons.

Of the above quantity 73,416 tons were imported from the United States.

**COBALT ORE SHIPMENTS.**

Following are the shipments from Cobalt for the week ending Aug. 14, and those from Jan. 1, 1909, to date:—

	Week ending Aug. 14.	Since Jan 1.
	Ore in lbs.	Ore in lbs.
Buffalo .....	748,678	
Chambers-Ferland .....	961,010	
City of Cobalt .....	64,000	1,002,522
Cobalt Central .....	41,670	519,474
Cobalt Lake .....	79,960	

Coniagas .....	1,043,315
Crown Reserve .....	182,800
Drummond .....	920,000
Kerr Lake .....	1,298,146
King Edward .....	183,740
La Rose .....	258,190
McKinley-Darragh .....	122,350
Nipissing .....	322,390
Nova Scotia .....	480,810
Nancy Helen .....	83,400
Peterson Lake .....	40,000
O'Brien .....	1,565,742
Right of Way .....	2,032,691
Silver Queen .....	167,350
Silver Cliff .....	598,395
Temiskaming .....	123,820
Trethewey .....	1,446,060
Temiskaming & Hudson Bay .....	1,296,698
Muggley Cons. ....	1,106,260
	72,900

Ore shipments to Aug. 14, 1909, from Jan. 1, are 37,315,252 pounds, or 18,657 tons.

Total shipments for week ending August 14, 1909, are 1,198,750 pounds, or 599 tons.



**COBALT ORE SHIPMENTS.**

Following are the shipments from Cobalt for the week ending Aug. 21, and those from Jan. 1, 1909, to date:—

	Week ending Aug. 21.	Since Jan. 1.
	Ore in lbs.	Ore in lbs.
Buffalo . . . . .	42,350	791,028
Chambers-Ferland . . . . .		961,010
City of Cobalt . . . . .		1,002,522
Cobalt Central . . . . .	39,310	558,784
Cobalt Lake . . . . .		79,960
Coniagas . . . . .		1,043,315
Crown Reserve . . . . .	187,840	4,043,315
Drummond . . . . .		920,000
Kerr Lake . . . . .	123,880	1,422,026
King Edward . . . . .		183,740
La Rose . . . . .	206,600	8,181,213
McKinley-Darragh . . . . .		1,237,556
Nipissing . . . . .	190,120	9,577,593
Nova Scotia . . . . .		480,810
Nancy Helen . . . . .		83,400
Peterson Lake . . . . .		281,110
O'Brien . . . . .	64,020	1,629,762
Right of Way . . . . .	61,990	2,094,681
Silver Queen . . . . .		598,395
Silver Cliff . . . . .		123,820
Temiskaming . . . . .	60,000	1,506,060
Trethewey . . . . .		1,296,698
Temiskaming & Hudson Bay . . . . .		1,106,260
Mugglely Cons. . . . .		72,900

Ore shipments to Aug. 21, 1909, from Jan. 1, are 38,291,362 pounds, or 19,145 tons.

Total shipments for week ending Aug. 21, 1909, are 976,110 pounds, or 488 tons.

**B. C. ORE SHIPMENTS.**

The re-entry of the B. C. Copper Company into the shipping list was one feature of the week, the Mother Lode sending 2,730 tons to the Greenwood Smelter. The appended are the ore shipments and smelter receipts in detail:

	Week.	Year.
Boundary—		
Total . . . . .	21,903	805,060
Rossland—		
Total . . . . .	4,918	138,942
Slocan-Kootenay—		
Total . . . . .	3,641	112,546
Grand total . . . . .	30,462	1,056,548

**SMELTER RECEIPTS.**

Granby, Grand Forks . . . . .	16,259	587,026
Consolidated, Trail . . . . .	8,765	228,445
Le Roi, Northport . . . . .		12,761
B.C. Copper, Greenwood . . . . .	2,730	143,235
Total . . . . .	27,754	971,467

The output of gold at the Rand in July was officially placed at 620,794 fine ounces, valued at £2,636,965.

The following table gives the output of gold at the Rand (in fine ounces):

January . . . . .	615,113	560,329
February . . . . .	565,218	541,930
March . . . . .	607,500	574,901
April . . . . .	607,101	565,832
May . . . . .	624,498	581,992
June . . . . .	617,228	574,973
July . . . . .	620,794	584,455

The total gold yield for Victoria for the last seven months amounted to 358,000 fine ozs., valued at £1,520,000. The decrease, as compared with the corresponding period of last year, is 14,000 ozs.

The London circular of Pixley & Abell, dated Aug. 12, gives the exports of silver to the east from Jan. 1 to Aug. 12, as compared with the corresponding period of last year, as follows:

	1909.	1908.	Dec.
To India . . . . .	£3,841,800	£5,313,753	£1,471,953
To China . . . . .	1,465,700	516,400	*949,300
To the Straits . . . . .	82,800	90,510	7,710
Total . . . . .	£5,390,300	£5,920,663	£530,363

**TORONTO MARKETS.**

**Metals.**

Aug. 24.—(Quotations from Canada Metal Co., Toronto).

- Spelter, 5 1-4 to 5 1-2 cents per lb.; (market strong).
- Lead, 3.40 to 3.50 cents per lb.
- Antimony, 8 to 9 cents per lb.
- Tin, 31 3-4 cents per lb.
- Copper, casting, 13 3-4 cents per lb.
- Electrolytic, 13.75 cents per lb.
- Ingot brass, 9 to 12 cents per lb.

Aug. 24.—Pig Iron—(Quotations from Drummond, McCall Co.)

- Summerlee, No. 1, \$24 (f.o.b. Toronto).
- Summerlee, No. 2, \$23.50 (f.o.b. Toronto).
- Midland, No. 1, \$21.50 (f.o.b. Toronto).
- Coal:

- Anthracite, \$5.50 to \$6.75.
- Bituminous, \$3.50 to \$4.50 for 1 1-4 inch lump.

**Coke.**

Aug. 23.—Connellsville coke, f.o.b., ovens:—

- Furnace coke, prompt, \$1.60 to \$1.70 per ton.
- Foundry coke, prompt, \$1.85 to \$1.90 per ton.

Aug. 23.—Tin (Straits), 30.60 cents.

- Copper, prime Lake, 13.37 1-2 to 13.50 cents.
- Electrolytic copper, 13.00 to 13.10 cents.
- Copper wire, 15.00 cents.
- Lead, 4.40 to 4.45 cents.
- Spelter, 5.70 to 5.80 cents.
- Sheet zinc, 8.00 cents.
- Antimony, Cookson's, 8.62 1-2 cents.
- Aluminum, 22.50 to 24.00 cents.
- Nickel, 40.00 to 47.00 cents.
- Platinum, \$24.00 to \$26.00 per oz.
- Bismuth, \$1.75 per lb.
- Quicksilver, \$43.00 to \$43.50 per 75-lb flask.

**SILVER PRICES.**

	New York. cents.	London. pence.
Aug. 6 . . . . .	50 7-8	23 1-2
Aug. 7 . . . . .	50 7-8	23 1-2
Aug. 9 . . . . .	50 7-8	23 1-2
Aug. 10 . . . . .	50 7-8	23 1-2
Aug. 11 . . . . .	51	23 1-2
Aug. 12 . . . . .	51	23 1-2
Aug. 13 . . . . .	51 1-8	23 9-16
Aug. 14 . . . . .	51 1-8	23 9-16
Aug. 16 . . . . .	51 1-8	23 9-16
Aug. 17 . . . . .	51 1-8	23 9-16
Aug. 18 . . . . .	51	23 1-2