Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- ☐ Coloured covers/ Couverture de couleur
- ☐ Covers damaged/ Couverture endommagée
- ☐ Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- ☐ Cover title missing/ Le titre de couverture manque
- ☐ Coloured maps/ Cartes géographiques en couleur
- ☐ Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- ☐ Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- ☑ Bound with other material/ Relié avec d'autres documents
- ☑ Tight binding may cause shadows or distortion along interior margin/ La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure
- ☐ Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/ Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.
- ☐ Additional comments:/ Commentaires supplémentaires:

- ☐ Coloured pages/ Pages de couleur
- ☐ Pages damaged/ Pages endommagées
- ☐ Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- ☑ Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- ☐ Pages detached/ Pages détachées
- ☑ Showthrough/ Transparence
- ☐ Quality of print varies/ Qualité inégale de l'impression
- ☑ Continuous pagination/ Pagination continue
- ☐ Includes index(es)/ Comprend un (des) index

  Title on header taken from:/ Le titre de l'en-tête provient:
- ☐ Title page of issue/ Page de titre de la livraison
- ☐ Caption of issue/ Titre de départ de la livraison
- ☐ Masthead/ Générique (périodiques) de la livraison

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
										✓	

The Canadian Mining Review

Established 1882

Vol. VIII.—No. 7. 1889.—OTTAWA, JULY—1889. Vol. VIII.—No. 7.

ONTARIO

Mining Regulations.

The following summary of the principal provisions of the General Mining Act of the Province of Ontario is published for the information of those interested in mining matters in the Algoma District, and that part of the Nipissing District north of the Mattawan River, Lake Nipissing and French River.

Any person or persons may explore for mines or minerals on any Crown Lands surveyed or unsurveyed, not marked or staked out or occupied.

The price of all lands sold as mining locations or as lots in surveyed townships is two dollars per acre cash, the pine timber being reserved to the Crown. Patentees or those claiming under them may cut and use such trees as may be necessary for building, fencing or fuel, or for any other purpose essential to the working of mines.

Mining locations in unsurveyed territory shall be rectangular in shape, and the bearings of the outlines thereof shall be due north and south, and due east and west astronomically, and such locations shall be one of the following dimensions, viz: eighty chains in length by forty chains in width, containing 320 acres, or forty chains square, containing 160 acres, or forty chains in length by twenty chains in width, containing 80 acres.

All such locations must be surveyed by a Provincial Land Surveyor, and be connected with some known point or boundary at the cost of the applicant, who must file with application surveyor's plan, field notes and description of location applied for.

In all patents for mining locations a reservation of five per cent. of the acreage is made for roads.

Lands patented under the Mining Act are free from all royalties or duties in respect to any ores or minerals thereon, and no reservation or exception of any mineral is made in the patents.

Lands situated south of the Mattawan River, Lake Nipissing and French River are sold under the Mining Act at one dollar per acre cash.

Affidavits showing no adverse occupation, improvement or claim should accompany applications to purchase.

A. S. HARDY,

Commissioner,

department of Crown Lands, Toronto.

Coal at Edmonton. — At Edmonton, a coal seam four feet thick crops out on the south bank of the Saskatchewan, forty feet above the water. A small quantity has been mined from it; but lately Mr. Donald Ross has run a drift into the north bank through a mass of quartzite pebbles slidden from above. The seam consists of three feet of good workable coal, overlain by about one foot of dark clay shale, which is again overlain by a considerable thickness of impure coal. It has not been found advisable to work this upper part of the seam, but it forms a very good roof for the drifts and rooms. The coal is being used in Edmonton at different forges and throughout the town generally. It burns well, both in stoves and in open grates, making a clear hot fire, and when stored under a roof can be kept for a long time in a perfectly serviceable condition; a quantity of this coal which had been lying in a shed for a year was still in lumps of fair size, and when burned made an excellent fire.

The Ditton Gold Field. All the reports bearing upon the gold of Quebec refer only to the Chaudière valley. Other areas are known which promise quite as good returns to capital well applied; among them may be mentioned the upper waters of the Salmon River, more particularly in the Township of Ditton. That attention has not been directed to this locality is in large measure due to the fact that what is regarded as the most promising field for work is entirely in private hands, and no royalty being in consequence paid to the Government, no official returns are available as to the amount of the precious metal obtained. Alluvial gold has, however, been found there and worked for many years. The place where operations have been more particularly carried on is on the Little Ditton streams, on Lots 23 and 24 R.W. Ditton. Nuggets ranging in value from $50 to $150 are reported as having been found. The rocks are black, wrinkled, and sometimes pyritous slates and grey sandstones, in character similar to much of those on the upper part of the Chaudière, and also to those of the gold series of Nova Scotia. Veins of all sizes, up to several feet, traverse the slates, generally with the bedding, though occasionally transverse to it. No attempt has yet been made, in so far as could be ascertained, to test the value of these veins, though that some of those on the Little Ditton are auriferous is proved by the finding of ragged gold in quartz in close proximity and below them in the bed of the river.

The Canadian Mining Review

CONDUCTED BY - - - B. T. A. BELL

OFFICES:

UNION CHAMBERS, 14 Metcalfe St.

OTTAWA.

Vol. VIII. JULY, 1889. No. 7.

Chemical Contributions to the Geology of Canada.

One of the most important and responsible, while at the same time, perhaps the least known position in the Geological Survey, is that of the Analytical Chemist and Mineralogist. Working as he does, quietly and unobtrusively, in his laboratory, it is on the results of his experiments that many of the conclusions arrived at, and published officially to the world, are based.

Mr. G. C. Hoffman, F.R.S.C, who fills this position, has long ago established his reputation, and is an acknowledged authority on mineralogy. We have before us Part T of the Annual Report of the Geology and Natural History of Canada for 1887, which contains "Chemical contributions from the laboratory of the Survey," a mere glance through which will convey to those who know anything about assays, the labour involved in the preparation of this publication. Mr. Hoffman says that his work, during that year, was "purely of a practical character, having been confined exclusively to the examination of such minerals and specimens as promised to prove of economic importance." He was assisted in his work by Mr. Frank D. Adams, M. Ap. Sc, who, by the way, has just been appointed a professor in McGill College University, a well merited acknowledgment of his skill, and by Mr. E. B. Kenrick, B.A., as junior assistant, who has also left the Survey for a better position at St. John's College, Winnipeg. Whilst wishing these gentlemen every success in their new spheres, it seems a pity that their services should have been lost to the country, and we are afraid that the spirit of economy, as far as remuneration for valuable services is concerned, may in this case, and in some others, tend to prove the truth of Solomon's words, "There is that with-holdeth more than is meet, but it tendeth only to penury."

The principal Assays dealt with by Mr. Hoffman were: Lignite from the Saskatchewan river, coal from the Rocky Mountains and the Pacific Coast, iron ore from various parts of the Dominion, precious metals from various quarters, and a variety of specimens of a general character, the assays of which tend to show the value of the deposits from which they were obtained. One very interesting contribution, in addition to the minerals, is an analysis of the water from the Thermal Spring at Banff, and another on water from a mineral spring near Belvedere, Province of Quebec. With regard to mineral waters, it is remarkable how little reliable information there is in print respecting them, and, with the exception of one article, some years ago, from the pen of Dr. Sterry Hunt, on mineral waters, we doubt if there is any Canadian publication confined entirely to this subject. We noticed some two years ago, an article in "Wood's Medical Cyclopedia," by Dr. B. Small, of this city, on Mineral Springs, which has attracted a good deal of attention, more especially in the United States, where the work is published, though we have seen it referred to in Canada. This article is, we believe, the latest contribution published on this subject.

The analysis of the Banff waters in Mr. Hoffman's report is credited by him to Mr. F. D. Adams, the gentlemen referred to above, and is the most comprehensive in detail yet made. The report does not say where the analysis was made nor what time elapsed between procuring the water and the analysis itself. These are considered by experts to be material points in this relation. Mr. Hoffman states that many more examinations are made during the year than those, the results of which are published, the latter only containing those likely to prove of general interest. The extreme accuracy in the work of assaying is made apparent especially in the report on a specimen of tin ore, reported to have been found in Compton County, P. Q. Mr. Hoffman says: "On two of the fragments were observed what apparently consisted of imperfectly removed labels." With microscopical power and chemical action all possibility of palming off in any case spurious specimens is entirely done away with. We are of opinion that when the time comes, which we hope is not far distant, for the publication of a new "Geology of Canada," similar to that got up by Sir Wm. Logan, it would be a boon to Scientists generally if the various assays made by Mr. Hoffman year by year and published in the Annual Survey Reports, were compiled into one volume. Separated, as they are at present, through so many different reports, it requires considerable search to find out any one particular analysis, and, where all are of so much individual value, a work of this nature, properly indexed, would not only be of value in itself, but would tend, if possible, to make more public Mr. Hoffman's researches, so unobtrusively carried on.

Nitrates v. Phosphates.

The frequently quoted simile referring to the respective merits of nitrates and phosphates, as a plant food, that "the nitrate is like a glass of spirits, the phosphate like a plate of beef," is an exceedingly terse way of putting a generally acknowledged fact that, while the former is a mere stimulant, the application of phosphate adds permanently to the fertility of the soil. The simile, however, might with equal accuracy be continued as follows:—"But a combination of the two is like a substantial dinner."

The application of science to agriculture is of comparatively recent date, but, nevertheless, the progress in agricultural chemistry has wrought, as was to be expected, a corresponding advantage in the art of farming. It was soon ascertained that the artificial barrenness produced by exhaustion yields, under proper conditions, to the touch of science. Certain constituents, it was found, are indispensable for plant growth, and of these the largest quantities were continually being withdrawn. Chief among these constituents are phosphoric acid, nitrate of potash or soda, and ammonia. Most agricultural soils contain sufficient iron, magnesium, calcium, chlorine, sodium, and sulphur to last for ages, but the disproportion between the amount of the three former ingredients required by plants and the amount replaced in the soil by nature is so great that exhaustion of these elements follows as the necessary consequences of continuous cropping.

The application of science to agriculture resulted in nothing more and nothing less than the creation of a new industry, namely, the production of "commercial fertilizers."

The introduction of artificial fertilizers marks, therefore, a new epoch in the history of agriculture. Their general acceptance in common farm practice is equivalent to the introduction of a new force. They have revolutionised the mode of agriculture as thoroughly as steam and electricity have revolutionised transportation and commerce. By their judicious application a barren soil can be changed into one of great productiveness. Therefore the principal functions of a good fertilizer are to supply to the soil the three elements of plant-food usually wanting in poor or exhausted lands, viz., phosphoric acid, ammonia, and nitrate of potash or soda.

The application of scientifically prepared concentrated plant-food to the soil forms a means of estimating the progress which a country is making in the domain of agriculture. The marvellous ease and rapidity with which France paid off the enormous war indemnity of five milliards of francs has justly taken the world by surprise. Yet to a great extent it was due only to the wealth Frenchmen knew how to derive from the land they live on by a generous and intelligent method of farming, and to nothing else can this be ascribed but a practical recognition of the value of artificial manure.

Is it not strange, therefore, in the year 1889, when it has been clearly and repeatedly proved by all the leading scientists of the day, as well as by practical demonstration, that each and all of the three elements enumerated above are requisite and necessary to form the basis of a satisfactory and practical fertilizer, that men of intelligence can be found antagonistically debating the respective merits of phosphoric acid, as represented by the general term of "phosphates," and nitrates of soda and potash, usually designated "nitrates"? This is clearly attributable, however, not to a lack of knowledge of the scientific facts as they exist, but because of the different financial interest involved in the two

industries, thereby causing an undue advocacy of the particular chemical ingredient in which the several parties have embarked their capital.

The time is rapidly approaching when such a state of things must end; already those most largely interested in the nitrate industry have accepted the teachings of science in regard to this question of superiority or inferiority of the respective elements, and—appreciating the certainty of an almost universal demand in the future for a concentrated fertilizer containing all the beneficial qualities to be derived from a judicious combination of phosphoric acid and nitrate of potash—are alive to the necessity of securing a substantial interest in the comparatively limited supply of the crude phosphate rock.

The average farmer's knowledge of plant, physiology, and agricultural chemistry is, as a rule, of a very limited nature. He is not able to determine for himself what are, or what are not, those essential elements of food plants which he desires to procure for his land; but he is rapidly becoming educated up to a proper understanding of the various elements, and their relative value to the soil.

The literature published by the Royal Agricultural Society of England and the Bath and West of England Society is having a very beneficial effect in this direction, and the statistics and results of experiments therein published have in the past, and will still more in the future, clearly demonstrate that the very best results are to be derived, not from the use of nitrates or superphosphates alone, but by an intelligent use of the two in combination.

As evidence of this, Mr. J. E. Knowles, the chairman of the Experimental Committee of the Bath and West of England Agricultural Society (1888 89) states in his report that the results of twenty-four experiments in relation to wheat-growing showed "that nitrate of soda and sulphate of ammonia, when combined with superphosphate, have each given a larger produce both in corn and straw than either used alone." In the same publication the same satisfactory results were noted in reference to the oat crop. Experiments were made on ½-acre plots with the following results:—"The unmanured plots produced at the rate of 21 bushels per acre. By spending £1 1s. an acre in nitrate of soda (70 lbs.) and superphosphates (168 lbs.) the produce of grain was exactly doubled, and there was an increase of straw of 864 lbs, this increase in corn and straw being equal in money value to 2*l.* 10*s.*, or a clear gain, after deducting cost of manure, say, 30*s.* per ocre."

"In the plots where sulphate of ammonia alone and nitrate of soda alone were used there was a small gain of about 6*s.* per acre."

Similar experiments on "grass" resulted as follows:—Uumanured, 4 cwt. 1 qr. per acre of hay; sulphate of ammonia, 5 cwt. 2 qrs. of hay; nitrate of soda, 5 cwt. 1 qr. 7 lbs. hay; nitrate of soda and superphosphates combined, 6 cwt. hay.

No clearer proof can be required to demonstrate beyond a doubt the unquestionable advantage of this combination, and it will be unnecessary, therefore, to trouble the reader with detailed results of the numerous other trials made.

That both the nitrate and phosphate industries have reached gigantic proportions, notwithstanding unreasonable opposition, may be gleaned from the following figures:—

	Tons.
Nitrates used annually in the United Kingdom and Continent.....	600,000
Nitrates used in United States (about)	90,000
Phosphates imported into United Kingdom alone (1887).....	283,415
Superphosphates and fertilizers mainly based on phosphates, used in the United States (1886).....	1,006,631

Of this quantity 616,631 tons were used in the Southern States in the cotton districts.

It is difficult to estimate to what proportions this business may grow when a loyal combination is once established between the two interests, which, as we have pointed out above, must be the inevitable and speedy result of the march of progress and intelligent agricultural enterprise.

The question then arises—and it is a question which has given great concern to the manufacturers of fertilizers both in Europe and America during the past year—Where are we to look for our future supplies of crude phosphate rock which the satisfaction of this ever-increasing demand for plant-food necessitates? That the question is one of great moment for the consideration of manufacturers is evidenced by the serious anxiety evinced on this point by Mr. Herman Voss—himself the manager of one of the largest fertilizer manufacturing companies in the world—in his admirable paper read before the Chemical Manures Manufacturers' Association on 10th December, 1888. He therein stated:—"The consumption of phosphatic manures, partly owing to the use of large quantities of nitrate of soda and ammoniacal manures, is rapidly increasing all over the world, and our supply is at present dependent upon so few sources that I consider it necessary and advisable to change our mode of selling superphosphate in such a way that we could also draw from other sources which would strengthen our hands as manufacturers."

It will be noted that Mr. Voss not only expresses anxiety as to the present limited sources of supply of the crude phosphate, but strongly emphasises the fact we have demonstrated above, that any increased use of nitrate of soda, as a matter of course, will increase comparatively the demand for phosphatic manures.

The present imports of crude phosphate rock into Great Britain, as stated by Mr. Voss, are derived from the following sources (1887):—

	Tons.
United States.....	165,275
Canada.....	19,194
Dutch West Indies.....	9,505
British West Indies	6,451
Spain and Portugal.....	15,612
Belgium.....	45,322
Holland.....	4,778
France.....	11,140
Australia.....	350
Hayti.....	3,044
Brazil.....	1,200
Other countries.....	1,544
Total.....	283,415

From these figures it will be seen that to supply the requirements of Great Britain alone for the next ten years, provided the demand does not increase, will require an output of about 2,834,150 tons, and it is but reasonable to assume that long before the expiration of that time many of the older sources of supply, from which there has been a continuous drain for many years past, will be completely exhausted. On the other hand, it will be noted that the Canadian supply up to the present has only amounted to about 8 per cent. of the British consumption, notwithstanding the well established fact that the phosphate deposits in the Dominion cover such an enormous area as to warrant the assumption that in the near future Canada will take a foremost place in the world's supply of this invaluable mineral.

It will be noticed that the largest producing countries at the present time are the United States and Belgium. A reference to Mr. Voss's admirable paper shows that the average percentage of phosphate of lime in the Belgian product is not more than 50 per cent., while that of the United States contains about 60 per cent. The Canadian mineral, as imported into Great Britain averages, however, from 80 to 85 per cent. of phosphate of lime, and may at once be set down as one of the highest grades of phosphate rock the world produces.

When we take into consideration that, in order to produce a really high-grade phosphatic manure compound (for which intelligent agriculturists are year by year becoming more exacting in their demands), it is a necessity that manufacturers should procure a correspondingly higher grade of the raw material—and, if proof of this is necessary, it is to be found in the fact that makers are willing to pay a much higher price per unit of phosphate of lime for the richer minerals than they are for that of poorer quality; thus, for example, while a manufacturer is paying, say, 7*d.* per unit for a 50 per cent. phosphate, or 29*s.* 2*d.* per ton and 9*d.* per unit for one of 60 per cent., or 45*s.* per ton, he is willing to pay about 1*s.* per unit for the higher-grade Canadian, or 4*l.* per ton for an 80 per cent. grade, and 4*l.* 5*s.* for one of 85 per cent.—it must readily be seen that the Canadian miner must always be in a position to produce his material at a decided advantage over any of his foreign rivals

The question then naturally arises, if this be the case, how is it that the present output is so limited?

The reply is to be found in Mr. Voss' remarks under the head of "Canadian Phosphates," as follows:—

The Canadian mines commenced to be worked some ten years ago, and the output now amounts to about 25,000 tons per annum. Our imports from Canada were:—

Years.	Tons.
1881.....	8,187
1882.....	16,531
1883.....	15,716
1884.....	21,484
1885.....	18,069
1886.....	19,194

So that it will be seen that in six years the output has increased about 250 per cent.

Capital is the agent most required in Canada to build up and develop her mining industries. With it much more could be accomplished; without it Canadians are unable to avail themselves to the full extent of their rich phosphate territory.

Canada offers to the British capitalist a large and profitable field for investment in her phosphate properties. As the great and vital question of the future supplies of fertilizing materials becomes more widely discussed capital will assuredly flow into Canada for the purpose of of developing this profitable industry; but it behoves every Canadian, every man interested in the great future of this business, to see that the interests of the British investor are safeguarded by countenancing only those mining schemes which can bear honest investigation, and that will provide a fair and reasonable expectation of returning to those who invest their money in these properties a good and permanent interest on their capital. Otherwise, notwithstanding the glorious future opening out for those at present engaged in the business, capital will seek investment elsewhere, and the advancement of the colony, as well as its mining industries, will be permanently impeded.

The Value of Prospects.

Prospects should not be overlooked, for without them a mine is of no practical value. The enquiry should be made as to what the prospects are—whether of a temporary or a more abiding character. Not a few mining investors are unacquainted with what they buy. Because mining shares are offered temptingly by unprinciplined men, they buy without weighing the statements made which are sometimes quite inconsistent. Caution should be exercised, and advice sought of those in whom reliance can be placed. When a rich mine has been discovered in a previously unknown district many other mines are soon started around it, but because one mine has proved exceedingly rich it does not follow, as a consequence that all the same neighbourhood will be rich. The character then of the district is not to be estimated only by the success of one mine, but by its geological and mineralogical features. Having considered the district in which the mine is situated; the reports severally and collectively should be perused, and the character and ability of the reports should not be overlooked. It is not an uncommon plan for capitalists and investors to send their own agents to give a special report, and as practical and experienced men can be obtained at reasonable rates, the safer course is to engage them when the mines are easily accessible. Should the company be a new one it is well to notice whether the projected adventure is an old or abandoned mine. Old mines are rarely abandoned with "riches in sight," but justifiable reasons can often be given for their abandonment, and then investigation is courted. Being satisfied thus far, it should next be ascertained what the extent of the property is, the length of the run of the lodes or veins which traverse it, and how the lodes lie one to another. Then the distribution of metals may be ascertained, whether abundant or otherwise, and the quality of the ore.

The development of a mine will have shown it rich in depth. So long as a mine continues to open out rich in depth, and the value of the "ends" or drivings keep up, then the investor may rest assured that the mine is a good one. The reserves should not have been unduly entrenched upon, because on them success greatly depends. They are the dividends in embryo, the cash to come, the something to fall upon while explorations are being carried on in other parts of the mine. A good manager will always endeavor to keep up a two or three years reserve of ore, and to open up new ground at the same rate he is taking ore out of the mine. When large bodies of ore have been raised from a mine, unless precautions have been taken, serious accidents may occur which would endanger the prospects. "Slips" and "cavings in" sometimes occur, and, where these are likely matters become grave.

Coal Mining in Alberta

(Vancouver Daily World.)

There are few persons at present who are aware that Canmore, Alberta, is destined in a short time to rival as a coal producting centre, the far-famed Newcastle of England. Few persons will believe that within the beautiful valley of the Bow River, extending from Banff past Anthracite and Canmore to a point where the railway enters the Rocky Mountains, lies one of the finest coal regions on the continent. The coal found here is pronounced by experts to be of a superior quality to that of the famous Anthracite coal of Pennsylvania, and in a location easily accessible to the Canadian Pacific Railway. Through the untiring efforts of Mr. C. Brinckerhoff, who, representing a St. Paul syndicate, has spent the past two years in prospecting the section for coal, is the public indebted for the valuable find that will revolutionize the coal trade of the whole Pacific coast. He has secured for his company several sections of the most valuable coal lands in the district. and is at present at work upon a splendid vein, 14 feet 2 inches in thickness, having a pitch of about 54 degrees, into which they are sinking a large shaft, having now reached a depth of 140 feet, the men working in three shifts of eight hours each, a number being employed outside the shaft in handling the coal, while another large force is at work on the numerous buildings being erected for the use of the company and the accommodation of the miners, for whom ample provision is being made. The dining room is at present capable of seating 40 men at one time, and will be enlarged when necessary. The sleeping quarters will accommodate 32 men and are perfect models of comfort and elegance, while, to make everything complete, a library and reading room is to be erected at once, in which will be kept all the latest newspapers and magazines, showing a liberal forethought on the part of the company.

In order to reach the railway from the mine an inclined plane is to be run from the head of the slope to the river bank, where the coal will be dumped into a large breaker, and discharged from it into the cars which are to be run out on a spur of the track from the station, nearly a mile distant. This portion of the work is to be commenced at once; and, as repeated tests have been made of the coal by President Van Horne, Superintendant Whyte and several engineers along the line, all of whom pronounce it the best they have ever seen, assures the ultimate success of the mines and the future greatness of Canmore as a mining centre.

The Canada Anthracite Coal Company are also making rapid strides in the development of their mines here, and are shipping several cars per day to Port Moody for transhipment to San Francisco. The understanding now is that their headquarters are soon to be removed from Anthracite to this point.

Non-Conductivity of Mineral Wool.

—The mineral wool consists of a mass of extremely fine interlocking fibers which form multitudes of minute air-chambers, to which is due the non-conductivity of the substance. The fiber is, however, extremely glass-like and brittle, and will not bear much handling. It doubtless merits the reputation which it has, of becoming broken and pulverized by repeated heating and cooling, and by the vibrations and jarring of steam-pipes. The powder then collects at the bottom of the paper bags, leaving the top of the pipes comparatively unprotected. This reputation the mineral wool shares with the asbestos fiber, but is certainly more entitled to it than the latter substance. Much has been said of the corrosive action of mineral wool upon iron pipes, and Prof. Egleston, in a paper read before the American Society of Civil Engineers, has demonstrated that under certain adverse conditions such a corrosion does take place. But it is probable that mineral wool made from slags that are free from sulphates and sulphides, those of lime particularly, will not be liable to this objection, especially if dampness of the coverings be avoided.

Detecting Minute Quantities of Iron in Minerals.

— Alexander Johnstone, F. G. S., assistant to the professor of geology and mineralogy in the University of Edinburgh, states a new and rapid method for detecting minute quantities of iron in mineral as follows:

By means of a good strong flame, produced in the ordinary way by the mouth blowpipe, heat for a minute or two a small portion of the mineral, preferrably in a powdered condition on *clean* platinum foil, with about four times its bulk of potassium nitrate or chlorate. The platinum should be heated from below, as it is not desirable that the flame should touch the assay. After the mass has been ignited, as stated, add to, *before it has cooled down*, by means of a piece of glass tubing, pure concentrated nitric acid, drop by drop, until not a single drop remains dried up. Next pour on to the top of the unevaporated nitric acid, also by means of a narrow glass tube, two or three drops of an aqueous solution of potassium sulphocyanide. A *distinct* red coloration will immediately arise and remain if any iron was present in the mineral examined. As this test is extremely delicate, nitric acid quite free from iron must be obtained; and it is essential that the potassium nitrate or chlorate should also be pure. The platinum foil must be perfectly clean, and the dropping tubes must be rinsed with water before and immediately after the application of each test.

Chlorination Works for the Lake of the Woods.

The indications are that the mineral deposits of the Lake of the Woods region are to be developed at last. The question of titles having been settled and everything made clear for the safe investment of capital, a company has come forward to establish works for treating ores, and promise to be turning out bricks of gold within three months. Mr. Henry J. Power who has been interesting himself in the scheme and who has just returned from Chicago, says that he has arranged to erect Chlorination Works at Rat Portage for the purpose of treating all kinds of gold and silver ore, even when the latter is carrying up to fifteen per cent of lead. By the chlorination process the ore is crushed, then pulverized, then subjected to electrified terraced plates, after which it goes through the pans, then through the agitators and finally concentrated. This process is repeated until the gold or silver is thoroughly separated from the ore. The plant necessary for the works is not very expensive, but is complete and will have capacity for all the ore that can be supplied. Mr. Power has arranged with companies owning mines to begin developing in time to have ore on hand by the time the mills are finished. Mr. Power is a practical miller, and has had experience either as proprietor, manager, miller or assayer in Michigan, the Black Hills, Colorado, Utah, Wyoming, New Mexico, Texas, Arkansas and other places. He believes that the minerals in the Lake of the Woods have good values and will give a good return. The people of Rat Portage have voted $10,000 to aid the new works.

Shipments of British Columbia Coal.

The shipments of coal from the port of Nanaimo for month ending 30th June were:

Vancouver Coal Co.....	13,393	tons.
Dunsmuir & Sons.....	18,204	"
East Wellington Colliery....	1,884	"
Union Collery (Comox).....	4,500	"
	37,981	

Sinking Appliances at Llanbradach.

An Interesting Paper Descriptive of a Plant in Which the Author has Applied Successfully a Number of Original and Useful Ideas.

BY W. GALLOWAY.

[From Proceedings of the South Wales Institute of Engineers.]

The sinking at Llanbradach has been undertaken by the Cardiff Steam Coal Collieries Company, Limited, for the purpose of winning and working the well-known steam-coal seams of the district. The shaft now being sunk is situate close to and on the west side of the Rhymney Railway, at a distance of 11½ miles from the Bute Rocks at Cardiff, and it is thus about midway in a direct line between Pontypridd, at the bottom of the Rhonda Valley, and Risca Colliery, near the southeastern outcrop of the coal-field.

The great anticline which traverses the coal-field from west to east crosses the Rhymney Valley nearly at right angles to its general trend, at a point about half-way between Energlyn and Maes-y-Cymmer. Accordingly, if we follow the undulations of any seam passing from the south outcrop through the town of Caerphilly in a direction almost due north, we find the following changes of dip to take place: From the south outcrop the dip is towards the north, very rapid at first, and then more gradual, until the axis of the southern syncline is reached near the town of Caerphilly. The strata then rise toward the north, attaining a maximum rate of dip near Energlyn, and thereafter becoming gradually flatter until the summit of the anticline is passed, when they again dip towards the north at a moderate angle. The site of the shaft in question was chosen at a point about half a mile south of the summit of the anticline, principally with the object of avoiding the proximity of the two great faults which formed the northeast and southwest boundaries of the workings in Powell's Gelligaer Collieries.

The seam of coal worked in the southern syncline at Caerphilly, and known by the name of Llantwit or Maesmawr, is either identical with, or, at any rate, occupies nearly the same geological horizon as that which was formerly worked in Powell's Gelligaer Collieries, and is still worked on a small scale in the same neighbourhood. It forms the upper limit of what is known as the Pennant sandstone series, which has a thickness of about 500 yards, or rather less, along the line of our imaginary section, being probably somewhat thicker towards the north than towards the south. It crops out in the northern rise near Energlyn, already referred to; and although the hills on each side of the Rhymney Valley near Llanbradach rise to a height of upwards of 1,000 feet above sea-level, as far as at present known, they contain no vestiges of it. The mouth of the shaft at Llanbradach, on the other hand, is somewhat less than 400 feet above sea-level, and it follows that it will have to traverse about one-half the thickness of the Pennant series, including the ground occupied by the rock seams of the south outcrop, before reaching the Shale series proper.

Under these circumstances the Company elected to sink one shaft to ascertain the exact depth of the steam-coals, and to serve as an upcast to the future colliery, before deciding upon the more important equipment of the principal winding shaft; but, at the same time, they determined to fit out this shaft in such a substantial manner as to be able to cope with all difficulties likely to be met with in sinking in ground such as has been described, and to act, in case of need, as a powerful auxiliary in winding coal from the greatest depth likely to be attained.

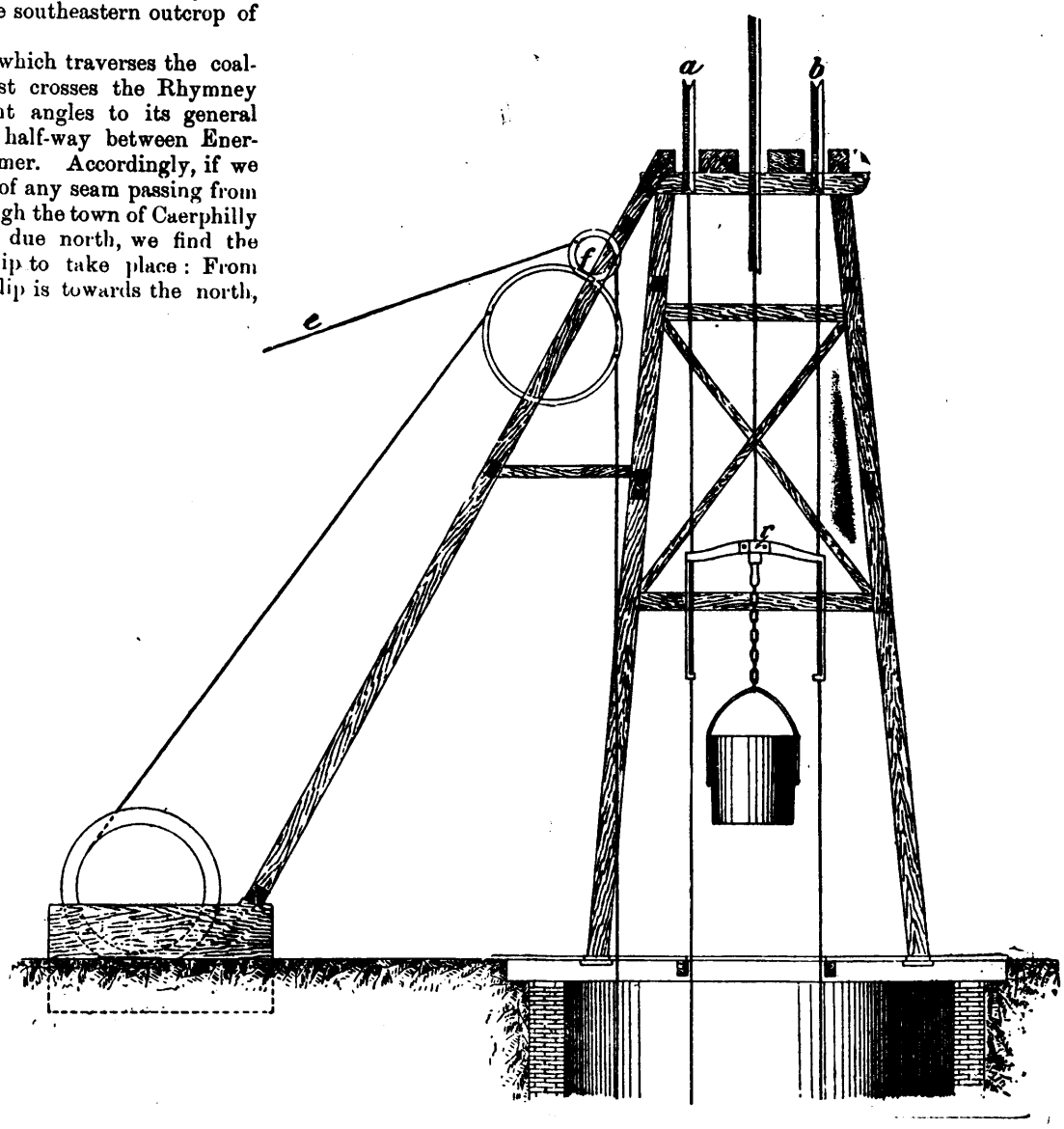
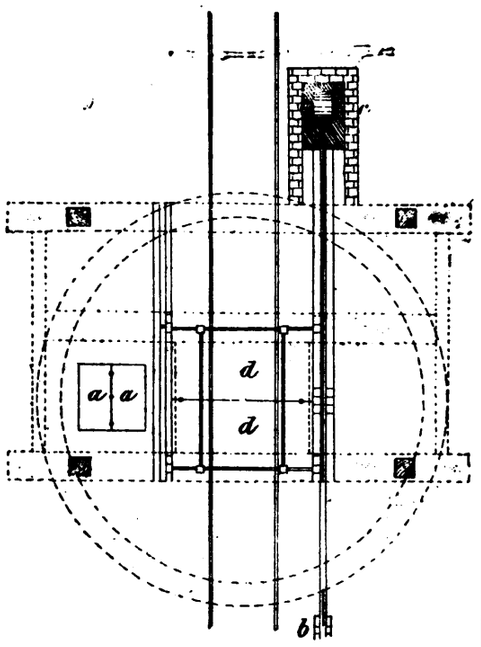


Fig. 1. Guides. Elevation. Scale, ⅛ in. = 1ft.

The shaft is 17 feet in diameter when finished, and is to be lined with brickwork throughout its entire depth. It is now (November 1, 1888,) 200 yards deep, and has passed through strata of a similar character to those found in Albion Colliery—saving only that the shales are thinner as a rule, and the sandstones thicker. This change in the nature of the strata was to have been anticipated, from the consideration of what takes place between Lady Windsor and Albion Collieries, and, again, between the latter and the ground which overlies and encloses the rock seams of coal in the Caerphilly hills.

The working pressure of the steam boiler at Llanbradach was fixed at 150 pounds per square inch, with the view of profiting as much as possible by the most recent improvements in steam-engine practice, such as working expansively either with or without compound or tripple-expansion engines. Only one boiler has been required up to the present; it is of the Lancashire type, is 8 feet in diameter by 30 feet long, consists entirely of steel plates, and was built and tested to a pressure of 250 pounds on the square inch, under the advice and supervision of the Boiler Insurance and Steam Power Company of Manchester.

A temporary brick chimney, only 30 feet high, was built in a position suitable to receive the products of combustion from two boilers of the dimensions given above, as it was intended from the first to apply a forced draught until such time as the permanent chimney is provided. The forced draught is now applied in the following way, with the most satisfactory results: An air-tight chamber built of brick, provided with two wooden doors and an iron roof in which there is a window of thick plate glass, has been built in front of the boiler, the brick-work enclosing the boiler-front constituting one of its sides. A sheet-iron tube, 18 inches in diameter, branches from the pipe which ventilates the shaft at a point near to the ventilating fan (a 40-inch Schiele), and is led into one corner of the air-tight chamber, on the side furthest removed from the boiler-front, and there turned upwards at right angles, so as to blow the air towards the roof. In this manner a pressure equivalent to a column of water one inch high can be maintained inside the chamber, creating an excellent draught through the boiler furnaces. The interior of the chamber is quite cool. The ventilating pipe leading to the shaft, and the branch leading to the air-tight chamber, are each provided with a loose-working throttle valve immediately beyond their point of junction with each other, whereby more or less air can be sent down into the shaft or into the air-tight chamber, as may be desired. The fan is worked by a belt from a small compound engine, with cylinders 6 inches and 12 inches in diameter respectively, by 8-inch stroke, expanding in the ratio of 8 to 1 when the valves make their full stroke, whereby the steam is cut off at five-eighths of the stroke of the pistons. The speed of the engine and fan is regulated by



Fig, 2. Guides. Plan, Scale, ⅛ in. = 1 ft.

means of a screw-wheel inside the air-tight chamber, which actuates the links, giving an earlier cut-off when desired.

The feed-water passes through a Green's fuel economizer, in which it is heated before entering the boiler by means of the waste furnace gases, on their way to the chimney, after they have left the boiler-flues. The fuel economizer has 48 vertical pipes, each 9 feet long by 3¾ inches in diameter, and heats the water nearly to the boiling point. It was considered better to heat the feed water in this way than by turning the exhaust steam of the winding and other engines into it, as the oil and tallow used in lubricating the slide valves and pistons would otherwise have been apt to form a hard cake on the top of the boiler-flues, more especially with the high temperature of the water within the boiler—about 357° Fahr. Besides this, an oportunity was left of condensing the steam from these engines, and obtaining the advantages of a vacuum; and the temperature of the feed-water was likely to be more uniform than if heated at irregular intervals, as it would have been by the exhaust steam from the winding engine of a sinking shaft.

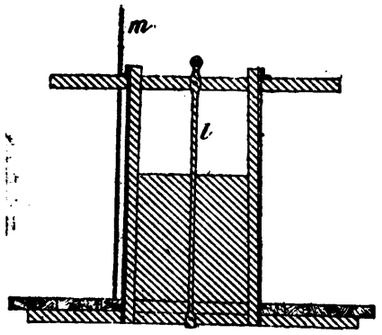


Fig. 3. Walling. Scale, ⅛ in. = 1 ft.

The shaft now being sunk is, as has been already mentioned, intended to serve as the upcast, and it was, therefore, not considered essential to make the principal winding engine a compound one. Besides, the author was aware of the difficulties that had attended the introduction of compound winding engines in other districts, both at home and abroad, and wished to investigate the question experimentally on a smaller scale, by means of another auxiliary winding engine, before applying the principle on a larger scale. The solution of this question which had presented itself to the author was the introduction of a reducing valve, properly so-called, between the steam-pipe leading from the boiler to the high-pressure cylinder and the pipe connecting the high and low pressure cylinders, regulated in such a manner as to maintain the pressure in the intermediate pipe, when the engine was not at work, as nearly as possible at the same average as the steam in that passage would naturally assume when the engine was working. In order to limit the quantity of steam passing through the reducing valve to the smallest quantity necessary to accomplish the object in view, a screw stop-valve was to be introduced in the pipe connecting the reducing-valve with the high-pressure steam-pipe, and a steam-pressure guage on the intermediate pipe itself, for the purpose of enabling the reducing-valve to be properly regulated. Accordingly, in May, 1887, when specifying the details of a small auxiliary compound winding-engine to be employed in lowering bricks and mortar on to the walling stage, &c., the author included the reducing-valve, stop-valve, and steam-gauge, arranged as described above. This engine was erected at Llanbradach in October, 1887. It is identical with the fan-engine previously described, except as regards the reducing valve, the steam stop-valve connected therewith, and the steam-pressure gauge; and it is connected to a drum, five feet in diameter, by means of helical spur-gearing in the ratio of six to one. Some preliminary difficulties were caused by the makers having, of their own accord, made the slide-valve of each cylinder to cut off steam at five-eights of the stroke; but after the valves had been cut so as to admit steam during the whole length of the stroke, these difficulties entirely disappeared, and thereafter this compound engine became as satisfactory, and as easily controllable, as any other winding engine with two cylinders.

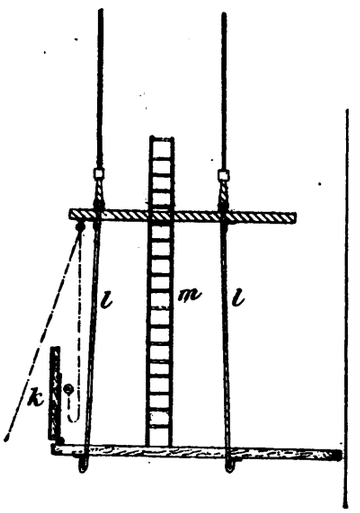


Fig. 4. Walling. Scale, ⅛ in. = 1 ft.

At first it was employed only for the purpose for which it was originally intended, but at a later date it became expedient to use it for raising water from a collecting cistern fixed on one side of the shaft, and then the great saving of steam effected by compounding became very marked, when its performance could be compared with that of the large winding-engine which had previously raised the same water from the bottom of the shaft at the same depth. As the author intends to describe more particulary the method in which this water is collected and raised, at a later stage of the paper, he will only say in this place that this engine, before the last remove of the cistern in the shaft, raised water from it continuously day and night, with one rope, from a depth of 135 yards, at the rate of 30 to 35 tanks (2,500 to 3,000 gallons) an hour to the 20th of October, when the cistern was removed to a point 190 yards deep. From the latter point the same engine raised temporarily 25 tanks (2,125 gallons) an hour; but as the cistern collects over 5,000 gallons an hour, it became expedient to apply a stronger engine and a larger tank to the same end.

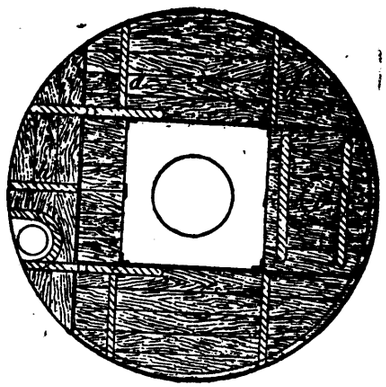


Fig. 5. Walling. Scale, ⅛ in. = 1 ft.

The principal winding-engine has two cylinders, each 24 inches in diameter by 4-feet stroke, connected directly to the shaft of a drum 14 feet in diameter. It is provided with equilibrium slide-valves and Allen valve-gear, and the dimensions of its principal parts are as follows:

Piston-rods, 5 in. dia.

Connecting rods, 5 in. dia. at the ends.

Crank-pins, 6 in. dia. by 8 in. in the bearings.

Drum-shaft, 11 in. dia. by 18 in. in the bearings.

Drum-shaft 13 in. dia. in the drum-heads.

This engine was built by the well-known firm of engineers, Llewellyn & Cubitt, of Penter Pontypridd, and has continued to give unqualified satisfaction since the first day it commenced to work. As the author anticipated, it works as smoothly, and is as easily handled, at the high pressure as a larger engine is at a lower pressure. In ordinary work it raises 9,500 lbs., consisting of

Rope, say.....	800 lbs.
Water-barrel.....	2,500 "
Water	6,000 "
Rider..	200 "
	9,500 lbs.

at the rate of 30 feet per second, thereby developing over 500 horse-power; but this is not by any means the limit of its capacity.

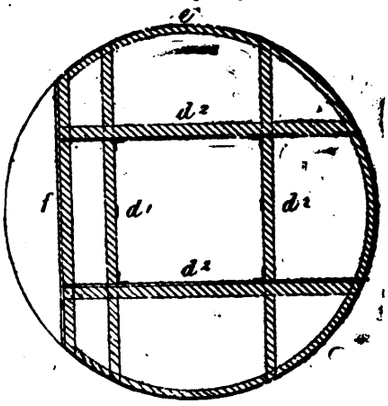


Fig. 6. Walling. Scale, ⅛ in. = 1 ft.

The loads raised and lowered by each winding-engine are steadied by means of wire-rope guides, applied according to the system patented by the author in 1875, and first made use of in that year at Penrhiwfer Colliery, belonging to the Glamorgan Coal Company. There are two guide-ropes to each engine, one on each side of the winding rope, and the three ropes of each system hang in the same vertical plane, one system, in this case being at right angles to the other.

At the surface, the guide-ropes of the principal winding engine pass over pulleys, *a*, *b* (Fig. 1), and are coiled upon the drums of a screw steam-crab at some distance from the shaft. These drums can be worked either separately or simultaneously, so that one guide-rope can be raised or lowered by itself, or both can be raised or lowered together. The lower extremities of these two guide-ropes are attached to the walling stage (Fig. 4).

The rider, *r* (Fig. 1), consists of three principal pieces of iron, namely: a cross-bar in which there is a central opening three inches in diameter, which fits loosely around the winding-rope, and two vertical l·gs bolted to the cross-bar, and having similar openings about two inches in diameter for the guide-ropes, both at their upper and lower ends. A circular iron plate, six inches in diameter, rests in a horizontal position upon the cap of the winding-rope,

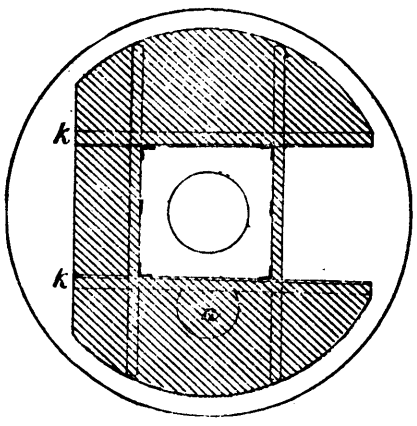


Fig. 7. Walling. Scale, $\frac{1}{8}$ in. = 1 ft.

and serves as a base for an india-rubber buffer, six inches in diameter by six inches thick, which surmounts it. The extremities of the guide ropes are provided with similar india-rubber buffers, 4 inches in diameter by 4 inches thick. When the end of the winding-rope is raised above the walling stage, the rider is caught up by the buffer at its end, and slides on the guide-ropes; on the other hand, when the end of the winding-rope passes below the stage, the rider is left standing upon the buffers at the ends of the guide-ropes, while the load can be lowered to any desired depth through a central opening in the stage. By this arrangement the stage is permanently suspended in the shaft, and is ready at a moment's notice for any service that may required of it; and the buckets, &c., are as quickly and easily *steadied* (whatever the depth of the shaft may be) as if the winding-rope was not longer than the distance between the stage and the bottom, which, for convenience, is usually about 15 or 20 yards.

In former applications of this system, the stage consisted of a simple wooden disc, suspended by means of chains to the ends of the guide-ropes, and having a central opening 6 feet square, through which the load passed upwards or downwards, as the case might be. At Llanbradach the stage is a much more substantial structure, and may here deserve notice as an improvement upon its predecessors. It is repre sented in Figs. 3, 4, 5, 6 and 7, and consists of the following parts, viz. :—

a. A wooden floor (Fig. 5), partly fixed to an angle-iron frame, partly movable.

b. An upright tube (Fig. 3), fixed to the iron frame of *a*.

c. A horizontal iron frame (Fig. 7), fixed to the pieces of angle-iron which form the corners of the tube.

The lower frame (Fig. 6) consists of four pieces of angle-iron, d^1, d^1, d^2, d^2, 5 inches by 5 inches by $\frac{5}{8}$ inch, crossing, each other, two and two, at right angles; a circular band of angle-iron, *e*, *e*, 4 inches by 4 inches by $\frac{1}{2}$ inch, in three segments, joined to the ends of six of the pieces d^1, a^2; and a straight piece of angle-iron, *f*, 5 inches by 5 inches by $\frac{5}{8}$ inch, joined to the shorter ends of d^2, d^2, and to the ends of the circular frame, as shown.

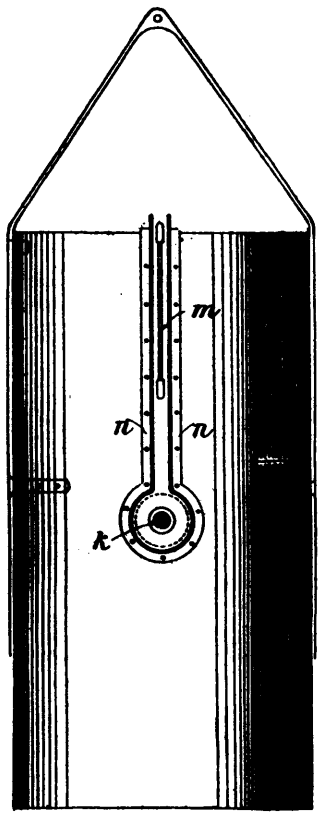


Fig. 8. Pneumatic Water-Barrel. Scale, $\frac{3}{8}$ in. = 1 ft.

Part of the wooden floor *g* (Fig. 5), is bound together by means of four straps of iron, two above and two below. One of its ends rests on the circular angle-iron, and the other on the cross-piece, d^1; but it is not fixed in any way, and can be lifted out of its seat and removed when desired.

At the other side of the stage there is a hinged door, *h*, forming the smaller segment of the circle, which can be raised up into a vertical position as shown in Fig. 4, or let down into a horizontal position (Fig. 5). It is held in the latter position by two chains attached to the ends, *k*, *k*, of the frame-work of the roof. When the stage is taken past the pipe buntons, this door is raised up. It is provided with an opening large enough for the ventilating-pipe. All the timber is 5 inches thick, and, except that which constitutes the hinged door and the part *g*, it is all bound strongly to the iron frame-work. The latter is is held together by $\frac{3}{4}$ inch rivets.

The tube consists of four upright corner-pieces of angle-iron, 5 inches by 5 inches by $\frac{5}{8}$ inch, which connect the upper frame with the lower one. Four plates of sheet-iron $\frac{1}{4}$ inch thick, attached to the four uprights just named, form a fence 6 feet high round the central opening in the stage, which is 6 feet 6 inches square.

The roof is 10 feet 6 inches above the stage proper. It is formed similarly to the floor, has a rather smaller diameter, and is covered with sheet-iron $\frac{3}{8}$ inch thick, except above the door and moveable part *g*, which are left uncovered. Its central opening is 5 feet 6 inches square.

The tube has thus the form of a frustum of a quad-rangular pyramid.

The stage is suspended from the guide-ropes as shown in Fig. 4, the caps at the ends of the ropes being attached directly to the eyes of the suspending rods, *l*, one on each side of the centre of the shaft. An iron ladder, *m* (Fig. 4), provides a means of access to the roof, and *vice versa* through the opening, *n*, in the sheet-iron cover.

The guide-ropes are made of steel wire; each of them is $3\frac{1}{2}$ inches in circumference, and is calculated to have a breaking strain of 33 tons, or thereby. The stage weighs about 5 tons, or a little over. The guide-ropes are 5 feet 6 inches apart, center to center, so that the center of each is 2 feet 9 inches distant from the center of the winding-rope.

The top of the shaft is covered with 4-inch planking, except over the two areas occupied by the two pairs of balanced doors, *a*, *a* and *d*, *d*

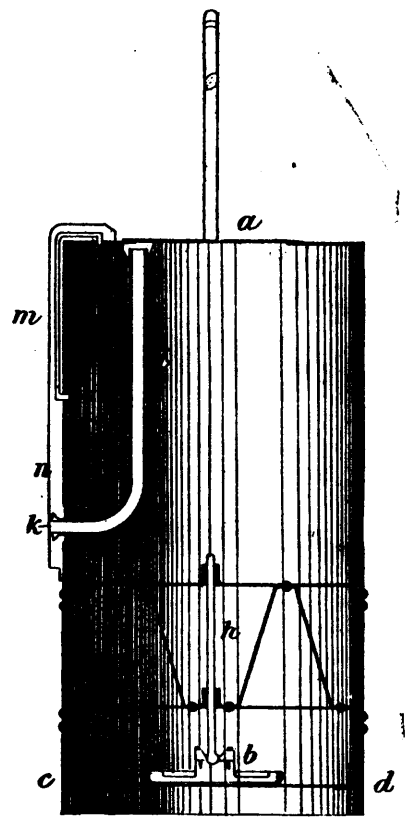


Fig. 9. Pneumatic Water-Barrel. Scale, $\frac{3}{8}$ in. = 1 ft.

(Fig. 2), The balance-weight of the doors *d*, *d* is shown at *c*, and the lever at which they are opened and shut at *b*. The corresponding balance-weight and lever of the doors *a*, *a* are omitted from the drawing for the purpose of avoiding complication. Suffice it to say that both pairs of doors are balanced in every position—open, shut, or intermediate.

In all former applications of the system the cranks, rods, and levers which connected the doors with the balance-weights, and with the handle for manipulating them, were overhead. At Llanbradach they have been brought down to the same level as the covering of the top of the shaft. The rider is shown at *r* (Fig. 1), with a bucket suspended below it. The buckets are 3 feet 9 inches in diameter at the top, 3 feet 4 inches in diameter at the bottom, and 3 feet 6 inches deep, so that each contains about $34\frac{1}{2}$ cubic feet when filled to level with the top. They are emptied into triple-center, side, and end tipping wagons of steel, without being detached from the winding-rope.

(To be Continued.)

Acknowledgment.—We are indebted to the courtesy of the Colliery Engine r Co., Scranton, Pa., for the use of the cuts illustrating the foregoing paper by Mr. W. Galloway.

PHOSPHATE.

Ocean Shipments.

The following is a statement of the Shipments of Canadian Phosphate from the port of Montreal since our last issue to 8th July :—

Date.	Vessel.	Destination.	Shipper.	Tons.
June 10.	Ripon City.....	Hull.....	Millar & Co.....	260
" 18.	Saturnina.....	Liverpool....	Wilson & Green.	401
" 21.	Zambesi.....	"	Millar & Co.....	300
" 25.	Montreal.....	"	Lomer, Rohr&Co	270
" 27.	Lake Ontario.....	"	Lomer, Rohr&Co	200
July 3.	Vesta.....	"	Wilson & Green.	200
" 6.	Colina.....	Glasgow.....	" "	15
" 8.	Etna.....	Hamburg....	" "	244
		.....	.....	1890

RECAPITULATION.

Lomer, Rohr & Co.....	470	Tons.
Wilson & Green.....	860	"
Millar & Co.....	568	"
Total.....	1890	
Liverpool.....	1371	Tons.
Hamburg.....	244	"
Glasgow.....	15	"
Hull.....	260	"
Total.....	1890	

The estimated value of phosphates exported from the Kingston district during April and May, as per Customs returns, was $3,940. Of this 279 tons were shipped to Great Britain.

A little over 1000 tons have been shipped to European points from the Blackburn mine, Templeton, since opening of navigation.

British Fertilizer Market.

We are indebted to Messrs. Couper, Millar & Co., London, for the following report of the British Fertilizer market since our last issue :—

Since the issue of our last circular, business has been somewhat restricted, manufacturers holding off, as they are unwilling to believe in the advance in the price of phosphates which has been established. Within the last few days there has been more disposition to contract for next season's requirements, and the continental demand continues active, more especially for high test. The prices ruling in America for South Carolina restrict shipments to Europe, and the demand there in the immediate future is more likely to increase than diminish. Nitrate of soda is firmer, even though the season's demand is about over, while sulphate of ammonia is very steady.

Mineral Phosphates.—Canadian is more appreciated on continent than in U. K. For 80 per cent. 1/0½ ex ship London and Liverpool may be considered to-day's price, with 75 per cent. at 11d. and 70 per. cent. 10d. per unit, all with one-fifth of 1d. rise. South Carolina 9¾d. to 10d. Somme, of the higher tests, enquired for, but not to be had except at extreme prices. Belgian 40 to 45 per cent. and 45 to 50 per cent. we are sellers of, prices according to port of discharge.

Bone Ash, Bones and Meal.—No enquiry for ash cargoes, but more disposition to operate in bones forward. Bone meal dull and sales of Bombay at £4 13s. 9d. to £4 15s. 0d.

Nitrate of soda firmer at £8 7s. 6d. to £8 10s. 0d.

Sulphate of ammonia very steady at £12 2s. 6d. per ton.

Ammoniacal materials wanted. Fish Guano and ground hoofs and horns we have sold forward, but can still offer more. Dried blood does not command so much attention, prices asked being comparatively much too dear.

Muriate of potash is quoted at £7 5s. on 80 per cent. ; Kainit at 23/6 in bulk, 26/6 in bags, and Kieserit at 17/3, all f.o.b. Hamburg, subject to open river navigation. Net cash. Strassfurt weights and sampling.

In General.

The Hon. Gerald McGarel Hogg (son of Lord Magheramorne, K.C.B., late Chairman of the Metropolitan Board of Works, London, England), who spent last summer in Montreal studying the phosphate interests of Canada, has been admitted as a partner in the firm of Messrs. Couper Millar & Co., London, England, the well known phosphate importers whose Montreal House Messrs. Millar & Co. are the agents for the Canadian Phosphate Company, Limited.

Captain R. C. Adams, Managing Director of the Anglo-Canadian Phosphate Company, returned from England on the 5th instant.

Enquiries for Canadian phosphate lands have been numerous, but only from speculators who desire to offer them to the public. The response to such efforts as have been made in this direction have discouraged the promoters. There is no doubt, however, that an interest is being awakened in the Canadian industry that will eventually lead to the investment of British capital, and it seems certain that phosphates have a good commercial future.

Contract work for the Anglo-Canadian Phosphate Co. proceeds at the Otty Lake and Bobbs Lake Mines. The output for the past month at Bobb's Lake averages eight tons per man employed, a very satisfactory result. This property has developed so well that the management contemplate putting an enlarged system of day's work into operation.

Mr. W. Hamilton Merritt, M.E., Toronto, spent a few days last month examining a property near the High Falls, Lievre river, Que., in which Mr. Dalton McCarthy, Q.C., has a large interest. Foreman Holmes and a small force are doing development work here, and have opened up a number of shows which promise well.

Markets.

Markets are firmer and lower grades of phosphate may be quoted at 10*d.* for 70 per cent. an advance of 1¼d. since the season opened. There is some enquiry for 60 per cent. phosphate. Eighty per cent. is quoted at 12½*d.*

Safe Transportation of Sulphuric Acid.

—Herr Bickmann has patented in Germany a process for enabling sulphuric acid for manufacturing purposes to be safely transported. He takes advantage of a property of certain salts—of which alkaline sulphates are representatives—by which they give up their water of crystalization when heated, and take it up again when cool ; and he does so by mixing the salts in an *anhydrous* condition with a calculated quantity of sulphuric acid. The whole mass becomes granular, or may be formed into cakes ; and when heated the whole liquefies, and may be used as if it were sulphuric acid, for the presence of bisulphate of soda does no harm in many utilizations of the asid.

MINING NOTES.

We shall be greatly obliged to mine owners and superintendents for such authentic reports of their operations as may concern shareholders and the public.

Nova Scotia.

At the Annual Meeting of the Gold Miners' Association of Nova Scotia, held at Halifax, on 6th March, a resolution was passed adopting the "Canadian Mining Review" as the official organ of this Association.

Chester Basin.

Mr. C. E. Willis, manager, started the mill of the Neptune Gold Miuing Co. last month. He reports the mill excellent in every respect, and says he has "the best little mill in the Province." Up to date the mill has crushed at the rate of 18 tons in 24 hours. The stamps, engine and boiler were furnished by I. Matthe-son & Co , of New Glasgow.

Chezzetcook.

Mr. J. L. Graves, of Boston, has been making another test of his property here, preparatory to deciding whether he will continue work or close down indefinitely. Some work was done upon this property last fall, but with no encouraging results.

North Brookfield.

The Philadelphia Gold Mining Co. have contracted with I. Matheson & Co., of New Glasgow, for a 20 stamp mill complete, with a 60 h. p. boiler, and an engine. The company have hitherto used the mill owned by Mr. McGuire, operating it under a lease. This lease is about to expire, and the management feel secure enough of the prospects of the mine to build a larger and better mill of their own.

Miscellaneous.

At the regular monthly meeting of the Gold Miners' Association on the 5th July Mr. J. S. McArthur, of Scotland, was a guest, and explained to the members present the process which the Cassell Gold Extracting Co., Ltd., of Glasgow, Scotland, are now trying to get adopted in the gold fields of both Australia and the United States. Mr. McArthur, who is the technical manager of the Cassell Co., stated that they now had four different companies using their process with success in Australia. The process is patented in Great Britain and the colonies and in the United States. The process is essentially one of volution and precipitation, the solvent being a dilute solution of Cyanide of Potassium. It is claimed that 85% is extracted at a cost of less than $20 per ton.

The Nova Scotia Iron, Coal and Railway Co. (Limited) has been organized under Charter granted by the Local Government, and the long talked of smelting works now bid fair to become a reality. The directors of the new concern are: J. P. Mott, Halifax, President ; Graham Fraser, Glasgow, Scotland, Vice President ; J. F. Stairs, Halifax, Thos. Bayne, Halifax, Wm. Jacks, ex-M. P., Glasgow, Forrest McKay, New Glasgow and Harvey Graham, New Glasgow. It is proposed to proceed at once with a thorough examination of their iron ore properties, and should the prospects prove satisfactorily, the erection of the furnaces and necessary plant will be at once begun. Those who look hopefully forward to the successful establishment of iron

smelting works in this district, must be gratified to find on the board of directors the names of gentlemen who have been associated with the iron industry of Pictou County from its infancy, and to whose skilful management and thorough business ability, the Nova Scotia Forge Co. and Nova Scotia Steel Co. (now amalgamated) owe their existence and their present prominent position among our local industries.

There is some improvement in the coal trade in Pictou County and this is particularly noticable at the Drummond Colliery, where work of late has been fairly brisk, yet not sufficiently so to warrant the re opening of No. 4 Slope and the Scott pit, although rumours are current that the latter will be re-opened at an early date.

At the Black Diamond Mine work is, as usual, steady, any stoppage of work at this colliery having not as yet been due to any lack of orders. Another Slope is soon to be opened here for the pupose of winning an extensive block of coal of excellent quality; it is always gratifying to report the success of this enterprising company, while the harmony which exists between the management and workmen is certainly worthy of notice, and cannot fail to be productive of lasting benefit to all concerned.

At the Acadia Colliery work is also somewhat steadier, and the sinking of the n w lift is progressing satisfactorily. There is some talk of a new hoisting engine being erected here, this will, however, be a necessity of the future, and will no doubt when erected be fully in keeping with the other machinery at the place, first class in every respect.

At the Albion Mines, the Acadia Company—not discouraged by frequent interruptions and a heavy expense—are pushing vigorously forward with the re-opening of the Foord Pit, Cage Pit Seam, and No. 1 Slope. A new steam pump (Knowles') has been put to work in No. 1 Slope, and good progress is being made with the drainage of the water. At the Foord Pit, despite many difficulties encountered, care and perseverence still characterise the conduct of the work, and the obstacles are gradually, but surely, being overcome. It is predicted by knowing ones that in another month the bottom of the shaft will be reached; your correspondent is one of many who hope for even better things. Very little coal is at present being raised at the McGregor pit, and miners employed there must, indeed, be feeling the pinch of hard times.

At the Vale Colliery work is exceptionally dull just now, only the McBean Seam being worked and very irregularly at that. This mine has recently been visited by several parties interested in the proposed new Iron Works, it is said with a view to purchase. Should the colliery pass into the hands of an iron company, it would doubtless be a means of providing steady work for the men employed there.

Ontario.

Application for incorporation is made by the National Gas and Oil Company of Canada with offices at Windsor, to carry on operations in the County of Essex. The capital is $100,000 in shares of $10.00 each. The applicants are:—Mary Agnes Burke, Windsor, John McArdle, of the same place, telegraph operator; John Atkinson Smith, of the same place, dentist; Charles Hilaire Deslisle, of the same place, hotel keeper, and William Goodwin Wood, of the same place, assayist.

The said John McArdle, John Atkinson Smith, and Charles Hilaire Deslisle are to be the first directors of the company.

We understand that the proprietors are at present negotiating for a sale of the well known Frontenac lead mine near Kingston. The property comprises the south half of lot 16 and the east and north parts of lot 15 in the 9th concession of Loughborough, containing about 200 acres, transversed diagonally for a distance of nearly a mile from south-east to north-west by the principal lead bearing vein, 10 to 12 feet wide, richly charged with galena, and cutting the country rock at right angles. On this vein two shafts have been sunk about half a mile apart. The eastern shaft, or No. 1, on lot 16, has been sunk nearly 200 feet, with an adit of 450 feet at a depth of 40 feet and 18 and 28 fathom levels along the vein and between its walls. The western shaft, or No. 2, on lot 15, has been sunk to about 30 feet, and the last ore raised from the bottom was a cubical mass of almost pure galena of about 200 pounds weight. This shaft is provided with a steam engine and hoist. At and near shaft No. 1 the following buildings have been erected:—(1) Shaft house. (2.) Dry house. ((3.) Offices. (4.) Engine and crusher house, 82x44, with powerful engine and crusher. (5.) Dwelling house, 36x26. (6.) Boarding house, 48x21. (7.) Blacksmith's and carpenter's shop, 31x25. (8.) Barn, 36x24. (9.) Mill building, 66x60 and two storeys high, containing under one roof engine of 40 horse power, with two boilers, very complete pumping and hoisting machinery, drum, cables, &c., two sets crushing rolls, two sets jiggers, and and other washing and dressing plant, Mackenzie blower, and American smelting furnaces. Lead to the value of $25,000 was obtained from the mine by the late lessees. Mine and works have been carefully examined, and are very favorably reported upon by several of the best known experts in the country, including Prof. E. J. Chapman, Dr. Sterry Hunt, Dr. Robert Bell, and Sir J. W. Dawson. The largest interest in the property is now held, we believe, by Messrs. J. M. Machar and W. Romanes, Kingston.

Sudbury District.

Three car loads of machinery arrived at the Copper Cliff mine last week, where a second furnace is being put in by the company. They are down over 400 feet in the mine now, and on the second and third levels they found two immense pockets or domes, holding thousands of tons of ore—three parts copper and one part nickel.

The Simpson Bros. are still testing their 900 acre claim just east of Nickel City. They have found gold in seven different places on it, and have a crusher at work grinding out the rock taken from the test shafts. An old horse and a primitive apparatus, the same as that used in King Solomon's mines, makes about $10 a day at it.

The new management of the Vermillion mine are preparing to work this magnificent property on a large scale. The great hill of decomposed ore on it is going to be tested with a diamond drill. It is estimated by mining experts that there are over a million tons of ore on this location alone, carrying from $50 upwards of gold and platinum to the ton, besides enough silver to more than pay for working it. The silver in it averages $11 to the ton.—*P. A. Herald.*

Port Arthur District.

A cablegram dated "London, England," states that "The bargain for the sale of the West Beaver mine has been closed."

Work is proceeding quietly at the Ottawa mine location. The ore is good and the prospects are that a large amount of money will be expended on the immediate development of the property. Leaf silver is being obtained.

The western shaft at Silber Mountain East is down about 400 feet and the silver is still found in abundance A large shipment will be made in a few days to Great Britain. They are now taking out high grade ore every day, and on the whole the mine is looking well If a railway were in operation the management would at once increase their force.

The following report has been received from Mr. Walpole Roland, C. and M. E., consulting engineer of the Silver Wolverine Co., (limited), dated Port Arthur, May 22nd: "Since date of my last report, referring to the rich strike of native and black silver in No. 1 shaft, at a depth of 82 feet and 90 feet, I have been unable to resume operations in this shaft owing to water. I have now, however, effected a purchase of hoist from the Beaver Mining Company that will fully answer our purposes. Immediately No. 1 shaft is made ready for further sinking, and the 100 feet level attained, we commence drifting from that point towards No. 2, between which points I anticipate cutting a rich deposit of black and native silver. In sinking No. 2 shaft, at a point 300 feet eastward of No. 1, after excavating some 13 feet of boulder drift and gravelly clay loam, they struck the vein. At this point the vein measures 4 feet 4 inches in width and carries the usual rich black blendes, fluorite and calcite together, with black silver and iron pyrites, and notwithstanding the fact that it is yet in the trap overflow.

The chief items of interest are the voting on the railway bonus by-law, on the 10th inst., at Port Arthur, as on it depends the immediate construction of the first fifty miles of railway into the silver and iron region south-west of Port Arthur.

In spite of the usual cry of boodle and the unpopularity of some of the Charter sellers, it is expected that the by-law will carry by a handsome majority. The Board of Trade and town Council are almost unanimously in favor of the scheme.

Mining locations are being sought after and bought up in view of the railway facilities. A large and enthusiastic meeting in the town hall, Port Arthur, was held last evening.

American tourists are doing the mines and the fishing in this vicinity in considerable numbers.

There has been nothing of special note to refer to in connection with the various silver mines. Favorable reports are daily received from the Badger, Beaver, Elgin, Silver Mountain, West End, Shuniah Weachu and Silver Fox mines.

The valuable buildings at the Jackfish or Huronian gold mines have been burned by bush fires. Nothing further will likely be done here until the Government road is completed to this property.

British Columbia.

The shipment of Texada iron ore amounted to 1,530 tons.

Shipping from the new Union Collieries has commenced. The latest reports speak most favorably of the several seams being opened. The principal seam being worked is now four feet of good merchantable coal, and as work progresses the thickness increases. The management are doing a good deal of prospecting on the property, two parties being at present working, one on Coal Creek and the other at Puntledge Lake. Three-foot seams have been struck on the latter, and thirty feet above an 18-inch seam. On Coal Creek, at the head of Allen Lake, a four-foot seam has been located, and a tunnel run in 200 feet. Above Allen Lake still another three-foot seam has been discovered. In fact the whole surrounding country seems to be one vast coal bed, and development will only prove that there is an inexhaustable area of the finest bituminous coal on the continent. The coal is said to be from 15 to 20 per cent. better steaming coal than the Wellington, weighs more per cubic foot (82½ pounds), though it does not ignite so rapidly. Up to 1st June it is estimated that at least half a million dollars have been expended on the property and in the provision of shipping facilities. The pay roll for May was over $22,000.

The work of sinking the shaft at the North Field Mine of the new Vancouver Company, says the Nanaimo *Free Press*, is progsessing most satisfactorily under the personal supervision of Mr. Robert Scott, the contractor, The shaft is now down over 300 feet, with about another 100 feet to reach the main seam of coal. With ordinary luck Mr. Scott expects to reach the coal in August. In the meantime, Mr. Samuel M. Robins, superintendent of the company, is perfecting arrangements for the rapid construction of the line of railway to Departure Bay and the loading wharves at Harwood Point and opposite the old Newcastle mine. As the majority of our readers are aware, this shaft is situated about four miles from the city and near the Wellington road and E. and N. Railway track, with the prospective Nanaimo Powder Factory in the near vicinity.

Work will be immediately resumed at the Monarch mine at Field, the owners of that property and the smelter at Vancouver having placed both mines and smelter in charge of L. D. Davis. This means business, for Mr. Davis is a thoroughly practical man. A number of men are working on claims adjacent to the Monarch, and Field is again showing signs of liveliness.

Reports are in circulation of rich placer finds on the headwaters of Bull River and over near Enderby. In fact, there is quite a stampede to the latter diggings, they being reported to be worth $30 a day to the man.

On Porcupine Creek, the Discovery Company is making more than wages, and the Elsie taking out nuggets of as high value as $15. The foreman of the latter is beginning to have a better opinion of the Elsie ground. The Donald Company has had some trouble with water in sinking a shaft, but now have it under control, and the shaft is going down at the rate of four feet a day. The French Company has everything in readiness, as soon as a pump arrives from Victoria, to begin pumping the water from its shaft, which is down over 35 feet.

A number of prospectors who left Donald intending to take in the country between the headquarters of Quartz creek and the north fork of the Spilimichene were turned back by the forest fires which are raging over in that section. They will make another effort by going in by way of the new McMurdo trail.

Coal Mining in Nova Scotia.

(Continued from June issue.)

work, and its strength and durability recommend it for mines having extended and irregular air ways. The Capel fan, which is highly spoken of, has not yet been introduced here.

The seams of the Cumberland and Cape Breton districts are very free from gas, it having been met in appreciable amounts only in the Springhill, Sydney and Caledonia collieries.

Still, reasonable care in systematically carrying the air through the workings is needed to prevent dangerous accumulations. Paradoxical as it may seem, mines giving off a small but steady amount of fire damp require constant watchfulness on the manager's part, as the employees do not bear in mind that their enemy, although easily routed, seldom omits to avail himself of any forgetfulness. Open lights and powder are used in all these mines.

In the Pictou district the seams are decidedly fiery, and much care is given to ventilation. They are as far as possible divided into separate districts for ventilating purposes, and in all, safety lamps are more or less used, and the use of gunpowder either guarded by appointing men to fire the shots, or in special cases prohibited.

TABLE SHOWING PRINCIPAL MECHANICAL VENTILATORS.
ENGINE AND FAN.

Colliery.	Name of Fan.	No. of cylinders.	Drain of cylinders, inches.	Length of stroke, inches.	Width of Fan, feet.	Diam. of Fan, ft.	Av. cubic feet per m.	Revol. per min. engine.	Pr. of Steam, lbs.
Pictou Co.									
Intercolonial	Guibal	1	16	20	7	20	85,000	58	70
Acadia	Guibal	1	20	24	8	24	54,000		105
Vale	Guibal	1	24	24	10	30	42,000	55	85 Belt, 2 to 1
Do.	Blowdown	1	12	24	6	16	20,000	....	
Albion	Guibal	1	24	24	10	30	80,000	39	45
Nova Scotia	Sturtevant	1	8	12	5-5	2·75	15,000	....	70
Cumberland Co.									
Springhill	Blowdown	1	12	36	7·5	18	41,000	35	55 Belt, 2 to 1
Do	Do	1	12	36	6	14	42,000	35	60 "
Do	Do	1	14	30	8	20	41,000	35	70
Cape Breton.									
Sydney	Guibal	1	24	24	10	30	67,000	40	35
Victoria	Champion	1	8	17	4 turn fans	59	40,000	65	35 geared 3½ to 1

PUMPING.

The seams of the various districts may be considered as not carrying large amounts of water. In the Springhill district three seams, lying close together, are worked with a steady extraction of pillars, under a roof carrying several beds of porous sandstone, and a heavy surface cover, and these conditions cause a heavy pump charge.

In the Pictou district the overlying measures are shaley and compact and pass little water, and at a depth exceeding 700 feet the workings are dry and dusty. In Cape Breton nearly all the mines are above the dry zone, but they are not very wet. In the Sydney mine workings there is little water, the submarine workings being remarkably dry. At this colliery a large amount of water from the old workings has to be handled. The pump is a direct acting Cornish one, the dimensions being given in the table of Cape Breton pumps, working through two lifts, the low set 335 feet, the staple set 350 feet, total lift of water to delivery drift from pump being 668 feet. The same was noticed in the "Lingan" submarine workings. Under the Mines Regulation Act, submarine seams having a cover of less than 500 feet must be worked in panels, and approaches cannot be driven under a cover less than 100 feet thick.

At several of the Cape Breton mines the pit waters are decidedly acid, and necessitate phosphor bronze and other patent linings, etc., for the working parts of the pumps

At the Gowrie mines, Mr. Chas. Archibald has had much trouble in coutending against corrosive effects of the pit water. The pumping shaft is 200 feet deep, and is divided into two bucket lifts. It was found necessary to use babbit metal lining for the working barrels, and iron and brass and gun metal shells, falls, etc.

As the water grew more acid from running over the small coal and stone in the bords, as the workings extended, it was found that pump rods, pumps, nuts, etc., were very quickly eroded. Finally wood pumps were used. and the straps, clamps, flanges, etc., protected by layers of tarred flannel. Similar precautions were taken with the rods, and finally the bucket doors and clack pieces were made of wood instead of iron. Mr. Archibald gave an interesting account of this matter in the Transactions of the North of England Mining Institute. The writer published some years ago a paper on the Nova Scotia pit waters, from which he gives the following analysis as serving to show the composition of some of these acid waters.

Block House mine, Cow Bay; Analyst, Geo. Suv. Canada, 1872-73. Suspended matter.

Sulphate of iron	·1510
In solution.	
Iron (as per salt)	·2426
Iron (as proto salt	·1168
Manganese	·0078
Aluminum	·0420
Calcium	·1498
Magnesium	·0618
Potassium	·0134
Sodium	·1884
Silica	·0116
Sulphuric Acid	1·4808
Chloric Acid	·4100
Phosphoric Acid	traces
Organic matter	·2844
Total in 1,000 parts	3·0094

Water, yellowish brown color, acid reaction, and Styptic taste. *Gardener Colly, Bridgeport.

Iron Sulphate	2·750
Potassium sulphate	·185
Calcium Carbonate	·736
Magnesium Carbonate	·025
Sodium Chloride	·096
Alumina	trace
Silica	·225
Total in 1,000 parts	4·881

Water, clear with blueish shade, after standing, deposited reddish sediment, acid reaction and highly styptic taste.

The appended table will show that direct acting pumps are at present the most fashionable, especially those of the Cameron and Knowles pattern.

* Analyst, E. Gilpin, Jr.

DETAILS OF PUMPING APPLIANCES, CAPE BRETON.

Collieries.	Number of Pumps.	Name and Style of Pump.	Steam Cylinder diam. inch.	Water Plunger diam. inch.	Length of Stroke.	Strokes per Minute.	Length of Waterpipe.	Length of Steam Pipe.	Steam Pressure at Bank.	Steam Pressure at Pump.	Vertical Lift.	Gallons Water per day.	Tons of Coal raised during 1886.
Sydney Mines (Queen)	1	Made to order.	30	8	48 in.	17	360 ft.	430 ft.	27 lbs.	.....	360 ft.	172,620	139,646
do (Princess Pit)	2	do	62	20	84 "	4½	720 "	.....	40 "	.....	720 "	139,863	
Victoria	1	Elliott.	18	7	44 "	14	590 "	890 "	40 "	37 lbs.	305 "	142,380	50,156
International	1	Knowles.	24	8	24 "	30	2100 "	2550 "	45 "	33 "	195 "	.....	118,129
do	.....	do	12	5	12 "	60	3547 "	1592 "	45 "	20 "	185 "	64,000	
Reserve	2	do	12	7	24 "	60	.....	2080 "	50 "	35 "	.....	115,984	81,783
do	.....	do	14	9	18 "	50	3037 "	1486 "	50 "	35 "	283 "	12,450	
Caledonia (two sets)	2	Lifting.	.....	8	48 "	12	128 "	.....	30 "	.....	123 "	86,400	72,810
do do	.....	do	.....	8	48 "	12	60 "	.....	30 "	.....	60 "		
Little Glace Bay	3	Cameron.	8	8	30 "	40	310 "	340 "	.....	.....	260 "	205,834	33,382
do	.....	Lifting.	6	6	48 "	10	255 "	.....	.....	.....	255 "		
do	.....	do	6	6	48 "	10	255 "	.....	.....	.....	255 "		
Gowrie	3	Knowles special.	20	10	48 "	20	254 "	244 "	43 "	35 "	215 "	328,265	95,307
do Lifting	.....	Built to order.	.....	10	36 "	36	110 "	.....	.....	.....	110 "		
do do	.....	do	.....	10	36 "	36	110 "	.....	.....	.....	110 "		

1886. DETAILS OF PUMPING APPLIANCES, PICTOU AND CUMBERLAND.

Company.	Appl'ances.	Length of Stroke.	Diameter Steam Cylinder.	Diameter Water Cylinder.	Number Strokes per minute.	Steam Pressure at Boiler.	Distance of pump from boiler in ft.	Steam Pressure at Pump.	Vertical Height of Discharge.	Pressure of Head per sq. in. lbs.	Length Steam Pipe.	Length Water Pipe.	Diameter Water Pipes.	Diameter Steam Pipes.	Average gallon discharge per day approximately.		Tons of Water raised year 1886. (Estimated)	Tons of Coal raised during year 1886.	Remarks,
International Coal Company, Westville. Connected.	Top. Cameron Pump No. 8.	36 in.	18 in.	8 in.	20 to 40	lbs.	480	lbs. 79½	350	lbs. 208	800	....	.....	5 in.	60,000	.....	104,500	108,498	Pipes cover'd with composition made by Mechanical Engineer
	Mid. No. 3.5.	12 "	10 "	4 "	40 to 60	80	1380	77½	300	130	900	900	3 × 2½	2 × 2½		.....	.....	.....	
	Bot. No. 3.4.	12 "	7 "	3½ "	40 to 60		1780	75	113	49	400	400	2 in.	2 in.		.....	.....	.....	
Acadia Coal Co. Westville.	Duplex Compound Pump.	24 "	H. P. 12 " L. P. 22 "	5½ "	45	105 lbs	2600	95	996	433	2600	2400	6 in.	4 in.	108,000 per day of 24 hrs.	.....	167,000	93,891	Pipes cover'd composition clay & straw
Joggins.	Burling and Johnson's Pump.	40 "	20 "	8½ "	15	60 "	1500	38	205	80	1500	600	8 in.	4 in.	84,000	.....	153,300	22,243	Pipes not covered.
Vale Colliery. 6 ft. Steam.	Cameron Pump.	24 "	15 "	5 "	50	80 "	1240	70	365	159	1240	1040	.....	.....	144,000	.....	262,800	128,539	Pipes cover'd to pit head. Balance of pipes in mine exposed.
Vale Colliery. 6 ft. Steam.	Blake Pump.	12 "	8 "	5 "	60	.....	510	....	130	57	510	310	.....	.....	8,640	.....	.....		
Vale Colliery. McBean Seam. Connected. Bot.	Knowles.	30 "	30 "	8 "	25	70 "	1400	60	650	282	1400	1200	.....	6 in.	234,000	Disch'rgs to mid. pump.	.....		
Vale Colliery. McBean Seam. Connected. Top.	Cameron.	30 "	20 "	6 "	50	.....	500	....	238	103	500	500	.....	4 in.	252,000	Disch'rgs at surface.	459,500		
Spring Hill Mines. West Slope. Connected.	Top Allison Pump	6 ft.	30 in.	14¼ in	15	75 "	750	68	340	148	750	750	12 in.	9 "	1,080,000	Disch'rgs at surface.	1976,000	416,739	750 feet of pipes covered.
Spring Hill Mines. West Slope. Connected.	Bottom Allison Pump	.....	.....	.....	.....	.....	1430	55	310	134	680	680	12 "	6 "	1,080,000	Disch'rgs to top pump.	.....		
Spring Hill Mines.	Special Blake	3 ft.	28 "	11½ in	32	60 "	512	40	430	187	890	850	8 "	4 "	742,080	.....	1354,296		
Spring Hill Mines.	Blake, not used.	.....	.....	.....	.....	.....	.....	....	....	....	....	....	.....	.....	... .	.....	.....		Cover'd from boiler to pit mouth with infusorial earth.
Spring Hill Mines. Cameron Pump.	Special, No. 7	30 in.	22 "	9 in.	40	60 "	.....	40	....	....	....	....	.....	.....	460,200	.....	840,960		
Spring Hill Mines. Cameron Pump. Connected	No. 5.	24 "	15 "	7 "	50	85 "	1500	60	278	121	1500	1400	4 "	3 "	216,000	.....	394,200		
Spring Hill Mines. Cameron Pump. Connected	No. 3.	18 "	10 "	4 "	65	85 "	1800	50	32	14	300	300	2 "	2 "	86,400	Disch'rgs to top pump.	.....		
Albion Colliery. Foord Pit.		Two	Iron	Tanks.	8 ft.	6 in x	6 ft.	x3ft.	40 tanks		per	hour	22 h	per dy	873,840	.....	1599,758		.....

From these tables it appears that in the year 1885, 1,352,205 tons of coal were raised, and that during the same period 3,646,889 tons of water were pumped—or nearly three to one. This estimate of the relative amounts of coal and water extracted has seldom been made over so large a district, and is interesting for reference beside the enormous tonnage of water to ore in many metal mines. It should, however, be remembered in considering these results that much of the water is from old workings, and forms a permanent duty. At the Sydney mines the present workings make little water, and the pumps have to handle the seepage of the acreage resulting from a century of mining and pillar working. At the Albion Colliery the pump duty represents in a similar manner the water of the underlying seam, as well as of the old workings in the thick coal which broke the roof for many feet. Here the main shaft of the workings furthest from the dip has been selected for pumping. The work is performed by substituting for the two cages, two tanks each 8 ft. 6 ins. by 3 ft. 3 ins. by 5 ft., which automatically open on entering the water, and by engaging with a lever at the top of the shaft discharge without any attention. The tanks are raised and lowered by the winding engine at an average rate of 600 trips per day of 20 hours, which is equivalent to about 520,000 gals.

The pump at the Acadia Colliery is one of the best in use in our coal mines. The lift is one of the heaviest single lifts in America, and the following note will be of interest.

The mine is opened by a slope 2400 feet long, vertical depth 1000 feet. The pump is a Knowles of the duplex compound condensing type, with high and low pressure cylinders, 12 and 22 in. in diameter, 24 in. stroke with four 5½ inch plungers working against a head of 435 lbs. per square inch. The column is six inches in diameter, of wrought iron, the air chamber is 30 by 15 inches, the steam pipe 2600 feet long and four inches in diameter, takes the steam from Babcock boilers on the surface, at a pressure of 105 pounds. The pipe is protected with an infusorial earth jacket, the material being taken from a local deposit. After four years service this pump has given no trouble, and no joints have leaked. There is no suction on the pump, the lower valves being below the level of the water. The pump usually makes 10 double strokes a minute, but could run 25 strokes, equal to 100 feet piston speed a minute. A small hydraulic ram will raise the water from the lower level to the pump.

PARTICULARS OF WINDING ENGINES, NOVA SCOTIA COAL MINES.

COLLIERY.	Nos. of Cylinders.	Dia. of Cylinders, inches.	Length of stroke, in.	No. of Drum brls.	Dia. of Drum barrels, feet.	Weight of load, cwt.	Diam. of rope, inches.	Length of haul, in ft.	Pressure of steam, lbs.	
Pictou Co.										
Intercolonial Colliery, Slope	2	16	36	2	8	126	1	1,800	70	Geared, 2 to 1; dip 15°
Intercolonial Colliery, Underground	2	16	28 / 24	2	8 / 8.66	126	1	1,200	70	do 3 to 1; do
Acadia Colliery (Slope)	2	16	42	1	9	*100	1⅛	3,100	85	Geared, 3½ to 1; dip 27°
Vale Colliery, McBean Slope	2	32	60	1	14	120	1⅛	2,400	55	Direct; dip 35°
Vale Colliery, Six feet do	2	16	36	2	10	†80	1	1,800	60	Geared, 3 to 1; dip 23°
Albion Colliery (McGregor Pit)	1	24	72	2	—	‡80	4 ×	1,800	45	Flat ropes, direct acting.
Cumberland Co.										
Springhill Colliery, West Slope	2	20	36	1	9	100	1¼	1,300	55	Geared, 3 to 1; dip 25°
Springhill Colliery, North Slope	2	15	30	1	9	120	1¼	800	60	do
Springhill Colliery, East Slope	2	16	36	1	9	60	1⅛	800	70	do
Joggins Colliery (Slope)	2	18	36	1	9	60	1	1,350	75	
Cape Breton Co.										
Sydney Colliery, Pit	2	36	60	1	18	132	1⅜	660	40	Direct acting.
Sydney Colliery, Underground	2	16	36	2	4	792	⅞	5,400	40	Gross lead, geared 2¾ to 1.
Sydney Colliery, do	2	16	24	2	4	252	⅞	5,800	40	Gross load, geared 1¾ to 1.
Victoria (Slope	2	22	54	2	6	152	1	1,959	50	Direct, dip 15°
International Colliery, Pit	2	16	40	1	7	39	1⅛	100	40	Geared, 2 to 1.
International Colliery, Underground	1	12	20	2	3 × 3½	224	¾	2,100	40	Stands at Bank, dip. Geared, 3 to 1.
Caledonia (Pit)	2	11	24	2	6	49	3½ × ⅜	205	50	Geared, 4 to 1.
Glace Bay (Pit)	2	12	36	1	6½	58	1¼	245	47	Geared, 2½ to 1.
Gowrie, Pit	2	20	42	1	8	49	13-16	235	60	Direct.
Gowrie, Underground	2	10	12	1	4¾	192	⅞	1,000	45	Geared, 5 to 1; dip 8°
Reserve, French	2	20	54	2	4	256	⅞	2,754	50	do 2 to 1; dip 5° 20'
Reserve, Slope						256				Twin engine at main slope.

* Wt. of coal, tubs, ropes, etc., 200 cwt; add 5 p.c. for friction; total, 210 cwt. † Coal only. ‡ Gross weight. § Net load.

Expansion in the steam pipes is guarded against by U pieces. The pump stands in a house lined with brick. and having a cement floor.

The appended table shows the winding engines at the principal collieries, above and below ground. They are generally direct acting for shaft work and geared 3 to 1 for drawing through slopes. As fuel forms a small item in the expense of raising coal, low pressure and simple engines are in use. The economy is more apparent than real, and compound engines with the lessened wear and tear of boilers would prove more satisfactory. The speed in the shafts is low owing to their comparative shallowness. In the slopes the speed is practically limited by the rate at which the empty tubs can run safely down the incline.

At many of the deeper slopes the men are raised in long tubs, holding from one to two dozen, with extra couplings, and a trip bar, or "durkey" at the end of the last tub.

At the Intercolonial colliery the coals are drawn up the slopes, dipping at an angle of 15°, 1,800 feet long, the gross weight being 11,400 lbs. in the space of 1 minute and 50 seconds, and the empty tubs are lowered by brake in one minute.

The tubs hold from one-half to one and a quarter tons of coal. The wheels are made with fast or loose axles, and vary in diameter from 10 to 12 inches. The gauge of the tracks is from 2 ft. to 2 ft. 8 in.

The following table will show the tubs used at the principal mines:—

A TABLE of the dimensions of pit tubs in use at the principal collieries:

NAME.	Track Gauge.	Dia. of Wheels.	Wheel Base.	Height above track	Width.	Length.	Height.	Capacity.
	in.	in.	in.	in.	in.	in.	in.	C.ft.
Joggins	30	12	20	37	37	48	23	23.6
Acadia	28	11	22	31	42	60	24	35.
Albion Mines	26	12	18	42	33	44	28	23.5
Intercolonial	32½	14	20	42½	26	50	28	21.
Caledonia	24	11	22	38	33	94	24	35.5
Glace Bay	30	10	16	36	33	60	24	27.5
Gowrie	24	12	18	38	34	80	24	19.0
International	32	14	18	45	30	49	29	24.6
Reserve	26	11	20	43	32	44	30	24.4
Sydney	24	11	26	40	34	37	27	19.6
Vale 8 ft. seam	29	10	....	45	33	54	25	26.8
" 6 ft. seam	29	12	....	42	33	54	25	25.7

Boilers.—In Cape Breton the boilers used for supplying steam to the pumps and winding engines are generally plain egg ended and cylindrical. Their dimensions vary in length from 20 to 37 fret, in diameter from 3 to 5½ feet. The working pressure varies from 30 to 50 lbs.

In Pictou and Cumberland there is a greater variety seen. At the Acadia colliery four Babcock boilers, running at a pressure of 105 lbs., supply the fan and underground engine and pump.

At the Vale colliery Lancashire and tubular boilers are used. At the West Slope, Springhill collieries, two Galloway boilers, 7 by 30 ft., form part of the battery. At several mines the plain egg ended boilers are used with pressures varying from 30 to 55 lbs. The consumption of coal, part round and part slack, used for stationary and locomotive engines, during the year 1887, was about 139,777 tons.

Transportation.—The various collieries are provided with railways varying in length from one half to thirty-seven miles for shipment of coal. The longest line in operation is that of the Cumberland Railway and Coal Company, who carry coal four miles to the Intercolonial Railway and thirty-three to Parrsboro on the

Bay of Fundy. The latter line is at present operated principally for general passenger and freight business, but it is expected that when their shipping facilities are completed much of their coal will find an outlet to St. John, New Brunswick, and the United States, via Parrsboro. The same company are now building towards the Gulf of St. Lawrence to obtain an outlet at Pugwash, so that they can secure water transportation to Quebec and Montreal during the summer months. A branch line ten miles long from Macan, on the Intercolonial Railway to the Joggins shore runs along part of the outcrop of the northern edge of the Cumberland coal field. It has been opened this year, and promises to develop several valuable coal seams.

The Pictou collieries are connected with shipping piers in Pictou harbor, and with the Intercolonial Railway by short branches which they operate with their own engines and cars, using the Government rolling stock when shipping over the Intercolonial road. In Cape Breton the Sydney mines ship at North Sydney, while the Victoria, International, Reserve and Bridgeport collieries ship at piers on the south side of the harbor. At Glace Bay, a brook emptying into the Atlantic, has been dredged into a spacious dock, capable of holding half a dozen large steamers and twice as many square rigged vessels. This dock was originally made through the enterprise of the Glace Bay Coal Company, but the Caledonia Coal Company have recently utilized it for shipping coal. At Cow Bay the Gowrie mine coal is shipped at a pier protected by the Government breakwater. The railway now being built through the Island of Cape Breton will, it is expected, be extended so as to connect all the principal mines with Sydney harbor, and ultimately to reach Louisburg harbor, so that during the summer, the busiest season, two outlets will be available, while the lessened winter trade can be accommodated at Louisburg. At present the cost of maintaining roads from one to eleven miles in length, with the rolling stock equal to a shipment of 2,000 tons a day, for summer shipments only, forms a heavy charge.

The various colliery roads and their equipments call for no special notice. The locomotives are of English and American types, the cars carry from four to six tons, and empty below. At the Sydney mines effective service is rendered by a locomotive built in the Company's shops, the frame, axles and tyres only being imported.

The locomotives vary in power and weight up to a Baldwin 50 ton freight engine. The roads are largely laid with steel rails, and are kept in very fair order. The only road calling for any special notice is that of the Sydney and Louisburg Coal Company. This road runs from Sydney to the Reserve mine a distance of eight miles, and ten miles further to the colliery at Schooner Pond, formerly operated by the company, and extends to Louisburg harbor, making in all 32 miles. At present the line is working only from Sydney to the Reserve collierp, the rest having been closed during the late depression in the coal trade. It is expected, should the trade continue to improve as it has for the past few years, that operations will be resumed on the Schooner Pond Branch, and the shipping piers at Louisburg be again utilized.

The road is well built and ballasted. Its gauge is three feet, with maximum grades of 1 in 100 against, and 1 in 75 with the traffic. The nature of the country has permitted a nearly a straight line with a minimum of curvature. In addition to two ordinary tank locomotives, it is equipped with three Fairlie double truck locomotives, 25 tons loaded weight, with 11 inch cylinders, 19 inch stroke, and 3 feet 3 inch wheels. About forty trucks, holding four tons each, make a train.

These locomotives have done very good work, but it is a question if this pattern of engine on a narrow gauge road will prove as effective in winter as one of American pattern on the standard gauge, as they are not so handy in snow, and have very little clearance.

The warves for coal shipments are all of wood, usually constructed with blocks and lines of piling. The cheapest form is that of a long pier with shoots on each side. In some cases a fall is given to a central track for the loaded cars to run towards the end of the pier, and areverse grade for them to pass back to the shoots and return empty. In other wharves the loaded and empty cars are moved by horses. Where a level pier top is adopted, a system of ropes with hydraulic capstans would be found quicker and cheaper than horse-power.

The pier of the Sydney and Louisburg Railway, as described in the report of the Geological Survey, may be taken as a type of the most approved wharf. This structure, at the terminus of the railway in the town of Sydney, is a handsome and substantial structure, 620 feet in length, and 40 feet wide, with 36 feet of water at the end at high tide (the rise and fall being about 4 feet). The top of the pier standing 24 feet above high tide level is furnished with four tracks and seven loading shoots, and four traversing tables. The wharf is built upn very long and stout piles of Baltic timber, creosoted, and suitably braced by caps, ties and trusses. The superstructure is of native timber of good quality, and strongly framed. The cost of the wharf is given at about $20,000.

The creosoting has proved an effectual preservation against the ravages of the teredo, and the piles, execpt a few imperfectly impregnated are in good condition at the end of fifteen years. The author is not aware of other applications of of chemically prepared timber for this purpose in Nova Scotian wharvea. Reference has been made to the very acid water pumped from the Gworie colliery. This water runs into the sea alongside their shipping peir, and, it is said, exercises a very decided effect in preventing damage from the naval borers, etc.

(To be continued.)

Interesting Electric Pumping Plant at a Scotch Quarry.— There is now at work near Linlithgow, Scotland, an electrical installation for pumping water which has some very interesting features. The motor and pump are situated at Kingscavil Quarry, near Linlithgow, where they raise water to a reservoir at a at a height of 135 feet, the water being forced through a distance of 600 yards of two inch pipes. The quantity of water raised has not been stated, but the pumps are double acting plungers at 2½ inches diameter, designed to work at about 40 revolutions to the minute. The dynamo is situated in the engine room of the Linlithgow Oil Co., at a distance of fully a mile and a quarter from the quarry, so that the power is transmitted electrically over 4,000 yards of cable. This not being an underground case, the cables are naked and are carried by insulators on telegraph poles. The E. M. F. at the dynamo terminus is 250 to 300 volts, and the current 11 to 12 amperes, the output being thus about 3,000 Watts, or about 4 h. p., and a margin of 30 to 40 per cent. over present requirements has been allowed for future use. This is a small installation, but will serve as a demonstration of what can be accomplished. It works satisfactorily, and requires no attendant at the pumping house at the gangway.

Canadian Mines on the English Market.

	Price Per Share.	
General Mining, Limited £219,752 fully-paid shares of £8	4¼	4¼
Low Point, Barrasois and Lingan, $309,100 fully-paid shares of $100		—
Ditto, $200,000 vendors fully-paid shares of $100		—
NorthWestern Coal and Navigation, Limited, £160,500 6 per cent. debentures; coupons June 30 and Dec. 31; principal 1904		—
Ditto £149,500 fully-paid ordinary shares of £10		—
Ditto £900 fully-paid deferred shares of £100		—
Sydney and Louisburg Coal and Railway, Limited, £50,000 cumulative 10 per cent. first preference shares of £10, £6 paid	7½	8½
Ditto, £14,560 fully-paid non cumulative 6 per cent. second pref. of £10	3	5
Ditto, £250,000 fully-paid ordinary shares of £10	1	2
New Vancouver Coal Mining and Land Co., Limited, £185,000 fully-paid shares of £1		—
Excelsior Copper, Limited, fully-paid shares of £1		—
Ditto, shares of £1, 17s, 6d. paid		—
Shuniah Weachu, Limited, £99,888 fully-paid shares of £1		—
Silver Wolverine, Ltd., £68,465 fully-paid shares of £1		—
Anglo-Canadian Asbestos, Limited, £39,132 fully-paid shares of £2		—
Anglo-Canadian Phosphate, Limited, £46,340 fully-paid pref. shares of £10		—
Ditto, £15,050 fully-paid deferred shares of £10		—
British Columbia Smelting, Ld., £25,000 preference shares of £1, 10s. pd		—
Ditto £40,000 fully paid ordinary shares of £1		—
Canadian Phosphate, Ld.. £100,000 fully paid shares of £1	¾	1
Bell's Asbestos, Limited, £100,000 fully paid shares of £5	16⅞	17⅛
White's Asbestos, Limited, £20,000 fully paid shares of £1		
Ditto shares £1 paid		—
Jackson Rae Phosphate Co., Limited, $25,000 fully paid shares of £1		—

General Mining.—Accounts to December 31 submited in April, but an interim meeting is held in November. Dividend for 1884, 5 per cent; for 1885 and 1886, 3⅛ each year; and for 1887, £4 13s. 9d. per cent. Reserve fund, £29,850.

Low Point.—The vendors' shares, up to the end of 1888, do not rank for dividend until 7 per cent. per annum dividends have been paid on ordinary. Accounts to Dec. 31. For 1887, 5 per cent. was paid on the ordinay shares other than those held by the General Mining Assoc., that Company foregoing their dividend rights.

North-Western Coal.—The deferred shares receive on dividend until 15 per cent. per annum (cumulative) has been paid on the ordinary. Accounts to June 30. Dividend for 1887-8, 5 per cent.

Sydney and Louisburg Coal.—Accounts to Dec. 31 submitted about May. Out of the profits of 1884 one half-year's dividend on the first preference shares was paid. No dividend since. Debit to Dec. 31, 1887, £1,574.

Vancouver Coal.—Accounts to June 30 and December 31 submitted in November and May. In the half-year to June, 1888, there was a net profit of nearly £11,000. Debentures, £57,200. Reconstruction has been decided on.

Excelsior Copper.—Registered September 26, 1888. Authorized capital, £450,000; purchase consideration, £400,000, in cash or shares. Fully-paid shares issued to the vendor; partly paid to the public.

Shuniah Weachu.—Accounts to Nov. 20 submitted in February. No dividend yet.

Silver Wolverine.—Registered October 19, 1888, with a capital of £100,000, of which £80,000 was the first issue. Most of the shares were issued to the vendor.

Anglo-Canadian Asbestos.—The Company was registered in November, 1885. Accounts to October 31 submitted in March. No dividend yet. Debentures, £3,450. Reports are not obtainable, but this information is official.

Anglo-Canadian Phosphate.—The preference shares rank first for 7 per cent., and after a like rate has been paid on the deferred shares, both classes rank equally.

British Columbia Smelting.—The company was registered May 9, 1888. The ordinary shares were issued to the vendor, and they do not rank for dividend until the preference shares have received dividends amounting to 100 per cent.

Canadian Phosphate.—Accounts to November 30 submitted in February. Eleven months to Nov. 30, 1888, resulted in a profit of £2,576, which was carried forward.

White's Asbestos.—Registered April 9th, 1889. the authorised capital is £100,000; first issue, £60,000, of which £20,000, fully paid, was issued to the vendor.

Manitoba and North-West Territories.

Notice of application for incorporation under the provisions of the Companies Act is made by The Anthracite and Bituminous Coal Company, Limited. The chief place of business of this new concern will be at Toronto. The capital stock will be $250,000 in shares of $100 each. The applicants are: B. E. Chaffey, Winnipeg, barrister-at-law; William Hamilton Merritt, Toronto, mining engineer; Frank A. Fleming and Sandford Hall Fleming, Ottawa, civil engineers, and George F. Harman, Toronto, barrister-at-law, and who are to be the first or provisional directors of the said company.

A sample from the mine owned by the Cariboo Creek Mining Company was sent to the Selby Smelting & Lead Co. of San Francisco for a test. The return gave the value of the ore as $18 in silver and $32 in lead, the smelting company stating that it was worth $27.20 a ton in San Francisco, but that it contained too much lead to enter the United States duty free.—*Truth.*

Experts have lately visited the Beaver and Queen mines, Port Arthur District, in order that the best of evidence may be had by the owners of those properties.

JAMES S. NOAD,

MINING AGENT

AND PROMOTER OF AND DEALER IN

Mines and Mining Properties,

MONTREAL, CANADA.

DEPARTMENT

OF

Inland Revenue.

AN ACT RESPECTING AGRICULTURAL FERTILIZERS.

The public is hereby notified that the provisions of the Act respecting AGRICULTURAL FERTILIZERS came into force on the 1st of January, 1886 and that all Fertilizers sold thereafter require to be sold subject to the conditions and restrictions therein contained—the main features of which are as follows:

The expression "fertilizer" means and includes all fertilizers which are sold at more than TEN DOLLARS per ton, and which contains ammonia, or its equivalent of nitrogen, or phosphoric acid.

Every manufacturer or importer of fertilizers for sale, shall, in the course of the month of January in each year, and before offering the same fertilizer for sale, transmit to the Minister of Inland Revenue, carriage paid, a sealed glass jar, containing at least two pounds of the fertilizer manufactured or imported by him, with the certificate of analysis of the same, together with an affidavit setting forth that each jar contains a fair average sample of the fertilizer manufactured or imported by him; and such sample shall be preserved by the Minister of Inland Revenue for the purpose of comparison with any sample of fertilizer which is obtained in the course of the twelve months then next ensuing from such manufacturer or importer, or collected under the provisions of the Adulteration Act, or is transmitted to the chief analyst for analysis.

If the fertilizer is put up in packages, every such package intended for sale or distribution within Canada shall have the manufacturer's certificate of analysis placed upon or securely attached to each package by the manufacturer; if the fertilizer is in bags, it shall be distinctly stamped or printed upon each bag; if it is in barrels, it shall be either branded, stamped or printed upon the head of each barrel or distinctly printed upon good paper and securely pasted upon the head of each barrel, or upon a tag securely attached to the head of each barrel; if it is in bulk, the manufacturer's certificate shall be produced and a copy given to each purchaser.

No fertilizer shall be sold or offered or exposed for sale unless a certificate of analysis and sample of the same shall have been transmitted to the Minister of Inland Revenue and the provisions of the foregoing sub-section have been complied with.

Every person who sells or offers or exposes for sale any fertilizer, in respect of which the provisions of this Act have not been complied with—or who permits a certificate of analysis to be attached to any package, bag or barrel of such fertilizer, or to be produced to the inspectors to accompany the bill of inspection of such inspector, stating that the fertilizer contains a larger percentage of the constituents mentionod in sub-section No. 11 of the Act than is contained therein—or who sells, offers or exposes for sale any fertilizer purporting to have been inspected, and which does not contain the percentage of constituents mentioned in the next preceding section—or who sells or offers or exposes for sale any fertilizer which does not contain the percentage of constituents mentioned in the manufacturer's certificate accompanying the same, shall be liable in each case to a penalty not exceeding fifty dollars for the first offence, and for each subsequent offence to a penalty not exceeding one hundred dollars. Provided always that deficiency of one *per centum* of the ammonia, or its equivalent of nitrogen, or of the phosphoric acid, claimed to be contained, shall not be considered as evidence of fraudulent intent.

The Act passed in the forty-seventh year of Her Majesty's reign, chaptered thirty-seven and entitled, "*An Act to prevent fraud in the manufacture and sale of agricultural fertilizers*," is by this Act repealed, except in regard to any offence committed against it or any prosecution or other act commenced and not concluded or completed, and any payment of money due in respect of any provision thereof.

A copy of the Act may be obtained upon application to the Department of Inland Revenue, as well as a copy of a Bulletin which it is proposed to issue in April, 1888, concerning the fertilizers

E. MIALL,
Commissioner.

January, 1889.

PROPERTIES FOR SALE.

Parties having developed or undeveloped mineral lands for sale will find the REVIEW an admirable medium for bringing them before the notice of CAPITALISTS and INVESTORS in GREAT BRITAIN and the UNITED STATES.

Intercolonial Railway

OF CANADA.

The direct route between the West and all points on the St. Lawrence and Baie des Chaleur, Province of Quebec; also for New Brunswick, Nova Scotia, Prince Edward, Cape Breton and the Magdalene Islands, Newfoundland and St. Pierre.

EXPRESS TRAINS leave Montreal and Halifax daily (Sunday excepted) and run through without change between these points in 30 hours.

The Through Express Train cars of the Intercolonial Railway are brilliantly lighted by electricity and heated by steam from the locomotive.

New and Elegant Buffet Sleeping and Day Cars are run on all through Express Trains.

The popular Summer Sea Bathing and Fishing Resorts of Canada are along the Intercolonial, or are reached by that route.

CANADIAN EUROPEAN MAIL

AND PASSENGER ROUTE.

Passengers for Great Britain or the Continent by leaving Montreal on Thursday morning wil join Outward Mail Steamer at Rimouski the same evening.

The attention of shippers is directed to the superior facilities offered by this route for the transport of flour and general merchandise intended for the Eastern Provinces and Newfoundland; also for shipments of grain and produce intended for the European market.

Tickets may be obtained and all information about the route, also Freight and Passenger rates, on application to

G. W. ROBINSON,
Eastern Freight and Passenger Agent,
137½ St. James St., MONTREAL.

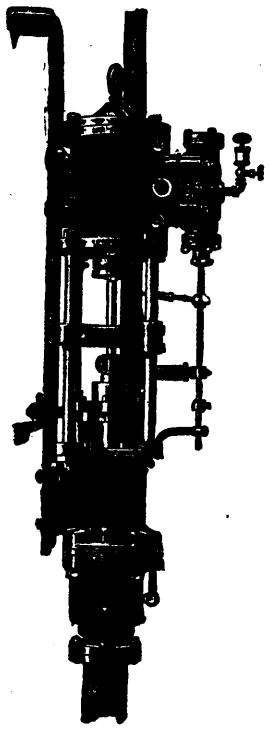
E. KING,
27 Sparks Street,
OTTAWA.

D. POTTINGER,
Chief Superintendent.

Railway Offices, Moncton, N.B
2nd July, 1889.

The Polson Iron Works Co'y

TORONTO, ONT.



Manufacturers of the Celebrated "Brown Automatic Engine."

GENERAL DEALERS IN

MINING MACHINERY.

SPECIAL AGENTS FOR

Knowles' Steam Pumps,

B. T. Sturtevant's Blowers and Fans,

Burleigh Rock Drills.

Hoisting Engines and Boilers, Quartz Mills, Diamond Prospecting Drills, Rock Breakers.

Office and Works, Esplanade E.; Warehouse, 38 Yonge St., - - TORONTO.

Mining Regulations

TO GOVERN THE DISPOSAL OF

Mineral Lands other than Coal Lands, 1886.

THESE REGULATIONS shall be applicable to all Dominion Lands containing gold, silver cinnabar, lead, tin, copper, petroleum, iron or other mineral deposits of economic value, with the exception of coal.

Any person may explore vacant Dominion Lands not appropriated or reserved by Government for other purposes, and may search therein either by surface or subterranean prospecting for mineral deposits, with a view to obtaining under the regulations a mining location for the same but no mining location or mining claim shall be granted until the discovery of the vein, lode or deposit of mineral or metal within the limits of the location or claim.

QUARTZ MINING

A location for mining, except for iron on veins, lodes or ledges of quartz or other rock in place, shall not exceed forty acres in area. Its length shall not be more than three times its breadth and its surface boundary shall be four straight lines, the opposite sides of which shall be parallel, except where prior locations would prevent, in which case it may be of such a shape as may be approved of by the Superintendent of Mining.

Any person having discovered a mineral deposit may obtain a mining location therefor, in the manner set forth in the Regulations which provides for the character of the survey and the marks necessary to designate the location on the ground.

When the location has been marked conformably to the requirements of the Regulations, the claimant shall within sixty days thereafter, file with the local agent in the Dominion Land Office for the district in which the location is situated, a declaration or oath setting forth the circumstances of his discovery, and describing, as nearly as may be, the locality and dimensions of the claim marked out by him as aforesaid; and shall, along with such declaration, pay to the said agent an entry fee of FIVE DOLLARS. The agent's receipt for such fee will be the claimant's authority to enter into possession of the location applied for.

At any time before the expiration of FIVE years from the date of his obtaining the agent's receipt it shall be open to the claimant to purchase the location on filing with the local agent proof that he has expended not less than FIVE HUNDRED DOLLARS in actual mining operations on the same; but the claimant is required, before the expiration of each of the five years, to prove that he has performed not less than ONE HUNDRED DOLLARS' worth of labor during the year in the actual development of his claim, and at the same time obtain a renewal of his location receipt, for which he is required to pay a fee of FIVE DOLLARS.

The price to be paid for a mining location shall be at the rate of FIVE DOLLARS PER ACRE, cash, and the sum of FIFTY DOLLARS extra for the survey of the same.

No more than one mining location shall be granted to any individual claimant upon the same lode or vein.

IRON.

The Minister of the Interior may grant a location for the mining of iron, not exceeding 160 acres in area which shall be bounded by north and south and east and west lines astronomically, and its breadth shall equal it length. Provided that should any person making an application purporting to be for the purpose of mining iron thus obtain, whether in good faith or fraudulently, possession of a valuable mineral deposit other than iron, his right in such deposit shall be restricted to the area prescribed by the Regulations for other minerals, and the rest of the location shall revert to the Crown for such disposition as the Minister may direct.

The regulations also provide for the manner in which land may by acquired for milling purposes reduction works or other works incidental to mining operations.

Locations taken up prior to this date may, until the 1st of August, 1886, be re-marked and re-entered in conformity with the Regulations without payment of new fees in cases where no existing interests would thereby be prejudicially affected.

PLACER MINING.

The Regulations laid down in respect to quartz mining shall be applicable to placer mining as far as they relate to entries, entry fees, assignments, marking of localities, agents' receipts, and generally where they can be applied.

The nature and size of placer mining claims are provided for in the Regulations, including bar, dry, bench, creek or hill diggings, and the RIGHTS AND DUTIES OF MINERS are fully set forth.

The Regulations apply also to

BED-ROCK FLUMES, DRAINAGE OF MINES AND DITCHES.

The GENERAL PROVISIONS of the Regulations include the interpretation of expressions used therein; how disputes shall be heard and adjudicated upon; under what circumstances miners shall be entitled to absent themselves from their locations or diggings, etc., etc.

THE SCHEDULE OF MINING REGULATIONS

Contains the *forms* to be observed in the drawing up of all documents such as:—"Application and affidavit of discoverer of quarts mine." "Receipt for fee paid by applicant for mining location." "Receipt for fee on extension of time for purchase of a mining location." "Patent of a mining location." "Certificate of the assignment of a mining location." "Application for grant for placer mining and affidavit of applicant." "Grant for placer mining." "Certificate of the assignment of a placer mining claim." "Grant to a bed rock flume company." "Grant for drainage." "Grant of right to divert water and construct ditches."

Since the publication, in 1884, of the Mining Regulations to govern the disposal of Dominian Mineral Lands the same have been carefully and thoroughly revised with a view to ensure ample protection to the public interests, and at the same time to encourage the prospector and miner in order that the mineral resources may be made valuable by development.

COPIES OF THE REGULATIONS MAY BE OBTAINED UPON APPLICATION TO THE DEPARTMENT OF THE INTERIOR.

A. M. BURGESS,
Deputy Minister of the Interior.