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The CANADIAN MINING REVIEW, *is devoted to the opening up of the mineral wealth of the Dominion, and its publishers will be thankful for any encouragement they may receive at the hands of those who are interested in its speedy development.*

Visitors from the mining districts, as well as others interested in Canadian Mineral Lands, are cordially invited to call at our office.

Mining news and reports of new discoveries of mineral deposits are solicited.

All matter for publication in the REVIEW *should be received at the office not later than the 17th of the month.*

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Advertising Space.

The circulation of the CANADIAN MINING REVIEW, which has steadily been going up since its first publication, more than five years ago, has now more than doubled the estimate upon which we had reckoned, and its value as an advertising medium to business men who wish to reach the best classes of mine owners and operators, and the mining centres and camps of every province in the Dominion, is consequently very greatly enhanced. The REVIEW is in the widest sense a Canadian journal belonging to all provinces alike; it is the only journal published in Canada wholly devoted to the interests of her mining industries and mineral resources. We would simply draw the attention of those who have hitherto overlooked it, to this matter, promising our best attention and most reasonable terms on any application for advertising space.

Iron and Phosphates.

At the recent meeting of the Royal Society of Canada we had the pleasure of listening to the address delivered to the mathematical, physical and chemical section by its President (Mr. Thomas Macfarlane). Some of the points touched upon seem to us to be of considerable practical interest.

After referring to the death of Dr. Baynes, a member of the section, and announcing as his subject the utilisation of waste in Chemical Technology, Mr. Macfarlane gave a description of the progress which had been made in this respect at the lead furnaces of Freiber, in Saxony, and at the iron furnaces of Gartsherrie, in Scotland. At the latter place it seems that the furnace gases are made use of on a stupendous scale for the production of sulphate of ammonia, and for other purposes. In another department of the metallurgy of iron waste, utilisations of a most important character have been accomplished, and to these Mr. Macfarlane referred in the following terms:

"Fifty-six years have elapsed since Karsten plainly pointed out the influence which certain small percentages of phosphorus exercise upon the quality of malleable iron. The presence of 0.3 up to 0.8 per cent. has the effect of making it "cold short," that is of lessening its strength at ordinary temperatures. This element is often present in iron ores in the shape of small quantities of apatite and other minerals, and when this is the case, as in 1840, the smelter has no means at his command for preventing the reduction of the phosphorus and its passage into his pig iron. In the original Bessemer process it was found utterly impossible to remove the phosphorus. All of that element present in the pig-iron stuck to the metal, while boiling white hot in the converter, passed into the steel ingots without the slightest diminution, and into the rails, axles and tyres, into which they were manufactured. It was found that for our modern purposes a much greater freedom from the weakening element was demanded than in Karsten's time. For rails 0.1 to 0.2 per cent. phosphorus was permitted, but for steel of a higher quality the pressure of one tenth of these quantities became the limit. As the demand for steel to replace iron increased, so also did the efforts of iron masters to apply cheap and inferior (because phosphoric) pig-irons in the production of Bessemer steel. The ores free from phosphorus were scarce, and, if we except the Cumberland hematites, had to be brought to England from Spain, Algiers and Sweden.

"At last in May, 1879, the problem was solved by Bolckow Vaughan & Co., at Middlesborough, who were the first to carry out the invention of Thomas & Gilchrist, since become famous as the "Basic process." By making use of a basic lining of bricks in the converter, containing not more than 10 per cent. silica, manufactured from dolomite with silicate of soda as a binder, and employing a basic slag containing not more than 20 per cent. silica, and continuing the "blow" 2 or 3 minutes after the removal of the silicium and carbon, those inventors were able to reduce the phosphorus in common pig iron 1.5 to 0.4 per cent. and drive it as phosphoric acid into the basic cinder. The consequences were far reaching. Inferior ores and pig irons became available for making Bessemer steel, and great reductions have taken place in the price of rails, of which our new railways have had the advantage.

"But these were not the only consequences of this invention. Chemical manufacturers began to face the question as to how the phosphoric acid thus separated could be made use of. Large quantities of Thomas & Gilchrist slag were accumulating at the steel works in England and elsewhere, and it was found to contain from 16 to 20 per cent. of phosphoric acid. Compared with our Canadian apatite it seems to be a meagre raw material for fertilizers. Nevertheless it was used for making these, and an article called Thomas' Precipitate was put upon the market by German manufacturers. But before this business had time to develop, it was found that by applying the slag itself as a manure, without any preparation beyond grinding to a very fine powder, the most satisfactory results could be obtained. The problem of utilising it has, therefore, been attacked and solved, and the phosphorus which, for fifty years, was the dread of the iron-master, has now no terrors for him, and has reached at last a sphere of widely extended usefulness in agriculture.

"It would be rather an undesirable result if this saving of waste should have the effect of reducing the value of our apatite deposits. Yet the most recent investigations point in this direction. In the *Chemiker Zeitung*, of March last, the following ultimate analysis of the Thomas slag is given:—

Phosphoric acid	19.02
Silica	8.20
Manganous oxide	5.24
Ferrous oxide	8.06
Ferric oxide	5.14
Lime	49.60
Sulphur	0.60
Magnesia	3.40
Alumina	1.10
	100.66

"Small crystals having been discovered in the slag possessing the composition of Quadrobasic phosphate of lime, the proximate composition of the slag has been computed from the above analysis with the following result:—

Quadrobasic Phosphate of Lime	49.02
Silicate of Lime	15.85
Lime (uncombined)	11.00
Sulphide of Calcium	1.35
Manganous oxide	5.24
Ferrous oxide	8.06
Ferric oxide	5.14
Magnesia	3.40
Alumina	1.10
	100.16

This view of its composition is supported by the fact that the slag is decomposed with facility by dilute acids, and further 8.7-8 per cent. of its phosphoric acid is soluble in a solution of Citrate of Ammonia, a circumstance that would indicate its agricultural value to be equal to that of the precipitated or reverted phosphoric acid of artificial fertilizers. This is just what field experiments with it, in an extremely fine condition, have proved. Its agricultural value has been found to be equal to the phosphoric acid contained in Thomas Precipitate or bone ash.

"With reference to price it is calculated that one pound of phosphoric acid, contained in the finely ground basic slag, can be delivered for about one penny. If we take the value of 80 per cent. apatite in Liverpool at 10c per unit., or about ½ per lb. of tribasic phosphate, then the price of the phosphoric acid in it amounts to very nearly 1d. per lb. This is the same price, but a great difference lies in the fact that