

"The preceding results demonstrate—First, that, even when the process of amalgamation is conducted under the most favourable conditions not more than about one-third of the gold can be extracted from the raw blanket-stuff previously freed from the metallic iron by the magnet; second, that when the process of amalgamation is conducted under similarly favourable conditions, nearly the whole of the gold can be extracted from the completely-roasted blanket-stuff.

"Experiments were made to determine whether, after rendering the pyrites magnetic by partial roasting, and then separating the magnetic portions by the magnet, any and what portion of gold would be removed along with the magnetic portion from the partially-roasted pyrites. The roasting was conducted so as to render nearly the whole of the stuff magnetic, and in small experiments there is no difficulty in securing this result :—

"First experiment.—The pyrites, rendered magnetic and separated by the magnet, contained of native gold 10oz. 16dwt. 21gr. per ton of iron pyrites. The residual sand contained of native gold 17oz. 18dwt. 16gr. per ton of iron pyrites. Total native gold, 28oz. 15dwt. 13gr. per ton of iron pyrites.

"Second experiment.—The residual sand, after separation by the magnet of the portion rendered magnetic, contained of native gold 20oz. 7dwt. 1gr. per ton of iron pyrites.

"Third experiment.—The residual sand, after separation, &c., contained of native gold 20oz. 12dwt. 6gr. per ton of iron pyrites.

"Fourth experiment.—The stuff was reduced to a finer state of division. The pyrites, after separation, &c., contained of native gold 14oz. 12dwt. 1gr. per ton of iron pyrites. The residual sand contained of native gold 15oz. 18dwt. 19gr. per ton of iron pyrites. Total gold, 30oz. 10dwt. 20gr. per ton of iron pyrites.

"No experiments have been made on the blanket-stuff containing the metallic iron. I do not, however, apprehend that the presence of this iron would be injurious; but, if it should, there would not, I think, be any practical difficulty in economically effecting its removal by means of an electro-magnetic arrangement under the blankets. It would be easy to contrive a simple, effective, and inexpensive apparatus to accomplish this object in every respect satisfactorily. Our electro-magnetic arrangement, it is stated, has been adopted with success in Italy for the separation of magnetic oxide of iron from certain ores.†

"It occurred to me as possible that by rendering the pyrites as far as practicable magnetic by roasting, and then separating the magnetic portion, the gold might be left in the residue; but the preceding experiments show that this is not the case.

"I do not think it necessary to communicate the results of numerous and varied experiments which I have made concerning the extraction of gold by liquid reagents. So long ago as 1848 I presented to the British Association a paper on the subject, which was subsequently published in the *Philosophical Magazine* for 1850. I have recently experimented on the Australian quartz-tailings, with a view to the application of liquid reagents for the separation of the gold; and the conclusion at which I have arrived, and which is strengthened by the opinion of Mr. Bland, is that, however applicable processes founded on this principle might be in England, they would be difficult of application at present in Australia, and would probably be unremunerative.

"I would observe that the results of the experiment on the application of liquid reagents to the extraction of gold from its ores, which I communicated to Mr. MacDonnell some time ago, are the identical results of Mr. Daintree to which Mr. Bland refers. They were obtained in the metallurgical laboratory of the School of Mines by Mr. Daintree, under my direction. As far as I am able to form a judgment from experiments on a small scale, I should say that the best thing to be done is simply to roast the blanket-stuff completely, and subject it afterwards to careful amalgamation. This would involve no change of system and no expensive-outlay, and the roasting might, I think, be conducted with a very small consumption of fuel, as the stuff itself contains much combustible matter. You may, perhaps, be disposed to regard this suggestion as so simple as to be superfluous; but I would beg to remark that in practical metallurgy many very important results have flowed from apparently the most trivial changes. I do not pretend that there is any novelty of principle in this suggestion. I have simply to express my opinion that it is the best thing to be done under the circumstances.

"I should, however, wish to speak with a certain amount of reservation. My experience of metallurgical operations on the great scale has brought me to be cautious in proposing alterations or innovations founded merely on experiments on the small scale. But you have in Mr. Bland a manager who evidently well understands his subject, and I should be disposed to rely with confidence on his judgment as to the value of any schemes which may be proposed for your adoption. He has great experience, and knows all the possible conditions of the country, of which I must be comparatively ignorant.

"I have, &c.,

"JOHN PERCY."

JOINT REPORT BY MESSES. ULRICH AND NEWBERY.

Effect of Fumes on Vegetation.

"There can be no doubt that sulphurous, sulphuric, and arsenious acid vapours given off from roasting pyrites will destroy vegetation. The country adjacent to all the great metallurgical works of Europe is destitute of vegetation, though of late years the damage has been diminished, owing to attempts being made to condense the fumes. The chief cause of damage is the sulphurous and sulphuric acid. These acid vapours are condensed on the surface of leaves, causing spots and stains, ultimately destroying them and in time killing the plant.

"In the neighbourhood of pyrites works all damage to vegetation will of course be credited to the fumes and not to other causes. The dark stains and mildew-like coating are quite as prevalent in districts where no sulphurous acid fumes exist as they are in some of the mining towns where

† I have received a pamphlet on this subject from Signor Gabau, Italian Commissioner at the International Exhibition.