

has combined with the chlorine drawn into it just before opening the chlorinator, as before described.

The patentees claim for this new process the following advantages:—

(1.) That the material for treatment falls by gravitation into the chlorinator, and is not damped or sifted by hand as in the old method, for it does not matter how wet it is: thus a great saving of time and labour is effected at the very beginning of the operation.

(2.) That the vessels in which the chlorination takes place do not occupy much space, say 4ft. by 5ft., instead of 10ft. and 12ft. in diameter, as required by the old process.

(3.) That the ore under treatment is kept in motion during the time that it is exposed to the action of chlorine under pressure. The great advantage of combined motion and pressure are, that the combination of the chlorine with the gold under high pressure is far more rapid than when only under the normal atmospheric pressure, and, no matter how large or coarse the grains of gold may be, they are rapidly dissolved. There is no obstruction to the action of the chlorine on the grains of gold by being surrounded with a solution of gold-chloride, or coated with silver-chloride, in many instances the source of failure by the old process. In cases where the silver alloyed with gold is worth recovering, or if there is any present in the chloride, it can be obtained by adding salt to the charge; when, as is well known, it will go into solution.

This is a point of great importance, and will make the process of value, especially in the North Island districts, where a very large percentage of silver exists in the auriferous ores.

A great point of value, and to which the patentees direct special attention in the improved process, is the introduction of compressed air; for by such means any chlorine that would otherwise exist over the surface of the ore in the form of gas is forced into the water with which the ore is mixed in the chlorinator. By this means there is not only a great saving of chlorine, but the chemical action is greatly accelerated, and the gold in the ore converted into chloride in one hour or so, instead of twenty-four to forty-eight hours by the old process.

(4.) The time saved in separating the solution of gold from the material is one of the principal features of the mechanical improvements of the new process; for heretofore the difficulty of leaching or washing the ore, and thereby removing the solution of gold-chloride, has been one of the great drawbacks to chlorination. The rapid filtration is brought about by means of a vacuum produced under the filtering-medium in the solution-separator by a specially-constructed pump, the action of which prevents the material, however fine, from settling down on or into the filter-bed in a compact mass; but, on the contrary, keeps the same lively and open.

(5.) The advantages of decomposing the gold-solution by passing it through charcoal or some other insoluble reagents are numerous, and will be fully appreciated by those who have experienced the never-ending and uncertain method of precipitation by sulphate of iron; and, moreover, such means of recovering the gold is practically automatic. When small quantities—say, 50 tons or less per week—of ore are to be treated, the process can be worked in one barrel or chlorinator; but greater economy will be experienced by using them in sets, as the pumping-power for exhaust and pressure with the smallest effective pump for one chlorinator or barrel is the same as required for four or more. The capacity of each barrel or chlorinator is from fifty to sixty tons of ore per week.

(6.) The plant can be made to treat small or large quantities of ore, and the cost is within the means of working miners. No great skill is required to work the new process, as all details have been so arranged that any person of ordinary ability can master the working of the process in a few days. The cost of chlorination proper is said to be from 10s. to 12s. per ton, including labour and wear and tear. The chemicals required amount to 2 per cent. of the ore treated, and can be so packed that no trouble or risk need be experienced in transit, and the acid necessary may be obtained dry in wooden casks.

This process is said to be in full work at the Mount Morgan Mine, in Queensland, and it has been of such marked success that the loss in the tailings is not 1dwt. of gold per ton. The patentees have also erected an experimental plant at Langland's Foundry, Melbourne, which has so far proved to be a great success. The production of chlorine at this plant is from equal quantities of sulphuric acid and chloride of lime.

Although this process is only now causing attention in the Australian Colonies on account of its introduction by Messrs. Newbery and Vautin, there is nothing original in the idea, neither is it a new one.

Since writing the above, further communication has been received by Mr. A. Saunders, of Auckland, from Mr. J. Cosmo Newbery, as to the adaptability of this process for treating silver-ores, which, Mr. Newbery states, would have to be modified before silver-ores could be treated satisfactorily. The following is a copy of Mr. Newbery's letter:—

"The Newbery-Vautin process, now being worked by the United Pyrites Company, at Sandhurst, was originally devised for the extraction of gold from the ore of the Mount Morgan Mine, in Queensland, and is essentially a gold-extraction process, and, unless modified, is not adapted for the treatment of silver ores. The ores which find their way to the Sandhurst works contain so little silver that it would not pay to try to save it. It seldom amounts to more than a few penny-weights per ton, and does not interfere with the extraction of the gold; for this reason the process at Sandhurst has been made as simple as possible: to extract one metal only.

"From experiments recently made with some New Zealand ores, I have found that the gold and silver are in combination with selenium, and that the silver is largely in excess of the gold; and I am of the opinion that to attempt to treat such an ore by the chlorination-process would only lead to failure, and I have advised that the stone broken by a stone-breaker should be heated to a low red heat in a kiln in the presence of steam. The steam is decomposed, and the hydrogen combines with the sulphur, selenium, &c., and the silver and gold are left free and bright in the form of minute shot; the ore may then be treated by amalgamation.

"Some 15cwt. of ore are now at Sandhurst, and are, I believe, being treated in this way.