

				Oz.	dwt.	gr.
"Gold from mercury in amalgamator	...	...	...	0	14	22·7
Gold from mercury in mercurialized ore	...	...	...	1	7	21·2
Gross total of gold obtained	...	...	...	2	2	19·9
Deduct gold originally in mercury	...	...	...	0	5	10·0
Actual gold obtained	...	...	...	1	17	18·9
Equivalent to per ton of 2,240lb.	...	...	...	3	17	0
Gold present per ton of 2,240lb.	...	...	...	4	14	0
Gold left in tailings	...	...	...	0	17	0

"This is equivalent to a yield of 81·9 per cent. of the total gold present. Assays of the tailings run from the mercury-separator gave an average yield of 17dwt. 16gr. per ton. Deducting this from the gold actually present—namely, 4oz. 14dwt.—shows a yield of 3oz. 16dwt. 8gr. per ton, equivalent to 81·2 per cent. of the gold present. The close agreement in the results obtained by these two entirely different methods confirms their accuracy.

"The advantages of this new process of dry amalgamation over the old process of wet amalgamation may be summarized as follows: Under the new system, the ore, while in a perfectly dry condition and in the form of a powder about forty times as fine as that producible by stampers, goes through a mass of heated mercury 30in. in vertical depth, instead of being, while in a coarse state, driven by a rush of water through stamper-boxes, riffle-boxes, over surfaces of amalgamated copper, &c. In other words, the naked gold is at once handed over to the action of the only agent which is commercially capable of saving it, under circumstances which allow that agent to exert its powers in the most advantageous manner.

"The new process, from the time the ore is raised from the mine up to the moment when the amalgam is deposited in the retort, does not involve the use of either fire or water beyond whatever of these two agencies is required for motive-power and for the use of the mercury-separator.

"The advantage of dispensing, by the means under consideration, with the use of water in the principal gold-saving districts, and the disadvantages attendant on its use in connection with stampers, are apparent from the following facts: As the gold contained in the auriferous rock is for the most part fine, instead of coarse, the water in the stamper-process ordinarily carries away with it a considerable percentage of precious metal, and the loss by 'water-sweep,' added to that caused by non-amalgamation consequent on defective pulverization and want of contact, amounts frequently to between 40 and 50 per cent. of the total gold, and sometimes to considerably more.

"In many auriferous regions, particularly in the tropics and in many goldfields in Australia, water is sometimes for many months in the year almost unprocurable, and, as in the stamper-treatment large quantities of water are essential, crushing-operations have to be entirely suspended during this season, while the pay of at least some of those employed by the mill-owners still goes on.

"Apart from the expense and trouble of pumping-gear, where water is used in quartz-reduction a heavy outlay, first, in the making and maintenance of roads, and, secondly, in the cartage of the quartz, is almost invariably required, for it is generally impracticable, both on engineering and on commercial grounds, to bring the water to the quartz—the quartz must be taken to the water. In many cases the cost of cartage necessitates the abandonment of fairly rich lodes; for in mountainous districts, while the making of wheel-tracks is often impracticable, the scarcity of horse- or bullock-feed increases with that of water, and fodder has frequently to be carried in wagons for very long distances.

"The new process extracts at one operation nearly all the gold contained in the ore, and renders unnecessary the numerous and expensive minor operations attendant on and inseparable from the employment of stampers, such as the use of blanket-strakes, buddles, Wheeler's pans, berdan-pans, &c. As the iron amalgamators, storage-chambers, and mercury-separators, in which all the gold extractable from the ore is deposited, can during both active operations and the suspension of work be locked up as securely as a bank-safe, the mine-owner has neither to trust nor to pay the wages of a watchman day and night to prevent robbery of amalgam.

"The new process, being almost absolutely automatic throughout (save that a man is required to feed the stone-breaker and to attend to the level of the mercury in the amalgamator), will effect an immense economy in labour.

"The new process can be used with very great economy for the treatment of stamper-tailings, especially where much pyrites is present with the quartz. Tens of thousands of tons of pyritic tailings, containing 1oz., 2oz., and sometimes 3oz. to the ton, commercially unworkable by the ordinary process, are waiting the introduction of some such process as the present one, which could be at once employed on these tailings with the certainty of winning a large percentage of gold from them.

"In all the principal goldfields of the world the free-milling ores near the surface are practically exhausted. Much of the ore now being mined contains a large percentage of sulphurets, and is of far too complex a character to be successfully treated by appliances so mechanically rude as stampers.

"The gold in these complex ores is, in many instances, finer than flour itself; it therefore follows, as a natural consequence, that there must be a perfect disintegration and absolute contact of the powdered ore with the mercury. These requisites have never been obtained by the old method, but are fully secured by the new process. There is, moreover, a great advantage in working with hot, dry mercury. The powdered ore falls cold into the amalgamator, and is at once saturated with mercury-vapour.