

the cyanide process involves no wasting, therefore no furnaces or fuel. Moreover, by the cyanide process, ores containing lead, zinc, or other earthy carbonates which cannot be worked to profit by chlorination, may be as easily and profitably treated as any other; also, chlorination does not extract any silver, but by the cyanide method, most of the silver—invariably associated with gold in ore—is extracted along with the latter metal at the same operation. For the sake of simplicity silver has not been mentioned in the body of this paper, but the remarks made in reference to gold generally apply to the silver associated with it."

The following statement shows the result of treatment of the Crown Company's ore at Karanga-hake for the last year, handed me by Mr. J. McConnell, the manager of the Cassell works :—

Clearing up.	Ore.	In Ore by Assay.		Recovered.		Percentage recovered.	
		Gold.	Silver.	Gold.	Silver.	Gold.	Silver.
	Tons. cwt. gr.	Oz. dwt. gr.	Oz. dwt. gr.	Oz. dwt. gr.	Oz. dwt. gr.		
First ...	43 2 1	148 15 8	308 12 20	141 19 3	277 9 9	95·4	89·9
Second ...	72 14 0	222 7 12	488 3 6	199 8 20	374 1 12	87·7	76·6
Third ...	193 0 0	324 8 10	504 2 18	305 18 9	376 3 20	94·3	74·6
Total ...	307 16 1	695 11 6	1,300 18 20	647 7 4	1,027 14 17	93·0	79·0

Whether Cassell's process will be superseded by a less costly one remains yet to be proved, but at present it is well adapted for such ores as are found at Waihi and Kuaotuna. At the latter place the gold is so finely divided that it is almost impossible to save it by the ordinary process. The loss of gold at the Try Fluke battery alone must be very great. Taking the amount saved by the battery process last year as 5,077oz., it may be safely asserted that at least 9,000oz. was left in the tailings, and carried away with muddy water down the creek.

At the present time there are other processes being tried to deal successfully with the extraction of gold and silver from ores which may soon enter into competition with the Cassell process. The following is an abstract from a letter forwarded by the Agent-General from L. Hundeschagen, of Stuttgart, Germany :—

"Being aware that the wealth of New Zealand will to a certain extent depend on the productiveness of the mines, I take the liberty to draw your attention to a series of successful experiments which the undersigned and a friend of his made on several kinds of refractory ores that hitherto offered extreme difficulties. As refractory ores occur in your colony—viz., ores containing gold, silver, copper, lead, zinc, arsenic, antimony, bismuth, &c.—as sulphides and other more complicated compounds, accompanied by iron- and copper-pyrites in quartz, feldspar, baryta, magnetite, &c., the result of our researches may interest you. We extracted—

" 90 to 92 per cent. of the silver	} purposely leaving other metals unextracted.
80 to 93 " gold	
90 to 95 " copper	
35 to 80 " lead	

"The percentage of precious metal extracted will chiefly depend on the ore. I may mention that we have treated lots of 40 to 60 tons each, and the cost of treatment will not exceed, even in Australia, 15s. to £1 per ton, as very little fuel—wood or coal—labour, and chemicals are required, which circumstance renders our method extremely suitable for mountainous districts, and generally for the colonies. The whole plant, too, is cheap—great part of it can be made abroad—and will require hardly any repairs for fifteen to twenty years. The value of our method will, furthermore, be illustrated by the fact that what chemicals are used can be found in or near the mines, or can be produced on the spot at a nominal cost."

It will be seen from the above that there is a great probability of other methods of treating auriferous and argentiferous ores being shortly introduced which will apparently be equally as good as the Cassell process. Mr. Hundeschagen, however, gives no clue to the methods he employs to extract the metal from the ore. A company has recently been formed in London called "The Gold-ores Reduction Company (Limited)." This company in their first annual report state they can extract from 85 per cent. to 98 per cent. of the gold and silver in the ores at a nominal cost. A description of the process will be given further on.

As several inquiries have been made in reference to the patent rights of the Cassell Company, a copy of the specifications under which the patent rights were granted is hereto annexed :—

"Whereas, we, John Stuart MacArthur, technical chemist, of 15, Princes Street, Pollokshields, in the County of Renfrew, North Britain, Robert Wardrop Forrest, M.D., and William Forrest, M.B., both of 319, Crown Street, Glasgow, in the County of Lanark, North Britain, are desirous of obtaining letters patent for securing unto us Her Majesty's special license that we, and such others as we should at any time agree with, should from time to time during the term of fourteen years (to be computed from the day on which this instrument shall be left at the Patent Office) make, use, and vend within the colony of New Zealand and its dependencies an invention for 'Improvements in obtaining gold and silver from ores and other compounds,' and, in order to obtain the said letters patent, we must, by an instrument in writing under our hands and seals, particularly describe