tinuous, will be of considerable interest, as these tailings, amounting to nearly 100,000 tons, are now to be treated by the cyanide process:—

Value of Ore per Ton.		Value of Tailings per Ton.		Per Cent. extracted.		Value of Ore per Ton.		Value of Tailings per Ton.		Per Cent. extracted.	
Gold.	Silver.	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.
$	$	$	$			$	$	$	$		
16·15	14·13	3·46	13·18	78·5	9·2	18·99	17·53	4·65	16·05	75·4	9·2
14·54	13·46	3·47	12·17	76·1	9·2	18·16	16·97	4·05	15·73	77·6	9·2
18·67	15·26	4·87	13·96	70·9	9·2	17·42	17·08	4·52	15·88	74·1	9·2
19·72	17·93	5·08	15·82	74·1	9·2	17·19	19·02	3·91	18·41	77·2	9·2

The higher-grade tailings have been worked with much success by the amalgamation process invented by Alexis Janier, but the low-grade tailings are left for the cyanide process; with this the extraction of gold will, undoubtedly, be very fair, and the consumption of cyanide low, while the silver will still remain rebellious. Considering the small contents of precious metals, it is doubtful if the process will prove a financial success. The Atlanta were extremely rebellious. They were treated, while the mine was in operation, by roasting in a Bruckner furnace, and were then amalgamated. The percentage extracted, however, was low, not running above 80 per cent. on the average, and with a heavy loss of gold in the furnace. The extraction by cyanide, all things considered, was quite fair, especially with the free surface-ores. Samples of tailings yielded nearly 80 per cent. of the gold and 60 per cent. of the silver contained.

The Paradise Valley ores are extremely good for experimental purposes, as they consist of a clean quartz gangue, with the mineral in the form of proustite and pyrargyrite distributed throughout it, so that the solutions employed act on the minerals alone, being entirely unaffected by the gangue. The results obtained in the extraction of gold by cyanide were fair, although there is but a small percentage in the ore, and that contained in mispickel. It is said that attempts are now being made to treat the tailings from the old twenty-stamp dry-crushing and chloridizing mill by the cyanide process.

The Custer County, Dakota, ore, which was tested by Mr. S. D. Porter, consisted of crystalline quartz with free gold, oxide of iron, and a small quantity of tellurium. By free milling 26 per cent. was extracted; and by concentrating 14·7 tons into 1 ton a concentrate valued at £47 18s. a ton was produced—a saving of 41 per cent. of the assay-value. Further tests, by concentrating 7·35 tons into 1, gave a concentrate valued at £33 1s. a ton, a saving of 57 per cent. Raw chlorination saved 84 per cent. Other ore in the vicinity gave results as high as 92 per cent. by the cyanide process.

E. N. Riotte made a series of experiments on the Bald Mountain ores by the cyanide process, but the results were not successful. Tests at the Golden Reward Works, Deadwood, where they are now using the barrel chlorination process with great success, were failures, according to the superintendent, Mr. Bamberger. Messrs. Frank and Darling have informed the writer that these experiments were successful so far as the extraction of the metals was concerned, but were failures mechanically, owing to the leakage of the vats. They state that 94 per cent. of the gold was extracted, and 87 per cent. of the silver, with a consumption of 0·9lb. of cyanide per ton.

Conclusions and Deductions.—It would seem probable that in ores containing both gold and silver only the oxidized surface-ores can be treated with success, both the silver and gold minerals from depth proving refractory. The Comstock ores give fair results, as should those of the De Lamar Mine, and the Minas Prietas ore should yield a high percentage of the gold, but very little of the silver. With the majority of these ores the consumption of cyanide would be large, as many minerals other than those of silver are contained in them, and would have a decomposing action upon the solution.

The interest which has been caused recently by the statement, substantiated by the fact, that cyanide of potassium dissolves the gold from auriferous pyrite and arsenopyrite, leaving the mineral to all appearances untouched and undecomposed, has reopened a much discussed question—namely, "the condition of gold in pyrite." These results, it is true, do not fully answer this question, for if the gold were either a sulphide, as it is claimed by some, or in the metallic state, the cyanide solution would still dissolve it; but, since the material operated upon is comparatively coarse, these results may give us some information as to whether the gold is in uniform mixture with the molecules of the pyrite, or simply a superficial and local deposition.

Those who have held the theory of chemical combination of the gold, silver, and iron in a double sulphide of the metals—and they number among them many eminent men—have based their arguments, as a rule, upon the difficulty of amalgamating the gold in these minerals when undecomposed, and upon the ease with which they are treated when the sulphur is eliminated, leaving, according to their theory, and in apparent confirmation of it, the gold in the metallic state. As the artificial sulphide of gold is unstable and is quickly decomposed by heat, leaving metallic gold, they argue that the gold in pyrite must have been partly at least in the form of a sulphide.

Others have subjected auriferous ores in which they suspected the existence of auric sulphide to the action of alkaline sulphides, claiming that if gold went into solution it existed as a sulphide, but forgetting that metallic gold is soluble in alkaline sulphides to a marked degree. In reality