

Precipitation.

The use of filiform zinc for precipitating gold was introduced on the Rand by MacArthur in 1890. At first no difficulty was experienced in the deposition of gold from the stronger cyanide solutions required for sand treatment; but when it was found possible to recover gold from slime with much weaker solutions, precipitation on zinc became more difficult. It was at this time that the Siemens-Halske electrolytic process, which was more effective than zinc in dealing with these weak solutions, threatened to replace the older method; but owing to serious defects in operation, already touched upon, it was finally abandoned in favor of the zinc method, which had been rendered much more efficient by the immersion of the shavings in a solution of acetate of lead, preparatory to filling the extractor boxes. With this exception, precipitation practice on the Rand does not differ materially from that in other mining districts where filiform zinc is used.

The zinc shavings are cut in the usual manner to a thickness of about 1/500 in. and 1 cu. ft. of such filaments loosely packed, per ton of solution per 24 hours, is the average allowance for capacity of extractor boxes. These boxes, usually built of steel, are from 4 to 6 ft. wide, and of corresponding depth, with 6 to 10 compartments. The existing system of gold precipitation, though highly efficient on the dilute solutions used on the Rand, admittedly possesses many awkward features which have for years stimulated investigation with a view to devising a more compact, positive and less wasteful substitute. Its weak points are: (1) the great area required for plant; (2) the labor required in dressing and cleaning up extractor boxes; (3) the uncertainty of cleanup, owing to the variable distribution of gold not immediately recoverable; (4) the impossibility of recovering at once all gold deposited within a given period; (5) the enormous loss of zinc in the destructive process of recovering its gold content.

The Merrill zinc-dust method, as perfected in America, offered certain distinct advantages over the older process. It is neater and more exact in operation, requires less labor, and possesses the very attractive feature of yielding a complete cleanup of all the gold deposited. After practical trials this process was introduced at three Rand mines; the Brakpan, New Modderfontein, and Modderfontein B.

The consumption of zinc in the Merrill presses is approximately 1-10 lb. less per ton milled than in extractor boxes. The cost at Johannesburg of cut shavings is 4.2d. per lb., of zinc dust 3.93d. per lb., so that as regards zinc consumption the presses have the advantage. But this is offset by the cost of additional cyanide required to strengthen the slime solutions sufficiently for good zinc-dust precipitation, which was found to be, at New Modderfontein, 1d. per ton milled.

The general opinion in regard to zinc dust, after three years' experience with the process, is that in effecting economies in zinc consumption and labor, and in affording a complete cleanup of gold, it has fulfilled the claims made for it. On the other hand, it requires more vigilance and care in manipulation than the zinc-shaving method, is liable to erratic fluctuations in efficiency without assignable cause, and requires the use of stronger solutions than are actually needed for dissolving purposes.

One cannot escape the conclusion that zinc in any form is far from being the ideal precipitant for gold. In 1913, about 9,000,000 lb. of zinc were consumed by the mines of the Rand. When we consider that the greater part of this irrecoverable loss is due to the destructive method employed in separating the gold

from the zinc after deposition, it is evident that the existing system is an extremely wasteful one. For this reason, the subject of gold deposition presents one of the most profitable fields for investigation in the whole realm of metallurgy, and I venture to predict that in this stage in the reduction of gold ores, the most important advances in the future will be made.

THE BELGIAN RELIEF FUND

To tell, even in part, the story of the work in Canada for the relief of the suffering Belgians, is to unfold a record of a series of surprises which is sometimes almost staggering. When, early in September, it was decided to open the fund, and an Executive Committee was formed, it was realized by those having the direction of the campaign that appeal was being made at a time when trade depression was more or less general and when the demands of the Patriotic Fund, the Red Cross Society and other worthy organizations were not only insistent, but immediate. It was hoped, however, that it might be possible to send a shipload of goods from Canada and perhaps even two to the starving people of a brave nation.

Four ships have already been dispatched, and as this is written, arrangements are being completed for the sending of a fifth. A few days ago, Mr. Hector Prud'homme, the honorary treasurer of the Belgian Relief Fund of Canada, was able to announce that the total donations in money and in kind had reached the magnificent total of \$1,750,000. What this means can best be judged by referring to another statement recently issued by the International Committee in London, which is handling the work of distribution for several countries. This showed that Canada had given more generously for the cause than any other country in the world, with the one exception, the United States. England, of course, has done splendid work through individuals by providing homes for thousands of the refugees, but in actual cash and other gifts placed at the disposal of the committee, England, Scotland, Wales and Ireland combined, have not been more generous than the Dominion.

There can be only one explanation of a manifestation as satisfactory as it is surprising. The imagination of the citizenship of Canada had been quickened by the story of the bravery and self-sacrifice shown by the Belgians in the early days of the war. Admiration for the army of heroes who held in check the German invader, melted into sympathy for those who, having refused to barter honor for happiness, found themselves homeless and starving in a devastated country in consequence. "Oh!" wrote the mother of twelve children, who sent a parcel to the Montreal headquarters, with a note attached, "if only I could make you understand, you who will receive this, how the hearts of Canadian mothers bleed for you. We think of you, of your homes destroyed, crops ruined, sons slain, and daughters worse than slain, and we pray for you daily. We look upon our own happy children growing up in a land of liberty and of happiness, and we weep for you. I am not rich. The coin I enclose with this letter (a twenty-five cent piece) is small, but my desire to help is big. Will you write to me, that I may pray for you by name?"

This spirit of direct and personal interest in the sufferers has been shown in a dozen different ways; children have emptied their toy banks, women have