ART. VI.—*An Experiment with Gold*; by M. CAREY LEA.

SOMETIME since I had occasion to reduce a number of gold solutions and used for this purpose sodium hypophosphite. The solutions all acted in the usual way with one exception; in this the liquid turned deep emerald green. This condition lasted about ten minutes and then the metal was precipitated.

I have since determined the conditions under which this appearance takes place and its explanation.

A weighed quantity of pure gold was dissolved and the solution was evaporated to dryness twice. The chloride was then dissolved in water in the proportion of 1 gram of metallic gold to each 10^{cc} of solution. A 10 per cent solution of sodium hypophosphite was also made. These solutions mixed in various proportions produced the green solution; perhaps the most satisfactory result was obtained as follows:

Of the hypophosphite solution 15^{cc} are to be placed in a beaker and 1^{cc} of the gold solution is to be added and then one drop of sulphuric acid. As soon as the solution begins to darken a little, which will be in from two to four minutes, 30^{cc} of water are to be added without delay. The solution presently assumes a deep green color, remaining quite transparent. By slow degrees it becomes less clear. If filtered at the end of an hour the filtrate will either be yellow or green; if yellow it soon turns green, remaining for some time transparent; and this may be repeated several times.

One explanation presented itself—that there might be present in a state of fine division the olive green oxide of gold Au_2O_3 , described by Prat.* But in the filtrations above referred to there is left on the filter an infinitesimal quantity of a blueish black substance which is not an oxide but metallic gold.

The green color of the liquid is, therefore, due to the presence of a small quantity of gold in its blue form in a state of very fine division, which together with the yellow of the undecomposed solution gives the effect of green.

If when the solution becomes slightly troubled, instead of filtering it is left to itself for a few minutes, the sides of the beaker will receive a deposit of gold, yellowish brown by reflected light but clear blue by transmitted.

* Roscoe & Schorlemmer, vol. ii, part 2, page 377.