

worth communicating. It is, therefore, with gold alone that I have to deal.

Some preliminary experiments were made with the ordinary gold toning baths containing borax or sodium acetate. The results were, in a measure, promising, as the image became, in time, perceptibly strengthened, showing that there was some slight attraction on the part of the platinum in the print of the deposited gold. But many hours were required in order to effect any change, the color was disagreeable and the print was badly stained all over. Baths containing gold sulphocyanide gave no better results.

Next, trials were made by the depositing gold on the print by reducing gold chloride with such feeble reducing agents as sulphites, oxalates, organic acids, and pyrogallol and other developing agents in a strongly acid condition. No useful result was obtained in any case. Whether the gold was deposited quickly or slowly it appeared to have no distinctly marked attraction towards the platinum image and did not perceptibly adhere to it.

I then used as reducing agents, various organic compounds of a glutinous nature, such as gum, glycerine, sugar, treacle and glucose. Several of these employed in a faintly acid condition gave promising results; glycerine especially answered well. The reducing action of glycerine alone upon gold chloride is very slow; no metal is deposited for ten or fifteen hours, but when applied to a platinum print the metallic platinum in the image by its attraction for the nascent gold hastens the action, and the gold chloride is then reduced in a few minutes. Under these conditions the metallic gold adheres closely to the platinum. The viscosity of the glycerine appears to

play an important part, possibly by acting as a mechanical check on the rapidity of the deposition of the gold.

The first action of the toning solution on the print is to increase slightly the strength of the image without changing its colour very much, but as more and more gold is added, the colour becomes first blue-black, and finally almost blue. If the original image is at all brownish in colour the effect of slight toning is to convert it into a pure black. Unless the toning is continued to an extreme extent, there is very little tendency for the gold to be deposited on those parts of the print where no platinum is present.

The first prints prepared were toned to the required extent and then simply washed and dried. I found later, however, that simple washing was not in every case sufficient to remove all the gold chloride from the paper, for, after keeping some weeks, a few of the prints showed a pinkish tinge in the high lights. It is probable that the gold chloride may, if left for any considerable time in contact with the size in the paper, form a compound of some description with it, and is then not removable by washing. Even rinsing the prints, after toning, with weak hydrochloric acid did not entirely prevent the pink color appearing. The simplest means of insuring the absence of any gold compound which would be liable to change appears to be to treat the prints after toning and slight washing with an alkaline developer, so that any gold remaining will be completely reduced to the metallic state. After this treatment a moderate washing to remove the developing solution should render the prints quite free from any tendency to change. None of the prints I have prepared in this way have shown any signs of alteration.