

at once. Do not use a combined fixing and toning bath; prints toned by it are of doubtful permanency. Judge of toning by looking through the prints, never by the surface; the color seen will be the color of the finished picture, allowing a little for the alteration in tone which arises in the drying. Always use a fresh fixing bath; dirty hypo will stain the prints. Wash prints two hours in running water and then mount; prolonged washing destroys the purity of the whites and is not required. Never use a strong toning bath; poor and uneven tones are the result. Do not attempt to tone without gold; the substitute, nitrate of lead, will destroy all the finer half-tones, ruin the whites, and is not permanent. Keep prints in moving water after they are toned until they are placed in the fixing solution. Do not use metal trays in any part of the process. Do not use the burnisher too hot; it will turn the tone a streaky red. Do not burnish prints until they are thoroughly dry, mounting over night is best. Do not use dry soap as a lubricator. Do not use salt in the toning bath. Spot prints same as on albumen paper, mixing your color with the white of an egg. Make your own chloride of gold. Mount prints in usual way with starch paste. Do not lay damp prints one on top of the other.

Prepare the chloride of gold as follows: Place a sovereign in a stone china cup with one oz. of C. P. hydrochloric acid; half oz. C. P. nitric acid; half oz. of water; place cup in hot water bath until dissolved and crystallized; then dissolve crystals in 16 ozs. of water. This will give one grain of pure gold to every dram of solution. In dissolving a smaller amount of gold use less aqua regia.

TONING BATH.

Water, 20 ozs.; gold solution, 1 dram; dilute in graduate glass with 2 ozs. of water, and neutralize with carbonate (sal) soda, and add to the 20 ozs. of water; mix well.

TONING.

Place the prints in the toning bath face down, until they are thoroughly saturated with the solution, then face

up. Prints should take about eight minutes to tone. As the bath becomes weak with toning a large number of prints, strengthen with gold diluted and neutralized as at first.

FIXING BATH--STOCK SOLUTION.

Water, 2 gallons; hypo-soda, 15 ozs.; pulverized alum, 7 ozs. This should stand a couple of days to clear before using. Use enough fixing solution to cover prints well. Fix prints fifteen minutes.

If all the operations are carried out faithfully, the operator will have prints of exquisite beauty and much greater permanency than those on albumenized paper.

Guelph.

A. E. LYON.

Photography and Photo-Mechanical Printing.*

BY PAUL L. WATERLOW.

II.

NIEPCE'S discovery, about the year 1825, of the curious effect of light on bitumen is very interesting from the fact that the process, only slightly modified, is employed to-day for the production of some of our finest photo-etched plates. I believe there are in the British Museum some specimens of Niepce's bitumen plates showing his attempts at etching quite half a century before there was any practical use made of them.

One of the most beautiful processes, namely, photogravure, was largely dependent in its beginning upon this action of light on bitumen.

PHOTOGRAVURE.

Photo-intaglio engraving is, as its names implies, just the opposite in effect to the photo-relief blocks, the principles are the same, however, and the difference in result is obtained by using a positive or transparency for obtaining the pictures on metal (instead of a negative), and by etching away the lines themselves instead of the metal surrounding them. I have here

*Lectures delivered before the Officers of the Royal Engineers at the Military School, Chatham.