ing, provided the recipient has been previously covered with a flux or glaze, if not the flux may be applied over the picture in the following manner. Pour on a solution of Canada balsam in spt. turpentine.—Dry the plate by heat until the turpentine is entirely evaporated.

Prepare the flux, which may consist of borax and glass, or borax, glass, and lead, by grinding it on a slab with water, and drying. Apply this (the flux) equally and evenly, by means of a pad of cotton tied up in very soft and flexible leather.

With respect to the colors used, they are ground on a slab with water, and dried.

The red picture is obtained by peroxide of iron, prepared by calcining the sulphate, and washing the mass with successive lots of boiling water; the dark brown by oxide of manganese.

*Photo-zincography.** By Colonel Sir HENRY JAMES, R.E., Director of the Ordnance Survey.

In the report of the committee of which Sir R. Murchison was chairman, it is stated that the annual saving effected by my having introduced this (the photographic) method of reducing the Ordnance plans from the larger to the smaller scales, amounted in the year 1858 to £1615. Since then we have so much reduced the cost of the photographs, that the saving which will be effected will amount to £35,000 in the cost of the survey. Up to this period we have exclusively used the paper prepared with nitrate of silver for printing the number of copies required; but we have made experiments with the printing paper prepared with the bichromate of potash, gum, and lamp black, or any other pigment, called the chromo-carbon process of printing.

The action of light on a coating of this composition produces the peculiar effect of rendering it insoluble in water, and consequently when a sheet of paper coated with it is placed in the printing frame under the collodion negative, the outline of the plan is rendered insoluble in water, and remains on the paper when all the remainder of the composition is washed away, and thus we have a “positive” plan in ink of any color which may be required.

In comparing the reduced plans obtained by this process with those obtained by the use of paper prepared with the nitrate of silver, we obtain no advantage whatever, but, on the contrary, the prints are less clear and sharp in their outline.

But by a new mode of treatment of these *chromo-carbon* prints which has been introduced by Capt. A. de C. Scott, R.E., who has charge of this branch of the work, and Lance-Corporal Rider, R.E., who is a good photographer, and also possesses a considerable knowledge of chemistry, we can produce very sharp, clear lines. The ink of the print after being soaked in a saturated solution of caustic potash or soda becomes, so to speak, disintegrated, and is then in a state which enables us at once to rub down the print and transfer the outline to the waxed surface of a copper plate for the engraver. This promises

* From the Lond. Mechanics' Magazine, April, 1860.

to be of great importance to us, as after obtaining the photographed reductions of the maps we have hitherto been obliged to make tracings from them in ink, for the purpose of transferring the plan to the copper, the expense and delay of which will now be saved, whilst we run no risk of any error being made by the draughtsman.

We have also tried a method which is still more valuable and by which the reduced print is in a state to be at once transferred to stone or zinc, from which any number of copies can be taken, as in ordinary lithographic or zincographic printing, or for transfer to the waxed surface of the copper plates. To effect this, the paper after being washed over with the solution of the bichromate of potash and gum, and dried, is placed in the printing frame under the collodion negative, and after exposure to the light, the whole surface is coated over with lithographic ink, and a stream of hot water then poured over it; and as the portion which was exposed to the light is insoluble, whilst the composition in all other parts being soluble is easily washed off, we obtain at once the outline of the map in a state ready for being transferred either to stone, zinc, or copper plate, or we can take the photograph on the zinc at once.

This new method of printing from a negative is extremely simple and inexpensive, and promises to be of great use to us. Sheet 96, of Northumberland, has been transferred to the copper plate from impressions taken from this process, and from the perfect manner in which we are able to transfer the impressions to zinc, we can, if required, print any number of faithful copies of the ancient records of the kingdom, such as "Doomsday Book," the "Pipe Rolls," &c., at a comparatively speaking very trifling cost. I have called this new method Photo-zincography, and anticipate that it will become very generally useful, not only to government, but to the public at large, for producing perfectly accurate copies of documents of any kind.

*Singular Effect of Lightning.**

At the November Meeting of the Philosophical Society of New South Wales, held in the hall of the Australian Library, a very curious circumstance was brought under the notice of the members present, by Professor Smith, respecting the singular effect of lightning upon a gas-pipe. Alluding to the phenomenon, the Professor says:—

"In his laboratory at the University, recently, he had had a connexion made with the iron pipes brought up from the city; the gas-pipe was laid along the front of the building, below the surface of the ground. The pipe was a cast iron one, three inches in diameter, and the connexion with the laboratory was by a small iron pipe, joining a tin pipe, under the floor. There was also a system of lead water-pipes, following nearly the course of the tin gas-pipe, and terminating underneath the door-way, where the gas-pipe entered the laboratory; at this point, or just inside the door-way, the tin gas-pipe touched the lead

* From the Lond. Jour. of Gas Lighting, &c., No. 191.