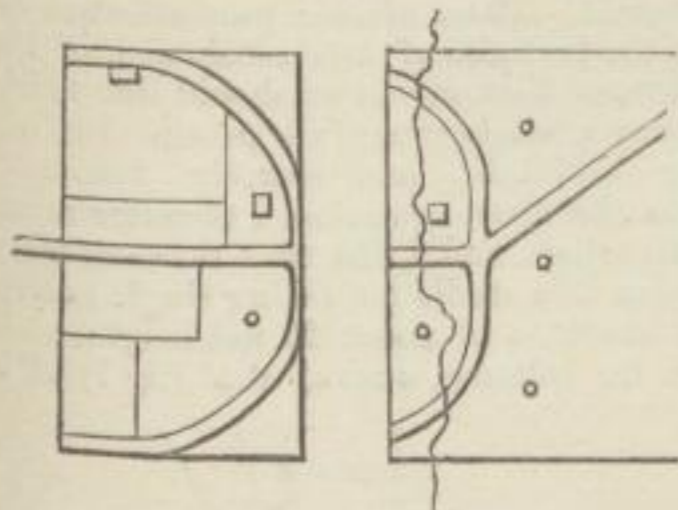


minutes, or as soon as the white parts appear loosened, gently remove the paper. If the operations have been properly carried out, the ink should have been almost entirely removed from the paper. The plate is now washed with water and a soft sponge, to remove all traces of paper and gelatine, and is fanned dry with a fan made of a stiff piece of cardboard inserted in a wooden handle. Should any corrections be required, they may be made with pen and transfer ink or with an etching point, as will be afterwards explained under the head of "Corrections." It is sometimes advisable, especially if the work is delicate, to let the plate remain a little time before etching, and also to warm it slightly, which causes the plate to absorb the greasy ink more perfectly, and strengthen the fine lines. The plate is now ready for etching; but before describing that operation I will give an account of the plan to be pursued in joining together several transfers on the same plate. If the work has been copied in sections, and it is desired to join all the transfers together, attention to the following directions will secure good results:—

1. A liberal margin must be allowed all round the sections.
2. All the sections must be copied under precisely the same conditions, so as to correspond exactly in size. The least shifting of the camera or plan-board will be sufficient to throw them out.
3. The transfer must be of the same age, otherwise some may transfer and some may not. To join the transfers, have ready a drawing-board, and two or three sheets of clean



paper, some pins, and some thick gelatine solution. Cut the black edges off the transfers, lay them down face upwards on the paper in their proper position, and select the best lines for cutting them, which should run as far as possible in blank spaces, crossing the work as little as possible.

Only one transfer is cut as a rule, but parts of the other one may be made available if desired. Now, with a pin, fasten down any two corresponding points on both transfers, and do so in as many points as may be required. When the work has been all fitted together, take some of the gelatine on a fine brush, and put a little between the transfer here and there, but not close to the edge of the join, or there is a danger of its spreading over the lines and spoiling the transfer; when this is dry take out the pins, gently turn the sheet over, cut away the paper of the under transfer to within half an inch or so of the joins, and pass the gelatine under the joins, and let it dry. The sheet may now be removed to the damping-book and treated as before. If the joins are too apparent on the zinc plate, any blank spaces may be filled in with a pen and transfer ink, or scratched in with a point, and any thickening of the lines may be reduced with the point of an eraser.

The plate must now be etched in order to fix the design on it and render the surface of the plate more capable of retaining moisture; this is done with a mixture of weak acid, tannin, and gum water. The theory of its action is not thoroughly understood, but it is supposed that the acid dissolves the oxide from the surface of the plate, and, by slightly corroding it, forms innumerable little hollows which retain moisture; the acid also decomposes the alkali con-

tained in the ink, and renders it insoluble. It is supposed that the gum and tannin combine with the surface zinc, and form an insoluble layer which preserves the zinc from the immediate contact of the water, and renders it more susceptible of receiving, without alteration, water and gummy liquids. The etching, also, draws off all dust and greasy stains, and increases the sharpness and vigour of the lines. The etching liquid is prepared as follows:—1 quart decoction of galls; 3 quarts gum water, about as thick as cream; 3 ounces phosphoric acid. The decoction of galls is prepared by soaking 4 ounces of bruised Aleppo galls in 3 quarts of cold water for twenty-four hours; the water and galls are then boiled up together, and afterwards strained.

The phosphoric acid is prepared by placing sticks of phosphorus in a bottle of water, the ends of the phosphorus being uncovered. Air is admitted by making a hole through the cork. This causes the phosphorus to become oxidized, forming a mixture of phosphorus and phosphoric acids, which dissolve in the water as they are formed. The solution will be strong enough to use in a few days. Phosphoric acid can be purchased ready prepared at the druggists', and is, I think, preferable, phosphorus being a dangerous material in inexperienced hands.

Before the etching liquid is used, its strength should be tested in the following manner:—Apply a drop of the etching liquid to a piece of clean, polished zinc plate, and wipe it off after twenty or thirty seconds; the stain should be distinctly visible, though slight, and of a light grey colour. If the stain be deeper, add water; if lighter, strengthen with some phosphoric acid. Some other etching liquids have been recommended, but they contain sulphate of copper, and have the disadvantage of darkening the surface to such an extent that the detail is not sufficiently distinct. The etching liquid is brushed all over the plate with a broad brush, and allowed to remain a few seconds; the excess is then wiped off with a cloth, and the plate is fanned dry; as soon as it is dry, the preparation is thoroughly washed off with water. It may be allowed to remain without any harm if it is inconvenient to wash it off at once, as its action ceases as soon as it is dry. The strength of the etching liquid varies according to the nature of the subject: for fine work it should be used weak, but for vigorous subjects, or if the ink contains a great deal of soap, it may be used stronger. If the etching is not sufficient, the work is apt to run smutty; and if etched too strong, the delicate lines are destroyed.

The etching having been thoroughly washed off, the plate is sprinkled with turpentine and a few drops of water, and gently rubbed with a cloth till all the ink is taken off (for photo-carbon transfers in half tone a mixture of one-quarter glycerine and three-quarters turps is used instead of plain turpentine); it is then damped, and rolled in with the ordinary lithographic printing-ink, rather stiff. The ink is prepared by taking equal parts of middle and thin litho-varnish, and adding a little to a lump of best chalk litho-ink, about the size of a hazel nut, or larger if required. This is well mixed with the palette knife, and then worked quite smooth with the roller. The ink should not be too thin, and must be harder for fine work. It is better to have stiff ink. A proof is pulled on thin paper, and any corrections found necessary may be made. Several prints must be pulled on the thin paper before the plate is in good working order; when that is the case the plate paper can be used and the required number of copies printed off. When copies of very fine work are required it is better to print on enamelled paper, which may be prepared as follows:—Quarter of a pound of Russian glue is soaked in 3 quarts of water till quite soft, and then dissolved with heat; 1½ pounds of zinc white are ground with water on a slab, and then mixed gradually with the solution of glue, and passed through a hair sieve. The paper is coated twice with this preparation; the streaks are obliterated by going lightly over the surface with a soft camel's-hair brush. This paper must