

HALF-TONE REPRODUCTION

Regular Ruled Glass Screens

THE half-tone screen is the medium that converts the continuous tones and shades of an original for reproduction into a dot formation that can be printed to visually reproduce the original. The impression of half-tone is simulated by breaking up a continuous tone image into dots too small to be resolved by the eye, being obtained by varying the sizes of the dots relative to the area of unprinted paper. Dot formations are thus used as a means of reproducing continuous tone values in relief and planographic printing and also in the intaglio method of printing; but here the dot formation or structure in its more recent commercial application is referred to as invert. With the planographic and relief processes it is realised that they are capable only of printing a solid film of ink, and in no manner can they be assumed or induced to print varying intensities of ink in order to reproduce a graduated tonal range. Thus a range of tone values is represented by a series of dots—14,400 per sq. in. ($6 \cdot 45$ sq/cm), using a 120 screen (48 lines/cm), which are in effect inversely proportional in size to the amount of light reflected from the original. A highlight area, where there is a high proportion of light reflectance, is represented by a series of fine dots, transparent openings on a ground of metallic silver, set in a geometrical pattern on the negative. As the tones in the copy vary and intensify as they absorb light—with a subsequent lack of light reflection from these areas—so the dots vary accordingly in size.

Negatives of this character are termed half-tone negatives, and in photolithography the half-tone negative bears a simple relationship to the copy and is known as a highlight negative. This same condition does not exist in an orthodox negative for letterpress block printing, because when the tonal gradation represented in the negative is transferred to metal the dot image has to be etched into relief, with a consequential alteration in dot size to obtain the necessary printing depth. This subsequent treatment alters considerably the shape and size of the dot formation, which must be adjusted initially in the negative to satisfy these conditions. This does not apply with powderless etching where negatives used are highlight in character.

A glass screen is made by diamond ruling lines on two optically flat pieces of plate glass coated with an etching resist. The lines are etched with hydrofluoric acid and filled with an opaque pigment. The two pieces of glass are then cemented together, using Canada balsam, with the lines crossing at right angles. When assembled the cross-line pattern resembles a wire mesh in which the width of the opaque element equals the width of the clear opening. When this type of screen is interposed between