paratively few years hand engravings on wood or metal were the only practical means employed for the illustrating of books but within the last decade a remarkable change has come about and where once few or no illustrations were to be seen, because of the great cost, books now abound with them. This revolution in illustrating has been brought about by photography and, owing to the beauty, correctness, rapidity and cheapness with which illustrations can now be reproduced, our best magazines are now greatly enhanced and many others, which sell solely upon their appearances, are enabled to do a paying business.

There are several methods of engraving by the aid of photography but that class of work which we meet with most frequently is line and half tone process work, known as photo-engraving, and in this paper only this class of work will be treated.

In general the photo-engraving process may be outlined as follows: first, negative making; second, reversing the negative; third, printing the negative image upon metal, and fourth, etching.

Negative Making. -The art of photography is based upon the fact that certain salts of silver undergo a change of molecular structure when acted upon by light. This change of structure is caused by certain chemical rays—actinic rays—which are largely present in sunlight, magnesium light and electric arc light. The salts of silver which have been found susceptible to acting rays are the iodide, bromide and chloride; each having the same general property but varying slightly in their respective qualities.

To obtain certain results desirable in negatives these salts are often combined.

In practice a glass plate is coated on one side with these salts and we have what is known as a photographic plate. It is essential, however, that some medium be used to hold these salts in a film upon the surface of the glass and here arise the distinctions collodion plates and gelatin or "dry" plates.

In the collodion plate the glass is coated with a film of collodion holding in solution certain halogen salts such as iodide of ammonium, iodide of cadmium, chloride of calcium and chloride of strontium. This plate is then submitted to the action of a solution of silver nitrate which causes the formation of the sensitive salts on the collodion film. If, for instance, iodide of ammonium be present in the collodion it will be converted, by the action of the silver nitrate, into iodide of silver, a sensitive salt, and am-