longitudinal section of one of them. The two boxes were alike except in the matter of depth; the bromine box being about twice as deep as the iodine box.

Each box contained a rectangular glass jar having ground edges. In the top of the box was fitted a slide more than twice as long as the box. In the under surface of one end of the slide was fitted a plate of glass, adapted to close the top of the jar, and in the opposite end of the slide was formed an aperture furnished with a rabbet for receiving the plate. Upon the top of the slide was arranged a spring-pressed board, which held the slide down upon the top of the jar.

On the bottom of the jar of the iodine box were strewn the scales of iodine, and in the bromine box was placed quicklime charged with bromine. The bromine was added to the lime drop by drop, and the lime occasionally shaken until it assumed a bright pink hue bordering on orange. The lime was thus prepared in a glass-stoppered jar, and transferred to the jar of the coating box as needed; one inch being about the depth required in the coating box. The polished plate was placed face downward first in the slide of the iodine box and coated by pushing in the slide so as to bring the plate over the iodine in the jar. It was there exposed to the vapor of iodine until it acquired a rich straw color, the plate being removed and examined by the light of the paper window, and replaced if necessary to deepen the color. The plate was then in a similar manner subjected to the fumes of the bromine until it became of a dark orange color. It was then returned to the iodine box and further coated until it acquired a deep brownish orange color bordering on purple. The time required for coating the plate depended upon the temperature of the dark room. The process was very rapid in a warm room and quite slow in a cool room.

The plate, rendered sensitive to the light by the thin layer of bromo-iodide of silver, was placed in a plate holder, and exposed in a camera according to the well known method. The time of exposure was much longer than that of modern photography. A great deal depended on the

quality of the lenses of the camera. The exposure in the best cameras was reasonably short. The old time gallery, with its antiquated camera and fixtures, and the dark room with the appurtenances, are faithfully represented in the

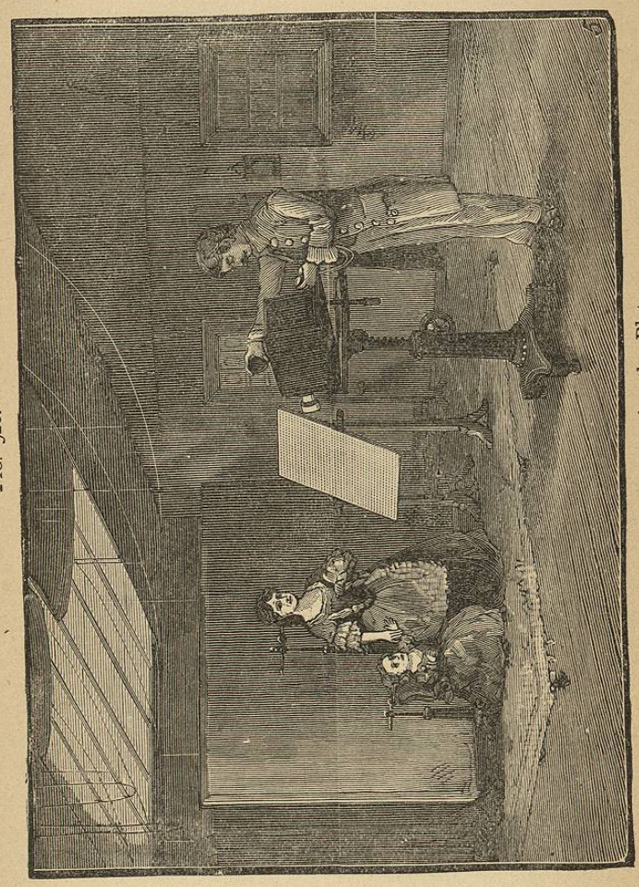


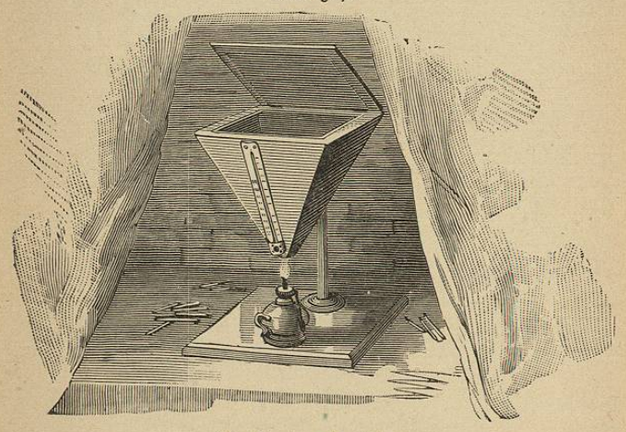
FIG. 326. The Gallery—exposing the Plate.

engravings (Figs. 325 and 326). After exposure, the plate was taken to another dark room for development. It was placed face downward over a flaring iron vessel (Fig. 327), in the bottom of which there was a small quantity of pure mercury. The mercury was maintained at a temperature of

120° to 130° Fah. by means of a small spirit lamp. The temperature was measured by a thermometer attached to the side of the vessel. The plate was raised occasionally and examined by the light of a taper, until the picture was fully brought out, when it was removed from the mercury bath and fixed.*

The fixing (Fig. 328) consisted merely in flowing over the plate repeatedly a solution of hyposulphite of soda having sufficient strength to remove in about half a minute all

Fig. 327.



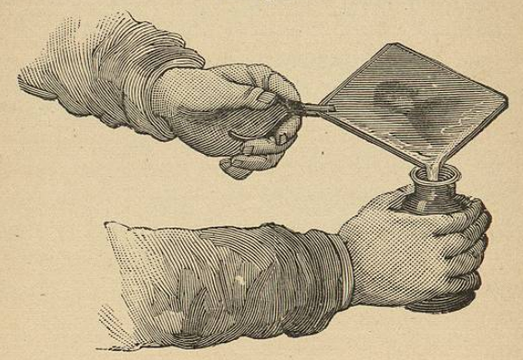
Developing the Plate.

the bromo-iodide of silver not acted upon by light. The plate was then thoroughly washed, and afterward gilded or toned by pouring upon it a weak solution of chloride of

* A fortunate accident led to the discovery of the development of the photographic impression by means of the vapor of mercury. Previous to this discovery, the image was brought out by a long-continued exposure in the camera. Daguerre on one occasion placed some under-exposed plates, which were considered useless, in a closet in which there were chemicals. Afterward, happening to look at the plates, he was astonished to find an image upon them. After taking one chemical after another from the closet until apparently all were removed, the images on his plates were still mysteriously developed. At length he discovered on the floor an overlooked dish of mercury, and the mystery was solved. He ascertained that the effects produced by mercury vapor spontaneously given off could be secured at will by suitable apparatus.

gold and heating it gently by means of a spirit lamp until a thin film of gold was deposited upon the plate and the pic-

Fig. 328.



Fixing.

ture attained the desired tone. The plate was then washed in clean water, and finally dried evenly and quickly over a spirit lamp.

Fig. 329.

Gilding or Toning.

This operation added to the strength and beauty of the picture, and also served to protect the surface of the plate to a great extent against the action of gases.

The finished picture was protected by a cover glass, and the edges of the glass and plate were securely sealed by a strip of paper attached by means of an adhesive coating.

Later on a metallic binding was added, which was called the "preserver." The pictures thus mounted were fitted to cases and frames which were more or less elaborate, varying in cost from a few cents to many dollars. Many daguerreotypes were inserted in gold lockets and charms, and occasionally they were fitted to finger rings made to receive them.

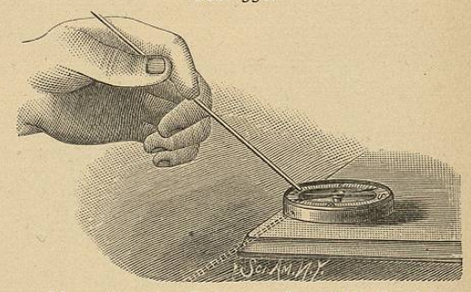
CHAPTER XVI.

MAGNETISM.

Nature furnishes permanent magnets "ready made," the lodestone being an example of such a magnet. She is able to induce magnetism in magnetic bodies, the earth itself being the great magnet by which the induction effects are secured. It is to the directive force of this great magnet that the compass owes its value.

The magnetism of the lodestone is due, doubtless, to a

FIG. 330.



Magnetism by Induction from the Earth.

long exposure to the inductive influence of the earth's magnetism. Any body of magnetic material becomes temporarily magnetized to some extent when placed in the magnetic meridian parallel with the dipping needle, and if it be a body like soft iron, without coercive force, it loses its magnetism when arranged at right angles to this position in the same plane. This may be shown by placing a rod of well-annealed wrought iron in the magnetic meridian in an inclined position, with the lower end toward the north, as indicated in the dotted lines in Fig. 330, with its upper end in close proximity to the end of a compass needle. The needle will be instantly deflected, showing that the rod has become magnetic. When turned in the plane of the magnetic meri-