

## THE USE OF THE AIR BRUSH IN THE DECORATION OF WALL PAPER AND FABRICS.

BY JACQUES BOYER.

The air brush was invented in the United States a number of years ago and was first employed in coloring photographic enlargements. The original apparatus was quite complicated, difficult to manage, and of little durability. Hence the air brush or spray method could not be generally employed in factories for the production of black or colored designs and decorations until after the invention of simpler and more solidly constructed apparatus.

There are now in use in French factories several types of air brush with which liquid pigments of all sorts, from alcoholic solutions of aniline dyes to the thickest oil paints, can be satisfactorily applied. Decorators and photograph retouchers use a very small apparatus which works easily and perfectly in either the vertical or the horizontal position. The accessories include a compressing air pump, which is operated by the foot, a compressed air reservoir, and a pressure gage. The reservoir having been charged to the requisite pressure, the air brush is grasped with the right hand like a pencil, with the forefinger resting on the button which controls the air and efflux valves, and the hopper is filled with liquid color.

To produce the spray, a current of compressed air is admitted by pressing the button. The size of the jet is regulated by drawing back the button more or less and thus opening to a corresponding extent the orifice of efflux. The width and intensity of the colored band produced in this manner are determined by the distance between the air brush and the work. Fine lines are traced by putting the instrument very close to the fabric or paper and drawing back the button very slightly, while broad tints and shadings are made with the air brush at a considerable distance from the work.

Veyron's improved air brush (Fig. 1) is shaped and handled like a pistol, the valves being operated by a trigger beneath the barrel. It can be used in any position.

In factories, the air pump worked with a treadle is often replaced by a tube communicating with a central reservoir of compressed air, and the designs are made with the aid of masks or stencils cut out of sheet metal. One of the photographs shows women engaged in decorating fabrics for cravats, scarfs, shawls, cushion covers, and other small articles. Each woman, standing before a vertical board on which the fabric is stretched, applies the stencils with her left hand and operates the air brush with her right. When the area of the board is finished, she turns the wooden cylinders at the ends of the board on which the plain and the decorated ends of the goods are rolled, bringing a fresh portion in front of the board. The entire work is planned in advance and the fabric bears marks which guide both the decorator and the cutters, to whom it goes after the designs have been fixed.

The operation of fixing is performed in an autoclave (Fig. 3). This is a large vessel heated by steam both inside and outside, but in such a manner that steam cannot condense on the goods and cause spotting. The goods having been placed in the vessel and the door closed, dry steam is introduced and the color is attached firmly to the fibers by the combined influence of heat and chemical action. The fixing is the most delicate and impor-

jected to a process of dressing or finishing. Post cards, boxes, calendars, pamphlet covers, and other objects of paper and cardboard are decorated in nearly the same manner, but without fixing (Fig. 4.) Porcelain, wood, leather, and other materials are also decorated with the air brush, which produces delicately gradu-

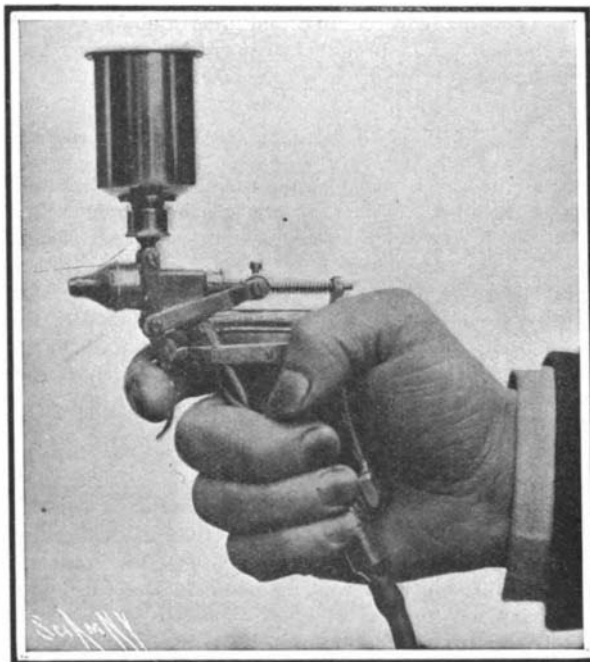


Fig. 1.—Veyron's Improved Air Brush.

ated tints without any blurring. Compound tints are easily and successfully obtained by superposing simple colors.

### The Chromograph.—A Solution of the Problem of Color Photography.

The Allgemeine Ingenieur-Zeitung has from the pen of F. Urban an article on this subject, which, while too long to reproduce *in extenso*, is worth a *résumé*.

Of the various attempts to produce photographs in colors, the original three-color process is inconvenient, while the modern ruled "filter plates" and "autochrome plates" require for their preparation a most unusual degree of care to get properly the thousands of small color filters of which they consist. Those who have made three-color filters know how much exactness is requisite even to make the three plates; these difficulties are repeated, however, every time. Urban undertook, therefore, to make a photographic apparatus which would make colored pictures with ordinary pan-chromatic plates, and without the use of artificial coloring materials, color filters, dyed particles, or col-

ber of small spectra, permits everywhere the passage of only those colors which correspond to the colored object of the photograph; so that the observer sees a picture of the object in its thoroughly natural hues.

The spectra are produced by a "grating" as for a half-tone engraving, and a medium which disperses the colors; this latter may be a simple prism. The net is a photograph of a very fine and exact ruled grating. Before it reaches the sensitive plate, the optical image of the object to be photographed is refracted by the grating into lines which are further dispersed by the special color-dispersing medium into spectra; so that the plate receives a picture composed of an infinite number of tiny spectra. If the apparatus is directed against a white field, these spectra will be perfect; if, however, the object photographed is colored, the picture on the plate will contain only the colors of that object. Those portions of the small spectra which were of other colors will be dark. The microscope shows that portions of the picture corresponding to the white parts of the object photographed, are really composed of thousands of small spectra; but the naked eye sees only a white field.

If the picture is developed, all parts on which the light acted will be opaque, the others transparent, as with an ordinary negative. The positive from the negative will be reversed in the matter of light and shade. Placing this positive in the apparatus in exactly the same place as the original negative, and directing the apparatus against a white surface, one sees instead of white fields composed of an infinite number of microscopic spectra, a picture which is influenced by the intermediate positive with its dark places. The small spectra will be covered on those places, which are dark in the positive; and in each of the small spectra those colors will be allowed to pass through in the same degree as shown by the object photographed. Where there were green lines on the original plate, the spectral green will be allowed to pass through; so that the unaided eye will see a picture of the object photographed, in natural colors.

Up to some years ago there were known only plates which were almost insensitive to green, yellow and red; and with such plates one could hardly photograph objects which contained these colors. Deep red showed black. In 1873 Vogel discovered that these plates could be made more sensitive for green, yellow, and red, by dipping them in very dilute solutions of certain aniline dyes. Eder made a study of the laws

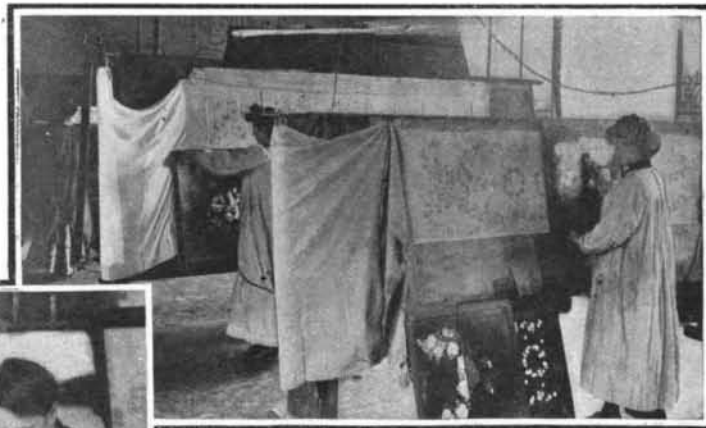


Fig. 2.—Decorating Fabrics with Air Brush.



Fig. 4.—Decoration of Cards with the Air Brush.  
THE USE OF THE AIR BRUSH IN THE DECORATION OF WALL PAPER AND FABRICS.

ored lines, only by "spectral" means; the pictures showing in the apparatus itself their natural colors.

The principle of the solar spectrum is understood by all. Therein appear the seven primary colors, which may not be resolved into others, and which naturally must give a more exact reproduction of an object than the three secondary colors, that are really only a mixture of the primaries.

With the "chromograph" there is produced a field composed of many spectra so infinitely small that its individual colors are not visible; it appears, in fact, as a simple white ground. If in parts of this surface certain colors in each of the tiny spectra are covered, these parts will appear tinged with that color, or mixture of colors, which was not covered. This covering is effected in the chromograph by the black portions of a photographic plate of such character that the surface, which is composed of an infinite num-

ber of action of these dyes, and nowadays only such plates are used for colored objects. They are called isochromatic, orthochromatic, and pan-chromatic. For use in the chromograph, such plates are used, in connection with a yellow screen, which corrects their unequal sensibility, by weakening those colors (principally blue) for which they are too sensitive.

Urban, however, does not first make a negative, as in black-and-white photography, but makes a positive by arresting development, washing the plate, and bringing it to the light. In this way the picture is in a certain sense copied on itself. The silver precipitate of the first development is dissolved, and it is again developed and fixed. The result is a strong enough positive.

Naturally, a paper picture can be made in the same way, as for instance, by pinatypy (a process something like hektography) or by means of the three-color process. By inserting color filters one after the other, there may be made from the plates the separate pictures for the three-color or multicolor process; but outside of the apparatus there may be used gratings with black lines, copies of the filter, with which the different colors may be covered. There are also special papers for giving from colored transparent views copies true to them in color—for instance, the Uto paper, known in the trade. On such paper one can copy the pictures outside of the apparatus, replacing the spectra by a copy thereof on a film (for instance, made by pinatypy) between the plate and the paper for color copies.

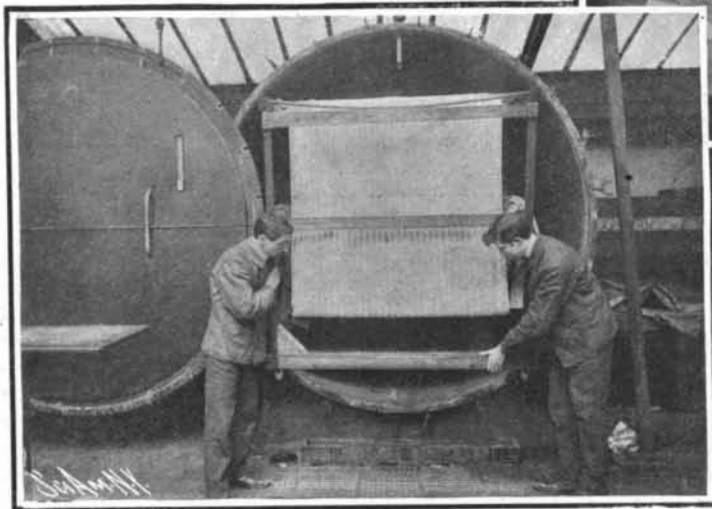


Fig. 3.—Putting Decorated Fabrics in the Autoclave to Fix the Colors.

tant operation of the entire process and it requires a profound knowledge of chemical and physical laws and properties, as the duration of the operation and the temperature and pressure of the steam must be varied according to the fabrics and pigments employed.

After the colors have been fixed, the goods are washed with soap and water, to remove the gum and other substances that had been mixed with the pigments, and are dried in the air. Finally, they are sub-