

BATIK, OR THE WAX RESIST PROCESS: BY PROFESSOR CHARLES E. PELLEW OF COLUMBIA UNIVERSITY: NUMBER XI

General.—While trying, as described in the last paper, to work out a satisfactory resist stencil paste for some of my craftsmen friends, my attention was called to the process known and practiced in the East for hundreds of years, where patterns were produced on cloth by the use, as a resist, of molten beeswax. Thanks to a friend who had studied the process in Java, some idea was obtained of the simple apparatus used by the natives and of the possibilities of the process. We soon designed some more or less satisfactory *tjentangs* or, as we called them, “teapots,” for pouring and spreading the wax on the cloth, and in a very few days some of my friends were amusing themselves by experimenting, more or less successfully, with this ancient process adapted to modern dyestuffs.

During the past year this process has been attracting a great deal of attention both in this country and Europe. Several articles have appeared in the journals, schools of Batik have been started in Europe, and much interesting work has been turned out from them, while in New York a small but energetic firm has been actively pushing the sale and use of a new apparatus to replace the ancient *tjentang*, and has been widely demonstrating the possibilities of the art as applied to a great variety of handicraft work.

Historical.—The Batik, or wax resist process, has been known and used on a large scale in the East for a very long period. In Madras one variety of the process was in use at least five hundred years ago for making the beautiful and interesting *Palampoor* goods, and in Java, where the greatest development of the process has taken place, there exist far in the interior some famous Buddhist ruins, supposed to be 1200 or 1300 years old, containing sculptured figures clothed in *sarongs* ornamented with Batik, almost, if not quite, identical with the garments and patterns used at the present day.

During the last few years careful studies have been made of the process, and the Dutch Government, especially, has endeavored with considerable success to introduce it into Europe. It was amusing to notice that in one of the reports issued by the Dutch Government on this subject it was stated that none of the modern dyestuffs could be utilized for this purpose, and that the only colors that could be recommended as fast to light were the old vegetable dyestuffs applied in the complicated and troublesome methods of past ages. This curiously unscientific attitude has seriously interfered with the success of the process in Western lands and is only now being abandoned.

A great mass of detailed information about the history, technique and designs of the Javanese process has been set down in a monumental work: “Die Batik-kunst in Niederlandisch Indien,” published by the Dutch Government in 1899. Perhaps of more interest to the non-scientific reader is a short but well written account of “Battack Printing in Java,” read before the Manchester Literary and Philosophical Society in 1906 by an English chemist, John Allan, who spent several months among the natives, studying the process at first-hand.

According to these authorities the Javanese and, indeed, most of the natives of Malaysia, wear garments simple enough in style and cut, but elaborately decorated with great variety of color and design. The principal garment, common to both men and women, is the *sarong*, in shape not unlike a large and elongated bath towel, which, according to the desire and sex of the owner, may be made to serve as trousers or skirt, overcoat or blanket, and is the universal bathing costume. It is made of calico, generally from Lancashire or Holland, and as the natives, both men and women, are exceedingly fond of bathing, the colors must be fast enough to

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stand constant exposure to water as well as to the fierce tropical sun.

They also wear head-dresses made from squares of calico, dyed with square centers of plain color and elaborately decorated outside; and *slendangs*, a kind of girdle or shawl, usually made of silk and less elaborate in decoration. The costume is completed for full dress occasions by a thin shirt or chemise and a light jacket.

For producing the designs on the *sarongs*, the process of wax resist is generally employed. But the *slendangs* and expensive garments made of silk are often ornamented by a different process. The design is applied directly to them, practically painted on, by pressing the color to the fabric from collapsible tubes with different sized orifices, the colors being fixed, probably, by steaming afterward. This process is often combined with the wax process, but not necessarily.

The Batik process, as usually meant, is a means of dyeing in which, before immersing the goods in the dye pot, the patterns are carefully drawn in molten bees-wax, applied from a little copper cup with a fine spout called, as before mentioned, a *tjentang*. Frequently, however, to save time, the wax is applied by a metal die or block, made by inserting thin strips of sheet brass in a wooden frame so that the edges of the brass form the desired pattern. These blocks, provided with a handle covered with cloth, are first dipped into the molten wax, and then the excess is removed by pressing against a pad, which is kept warm by being near the fire of the melting pot. The pattern is thus stamped onto the cloth instead of being poured on from a small spout out of a cup.

In India the wax resist is often combined with block printing, and it is perfectly easy to apply the wax through a stencil, either with a brush or from a *tjentang*, or to get reverse effects by cutting out a pattern in stiff cardboard or thin metal, as, for instance, sheet lead, and then, using this as a templet, pouring or painting the wax around it, leaving the

pattern in the original cloth, to be dyed later.

The wax used in Java for pouring is generally a mixture of paraffin and bees-wax or an impure wax imported from Japan for this purpose. For stamping the patterns it is necessary to use a stiffer wax made from rosin and paraffin, sometimes mixed with varnish gums.

The principal colors used in Java are indigo blue and a beautiful golden-brown dye made from the bark of the mango tree. The combination of these gives a black, so that the fine old *sarongs* usually contain white, blue, brown and black. The indigo is applied first, and all the cloth excepting that which is to come out blue or black is carefully covered with the wax. After the indigo bath (the Javanese use a fermentation vat) the color is set by oxidation. The old wax is then all washed off with boiling soap and water, and after drying, the wax is again applied to all parts, whether white or blue, which are not to receive the brown dye. The latter is made from a strong, syrupy extract of mangrove bark, and is used without mordanting, the color being set by exposure to air. As the dyes must be used cold to avoid melting and obliterating the pattern, the goods are usually dipped and exposed several times in each bath before reaching the desired shade. After the final dyeing the wax is removed by a hot bath of wood ashes or soap, and the garment is pressed out ready to wear.

When it is desired, the natives use a variation of the old Turkey red process, dyeing with madder root upon cloth mordanted with alum and oil. The wax in this case acts as a resist against the alum mordant, which is applied cold, and thus prevents the dyestuff, which is applied at the boil, from coloring the cloth in the protected portions.

The peculiarity of all these Batik goods, whether from the East or made at home or in Europe, is the characteristic "crinkled" effect, due to the breaking of the wax upon the cloth in the process of dyeing, thereby admitting the color to the protected cloth in fine lines and streaks. This distinguishes

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the wax resist work from the previously described paste resist, which if desired will leave a smooth, clean, white background, or if applied more lightly will give backgrounds shaded uniformly and without irregular lines of color.

Modern Batik Work.—The application of the artificial dyestuffs to this ancient process has simplified it greatly and has brought it within the scope of craftsmen in general.

Apparatus.—For the more or less mechanical application of wax to cloth through stencils or around patterns cut out of cardboard or metal, a small-sized flat paint brush is all that is necessary. The wax should be melted in a cup or casserole and painted on.

A broader and in some respects more interesting field is open, however, to those who use the wax to produce designs free-hand, by pouring it from a cup with a small fine spout. In using either the *tjentang* or "teapot" a great deal of practice is needed to get good results. The heat must be carefully gauged, for if too hot the wax is liable to run over everything, while if too cold it will either not pour at all or run irregularly. The chief difficulty is to prevent it from dripping and forming blots and splashes when not desired. This is particularly the case with the native implement, and can hardly be avoided except by using the Javanese practice of hanging the cloth over a frame while working on it, so that the cloth is almost vertical and is not lying horizontal. The *tjentang* should be held in one hand and the cloth pressed out to meet it with the other hand from the back, while if care is taken any drip of the wax will fall down to the floor or table and not touch the cloth.

An entirely new idea has recently been applied to the art of Batik by the introduction of a (patented) "wax pencil," made on the principle of the early stylographic pens. This tool is made of heavy brass, with a removable wooden holder, and the wax, in cylinders, is shoved into it from the top after removing a cap. To

melt the wax the wooden holder is slipped off and the pencil is heated over a flame or on a hot electric plate, while the liquid wax is prevented from flowing out by a "needle valve," held in place by a small spiral spring. To use the tool, the holder is slipped over the body, taking care not to burn the fingers in so doing, and the pattern is traced in just the same way that it would be in ink, pressure on the projecting needle tip relieving the valve and permitting a greater or lesser flow of wax.

These instruments have the great advantage of being more convenient to draw with than the little cups or "teapots" and on hard surfaces, such as leather, wood, bone, metal, etc., will make patterns of greater or less complexity with care and precision. They are not quite so satisfactory, so far as our experience goes, in drawing on textiles, as the needle point is apt to catch in the surface and spoil the lines. They certainly need considerable practice before they can be depended upon and it is a question whether, for cloth, they are much of an improvement over the simpler and cheaper *tjentangs*.

Composition of the Wax.—For satisfactory work in Batik, a great deal depends upon the composition of the resist materials. Pure paraffin, while useful for brush application, is valueless for drawing because it runs too freely, acting on cloth much as ink does on blotting paper. Beeswax, on the other hand, when at the proper temperature runs just about right, but it is rather too soft and sticky to crackle well, unless in very cold weather or when ice is used in the dye vat,—a procedure that does not assist the dyeing. Besides that, beeswax is pretty expensive and, although it is possible to recover most of it from the boiling-off kettle, there is no need of spending money unnecessarily.

As a substitute for beeswax it is quite possible to use the much cheaper mineral wax known to chemists as ozokerite, and, in its refined state, such as is best to use for this purpose, as ceresine. This can be advantageously mixed with paraffin, especially to increase its crackling properties,

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and should have some rosin, so that when on large surfaces and after crackling it will adhere to the cloth and not break away in large pieces. We have not made an exhaustive study of this matter so far, but have found a mixture of one part of rosin, three or four of paraffin and five of beeswax or ceresine will give very fair results.

Dyes.—I need scarcely say here to my readers that it is quite unnecessary now to use Vegetable Dyes for obtaining fast and interesting colors. The Sulphur Dyes or the various Vat or Indigo Dyes are exceedingly fast and can be readily applied in the cold in one bath to both cotton and linen. For silk the Sulphur Dyes are also useful, if the goods are to be washed; otherwise the Acid Dyes or the Basic Dyes with acetic acid will be most convenient.

For wood it is probably best to use a solution of the fast Acid Dyes with a little acetic or formic acid, for these are very fast to light, and penetrate the wood better than the Basic Dyes. The latter, however, will be found more fast to washing. These dyes can be readily applied to wood with alcohol, and the wax can be taken off later with a hot flatiron and blotting paper instead of hot water. Leather can be dyed in this same way.

Bone can be easily dyed by this process. The white parts are covered with wax or paraffin and then before dyeing a little

acid—hydrochloric or sulphuric—diluted with an equal amount of water, is brushed on, or the bone is immersed in it until the unprotected parts are distinctly affected. If then immersed in a bath of Acid Dye, with a little free acetic acid, they will take the dye readily,—without this previous treatment with acid the polish of the bone may interfere.

This, of course, amounts to etching the bone, before dyeing it. If instead of bone a piece of metal, such as copper or brass, is used, and after batiking it is immersed in a bath of hydrochloric or dilute nitric acid, the protected portion will remain smooth and raised, and the exposed parts will be etched as deeply as desired. This furnishes a simple and interesting method of ornamenting metal work. It is even possible to etch wood in quite an effective manner by treating the batiked surface with strong sulphuric acid, which softens and cuts away the tissues, so that they can be rubbed off later in hot water with a stiff bristle brush.

Of course, great care must be taken, especially by amateurs with little knowledge of chemistry, in the use of these strong chemicals, but a comparatively little experience will show that in this old art of Batik there are endless possibilities for interesting and beautiful handicraft work of many varieties.

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SINCE the publication of the article on stenciling in the April CRAFTSMAN, several inquiries have been received asking for assistance in applying indigo to cotton goods by the aid of stencils. We have, accordingly, been making a series of experiments on the subject and find that there is no very serious difficulty involved. The indigo must be reduced carefully with hydrosulphite and caustic soda, as described in a previous paper,—using a considerable excess of reducing agent,—and then thickened with gum tragacanth or other thickening agent.

This paste, thinned to the proper degree with water, can be brushed into the slightly dampened cloth through a stencil, and should then be immediately fixed by a flatiron or hot plate. The best results come from using a hot flatiron laid on its side, then by placing a dampened cloth under the stenciled goods and rubbing it on the hot iron, the steaming will be quickly and easily accomplished. After this the goods are washed in hot soap suds to remove the gum and loose dyestuff. After drying and ironing they will be found to be exceedingly fast to both light and washing.