

## Mordança

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Excerpt taken from The Experimental Photography Workbook, a 200+ page plethora of experimental photographic processes. Available for \$20 plus \$5.75 postage if mailed within the USA (more if overseas). Contact [zphoto@montana.net](mailto:zphoto@montana.net) for details on ordering.

Mordança is a fascinating, arcane process dating from the late 1800's, and rarely found in textbooks today. Because it has such possibilities for expression in our postmodern art world, I've been searching through out-of-print photography books and patents from as early as 1898 to find out more about its chemical workings.

It was called by different names when it was first discovered: bleach-etch, etch-bleach, gelatin relief, and reverse relief are some of the terms used. The process was originally designed to be used on film and not paper. It was a method of reversing a *film* negative to a positive. Originally discovered by Liesegang in 1897, a man by the name of Andresen improved upon Liesegang's formula in 1898 by substituting hydrogen peroxide for the ammonium persulfate Liesegang used, and that is the formula we use today. Then Jean-Pierre Sudre coined the term 'mordança' and turned it into an art form using prints.

What happens to the print in the mordança process? An acid copper bleaching solution is used to bleach and dissolve away parts of the silver image. It leaves the print in a *reverse relief*. The dissolving occurs proportionately to the darks—the darker the area, the more dissolution. With a little rubbing, the solubilized metallic silver gelatin layer lifts off of the print and leaves behind whites in reverse relief where the darks once were. Then with redevelopment, toning, or dyeing, the image reappears as part positive and part negative, or all negative.

Rubbing completely, barely, or not at all, are your choices. Complete rubbing produces a reversed or more negative image, but more often than not, some positive remains because the original highlights in the print usually don't dissolve. If there are large areas of darks in the print (e.g. a black background), with strong enough peroxide these areas become wavy, like veils. If you are careful with your rubbing and washing, these veils can remain attached, albeit tenuously, to the points of contrast between the more anchored highlights and the detached shadow areas. Upon drying, the gelatin veils will re-adhere to the print surface and stay put.

You can use the process on previously finished prints or fresh prints that you have just developed. In fact, you can mordança a print right after developing and before fixing. The best images for this process are ones with rich blacks, such as dark backgrounds, or intricately detailed patterns like black lace or wrought ironwork.

If you can put up with the odor and don't mind purchasing a few extra chemicals (copper chloride, glacial acetic acid, and hydrogen peroxide), it is a must-try. Adopt the attitude of accepting what comes, because it is imperfect, messy, unpredictable at times, frustrating at others, and finally serendipitous.

## Mordançage Formula

### Solution A:

750ml water

30g copper chloride (2 tablespoons)(can use 10-30g\*)

80ml glacial acetic acid (can use 80-110ml; can also substitute 10g of citric acid)

Water to make 1000ml

### Solution B:

10 - 20 volume hydrogen peroxide (You can use even a 40 volume hydrogen peroxide, but the stronger the peroxide, the greater the chance of staining in fiber prints. Furthermore, the stronger hydrogen peroxide may dissolve the darks too much, so use the weaker strength hydrogen peroxide or decrease your amount of copper chloride—Hurst and Meulendyke patent no. 1,938,290).

**Use:** Add copper chloride slowly to the water and stir. Add acetic acid slowly and stir. Add water to make 1 liter. Just before use, mix solution A and B together in equal parts to produce the amount of working solution you need. I usually use about 500 ml of combined solution in a tray to do quite a few prints. Solution A, when mixed, lasts indefinitely. Once A is mixed with B, this working mixture may last several days in a tray, but it is best to mix right before use.

**Caution:** *Use this process at your own risk! This process requires excellent darkroom ventilation. If you do not have this, do the process outside! Always protect your eyes from splashing. Wear old clothes or an apron, because the solution will discolor and eat through fabric. Wearing gloves is an absolute must. Latex gloves are permeable to chemicals, so nitrile gloves are your best choice.*

**Remember:** *AAATW—always add acid to water, never water to acid!*

## The Process

(PUT ON GLOVES!!!!)

1. Bleach a wet or dry print in the mordançage solution for twice as long as it takes to fully bleach. This can take from 1 minute to 15, depending on your print, paper, and strength of hydrogen peroxide and copper chloride. The more hydrogen peroxide, the greater dissolution. The more copper chloride, the faster the bleaching. Nudge a dark area of the print to see if it is lifting off and bubbly.

2. Rinse well, especially with fiber paper.

3. Rub off the disintegrating emulsion with your gloved fingertips, cotton balls, or even the plastic scouring side of a sponge if it is not being cooperative—be careful or you may rub all the emulsion off and make scratch marks.

You can do your rubbing under water (put the print on a piece of glass or use a flat bottomed tray), under hot water with a stubborn print, or out of the water. It depends on how fragile the emulsion is. You can also choose not to rub at this stage, but you will end up with the resulting black sludge in your developer during redevelopment instead of in the rinse water, necessitating remixing your developer to a fresh batch more often.

Be prepared to have a mess on hand. The emulsion will lift off the base and leave bits of stuff floating in your trays, that sticks to everything when it dries.

4. Redevelop the print in any of the following: Dektol normal strength or up to a 1:5 dilution, sepia toner, thiocarbamide toner, LPD developer 1:6, etc.

5. Remove, rinse carefully and fully, and inspect. If it is perfect, then fix the print in fixer as per normal (if it is not fully rinsed it will stink to high heaven when it gets in the fixer). OR, don't fix, and then wash.

Sources vary greatly on the need to fix after the mordançage process. Some prefer the silvering out oxidation that can occur, and sometimes there is no rehalogenized silver in the print that will silver

out...to be sure that there is no change in the image, fix.

If it needs more etching, repeat the 5 steps again. When you go back and forth from the acid bleach to an alkaline developer, the gelatin gets damaged more and lifts off more easily. You will notice this in practice: the gelatin may not budge until it hits the developer for the first—or second—time. I have never needed to redevelop more than twice, and I rarely redevelop twice in the first place.

6. Wash. If you have veils that you want to remain attached, the print will be difficult to wash well. I recommend a separate tray for a finished print to soak in plain water; carefully change the water a number of times over the course of an hour. It is not the most archival process by any standards, but since the process resembles deterioration, perhaps a bit more deterioration through the years will be an added benefit. \*\*

7. Dry. Don't use your normal drying cabinet for this because you may contaminate the screens.

\*\*Before drying, you can use the following bath (Baker's Patent #2,058.396) to neutralize the acid condition of the gelatin layer and remove the chemicals completely, if you want:

### **Baker's Neutralizing Bath**

sodium bicarbonate (baking soda)    1 part  
water    16 parts

Immerse the finished print in this for one minute; rinse well.

### **Tips**

All brands of papers work: RC paper has some advantages in this process, if you can put up with its inherently unpleasing plastic quality. It rinses quickly between steps, and remains more impervious to the chemicals, so it doesn't have the yellowing problem that fiber paper sometimes does.

Fiber paper can stain yellow brown in the highlights and borders of the print, which is not always a bad thing. You can minimize or prevent this entirely by the following five practices. They are listed in order of importance from most common cause to least:

1. Rinse the mordantage solution off very well before redevelopment to prevent chemical stain resulting from contamination between copper bleach and developer.
2. Reduce the copper chloride in the solution to a lower amount.
3. Use the lesser strength hydrogen peroxides—10 or 20 volume.
4. Fix after you have mordanted, redeveloped, and rinsed your print thoroughly.
5. Mordantage under safelight, not room light, even with a previously fixed print.

If you find your mordantage is not dissolving as it should, there are a number of causes that you may address:

1. Make sure your hydrogen peroxide has not exhausted.
2. Use a stronger volume of hydrogen peroxide.
3. The acidity of the solution needs to be between 2.6 and 3.0 (Speck, Patent #2,494,068), so add a tad more of glacial acetic acid.
4. Give the print more time in the solution.
5. Dry your print first, before mordanting it. A dry print will accept the chemicals fully as it soaks, unlike a wet print that is already soaked through.
6. Heat the print in a dry mount press before using it in the process.
7. Be sure your print has not been previously toned.

The process will make sense once you do it. You will begin to know what images are perfectly suited for the process, and seek those types of images with your camera. Always try to integrate content with this process, so it doesn't become one more meaningless technique. What an expressive

technique it is when you have discovered the right images for the mordantage process. Happy experimenting!

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