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The Many Shades of Cochineal Red
Workshop Review and Recap

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Michel Garcia's workshop *The Many Shades of Cochineal Red* at the in Arlington Arts Center in Arlington, Virginia, was packed with multiple steaming pots, a couple of blown fuses and multiple vibrant hues of red, purples and oranges. Garcia demonstrated how the selection of mordanting processes used in conjunction with cochineal dye resulted in different nuances of the color red in the final dyed cloth and yarn. As a bonus and demonstration of other reds from natural dyes, Garcia also used madder to dye more fiber.

The three mordanting methods outlined by Garcia were what he called the classical method, the forgotten method and the unknown method. The classical method uses the mineral salt alum (aluminum sulfate) and cream of tartar to mordant the fiber. The forgotten method uses bio-accumulators of Aluminum in place of mineral salts as a mordant. This method was in use in some countries until the 18th century. Both the classical and forgotten methods require that the fiber be mordanted separately before being dyed in a cochineal bath. The third or unknown method is a one-bath process using plant tannins and citric acid together with the cochineal all at the same time.

The classical mordanting method of mineral alum (15% weight of fiber/WOF) with an addition of cream of tartar (6% WOF) simmered and then dyed in the cochineal bath produced a rosy red on wool gauze and cool blue-toned purple-red on felted wool and wool yarn. A bonus dye bath on silk produced a deep rose pink.

Garcia uses a plant called rhexia from the genus *symplocos* as a bio-accumulator of alum for the forgotten method. These plants are hyperaccumulators of aluminum, containing large amounts of organic salts such as Aluminum oxalates or Aluminum phosphates. The fiber is soaked in a solution of dried symplocos leaves weighing 50% of the weight of fiber and heated to 90 degrees Celsius for a few minutes. Once the mordanted fiber is dyed in cochineal, it was apparent that the colors achieved with this forgotten method were vastly different in hue than the classically mordanted cochineals. The wool gauze and felted wool were both a warm orange red. The wool yarn was a light orange. Silk mordanted in this manner and dyed in cochineal was a blush pink color.

The unknown method of using tannins in combination with citric acid as a mordant is limited to natural dyestuffs of the chemical group anthraquinones such as insect dyes, madder, dock and lichens. The binding proteins in the tannins make an effective mordant when combined with the astringent citric acid. Fresh lemon juice (10% WOF) was used as the citric acid with tannin at 10% WOF in the cochineal dyebath. This unknown method on wool produced rich lipstick or "true" reds on wool fibers and a warm orange red on silk and silk blends.

Garcia also demonstrated an additional one-bath process using the South American plant from the family *bignoniaceae*, commonly called “chica”, in combination with tannin and citric acid. The chica produced oranges on the wool fabrics. The madder baths with the same three mordanting techniques produced orange tones on the wool fabrics very similar to the chica process.

Lightfastness studies done on the three techniques produced results that had the tannin or unknown process having the best lightfastness followed by the bio-accumulator of alum and the mineral alum in lightfastness.

Cochineal is famous as the natural red dye, but the workshop illustrates in living color that the mordanting processes that the fibers are subjected to prior to the cochineal dyebath play a significant role in the resulting hue of red produced by the single dyestuff. Garcia’s historical study of mordanting processes long lost to history is instructive to natural dyers of today who have an awareness of sustainability and environmental effects of their production.