

a little history on natural dyeing

- ◇ As Old as prehistory - clothing, stone, skin...
- ◇ It was to become a massive industry all over the world for centuries, the actual economy of Europe was greatly driven by these industries.
- ◇ Class marker, i.e. Tyrian Purple.
- ◇ Synthetic Dyes are discovered in the mid 19th century and overshadowed natural dyes immediately, i.e. cheaper, easier, more reliable, perfect for mass-produced stuff.
- ◇ Revival 21st century with Slow Fashion movement, sustainability and pollution concerns for our planet.

Traditional Dyes Europe

The main dyes used in Medieval Europe were:

- ◇ Woad for blue
- ◇ Madder for red
- ◇ Weld, Dyer's Rocket or Fustic for yellow

...any concerns about fastness?

These three primary colours can all be clearly seen in this close up from the Bayeux Tapestry which dates back almost a thousand years...



Other traditional animal and vegetable dyes and assistants

- ◇ Cochineal
- ◇ Indigo
- ◇ LAC
- ◇ Eucalyptus
- ◇ Persimmon
- ◇ Black Walnut
- ◇ Oak Galls
- ◇ Rhubarb
- ◇ Solidago
- ◇ Pomegranate
- ◇ Osage
- ◇ Onion skins
- ◇ Logwood
- ◇ Brazilwood
- ◇ Cutch
- ◇ Chaste Tree
- ◇ Safflower
- ◇ Avocado skins

Linnaean System

Carolus Linnaean drew up rules with a binomial system in 1758 to name plants and animals.

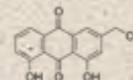
officinale	used in medicine
tinctoria / tinctorum	used in dyeing
nigra/niger	black
luteum/lutea	gold /yellow
sanguinea/sanguineum	bloodlike
caeruleum / caerulea	blue
purpurea / purpureum	purple
rubra/ rubrum	red
viridis	green

The Chemistry of Natural Dyes

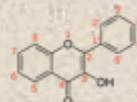
Indigoid dyes: blue obtained from *Indigofera tinctoria*, Woad: there is about 20 sps. that will yield some indigo.



Anthraquinones: red dyes both from plant and insects, good fastness to light, and improved wash fastness when forming complexes with metallic salts, i.e. mordanted with alum.

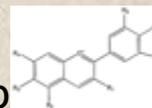


Flavones: producing yellow dyes



Anthocyaninins: in autumn leaves

Etc, etc...



The chemistry of dyeing is co

Types of Dye

Sustantive

dyes that bond to fabric naturally

Adjective

dyes that need the help of a mordant to bond to the fabric

Most dyes bond better to protein than to vegetable or cellulose fibers

Mordanting

Protein Fibers:
Silk, Wool...

Aluminium Sulfate
(Alum)

Vegetable Fibers:
Cotton, Linen, Bamboo...

Aluminium Acetate
Tannins

Many others: Titanium Oxalate, Iron, Copper,
Rubarb, Salt, Urea...



Natural Fibers

Vegetal (Cellulose)

Cotton

Linen

Flax

Bamboo

Hemp

Animal (Protein)

Silk

Wool

Alpaca

Leather

Water

- ◇ Soft water, i.e. rain or distilled water, is best for practically all natural dyes with the exception of madder, weld, logwood and brazilwood, they prefer hard water (containing calcium and magnesium salts).
- ◇ For dyes that prefer hard water, calcium carbonate can be added in the form of finely ground chalk, or an antacid tablet. Also soda ash, household ammonia, or wood ash water can be added to push the pH up.
- ◇ If local hard water needs to be made acidic, add vinegar, lemon juice or a few crystals of citric acid.

Water pH - Acid or Alkaline

General Characteristics of Acids: pH < 7

- ◇ Sour taste
- ◇ Reacts with a metal to form hydrogen gas
- ◇ Increases the H⁺ concentration in water
- ◇ Donates H⁺ ions
- ◇ Turns blue litmus indicator red

General Characteristics of Bases: pH > 7

- ◇ Bitter taste
- ◇ Slippery feel
- ◇ Increases the OH⁻ concentration in water
- ◇ Accepts OH⁻ ions
- ◇ Turns red litmus indicator blue

Pots

Neutral

- Stainless steel
- Unchipped enamel
- Aluminium (they take more scrubbing to clean and may stain permanently with dark dyes)

As modifiers/mordants

- Iron
- copper



Dye Extraction (cont...)

The general rules for a dye bath are to simmer/boil your chosen dyestuff in plenty of (rain) water

FLOWERS need the least temperature and time, simmer for about 20 minutes

BARKS, ROOTS and DYEWOODS tend to benefit from a soaking in rainwater overnight before boiling for $\frac{1}{2}$ to 1 hour - you can then pour the dye off and boil again, as long as dye continues to extract.

LEAVES also benefit from a short pre-soak in water, simmer or boil for $\frac{1}{2}$ to 1 hour



... Dye Extraction

- ◇ The extraction of dye can start parallel to your mordanting, as the extracting requires some time, especially when you do a few boils and still obtain more dye (i.e. onion skins)
- ◇ Dyeing and mordanting can also be done simultaneously, in some cases you may prefer and after mordant.
- ◇ You will obtain a range of shades and tonalities, not only because of its intensity, but because different chemicals found on one particular part of plant you are using can release its dyeing potential at different times in the extraction time, and under a range of circumstances, i.e. temperature, water source



Safflower *Carthamus Tinctorious*

...is an annual thistle mostly known for its seed oil. It is also a precious dye, as petals contain 2 different yellows and 1 red dye:

- ◇ Yellows
- ◇ Sharp pinks
- ◇ Orange-reds
- ◇ Corals



Great advice on extraction on India Flint's *Eco Colour*, pg. 117

Immersion Dyeing

Pre-soak your fabric in water at room temperature, and to match the dye bath temperature

Add to the dye bath and heat (temperature depends on type of fabric) for 1 hour or until desired colour



Do remember that colour will lighten after it is rinsed and dried.

If mixing colours, you start with the lighter shade and add the darker to it slowly until the desired result is achieved

Modifying Dye Bath

Now you can make an iron bath with $\frac{1}{2}$ oz / 1 tablespoon of ferrous sulphate (per pound of textile) and add to the dye bath, or alternatively, transfer the textile to the iron bath in warm water.

Iron will turn:

Golds to moss greens
Reds to plum and maroon
Darken browns
Will make greys and blacks



Testing

- ◇ Parts of a plant, leaves, bark, flowers, roots...
- ◇ Interaction between dyes and mordants
- ◇ Interaction between dye and water qualities and PH levels
- ◇ Dye uptake by protein or vegetable fibers, or different weights.
- ◇ Temperatures, Length ...



Eco Printing

Pioneer of this technique is Australian artist and dyer **India Flint**



Other inspiring artists

Morgen Bardati
(Canada)

Irit Dulman (Israel)

Wendy Felberg (Canada)

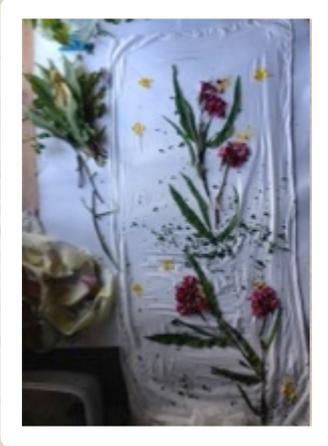


Bundles for Eco-prints

- ◇ Pre-mordant your fabric with alum
- ◇ When placing leaves remember different sides print differently too very often
- ◇ When using colour modifiers such as iron: use brushes to add some iron water to some leaves; twisters are helpful too; dipping into iron water helps define the outline of the prints; give the rolls a rinse in a weak baking soda bath to neutralize the iron once the printing has ended (mostly when working with silk)
- ◇ Other colors or shades can be obtained by adding a dye assistant such as iron, vinegar, ammonia, baking soda, cream of tartar...
- ◇ Use a copper pipe to roll up your bundle...
- ◇ Be mindful of your folding, can incorporate shibori
- ◇ Experiment have fun!



Making an Eco-print bundle



Sorrel Leaves
Persimmon Bark
Weigela (Red Ruby) Flowers
Coreopsis Petals

Inspiring Artists and Sources

<http://www.wildcolours.co.uk/index.html> - great site for info/sales based in Birmingham

A book on vegetable dyes by Ethel M Mairet in 1916

A weaver's garden. Growing plants for natural dyes and fibers by Rita Buchanan, 1987

Craft of the Dyer. Colour from plants and lichens by Karen L Casselman, 1993

Eco Colour by India Flint, 2008

Getting started handbook, Kimberly Baxter Packwood, <https://kbaxterpackwood.com>

The Dyer's Handbook, Memoirs of Dyeing by a French gentleman-clothier in the age of enlightenment translated and contextualized, Dominique Cardon Ed., Oxford 2016

The family dyer and scourer by William Tucker, London 1826

Natural dyes and home dyeing by Rita J Adrosko, 1971

