General directions and helpful hints;

Mordants - Latin - Mordere - to bite

Alum-Amuminum potassium sulfate
Cream of Tarter-Potassium dichromate or bichromate
Iron-copperas-Ferrous sulfate or Green Vitriol
Tin-Stannous chloride
Copper sulfate-Suprous sulfate or Blue Vitriol
Vinegar-Acetic Acid
Ammonia-Ammonium hydroxide

For one pound of wool- washed
3-4 gallons water

Basic Mordant
3-4 ounces of alum (mounded Tbs.= 1 oz.)
1 oz Cream of tarter
Dissolve mordants in small amount of warm water and add to pot.

Chrome
1/2 oz. to 1 lb. wool

Simmer for about 5 minutes then add wet washed wool. Always thoroughly wet wool before adding to mordant or dye pot. Best to soak an hour.
Don't need to rinse alum out before adding to dyepot.
Temperature is never too hot as long as can put hand in water.

Simmer mordant and wool 3/4 to 1 hour. Strong wool and hour, tender wool 3/4 hour.
Methods of Handling Mordanted Wool
1. Take directly from mordant pot and add to dyepot
2. Let cool in mordant overnight and dye the next day (maybe best)
3. Store wool wet in plastic bag. Can for several days or week.
4. Rinse and dry and store until needed. Wet before adding to dyepot.

Methods of Mordanting
1. Alum and cream of Tarter is basic-use first and add others to dyepot for last 15 min. Divide dye into several pans after try basic color with alum. Add iron, tin, vinager, amonia
Chrome is mordanted first and never added to dyepot. Best mordanted just before dyeing because so sinsitive to light. Keep lid on.
All other mordants can be added to the dye pot.

always rinse chrome

Mordants are harsh to wool, especially iron and tin. Add only small amount- 1/16 tsp. per quart of dyebath. Needs to be throughly rinsed or will damage the wool.
Too much alum causes the wool to become sticky
Too much chrome impairs color

Too much tin causes wool to become harsh and brittle
Too much iron hardens wool.

Don't stir the mordant pot or dyepot too much. Causes wool to felt and tangle.

Simmer dyepot until shade darker than want-lightens when dryed.

Wool very sensitive to alkalis (caustic soda/indigo) but takes very well to mild acids, even at high temperatures.

Use dyepots until exhausted, may be saved in refrigerator or freezer.

Salt often used to help set color. Glaubbers salt called for; can substitute table salt.

Pots to use
Enamel , stainless steel or glass best. These will not react with dye material. Better to add mordant than try to use iron, copper or brass pots.

Flowers-
Cover with water and boil shorter time-30 min. to an hour. Add material to be dyed. ~~Boil~~ Simmer 30 min to an hour.

Leaves and skins
Cover with water and soak overnight, boil at least 30 minutes. Add material and simmer for 30 min. to an hour.

Barks
Shred or chip and soak from overnight to several days. Boil for at least an hour. Add materials and simmer for an hour or more. Can let cool in dyepot overnight for deeper color.

Nut Hulls
Walnut hulls, husk from nuts. (wear rubber gloves) Soak for 24 hours to several weeks. Simmer at least an hour. Add material and simmer at least an hour for deep color. Let cool in dyepot. Walnut hulls may be harsh to fine wool. Simmer less time and leave in dyepot overnight.

Roots
Shred or chip and soak overnight to several days. Simmer at least 30 Minnutes and add material. Simmer at least another 30 minutes. Madder root turns brownish if boiled at too high temperatures. Most reds loose brightness if boiled. Best below 160°

Yellows also spoiled by too high temperatures. Keep reds and yellows below 150 degrees.

Be careful if using wooden spoons or sticks. Keep one for dark colors one for light colors so dark not bleed into pale colors.

Rain water is best. If water is hard you can use a little borax, Calgon, acid such as vinegar. Can check with litmus paper to see if hard (alkaline)

May put dyestuffs in old nylon stocking so don't have to strain or pick out of materials.

Can dry some flowers, leaves, roots and barks for storage. Others can be frozen. Some dyebaths can be made up and frozen, or stored in refrigerator or sealed in jar. Some better after fermented. Watch orders. Experiment.

Not easy to dye cotton and linen. Mordanting long and takes several steps over a several day period. Silk dyed more like wool, but colors weaker. Do not exceed 185°F.

Colors-

Yellows-fade fastest- are more fast with chrome and tin
Yellow-orange-fastest with chrome and tin

Oranges and reds-Madder and cochineal very fast

Greens-
- Indigo over yellow
- Yellows with iron added
- Milkweed
- Dock

Brown-
- Light fast with most mordents
- Greyed with chrome
- Brightened toward orange and yellow with tin
- Walnut Hulls yellowed with alum

Grey and Black
- Rhododendren best grey, add iron last 10 min.
- Logwood with chrome
- overdye walnut with dark indigo
- overdye yellow with red then blue

Dye Materials Easily Found

Substantive-no mordant required for fastness
- Walnut hulls-brown
- Onion skins-tan
- Cochineal-rose-pink (buy)
- Bloodroot-orange (protected in N.Y.)
- Choke cherry-root-purple-brown
- Lichens-Plums,lavenders but not always, depends on type

Black Oak-galls or gallnuts-brown

Mordants may change color on above

Adjective or indirect- need a mordent to fix dye
- St. John's Wort-green to gold
- Logwood (buy) lavender to blue grey to black
- Elderberry leaves-Bluish to brownish tan (may be fugitive)
- Pokeberry-Pink to purple-red (fugitive)
- Madder root (buy) -orange to tan, red
- Barks-yellow to tan some need no mordant
- Golden rod-yellow, gold, tan, bronze, green
- Sumac leaves and berry-beige, grey
- Acorns-yellow, tan
- Aster-yellow
- camomile-leaves, stems,dried or fresh flowers or tea bags yellow,yellow orange, olive green,yelllow green
- Carrot tops-green, yellow
- Coreopsis blossoms-yellow, burnt orange
- Joe-pye weed-yellow, olive brown
- Lilly-of-the-Valley-Leaves-yellowish green to tanish green
- Marigold-lemon yellow to bright orange, yellow, tan
- Onion skins-yellow, brass, yellow-orange, red -orange, green
- Parsley-greens
- Queen Anns Lace-pale yellow, tan, ~~green~~

Natural Plant Dyes

When lovely woman tilt's her saucer,
and finds too late that tea will stain,
Whatever made a Lady crosser,
What art can wash all white again;
The only art the stain to cover
To hide the spot from every eye;
And wear an unsoiled dress above her,
The proper colour is to DYE.

From (Swartz, 1841, p. 36)

Color has always facinated mand from earliest time. He has tried to duplicate nature's colors. There are many stories and folklore telling how dye colors were discovered and how colors were used, the meaning different colors had for ancient peoples.

Julius Caesar found that the Natives of Britain painted their bodies with woad before battle. They felt it made them look more ferocious. Galic women painted their bodies with woad for certain ceremonies.

Alkanet was synonymous with falsehood and insincerity because from the root a red dye was obtained furnishing the color for lip salve used by court ladies of Medieval days.

Irish women dyed their bed linen with Saffron so that their limbs might gain strength as they lay between the yellow sheets. The Greeks used this color for their royality.

The major commercial natural dyes were Madder, Woad, and Indigo. Other dyes used on a commercial basis were Brazilwood, Annatto, Safflower, Fustic, Quercitron (black oak), Weld, Orchil, Logwood. Professional dyers in Colonial America also used Butternut hulls, these were used to dye the Confederate Uniforms, Walnut hulls, Goldenrod, Hemlock bark, all local dyestuffs. Homedyers also used onion skins, pokeberry, beets, alkanet, goldenrod, peach and apple bark and leaves, nut hulls, hard wood barks, mullein, and other herbs, and weeds found in fields and gardens. Homedyers also used imported dyestuffs for special articles when they could afford it.

We have found evidence of the first western dyers going back to 2000 B.C., and the first eastern dyers going back 1000 years earlier than that.

European dye techniques improved slowly before the 18th century. During the second quarter of the 18th. century French chemists began to organize information, experiment and develop an understanding of the chemical and physical mechanisms of dyeing. This gave impetus and encouraged others in Europe and the United States to apply scientific methods to their own work.

American dyers looked to Europe and prefered to use materials they had learned to use in Europe.

Imported dyes generally were superior to domestic producct due to lack of knowledgable American technicians. Even when high quality, raw materials were produced, Americans lacked experience in preparing them, which reduced their market value.

In producing good quality indigo, leaves must be picked and processed just before flowering, at the peak of maturity.

Some South Carolina planters were unable to pick and ferment all the leaves at once, and let them remain in the fields 2-3 weeks after they ripened. The Indigo had to be marketed as senond-rate since it could not yield the maxium quanity of dye. Planters in Bengal, India avoided this by staggering their plantings. Dye plants were not cultivated on a commercial scale in the U.S. during the 19th century.

Before the Revolutionary War high import duties added to the price of dyes. Post-war tariffs were still high. Even dyes obtained from South America, such as Logwood, Brazilwood, Annatto, went thru England and Spain at Extravagant Prices.

Lack of funds plus long distance to cities where dyes were obtainable caused rural colonists to experiment with dyes from their surroundings.

They had to rely on personal papers, regional and family traditions and book of miscellaneous recipes to gather information on home dyeing.

Influential individuals such as Thomas Jefferson and Dolly Madison could not persuade farmers to grow madder, indigo, woad, or weld on a commercial scale.

In 1785 the Society for the Promotition of Agriculture in South Carolina offered a premium for growing madder. ~~Many from~~ Thomas Jefferson grew madder himself and an 1811 entry shows seeds imported from France. In 1802 the American Philosophical Society offered a $150 premium for the best experimental essay on native red dyes of the U.S. Mrs. Madison is said to have made a report to the society on specimens dyed with madder raised under her direction.

Perkins discovery in 1856 of a lavender dye made from aniline, a coal tar product, marked the beginning of the end of the natural dyestuff era. It became known as mauve in France and Queen Victoria wore a dress dyed mauve to the Great Exposition in 1862.

News of this new dye reached the U.S. soon after its discovery but was not used for a number of years. For decades after aniline dyeing became standard proceedures, old natural dyes continued side by side with the latest manufactured dyestuffs. By the end of the 19th century all but a few such as indigo, logwood and cochineal were replaced by manufactured dyes.

Natural dyes made a brief comeback during the first World War because most supplies came from Germany. Only in rural areas of the Southeastern quarter of the country, and Western Indian tribes did homedyers and weavers continue. They, more than any other group of dyers, preserved the traditions of home dyeing from natural materials.

For the modern craftsman the excitement of collecting the materials, and the unpredictable nature of the dyes, and the lovely, rich colors, the soft light and shadows achieved with natural dyes make it increasingly popular.

Indigo

Indigo is one of the world's oldest cultivated plants. It was known almost the world over. Indigo is native to India and reached the Mediterranean as early as the last few centuries before Christ. It was found in Egyptian burial grounds of the 5th cenutry A.D. It was found in India, Malaya, Asia and Egypt long before trade routes and a means of communication existed between eastern and western countries. The Spainish word for India gave Indigo it's name. After the discovery of the sea route to India in 1498, Indigo was brought to the west by the Spanish and Portuguese ships. By 1615 it had begun to be an important and valuable commodity in all East Indian trading companies of Europe, Particularly those of the Dutch.

Growers and merchants of European woad promoted ordinances against importation of Indigo. It was called a devilish drug and harmful to textiles. It was forbidden to be used by Parliament during the reign of Queen Elizabeth (1550-1603). This law was in effect in France prohibiting the use of Indigo until 1737. The act remained in effect in England until the reign of Charles II.

American Colonists imported indigo from the West Indies by way of British Ships. Indigo was very expensive because of the long sea voyage around the Cape of Good Hope and the long processing. For some time European dyes mixed with less woad. Woad had almost the same properties as Indigo but gave only one third of the amount of dye obtained from the same amount of Indigo. Woad gave a duller shade of blue than indigo. Importation of indigo with the brighter, deeper blue color and higher yeild, slowly but inevitably brought and end to the cultivation and use of woad and other blue dye plants.

Cultivation and Processing

One hundred pounds of indigo plants to make 4 ounces of coloring matter. The amount of indigotin in one cake of dried indigo could vary from 20-90%. Buyers of indigo tested it by seeing if chunks broke easily, floated in water, and burned freely with a purple flame. The indigo could have been carelesly processed or other substances added.

Indigo is a legume that grows to 5 feet high shrub with dainty compound leaves and typical legume pods. It is harvested when the plants are about to bloom. The leaves are placed in large tanks of water and allowed to ferment. In a week or so, the liquid is drawn off and the plant residues stirred to allow it to mix with air and then allowed to set. When the solution is settled, the clear top is drawn off and the remaining residue is reduced in volume by sun drying or heating over a fire. The solid matter is made into cakes or balls, called junks.

Indigo is insoluable in water. It must be reduced then put in an alkali solution before it can be dissolved and absorbed by textile material. The alkali is made up of lime, potash or soda in water.

Fermentation is used to reduce indigo. Bran, madder and urine were all used as fermentation agents.

When indigo is dissolved in alkaline liquid it turns yellow.

Wool and cotton are dipped in the yellow liquid and then held up in the air to ozidize. When it becomes oxidized it turns blue and reverts to insoluable form on fibers. This is repeated until the shade of blue desired builds up. This returning to an insoluable form makes it so fast to both washing