		No. fronds:	%:
Montgomery Park - Hilltop:			
B: On large fallen dead tree			
	Fertile fronds	0	0
	Barren fronds - well over	2000	100.0
		2000	100.0
C: On smaller fallen dead tree			
	Fertile fronds	74	18.1
	Barren fronds	334	81.9
		408	100.0

The colony under the Bon Chretien Pear is partly on flat ground but some rhizomes climb up the tree for approximately one foot. It is not until the rhizomes begin to climb that they bear fertile fronds on leaders that carry up to 4 fertile fronds but do not then appear to continue growing.

The flower pot is a concrete one of 7 inches inside diameter and of a depth of $7\frac{1}{2}$ inches. It is kept in the unheated glasshouse under a bench and is given no attention other than an occasional watering. Why does this plant bear such a high percentage of fertile frounds (65.2)?

I would welcome advice on the possible causes of the variation in fertile frond numbers of this fern.

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WOAD - (ISATIS TINCTORIA)

by I.A. Clarke

With the revival of the homecrafts of spinning and weaving, there has been an increasing interest in the related craft of natural dyeing and dye plants. Blue has been one of the most difficult colours to obtain in a colour fast dye. Imported indigo powder can be used with confidence, but one of the fascinations of natural dyeing is to be able to gather the dyestuff where it is grown, and to see the whole project through to the finished product.

Woad grows and seeds readily in this country. It is a member of the cruciferae family, a biennial herb, and the famous astrologer-physician, Nicholas Culpeper (1616-1654) gives this quaint description of the plant: It has large leaves, long and broad, of a greenish colour, somewhat blue. From among these leaves rises up a lusty stalk, three or four feet high, with leaves thereupon; the higher the stalk rises, the smaller are the leaves; at the top it spreads divers branches, at the end of which appear very pretty little yellow flowers, and after they pass away, come husks, long and rather flat, in form they resemble a tongue, in colour they are black and hang downwards. The root is white and long.

During the first year's growth the plant is a rosette, with spoonshaped leaves up to 30 cm. long and about 10 cm. wide. The second year the flower stalks rise, 100 cm. - 150 cm., the leaves on these being more arrow shaped. Masses of small yellow flowers are followed by the attractive purplish-black seed capsules.

History records that woad was in use in Britain in 55 B.C. when Julius Caesar invaded that country, and used extensively for commercial dye production from 13th - 16th centuries. By the fifteenth century it is thought that the cultivation of woad was dwindling in Britain, but it's popularity as a dyestuff was not. Indigo dyeing was developed in the sixteenth century and apparently there was much bitterness in the textile industry between the woad growers and those promoting the more easily processed indigo dye.

It would appear that some of the secrets of dyeing with woad have been lost in antiquity. Old dye recipes record leaves being reduced to a pulp, ground between wooden rollers drawn round and round by horses. The mass was then separated into heaps for draining, next, formed into balls by hand. These were dried in racks for two to four weeks, then ground into powder by the same rollers that ground the leaves to pulp. This powder was piled two to four feet deep on a stone floor, frequently sprinkled with water and turned, then left to ferment for nine weeks. A dark clay-like substance resulted, this was the dye.

When dyeing with woad and indigo, one must understand that the leaves are a source of indigotan and indirubin, which are vat dyes, and realize these vat dyes are insoluble in water. It is therefore necessary to reduce them to the soluble leuco form. Prior to this century, this was done by fermenting the leaves, but now we have the reducing agent sodium hydrosulphite, used with an alkali added to control acidity. (The vat solution must be alkaline). The trick with vat dyes - having been reduced to the soluble form so it can be absorbed by the wool - is when the wool is removed from dye bath and dried, the leuco compound is oxodized back into the insoluble original form by oxygen from the air.

For dyeing, mature woad leaves are used, preferably showing purplish margins and stems. I have obtained blue dye from leaves gathered in May and December, but September gathered leaves had little dye content.

Strict temperature control of the dye bath is necessary, if the dyebath rises above 60° the blue dye is lost, and purple results.

Using a reliable recipe for indigo hydrosulphite vat dye (Brooklyn Botanic Garden "Dye Plants and Dyeing") led the way for me to experiment with fresh woad leaves. After trying unsuccessfully for a number of years to obtain an unfading blue by the fermentation method, it took a lot of trial and error before I obtained a good lasting blue from the following recipe :- 1 oz. fresh woad leaves (minced)
¾ pint water (warm)
1 level teaspoon hydrated lime (brick layers quality). Mix these together and stand in a warm place (about 40°C.) for one hour, strain through muslin and stand for another hour. There should now be a bronzy scum on the top (flurry). Have ready this solution :- 2 level teaspoons Sodium hydrosulphite dissolved in 1 pint warm water left standing in warm place ¾ hour. Add 3 fl. ozs. of this solution to dye bath. Stir gently and stand at 50°C. for half an hour. When ready, a drop from dye bath should turn blue in about 25 seconds, the dye bath itself should be a clear lemon colour. More sodium hydrosulphite may be added and bath left standing to bring about these conditions, but too much "hydros" will inhibit the dye from "taking"!

Thoroughly scoured wet wool is now entered, temperature kept between 50° - 55°C. for half an hour, with wool being gently agitated to ensure even dyeing. Oxodize by hanging in the air without rinsing for at least half an hour. Longer soaking in the dye bath will result in a deeper colour, or dyed wool can be redipped after oxodizing if a deeper colour is wanted.

With vat dyes of this type a final rinsing, preferably next day, of a weak acetic acid - water solution is necessary, followed by washing in soapy water and a final clean water rinse. This is to rid wool of loose particles of oxodized dye that cling to fibres and will rub off, even though the colour is fixed fast in the wool.

When the wool is first lifted from the dyebath it is a pale lemon colour but it is like magic watching the oxoditation take place, the lemon changing rapidly to green, and with indigo dye, right through to blue - woad dyed wool stays green, but when rinsed the green washes off leaving blue.

1 oz. woad leaves processed as above dyed 1 oz. wool very pale blue, so for a deeper colour, with a half hour dip, probably 4 ozs. of leaves would be needed.

Sodium hydroxide, calcium carbonate and ammonia may be used to make dye bath alkaline, and these may result in different shades of blue, but I haven't yet worked out the proper proportions to use.

References:

Brooklyn Botanic Gardens, 1964: Dye Plants and Dyeing, pp.33-34.

Clarkson, Rosetta E. 1971: (Nineteenth Printing) Herbs, their Culture and Uses. pp. 195.

Culpeper, Nicholas Culpeper's Complete Herbal. pp. 391.

Macleod, Dawn 1965 A book of Herbs. pp. 159-161.

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MT. HERBERT AND MT. BRADLEY

The recent changing of the names of Herbert Peak and Mt. Herbert, which peaks are situated on the Southern side of Lyttelton Harbour, could lead to confusion if one tries to follow the paths of earlier botanists and examine the plants menticned in their records.

In reading these records one should have in mind the following name changes:

The highest peak 3015 feet was called Herbert Peak and is now named Mt. Herbert. The lower castellated peak of 2865 feet is now named Mt. Bradley, its old name being Mt. Herbert.

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PLANT HUNTING WITH A CAMERA

by R. Drake

After years of enjoyment from a Ziess Camera and black and white film in the hills, I managed to afford a Pentax, which opened up a new and very satisfying "eva" (or something) for me. Most of the days were shared by my wife. I could identify a few of the flowers but most of them were named for me by Mr. John Thompson, and I am very grateful to him.