

Snug as a Sustainable Bug: Quilts, Natural Dyes, and Printing Pastes

Cathy Plummer, Wiltshire Guild

How it all began

I started dyeing in 2017 with avocados and blackberries. I didn't really understand it all but, during lockdown, I bought Jenny Dean's book, *Wild Colour*, and began foraging and learning more about the process, particularly mordants.

Dyeing cellulose is more difficult than wool because it's a two-part process to mordant it. It took me years to fully understand this. But once I had read Catharine Ellis and Joy Boutrop's book, *The Art and Science of Natural Dyeing*, it became clearer. This is now my bible.

Creating dyes from plants is quite magical, and the effects are wonderful. It never ceases to amaze me. My passion is reusing dyes and making lake pigments when they are exhausted¹. From these, I make watercolour paint, inks and fabric pastes for printing.

The group

I joined the Wiltshire Guild in October 2023. At the guild a dedicated dye group was just forming, and I was fortunate enough to join. We decided to use the *Certificate of Achievement* syllabus to guide our work.

We meet once a month to tackle a new dye or process. We all have different focuses. For example, I don't usually use wool or silk in my work (I can't knit!), but other members are amazing knitters and weavers, so their focus is wool. Often, one of us will lead a topic if we have a particular interest in it, for example shibori or eco-printing with silk. We're very methodical and record all our results.

The Guild meets at *The Textile Studios*, once St Mary's School, in the beautiful village of Steeple Ashton. There we have a well-stocked garden that provides most of our dyes. Kath Segall, our chairperson, takes charge of the garden, and we often spend time



My grandson with the trial quilt

All photos: Cathy Plummer

weeding! It's great to be part of a group because we can bounce ideas and get answers to questions. The knowledge in the whole group is huge. We all do our own experiments at home and share them with the group. There's so much to learn in natural dyeing – I'm sure you could never learn it all!



Sample dye sheets from one of our guild days



The dye garden at the Wiltshire Guild with our samples drying on the sumac tree



Sketchbook showing the design for the spotted cucumber beetle



The Picasso beetle



The shield bug

Beginning the quilt

I began making a quilt for my grandson, Rufus, during the summer of 2024. I asked him what he wanted, and he debated between beetles and dinosaurs. I'm so glad he chose beetles or flying insects. We chose the insects together, and then I used dyed material that I already had.

When I visited the *Festival of Quilts*² in August 2024, I was intrigued that I couldn't find any naturally dyed quilts in the sustainable quilt section. So, I decided to make another beetle quilt, using only natural and recycled materials and enter it for the 2025 festival.

To qualify, the quilt must be at least 75% sustainable. Mine is nearer 100% as it mainly used recycled cotton sheets, gifted cotton threads and most of the dyes came from plants that I have grown, such as madder, weld and woad. Additional dyes, such as cochineal (from a scale insect), indigo, logwood, and cutch (from the heartwood of an acacia tree native to Asia) came from my stash, as did some red wool fabric for the ladybird. The wadding was a gifted 100-year-old wool blanket. The concept is that my quilt will compost down as it has no polyester included.

I began a sketchbook to record my designs and ideas. Once I had analysed each insect for the colours required, I made inks and created a drawing of each. This really helped the process of deciding how to make each appliqué piece. I could work out the colours I needed to dye and what techniques to use. Then, I mordanted the cotton following Boutrop and Ellis's two-step method using tannin and neutral aluminium acetate.

Working on the beetles

For the Picasso beetle, I initially dyed the cotton yellow with weld, then drew a design for the beetle on the fabric, applied a resist paste³ and dipped the fabric into an indigo vat. I use a small 2-litre vat for individual pieces, which is quick and easy to reduce⁴. The combination of blue and yellow turned the fabric green. Once dry, I scraped off the paste, leaving a great mottled yellow underneath. On some of the resist sections, I painted a cochineal print paste to colour them pink⁵ (see Box 1 on p.13).

For the shield bug, I dyed the cotton brown with cutch modified with iron for the darker sections. I painted on iron print paste in parts and embroidered with French knots. In total, I developed designs for 12 beetles or flying insects.



Sketchbook showing the design for the flea beetle



Details of sketchbook of dyed threads and embroidery



Print border with grasshopper



The finished Picasso beetle using resists and print pastes



The finished shield bug dyed with cutch and modified with iron

The printed border

For the border, I dyed the cotton yellow with weld and then used handmade stencils to print it with various insects using an indigo print paste⁶ (see Box 2 opposite). I had intended to keep the background yellow, but the colour was very bright when I put it next to the quilted sections and it really jarred. With hindsight, I would have used a lower concentration of weld. Hey ho! I always think we make mistakes for a reason, and the challenge is how to fix it and make it better than it would have been. So, I re-dyed the fabric in indigo, turning the background green. This sits much better with the quilt as a whole.

The embroidery beetles

I dyed cotton threads as well as fabric and used these to create miniature beetles. This was for extra decoration, but I confess that I used the beetles to hide some bad stitching on the quilt. I found it handy to have one of the embroidery pieces on the go, in my bag, so I could pick it up when waiting for a train or appointments. I get bored quickly!

Finishing the quilt

For the reverse, I used an old, patterned sheet and tie-dyed this with logwood, indigo and weld. Finally, I added my name as I didn't want my quilt to get lost in the hundreds on show at the *Festival of Quilts*.

Further Reading

Boutrup, Joy and Ellis, Catharine (2018) *The Art and Science of Natural Dyes: Principles, Experiments, and Results*. Atglen, PA: Schiffer Publishing, Ltd.

Dean, Jenny (2018) *Wild Colour: How to Make and Use Natural Dyes*. London: Octopus Publishing Group.

Footnotes

- 1 Natural dyebaths can't be stored as they develop mould and deteriorate. The alternative is to bind the remaining soluble dye to potassium aluminium sulphate (alum) so that it precipitates and can be separated from the water. The result is a paste-like pigment which can be stored and used later.
- 2 The *Festival of Quilts* was launched in 2003 in partnership with The Quilters' Guild and is held each year at the National Exhibition Centre (NEC) in Birmingham, UK. It is the biggest quilting show in Europe and the largest open quilt competition in the world.

- 3 I use a resist paste of 50/50 ratio of soya flour and calcium hydroxide inspired by the recipe in Boutrup and Ellis. This mixture creates a paste that can be applied using a brush or stencil and is suitable for use in indigo vats. I allow it to dry thoroughly, dye the fabric, then wash the resist off.
- 4 For my indigo vat I used iron as the reducing agent following the recipe supplied by Botanical Colors <https://botanicalcolors.com/iron-indigo-vat> which is based on Michel Garcia's original recipe.
- 5 I have developed my own print paste recipe (see Box 1 opposite) from several sources including Jane Dunnewold's YouTube video *Making your Own Print Paste* and from a selection of courses I have attended, such as Printed Textiles at Bath College run by Lyn Snow. (www.youtube.com/watch?v=D9pAMmljG5o)
- 6 I have developed an indigo print paste recipe (see Box 2 opposite) based on a Michel Garcia video (purchased from Woolmasters) which I have adapted and experimented with.



The quilt is complete! The author with her wonderful work

Box 1. Print paste recipe

100ml warm water
1tbs urea (=humectant)
3g sodium alginate (=thickener)
5g soda ash (=alkali)

1. In a container, combine the water and urea, add the sodium alginate and whisk vigorously until the mixture thickens. Mix in the soda ash. Allow it to thicken for several hours.
2. For cochineal print paste, mix with an equal quantity of wet lake pigment. Other dyes can be used, but this will need experimentation as to the ratios to be used.
3. For an iron paste, mix 1tsp of ferrous sulphate with a small amount of warm water in a separate container. Add this mixture to 1tsp of tannin powder, such as oak gall. Strain if necessary. Allow it to darken. Add to the print paste.
4. Use these pastes to print/paint or stencil the fabric. Cover prints with plastic overnight.
5. Wash the printed items gently. I use a cold handwash. Some recipes suggest steaming to set the print, but the use of a mordant and the ingredients in this paste do not make it necessary in my experience.

Box 2. Print paste recipe specifically for indigo

100ml hot water
5g indigo (or less if the paste is too dark)
4/5g sodium alginate
20g salt
20g calcium hydroxide plus 10g per litre for the vat
20g fructose per litre of water in vat

1. In a jar, combine the hot water and indigo and stir well. Then add the sodium alginate and stir again, using an electric mixer.
2. Use the paste to print, paint or stencil the fabric. Allow to dry completely.
3. Mix the salt and calcium hydroxide in a bowl. Add to 2 litres of warm water and stir until completely dissolved. Soak the fabric in this solution for 10 minutes*.
4. Mix the fructose with water at 80°C. Add calcium hydroxide and stir until the solution turns yellow. Soak the fabric in the solution for 10 minutes**.
5. Rinse in cold water to remove the paste and oxidise the indigo. A final rinse with soda ash might be needed to remove any alginate or yellow colour.

*Calcium chloride is produced and reacts with the alginate paste solution, forming a gel-like structure that provides shape and stability to the print paste area, and preventing it from dissolving in the reduction vat.

**The indigo is reduced under these conditions, becomes soluble and attaches to the fabric.

Notes on Health and Safety

When using any natural or synthetic materials for dyeing, dyers should fully inform themselves as to the possible toxicity of the substances they are choosing to use. They should be aware of local environmental law on the collection of material from the wild – and adhere to it. For information on recipes, safe handling and disposal of substances used in dyeing, dyers should consult the most up-to-date dyeing reference books or company material safety data sheets and refer to their health and safety sections. Older information may be inaccurate, or otherwise misleading. Also note that equipment used for dyestuff preparation and dyeing should never be used for any stage in food preparation or cooking. More information can be found at: www.hse.gov.uk/textiles/dyes-dyeing.htm

About the author: Cathy Plummer is a member of the Wiltshire Guild. She has always been creative and loved art at school but ended up studying to be an accountant. Eventually, when her children were small, she studied part-time for a Higher National Diploma (HND) in art and made quilts as part of this work. This was followed by a City and Guilds course in embroidery and design. She taught art in a special school for 10 years, had a studio in her hometown of Frome for a few years, and a business called Plum Stitch and Dye where she sold dyed fabric to creatives for their sewing. Today, she enjoys sharing her skills, as well as dyeing for her own projects and pleasure.



Reverse detail of quilt