

# Slow Writing/Sustainable Printing

An artist/maker's quest to develop frugal, sustainable and self-produced printing materials

By Catherine Lewis.



## Introduction

The collection and making of my own inks and the documentation of the processes and associated outcomes highlights themes that run through my art practice: encouraging a lighter touch on our earth, seeing beauty in daily life, cherishing ideas without franchise, sharing resources, doing it yourself and importantly, enjoying the act of doing. The final artwork exhibited is often not the endpoint; it is a work in flux; it can form a focal point where shared ideas can emerge, dialogues ensue and collaborations flourish.

I want my work to engage on many levels – to evoke enchantment with nature, to charm the viewer, and to kindle care in the choices we make; to encourage acts of sharing and of frugal, creative, intriguing d-i-y art practice. The project I have titled slow writing takes some inspiration from the ‘slow food’ movement. Slow Food was started by Carlo Petrini and a group of activists in the 1980s with the initial aim to defend regional traditions, good food, gastronomic pleasure and a slow pace of life. In over two decades of history, the movement has evolved to embrace a comprehensive approach to food that recognizes the strong connections between plate, planet, people, politics and culture. Today Slow Food represents a global movement involving thousands of projects and millions of people in over 160 countries. (<http://www.slowfood.com/about-us/our-history/>)

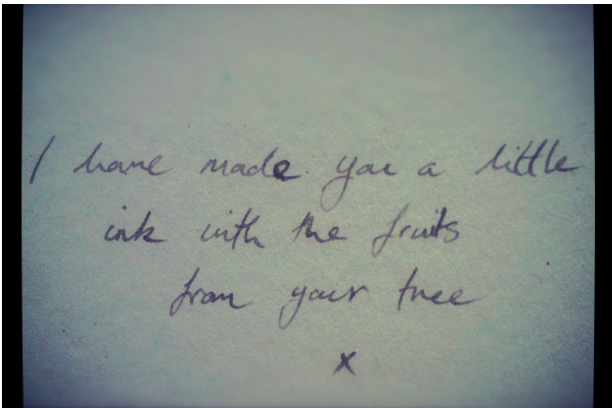


Figure 1: I made you a little ink, Walnut Series, 2014, Catherine Lewis

This idea of a return to a making practice that celebrates the origins and processes involved in making, connected with an increasing awareness of my own deeply held beliefs that over-consumption and a lack of awareness of provenance has caused ‘western’ society to not apply a worthy value to many important things in our lifestyles - food, clothing, technology etc. Many artists now see their role as sounding an environmental alarm; we have felt the need to alter the direction of our art so that it is more socially and environmentally defined. Performance artist Guillermo Gómez-Peña states “Most of the work I’m doing currently comes from the realization that we’re living in a state of emergency. I feel that more than ever we must step outside the strictly art arena. It is not enough to make art.” In a similar vein, Chicago artist Othello Anderson states: “Carbon and other pollutants are emitted into the air in such massive quantities that large areas of forest landscapes are dying from the effects of acid rain. Recognizing this crisis, as an artist I can no longer consider making art that is void of moral consciousness, art that carries no responsibility, art without spiritual content, art that places form above content, or art that denies the state of the very world in which it exists.” (Gablik 1998).

I can no longer ignore this crisis and have become increasingly aware of how very easily and comparatively cheaply we acquire our materials, without thought of where they came from or where they’ll end up when we’re finished with them. Following on from a commitment made during my Masters studies to live and work with only the materials and tools I already possessed or was able to make myself from sustainable and local resources, came the necessity to find a viable alternative to buying traditional oil-based printing ink products and wasteful, expensive manufacturer’s inkjet cartridges. My aim was to print and bind my own books, which are made physically out of their subject materials: such as linen, walnut and oak. This series of books are to be printed by both hand and machine, with my own made inks and paper, hand-made, cut and bound. They will reveal the stories of the ingredients, the people and the methods that made them.



**Figure 2: Walnut lotus fold book, screen printed cotton paper, walnut ink, linen thread, 2015, Catherine Lewis**

The desire to make my work sustainable and to make my books from only gathered and recycled materials has been the driver of my research into making inks. Bookmaking involves printing text and images by both hand – in the form of screen prints, letterpress and etching – and by machine, with inkjet prints. It also involves papermaking and casting, photography, drawing, stitching.

This document is a visual diary of that process.



**Figure 3: 1 stone: 5 birds, handmade cotton paper, cyanotype print, inkjet print, linen thread, 2015, Catherine Lewis**

## A Brief History

The combining of art and science as collaborative art practice is held deeply in my nature: I have a history... growing up in a family with three generations of dentists, I was surrounded by casting materials, tools and the scents of a laboratory. I also grew up during a time of many 'digital' firsts: I began typesetting on Apple Macs in the 80s, when the established designers exclaimed 'it'll never catch on, it is too slow!' I studied textile design at Chelsea College of Art just as digital design software was first introduced. I was made aware of potential links between engineering and textiles whilst working for the couture fashion house of Charles and Patricia Lester – as Charles worked out ways for her to achieve and improve on the pleated silks she had seen in Japan, but by using more scientific and reproducible methods.



**Fig 4: Good Girl; digital sublimation print, recycled polyester, hand stitch, 2002, Catherine Lewis**

I began to introduce digital artwork and printing into my own textiles work as I lectured and assisted in the installation of the Mimaki TX2 digital textile printer at UWIC (Cardiff School of Art and Design) early 2000. I began to play with the combination and layering of hand and machine production.



**Fig 5: Afan Valley – Glyncorrwg Banner, Summer; reactive dye inkjet print onto cotton; Catherine Lewis and Afan Valley community groups, 2005**

In 2014/5 I lectured on the foundation degree in New Textile Technologies at Carmarthen College of Art and Design, researching the impact design and production methods for the fashion and textiles industries, through case studies within the local economy. More recently I have been involved with the Product Design Research centre and FabLab Cardiff, witnessing the development of additive manufacturing and laser technology, witnessing the huge potential it has for designers and designer makers and discovering the benefits it has given us for more sustainable and efficient production.

## Underpinning Matters of Importance

In 2009 I became engaged in trying to find a way to voice my concerns and generate interest and curiosity in environmental issues, through my visual medium. I was looking at issues such as:

- Political and environmental concerns relating to making art in a sustainable way; avoiding excessive consumerism and waste in my making.
- A general lack of understanding of provenance and the consequences of our purchasing decisions.
- My own disempowerment in the choices I was able to make because of monopolies and controls in the printing industry.
- Active making – to enjoy the playful element of art making, to experiment with technologies, to find out new ways of expressing my ideas through these new mediums.
- The empirical element of my artworks – I need to understand these new technologies, through touching, making, deconstructing, rebuilding and reusing.
- Participation and Sharing – developing interactive places to make, to enable public participation in the making process, resulting in social engagement and knowledge transfer between makers/artists/technologists and the public.
- Combining digital and traditional print methods – new technologies being just another tool at our disposal – for us to have the ability to investigate, combine, personalise, these new forms of expression.

This idea of asking a question and seeking an answer from within our surroundings is something we can all do. All too often we hunger for the latest products and dump our technology rather than use the parts to create something new.

I also became aware at this time of the concept of Wabi-sabi: pared down to its barest essence, Wabi-sabi is the Japanese art of finding beauty in imperfection and profundity in nature, of accepting the natural cycle of growth, decay, and death. It's simple, slow, and uncluttered - and above all it reveres authenticity. I wanted this for my work – for it to be authentic, for it to show process, simplicity, to allow nature's original beauty to shine through the concepts and metaphors.

I also became aware of the policies of Compact living:  
 1) GO BEYOND RECYCLING IN TRYING TO COUNTERACT THE NEGATIVE GLOBAL ENVIRONMENTAL AND SOCIOECONOMIC IMPACTS OF CONSUMER CULTURE, TO RESIST GLOBAL CORPORATISM, AND TO SUPPORT LOCAL BUSINESSES, FARMS, ETC;  
 2) TO REDUCE CLUTTER AND WASTE IN OUR HOMES (AS IN TRASH COMPACT-ER);  
 3) TO SIMPLIFY OUR LIVES (AS IN CALM-PACT)

**How I began to make ink... the story starts here**



Fig 6: The packaging from a new telephone, digital photograph, 2007, Catherine Lewis



*Tuesday 9-10pm*

Fig 7: Gesture to Myself: Changing Rooms, Polaroid photograph, 2008, Catherine Lewis

At the start of my MFA, I decided to live by the 'no new policy'. I had enough stuff already. I had to reuse – recycle – re-appropriate in my work as well as in day to day living. I became involved in freecycling, freeganism, swapping and sharing.

Recycling textiles presented not too much of a problem. I could collect, recut, wash, dye, overprint, apply a suitable coating of Urea and soda and then print digitally with the Mimaki large format Inkjet printer. But then I began to think about 'art' and photographic printing, onto recycled 100% post consumer and handmade papers. This led me to the realisation that I needed to make my own materials, with what I could gather from my surroundings.

Making the paper was easy. But to print, I needed to find a printer that would allow me to experiment with papers.... but those who had the machines were not at all keen on feeding them with handmade, rough, uneven, 'who knows what ph', through their expensive new machines – which came with warning and warranties and locked in supply chains.

Then I considered the printer ink... What is it made of? Where does it come from? Are there alternatives? No one really knew or wanted to find out. I had not even considered that all our printer inks are made from mineral oil. If I was to be working in a totally sustainable way, this was not an option for me.... I had to find out how to make my own.

On a research visit for an exhibition at the Roman museum in Caerleon I chanced upon one of the earliest known surviving examples of the use of ink letters in the Roman period. The tablet (like those found at Vindolanda in Northern England) is made from veneer of oak that grew locally. The ink is made up of carbon, gum Arabic and water. This find initiated my research and process experiments.

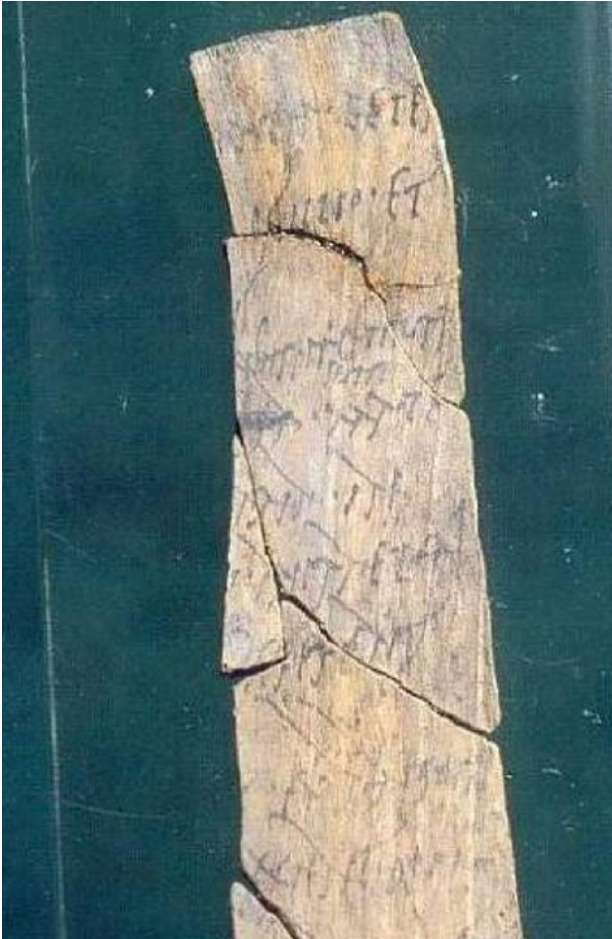


Fig 8: Roman Ink tablet at Caerleon roman Museum, digital photograph, 2007, Catherine Lewis

#### An Etymology of Ink

“the black liquor with which men write” [Johnson], mid-13c., from O.Fr. enque

“dark writing fluid,” from L.L. encaustum, from Gk. enkauston

“purple or red ink,” used by the Roman emperors to sign documents, originally a neut. adj. form of enkaustos “burned in,” from stem of enkaiein “to burn in,” from en- “in” + kaiein “to burn” (see caustic).

The word is from a Greek method of applying colored wax and fixing it with heat.

To Ink: The verb meaning “to mark or stain in ink” is from 1560s.

Inky “as black as ink” is attested from 1590s.

#### Making five inks

Made from charred ivory, which is calcium phosphate containing carbon. A pure Ivory Black should be a very dark pigment, bluish when mixed with white. Beside lamp black (flame soot) ivory-black is the strongest and deepest carbon-black. Genuine Ivory Black has not been produced since end of the Second World War, except from Kremer Pigmente in Germany. Genuine Ivory-Black was made from ivory wastes. These were put into iron pots, locked hermetically and then heated to approx. 800°C. The residue was a pure animal charcoal with small impurities of phosphate and sometimes different salts. With mistakes due to wrong temperature or burning duration the coal exhibited a more or less clear brown tone. After the grinding of the pigment it was pressed in 8 mm capsules and genuine ivory-black could be recognized by its characteristic form. The main reason for the drastic decrease in the use of ivory-black was the increasing use of plastic products until finally the regulations for the protection of species prohibited the procurement of ivory wastes. Now ‘Ivory Black’ is plain bone char.

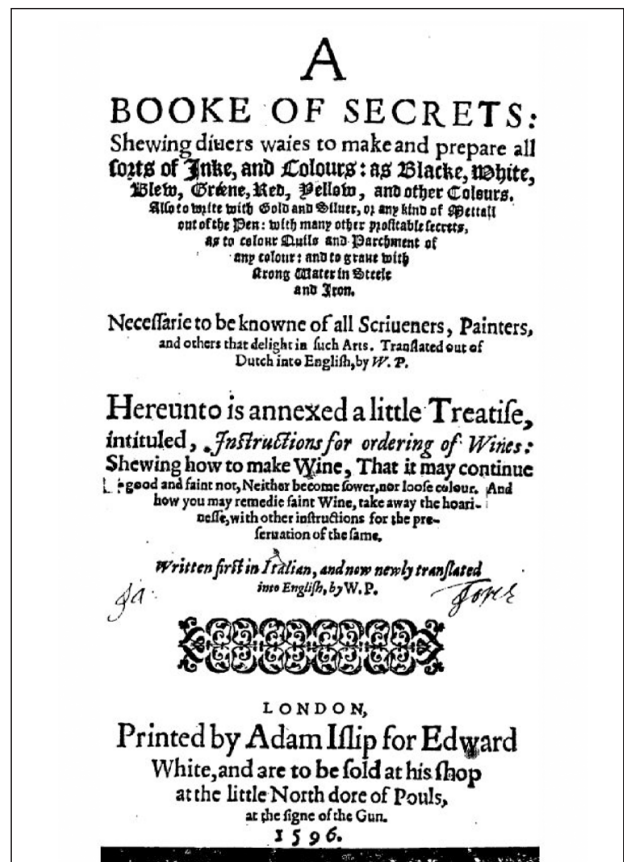


Fig 9: A Book Containing Divers Sorts of Hands, by John de Beau Chesne and M. John Baidon, and published in 1571

A piano restorer came to my rescue. Initially he gave me some of the piano key veneers, which I treated in a kiln. This produced beautiful slithers of porcelain! He then offered me a tusk – we presume from a Walrus. This time I was advised to carbonize it with a ‘perfect’ flame – deoxygenated – and this produced a dark blackish brown. I crushed it, ground it with a glass muller, tempered it over a beeswax flame and added some gum Arabic. Although I had made an ‘incorrect’ carbonization, the ink was a lovely deep brown.





**Figs 10 – 17: The Ivory Process, digital photographs, 2010, Catherine Lewis**

**Gallo-Tannic (Oak Gall)**

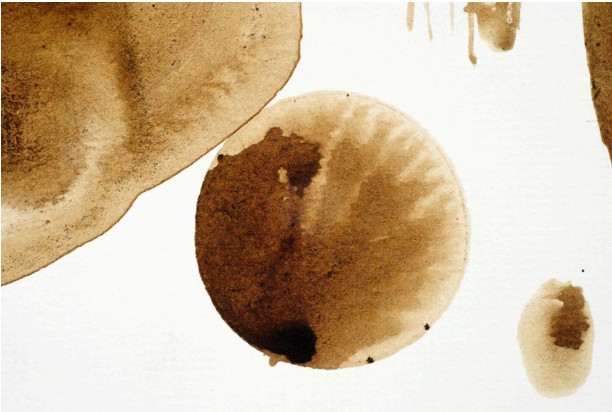
Oak gall ink (also known as iron gall ink, Gallotannic and common ink) is made from iron salts and tannic acids from the Oak Gall. It was the standard writing and drawing ink in Europe from about the fifth century to the nineteenth century and has remained in use well into the twentieth century. This ink has been called the single most important ink in history. It is still used today in the printing of Acts of Parliament onto vellum, although this is now under threat. The ink was prepared by adding some iron sulphate made with iron scraps and vinegar - to a solution of tannic acid extracted from oak galls that were collected from local trees and donations from an online request. The fermentation of the extract releases tannic acid, which yields a darker black ink. The fermented extract was combined with the ferrous sulphate solution. After filtering, the resulting solution had gum Arabic added to it. The ink gradually darkened to an intense brownish black. The resulting marks adhere firmly to parchment and so cannot be erased by rubbing or washing. The marks can only be erased by actually scraping a thin layer off the writing surface.



**Fig 18: A Visual Taxonomy of Ink, Installation digital photograph, 2010, Catherine Lewis**





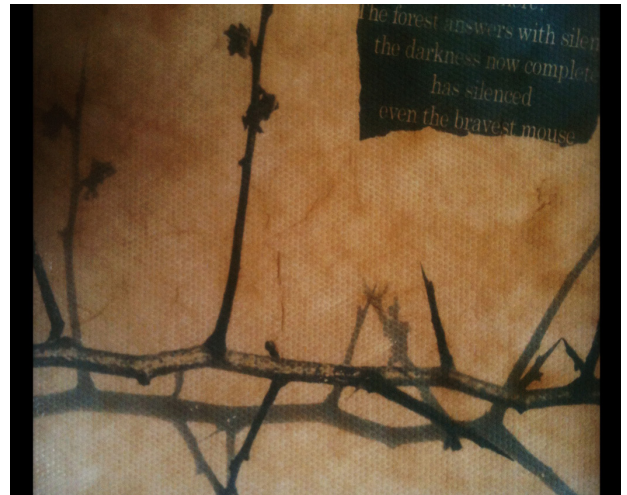
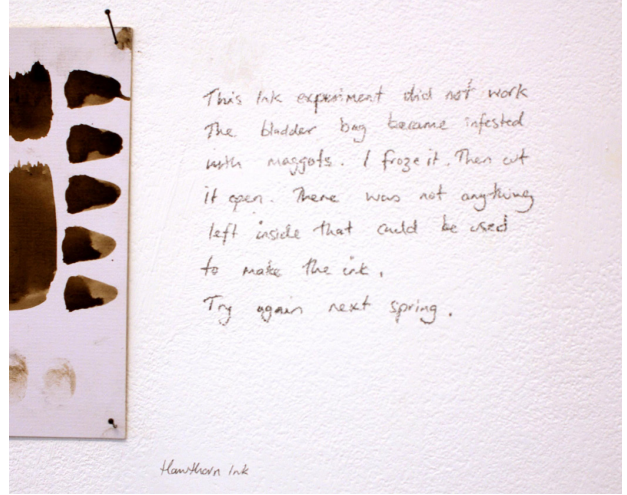


Figs 19 – 26: The Gallo-tannic Process, digital photographs, 2010, Catherine Lewis

#### Hawthorn Ink

This was the oldest recorded recipe that I used – sixteenth century – and called for the most unusual ingredients and production methods, including a pigs bladder, the outer bark of the Hawthorn tips collected in spring, and a vellum sack. The result was hung in a tree for a month, then the remaining residue scraped out and added to ferrous sulphate solution and gum Arabic added.





Figs 27 - 34: The Hawthorn Process, digital photographs, 2010, Catherine Lewis

### Lamp Black

Soot - The most basic and oldest form of mark making (after mud). It all starts with the bees, who make the beeswax that was burned to collect the soot on a glass held above it. This was diluted with wine and a little water, then gum Arabic added.



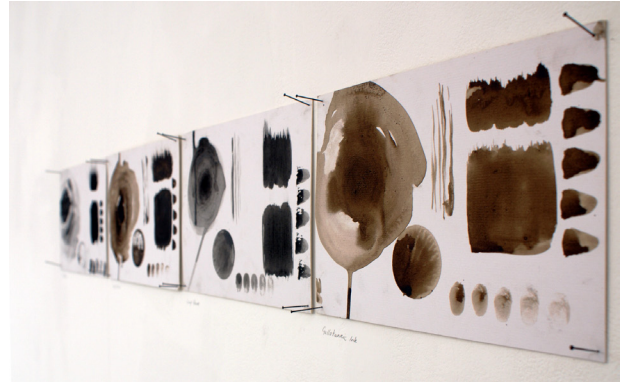
Figs 35 - 39: The Lamp Black Process, digital photographs, 2010, Catherine Lewis

**Vine Black**

Pinot Noir vine tips were collected locally and carbonized in a perfect gas flame. These were then crushed and ground to a fine powder, tempered over a beeswax flame, a little wine added and some gum Arabic.



Figs 40 - 43: The Vine Black Process, digital photographs, 2010, Catherine Lewis



Figs 44 - 45: Ink samples on paper and vellum, Installation digital photographs, 2010, Catherine Lewis



Unsustainable:

These photographs document some of the processes involved in making the five black inks. I wanted physical evidence, something to touch. So I wanted to print. I have spent over 2 years looking for a properly Sustainable way of doing this. SMU digital print facility is not able or interested. Epson, whilst producing full post-consumer 80g paper for home printing, do not make paper that is suitable for large format, archive quality photographic printing. And so these prints are a compromise.

SUSTAINABLE: Capable of being maintained at a steady level without exhausting natural resources or causing ecological damage.



**Figs 46 - 47: Unsustainable, Installation digital photographs, 2010, Catherine Lewis**

**Walnut Ink**

Following on from the five initial samples, I wanted to continue making other inks and so I worked on Walnut. Like the Oak Galls, the husks of Walnuts have a high tannic acid content and make a beautiful deep rich brown ink. With its resemblance to the brain and the many interesting myths and stories surrounding it, it had a lovely provenance. The nuts were given to me by a friend.



c the forest people, she do  
 on't see what they do to her  
 forest, they are the grass a  
 the soldiers are in their  
 of battle, but their  
 their weapon, the flea



**Figs 48 - 52: Walnut Ink Making Process, digital photographs, 2015, Catherine Lewis**

### Linen and fine art printing inks

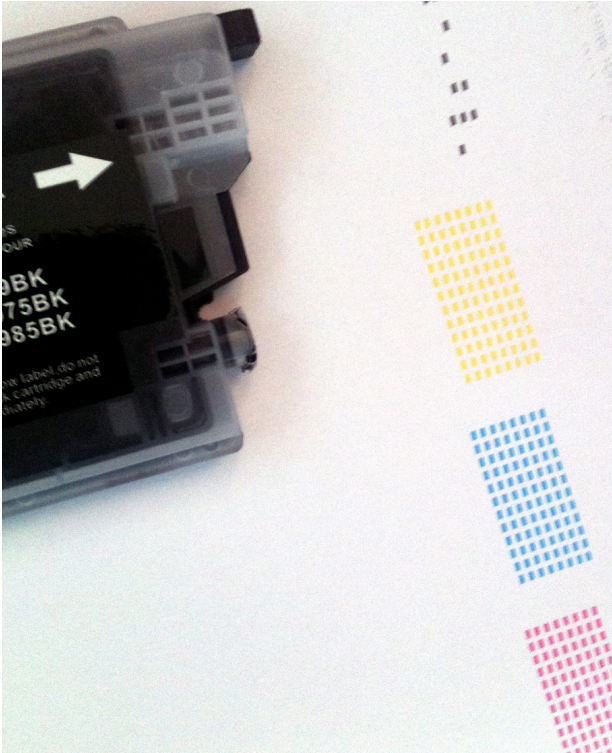
All the inks I had made to date were water based and thin, so not suitable for art print making processes, such as etchings and collographs. So I had to return to the source material – the ground pigments of walnut and oak gall and then I thickened these with an oil-based binder. An exhibition project using Linen in Northern Ireland gave me the next step in the process - boiled linseed oil. At 500.C the linseed oil thickens to a viscous sticky material, suitable for printing. I applied these onto handmade recycled linen rag paper.



Figs 53 - 56: Linseed Oil Process, digital photographs, 2015, Catherine Lewis

### Going Digital

The next step – is to make inks that could be transferred and used in a home ink jet printer. This ink would be a completely different story. It needs to be water based and fine enough to run through the nozzles of the ink jet printer head. The ink manufacturers information told me it contains: humectants...gum...minerals...and colours. So I set about trying to create the four base colours: magenta, cyan, yellow and black.



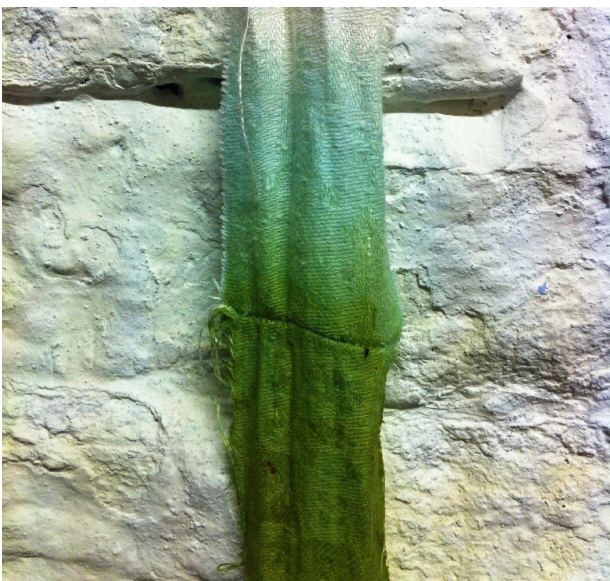
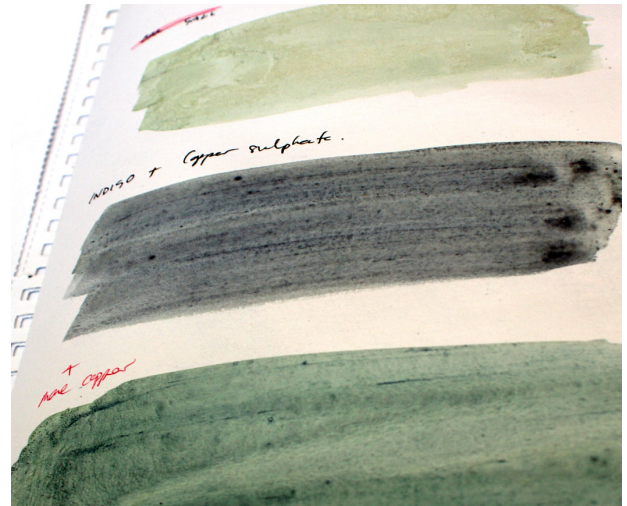
I acquired a Brother Inkjet printer, which was suitable as the cartridges have no chip, allowing a continuous ink supply system to be fitted and my inks added to the feed. I needed to make coloured solutions and so a new forage ensued at my local city park. As part of a community led project in Cardiff, we gathered, processed and talked. Solutions were made up of hawthorn leaves, walnut husks, blackthorn leaves and berries, blackberries, copper sulphate solution made from vinegar and scrap copper, ivy leaves, eucalyptus leaves and bark and red onion skins.



Figs 57 – 58: The Brother Inkjet Printer, digital photographs, 2015, Catherine Lewis

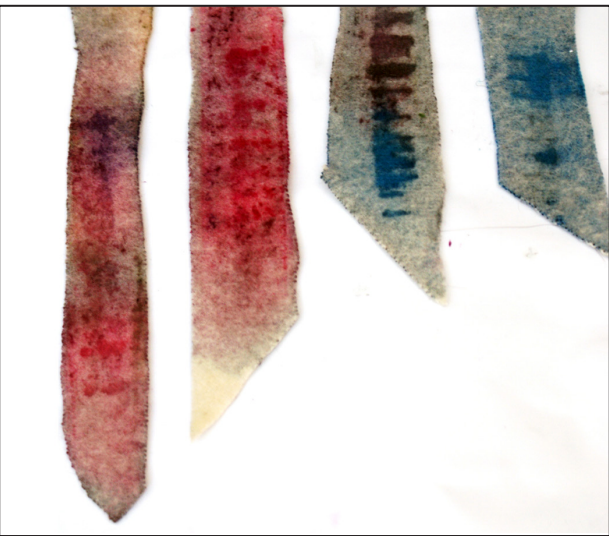
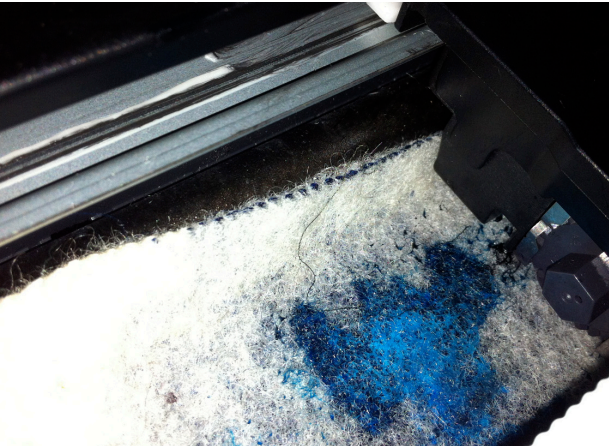
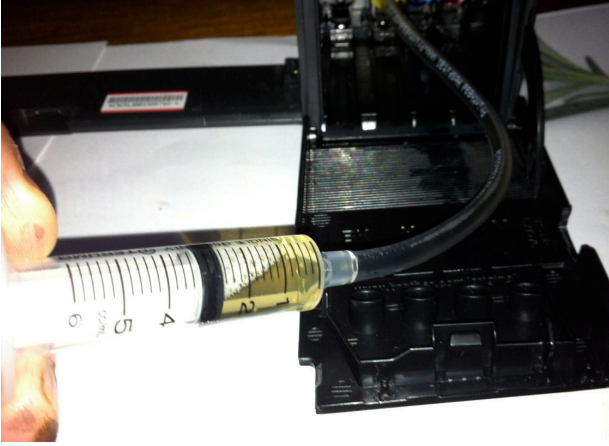


Figs 59 – 64: Making Plant Inks, digital photographs, 2015, Catherine Lewis



Figs 65 - 69: Making Plant Inks, digital photographs, 2015, Catherine Lewis

Then it was back to the printer to attempt a print: first, flush out the system and print heads with isopropyl alcohol to remove all trace of mineral inks. Then I refilled with my plant inks.





**Figs 70 - 77: Installing the CIS with the Plant Inks, , digital photographs, 2015, Catherine Lewis**

I managed to activate the printer and the inks came through the heads with pressure as I filled, but in test printing, no ink would appear despite many attempts, re-cleaning, re-filtering and head cleaning. There is a lot more testing to be done!

### Conclusion.

The ink consistency and PH is clearly of vital importance to work inside these sensitive and fine nozzles. I plan to develop the inks so that they can be incorporated into adapted printers; the aim is for these to be powered by renewable or self-generated energy source, to fully allow post peak-oil mechanical image reproduction. I hope that my ideas the knowledge I have gathered through these experiments will eventually lead on to a successful outcome. I plan to further investigate and to document an 'industry' ink production cycle. I am still unsure how the industry makes the colours that are so highly priced and developed in such secrecy.

Printing began as a process of democratization of the written word – the sharing of information and stories that were the origins of modern democratic discourse. The key to the rise of a democratic public sphere was the impact of this culture of printing on the secrecy and privilege that shrouded political decisions in seventeenth century England. Printing had liberating effects and printed communication transformed the world of political secrecy into a culture of open discourse and eventually a politics of public opinion. We are currently held to ransom by the industries closed production and threats of invalidation of warranties and high prices.

Artistic strategies for production have shifted and materiality and the craft of are back with a vengeance. The handmade and sensuous are gaining increased favour even though, or perhaps because of, the ubiquity of the current digital culture and the ever-widening practice of digital production. The *Slow Writing* project combines this use of aesthetic materiality, craft practice, the ready-made or found object and sustainable art practice. The materials and actions used have specific symbolic values, as exemplified in the work of Joseph Beuys; e.g. honey is the product of bees which for Beuys (following the thoughts of Rudolf Steiner), represented an ideal society of warmth and unity.

The visual arts offer a myriad of powerful ways to think and feel more deeply about our age and our humanity, but it is almost impossible to trace the causal links of how that may feed through to political engagement or behaviour change. Whilst artists may be inspired to create by the facts of science and economics, to expect or demand that we make work solely relating directly to environmental catastrophe would be too much - the art would be of little value if it is simply preaching about climate and sustainability.

#### **About the Artist**

Catherine is a visual artist and maker, a textile print and dye specialist, but with a practice that encompasses a wide range of media and techniques. Her work is driven by a passion: to create without burden, to add to the existing but often unseen, to represent the forgotten or undervalued traditional skills. With images made and found, with ordinary things, with people's memories and writings, she reveals the hidden, sometimes entangled ways, the life stories held captive inside everyday products. She wants others to look and find them also; and to question what we take for granted in our increasingly unbounded and throw-away world.  
[www.catlewis.com](http://www.catlewis.com)

- 1: Big Things From Small: The Frugal Digital Initiative (2014)
2. The Compact: <http://groups.yahoo.com/group/thecompact/> (2007)

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