‘Solar patterning: The employment of fast and fugitive colorants via Anthotype, Cyanotype and other photographic techniques.’

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This paper discusses on-going research into natural dyes, mineral dyes (Lake pigments or raised colours) and leuco-vat dyes (Inko and SolarFast) with the potential to create a sustainable method of patterning fabric that employs the light sensitivity and fastness properties (fast or fugitive) of the colorants in creating a permanent (photographic) image in colour upon natural or re-generated fibre base.

Instigated by the output of collaborative research between two different disciplines: That of textile design and early colouration methods with historical photographic imaging techniques. The project initially considered the symbiotic relationships between natural plant extracts had with ‘Anthotypes’ [1] and raised colours specifically ‘Prussian blue’ had with ‘Cyanotypes’ or ‘Blue prints’ [2] (Figure 1) under different application techniques and light exposure sources. The aim of which, was to understand the success or failure of these types of photographic processes known today under the heading of ‘Alternative photography’ and consider the question: Could this kind of photographic image making be applied as a future, sustainable method of design generation, colouration and patterning of fabric for fashion and interiors? The objective was in creating an alternative sustainable surface design process that relies upon light and natural colouring substances/dyes as the main patterning and processing medium.

The main aim of the research was to combine collaborative design practice with a scientific technical approach in understanding the reasons: Why and How Cyanotypes and Anthotypes work? Their correlation with sunlight, ultraviolet and infrared light in relation to quality and colour of images achieved on exposure; in combination with the fastness properties of natural dyes/substances employed within the process. By looking at the substantive and fugitive properties of the colouration materials, analysis could be made into which colorants are the most successful and reliable for future use.

Followed was an investigation into the relationship of natural colours both their fastness and fugitive properties and those of mineral dyes (lake or raised colours) have in enabling the success of creating a positive image with these early photographic techniques. In order to establish a clear method of how to manipulate the differing light fastness of natural dyes, literary searches were carried out with Patricia Crews [3], Gill Dalby [4] and David Lee [5] recording extensive research regarding methods and techniques and rated many natural dyes based on their light fastness qualities and light absorbency in relation to the colour.

Their studies show that although the majority of natural dyes fade at differing rates when exposed to natural daylight there are a handful of natural dyes that show a strong light fastness, these include Madder, Indigo and Woad. Therefore the mixing of these light fast dyes with fugitive dyes can potentially create a larger colour palette that changes over time with a fugitive secondary colour fading to reveal a fast base colorant. These findings were then applied to dyestuffs to be employed, using sustainable fabric bases for the creation of an eco textile design process. The colour extractions were applied to a substrate through different coating and dyeing techniques and allowed to dry before imagery, as photograms or acetate positives, based upon the plant material the colouration solutions had been extracted from was then exposed to different light sources: daylight, the visible spectrum as well as ultraviolet and infrared light which act as catalysts to the fading process, with some dye stuffs fading at the blue end of the spectrum and others within the yellow/red wavelengths.

Although some very successful outputs were achieved; the main disadvantage of this technique being sustainable being that the fugitive colorant that provides the photographic image/design continues to fade with light and time. New investigations lead to an improvement in fastness once a design has been created, with recent research carried out into the different solubility of colouring materials touched upon by Hubble [6] and expanded upon by Lee [5] with developments in application of the colouring matter as well as methods for enhancing the light fastness after exposure and patterning by applying an after-mordant such as Iron or Copper acetates to the Anthotypes after exposure or as other research has revealed the application of UV blockers such as vitamin C, [7] lemon and lime juice that does not normally affect the colour of the patterning produced.

Figure 1: Cyanotype of Periwinkle and Anthotype of Blackberry on Blackberry.

References

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