



## TO DYE OR NOT TO DYE

KATE FLETCHER ON COLOUR, TEXTILES AND THE ENVIRONMENT

**W**HAT is it about a fabric that first attracts the eye? Colour? Texture? Proportion? It is undoubtedly a combination of the three, but what is certain is that colour, with all its social, cultural and psychological nuances, is an extremely powerful medium and one that no sector relies on, or makes more successful use of than textiles.

More than 700,000 tons of dyestuffs are applied to 40 million tons of fabric each year in many cocktails of chemicals, water, time and temperature. The art of dyeing (and printing) involves achieving subtle yet defined differences in shade from a seasonal colour palette predicted by trade gurus, copied by designers and reproduced by dyers. But there is a downside to coloration. Over and above its consumption of large amounts of chemicals, water and energy, dyeing produces effluent. The designer's choice of colour has a distinct bearing on pollution: dark shades cause more damage. While dye effluent today is dominated by 'aesthetic pollution' rather than toxic emissions, the inherently dirty nature of applying colour to fabric has meant dyers and finishers are increasingly under environmental scrutiny.

So where does this leave environmentally responsible textile design? With a

series of stark choices about colour; the most fundamental being whether to dye the fabric at all. Without colour, manufactured fibres are an almost useless transparent (they are bleached before dyeing to make them opaque). In contrast, unbleached, undyed, natural fibres vary in colour quite considerably but are generally limited to a range of mute beige-brown tones (we want bright shades). One way around this is to grow coloured fibres. By exploiting natural variations in the colour of cotton lint and using traditional plant breeding methods, coloured cotton fibres can be grown that do not need to be bleached or dyed. Naturally coloured cotton was originally developed in six shades by native Americans and is available in green, brown, yellow and rust red under the brand name 'Foxfibre'. Biotechnology has also had a hand in developing cotton crops of vivid indigo blue for use as denim.

If the decision is made to dye the fabric, colours and chemicals must be chosen carefully. Neither natural nor synthetic dyes offer easy answers or

problem-free colouration. Both require cleaning and preparation of the fibre surface before dyeing, extra chemicals to help them attract and fix to the fibre, and lots of water. Natural dyes can only be used on natural fibres, have large variations in colour and poor light and wash fastness, making them virtually unacceptable for industrial use. Natural dyes have no built-in affiliation for the fibre; to enable the dye molecules to react, the fibre surface is chemically altered with highly polluting heavy metal mordants. Demand for dyes is high and concentrations of dye found in nature tend to be very low. This puts an enormous, unrealistic strain on natural resources. Synthetic dyes colour fibres more efficiently, but the most popular synthetic dye, the reactive – applied to one quarter of all world textiles – has an especially poor exhaustion rate, with up to 50 per cent of the dye remaining unfixed after dyeing and being flushed away, needing a wash-off (using many baths of water) to remove unfixed dye and other chemicals.

**C**hemically treating fabrics with colour or with more specialist finishes not only causes pollution but also hampers a fabric's ability to biodegrade. While most natural fabrics would biodegrade, dyes, pigments, bleaches and scouring chemicals tend to persist in the environment. Given that they make up to 10 per cent of a fabric's composition, biodegradability is almost impossible.

In summary, what choices are left for the responsible designer? The integration of environmental concerns into textile design has been excruciatingly slow, due mainly to the common belief that all 'solutions' to environmental problems are technical. While it is true that chemical companies hold the key to introducing friendlier dyestuffs (they already exist, but high price inhibits their use), designers must realise the importance of their role in reducing and preventing environmental damage, unleashing their creativity within the restrictions of environmental compatibility and to find new ways of applying colour to fabric.

■ Colour and its environment implications will be the focus of a TEN event in 1998. **ed**

Further details about the Textile Environmental Network from: c/o National Centre for Business Ecology, The Peel Building, University of Salford, Greater Manchester M5 4WT  
Tel 0161 7455276  
Fax 0161 745 5041  
e-mail NCBE@NCBE.co.uk



Kate Fletcher