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Question 4: Outline a current environmental, political, or social issue that requires redesign. Explain how you will solve this issue over the duration of your future design career. Underline the tools and approaches will you use and discuss how and why.

A current environmental issue that greatly threatens society today and its future, if not resolved quickly and efficiently is global warming and one of its largest contributors, the textile industry, 'planetary systems are under threat. Fashion, clothing products and production processes are actively contributing to the destruction of these systems' (Union of Concerned research in Fashion, n.d.). In this essay I will be exploring the dangers caused by the fashion industry through in-depth research. In particular, I will be discussing the reality of greenwashing and the destructive affects inflicted on both the environment and human wellbeing caused by synthetic textile dyes, fabrics and fibres. I will be discussing solutions to these issues whilst looking at a range of environmental theorists who have years of knowledge studying the ecosystem and sustainability within textile industrialisation such as Michael Braungart, William McDonough, Kate Fletcher, Mathilde Tham and Donella Meadows. Alongside these designated theorists will be natural textile dyers Jenny Dean, India Flint and fashion unions, Union of Concerned Researchers in Fashion (UCRF) and Fashion revolution.

In modern day culture there is seen to be a staggering increase of information and knowledge surrounding global warming and sustainability, leading consumers to be more conscious of their purchases. To meet these trending concerns, many brands are falsely claiming to be sustainable in order to be more appealing to the public eye, 'brands are routinely deceiving consumers with false green claims' (Synthetic Anonymous, 2021). This is known as greenwashing. An example of green washing is that many of the world's largest clothing companies such as H&M are contributing towards climate change and plastic pollution through a long-term and continuous use of fossil fuels that make up synthetic fabrics and materials which are over 'two thirds (69%) of all materials used in textiles' (Synthetic Anonymous, 2021). However, they are manipulating customers by claiming that the synthetic fibres used are recyclable and clean when there is no documented proof or technology to support this claim. Instead, synthetic materials are more harmful to the environment than realised by consumers and brands as they are accountable for over '1.35% of global oil consumption' (Synthetic Anonymous, 2021) and pollute large sums of water due to their build of microplastics and fibres that are released during wash cycles and the production process without notice, 'Microplastics also emerge as a critical blind spot for most brands' (Synthetic Anonymous, 2021). This causes a continuous overshoot of waste

into the environment which means that there is an over production of synthetic and plastic materials that are unintentionally affecting the earth and its surrounding atmosphere, 'To overshoot means to go too far, to go beyond limits accidentally' (Meadows and Randers, 2005, p.1). Synthetic fibres do not only affect the earth, but they are also harmful towards the health of human beings as the microplastics can be easily absorbed by the body's biggest organ, our skin. The fibres are then passed through our system and make their way into more vital organs which can cause serious disturbances to our health, 'research which has found microplastics in placentas, stools and even able to cross the blood-brain barrier' (Synthetic Anonymous, 2021). This is a large concern as fast fashion is ever evolving, causing a decrease in high quality garments that could potentially be lethal for our health. To oppose the damages caused by fast fashion there needs to be an extended focus on using biodegradable and plant-based fibres, such as hemp, organic cotton and bamboo that can be easily decomposed without filling landfill, instead they will nurture the planet by returning biological minerals needed to the ground, 'At one time fabrics were biodegradable and unwanted pieces could be tossed on the ground to decompose' (Braungart and McDonough, 2009, p.42).

Although synthetic fibres are largely responsible for over '20 percent' (Fletcher and Tham, 2019, p.18) of worldwide water pollution, I believe there's also an increasing concern on the impact and hazards that come from the mass use and production of synthetic textile dyes that are also compact with harmful chemicals and toxins, 'Synthetic dyes are silent contributors to ill health' (Flint, 2008, p.15).

Popularising in the 19th century, synthetic dyes came into high demand due to economics and the rapid growth of textile industrialisation which predominantly relies on the mass production of dye pigments at a reasonable price to ensure profit for businesses. The increase in demand has, till the present-day negatively affected and exploited not only the environment but also workers in developing, indigenous and poorer countries, 'Even today many dye workers are still compromised by dangerous conditions' (Flint, 2008, p.15). For example, in India workers are forced to work in compromising conditions such as child labourers who are sent to flowing waters such as rivers and streams to rinse dyed materials without the education of water safety, putting themselves in harm's way whilst polluting surrounding waters and endangering wildlife. This must change. However, before the industrialisation and evolution of fast fashion, society relied on harvesting natural resources throughout the year to create an infinite variety of pigments derived from different elements of nature, 'archaeological finds indicate that dyes from natural resources have been used to colour textiles for at least 6,000 years' (Dean, 1999, p.10), such as flowers, leaves, bark, food waste, roots, clay and soil. The colours captured in the dye bath would vary based off geographical location and the quality of climate, such as temperature. As a surface pattern designer, I aim to reinstate the use of natural dye pigments throughout my future career and practice to encourage an increase in sustainable craft and processes, in a modernized and considered way since naturally derived dyes are not as clean or eco-friendly as they appear to be.

Natural dyes and pigments are a more sustainable alternative to manufactured and synthetic dyes as their ecological footprint is less impactful. The term ecological footprint was made popular by a study ran by Maths Wackernagel for the earth council, it is a well-known term that 'refers to the relation between humanity's demands on the planet and the globes compacity to provide' (Meadows and Randers, 2005, p.3). This means that the harvesting and use of natural pigments and materials has less impact on the environment than resourcing fossil fuels that are used for chemical-based synthetic dyes such as coal extracted from petrochemicals as they are a more renewable and organic source. However, dying techniques using natural pigments rather than man made synthetics often contain mordants, a chemical additive that serves as a bonding agent between coloured pigments and fibres in the dying process to ensure the chosen colour is fully fixed in place whilst being rich in pigment and lasting in tone. Mordants can be moderately harmful or even toxic, especially when consumed and are not easily disposable, 'none of them, except plant extracts, can be easily disposed of' (Flint, 2008, p.26). This means mordants often infect surrounding soil, as synthetic dye molecules are unintentionally dispersed into main water systems during the manufacturing process and wash cycle, causing soil to be saturated with an unwanted build-up of chemicals and are diminished of important nutrients in which are crucial for healthy and efficient germination, 'the use of toxic chemicals as dye adjuncts has unhealthy and ongoing consequences for both the dye practitioner and the environment' (Flint, 2008, p.23). This could negatively affect the Economy overtime if continued to be unresolved, resulting in poisonous toxins transmitting into grown food sources consumed or even depleting the growth of crops entirely which will greatly perturb agricultures future. Examples of toxic mordants include potassium aluminium sulphate, copper sulphates, ferrous sulphates found in iron, stannous chloride derived from tin metals, diluted acids such as vinegar and sodium chloride (salt). To combat the use of harmful mordants when dying fabrics as a textile designer I will actively choose and encourage holistic approaches and materials during the dying process to ensure minimal impact on the earth.

As explained by Jenny Dean in her book, *Wild colour - How to make and use natural dyes*, 1999, natural dyes consist of three different categories: Substantive dyes, Vat dyes and Adjective dyes. The use of both Adjective and Vat dyes heavily relies on mordants as a chemical reactive to successfully secure colour in place. Whilst Substantive dyes are rich in tannins, which are biomolecules found in tree bark, a variety of leaves and fruit grown from trees that binds proteins together resulting in easy fixation of colour and fibres without relying on the aid of other chemical substances, resulting in less environmental impact. To obstruct the use of toxic mordants as a designer, I will actively choose to work with Substantive dyes, however this will cause limitation to the colour, affects, materials and textile fibres used when dying fabrics, therefore I must also focus on an alternative solution to mordants. There are many alternative resources instead of chemicals to form bondage between textile fibres and plant dyes such as sea water, aqueous plant emulsions, compost (food waste), eggs, seethed fruit, and tinned lids which can be used as a dual-purpose of both a mordant and vessel for the dye bath. There are also more traditional alternatives which includes the options of urine, animal manure and blood, however I do not feel these are appropriate or as ethical. Instead, I intend to use soy milk and oil as my designated

mordants by manually crushing and pulverising organically grown soybeans to reduce energy waste and carbon admission, immersing the crushed beans in water, and straining the solution to result in milk. I will then recycle the waste leftover from the strained solution, choosing to use it as a fertiliser for soil as the soybeans plant's roots churn out miniscule nodules that consist of '44 percent' (Flint, 2008, p.93) of protein, resulting in improvement of soil quality by embedding nutrition back into the earth, 'helps to fix nutrition to the ground' (Flint, 2008, p.93). This will improve the penetration, strengthening and growth encouragement of plants and crops whilst increasing their chances of inevitable regrowth.

Dying with natural pigments and materials derived from the earth will enable myself to promote localism as a future designer, which is a crucial component of sustainability as it promotes the use of surrounding resources whilst offering education on our existing environment and encouraging self-sufficiency as a whole community of textile artists, 'localism is recognised as a central tenet of sustainability that will, it is claimed, solve at root many of theoretical and practical problems' (Fletcher and Tham, 2019, p.51). Localism will also enable myself to work with the different seasonal materials offered by the yearly cycle of changes nature endures 'Hues will vary depending on the season' (Flint, 2008, p.26), to create a variety of unique and bespoke colours, tones and textures throughout the year. For example, I will be able to produce deeper, richer and earthier tones in autumn deriving pigments from dried leaves. Whilst more vivid and bright colours are available during the summer period that can be found within the new blossom of flowers and their petals, 'the plant world is rich in sources of colour; which may be extracted from flowers, leaves' (Dean, 1999, 16). Working with seasonal materials and pigments will strongly promote the benefits of storage and harvesting as it will conserve more water and terminate the erosion of soil alongside being economical due to the decrease in consumption and waste, 'the origins of the term 'consumption' are found in the act of wasting, of destroying by its use' (Fletcher and Tham, 2019, pg.60). To reduce my contribution of waste further, I intent to re-use and gather water from unmannered and wild sources such as local streams, rivers and collected rainwater which will then be used in the dyeing vessel/vat. The water will be sterilised during the boiling process to reduce the high risk of unwanted results and disturbances when dying fabric. These disturbances consist of pollutants such as a mixture of dirt carried from the ground during the water cycle. Using the boiled water, I will transfer colour to textile fibres by soaking the fabric in the same bath as my chosen natural forms such as onion peels with the soybean mordant if required by the fabric type, experimenting with a variety of temperatures and lengths of time to create a range of colour hues. Alongside this, I intent to use the bundle dye technique using fresh spices such as cumin and flowers to create organic surface patterns. When dying fabrics, different acids and alkalis are required depending on the PH scale of each materialistic component. To create natural alkalis, I will use ash sourced from dried plants and seeds, cucumbers, courgettes, and pumpkins whilst lemon juice and vinegar will be my delegated alternative solution for acids.

To conclude, I believe that we need to work towards organic solutions to replace and improve synthetic dyes by working cohesively with, instead of against what nature provides for us. We must also aim to work on revoking years of eco-destruction alongside our

involvement in climate change, especially within the fashion and textiles industry as this is an ever-growing contributor to global warming and climate change. As a textile designer I intend to be rawer and more transparent with materials being used in my future craft to avoid the inevitably increasing culture of greenwashing and overlooking of responsibilities society has for our planet's health, holistic living and practices within industry, 'Fashion conserves and restores the environment. It does not deplete precious resources, degrade our soil, pollute our air and water or harm our health' (Fashion Revolution, n.d.).

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