

Sustainable Elegance: The Role of Green Aesthetic in the Fashion Industry

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Abstract

In an era of unprecedented technological change and fast-paced consumerism, we are witnessing a renewed appreciation for nature's beauty, influencing aesthetic paradigms. Although Kantian and Burkean notions of the sublime historically framed nature as separate from human experience, contemporary challenges have led to a different consideration of this relationship. Movements like *Art Nouveau* and *Arts and Crafts* pioneered organic designs in objects, clothes, wallpapers, and upholstery of every kind. Today, climate crisis and the environmental impact of the fashion industry — which ranks as the world's seventh most polluting industry — demand designers to find sustainable solutions, such as the use of innovative biomaterials and natural dyes (derived from plants, insects or minerals), reducing pollution and waste. A green aesthetic represents more than a simple choice of style: it embodies a call for a more responsible future, where beauty is about living in harmony with the environment we live in. This study explores the significant impact that a green(er) aesthetics has on the fashion industry, thus reflecting a broader movement towards sustainability that encompasses sustainable innovations in designs, materials, and communication.

Keywords: Green Aesthetics; Sustainability; Fashion; Biomaterials; Natural Dyes.

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Introduction

In our contemporary world, characterized by unprecedented technological advancements and fast-paced consumerism, we are witnessing a shift towards a renewed appreciation of nature and its beauty, which leads to a growing environmental awareness that is radically reshaping our approach in several fields. One of these fields is that of aesthetics. According to Gioia Laura Iannilli, “the aesthetic intrinsically possesses an environmental feature”.¹ In other words, the ‘aesthetic’ is always embedded in an environment: its perception cannot be isolated from the surrounding context, whether physical, cultural, or theoretical. As evidenced by Iannilli in *Aesthetics of the Environment and Environmental Aesthetics*,² the aesthetic value can act as a determining factor in orienting our choices and behaviors in a twofold manner. On the one hand, it can be a guiding principle towards sustainability: many scholars — such as Yuriko Saito³ or Sheila Lintott⁴ — have demonstrated that “green, eco-friendly, eco, or ecological aesthetics” are more aesthetically pleasing for some people, leading them to opt for the protection of environments through eco-friendly choices, such as sustainable fashion for instance. On the other hand, however, according to authors such as Saito,⁵ this same idea of “aesthetical pleasantness” could lead to the opposite result: the “aesthetics of consuming” or “consumer aesthetics” has indeed the potential to accelerate the already-existing global environmental crisis, as it may encourage a disposable consumer culture. Nonetheless, nature — whether in terms of its preservation or its destruction — remains a key focus in current discussions surrounding aesthetics, leading to the emergence of “environmental aesthetics,” which has profoundly influenced several artistic fields, including that of fashion. The fashion industry has always been receptive to cultural and social developments: a growing attention to environmental issues, therefore, could only be the most natural response for an industry that attentively follows trends and consumer demands.

In light of these discussions and amid growing political challenges to environmental policies — especially in the U.S. under the Trump administration, which is responsible, among other actions, for the rollback of several environmental regulations and the withdrawal of the country from the Paris Agreement, which aimed to reduce global warming by regulating carbon-dioxide emissions, as well as the heavier exploitation of the nation’s timber resources⁶ — my paper will explore the significant impact that green aesthetics has on the fashion industry, examining the various ways in which elements of nature are increasingly being integrated into fashion products and communication, thus reflecting a broader movement towards sustainability. Despite the ever-changing nature of cultural and political landscapes, the fashion industry’s efforts to implement a green(er) aesthetic demonstrate its commitment to aligning beauty with a conscious ecological responsibility. Furthermore, I will consider the movement’s connection with consumers’ growing demand for ethical choices that can have a positive impact on the environment. By analyzing this intersection of fashion and environmental aesthetics, therefore, my paper aims to prove that green aesthetics represents way more than just a style preference for people: it embodies, indeed, a call for a more responsible future, where beauty is about living in harmony with the environment we live in.

1. Gioia Laura Iannilli, “Aesthetics of the Environment and Environmental Aesthetics,” *Aesthetica Preprint*, no. 114 (2020): 7–34.
2. Iannilli, 8.
3. Yuriko Saito, *Everyday Aesthetics* (Oxford: Oxford University Press, 2007).
4. Sheila Lintott, “Toward Eco-Friendly Aesthetics,” *Environmental Ethics*, Vol. 28, no. 1 (2006): 57–76.
5. Yuriko Saito, “Consumer Aesthetics and Environmental Ethics: Problems and Possibilities,” *The Journal of Aesthetics and Art Criticism*, Vol. 76, no. 4 (2018): 429–439.
6. Simone Shah, “Here Are All of Trump’s Major Moves to Dismantle Climate Action,” *Time*, accessed 5 March, 2025, <https://time.com/7258269/trump-climate-policies-executive-orders/>.

Environmental Aesthetics: A Natural Definition of Beauty

Arisen around the end of the twentieth century, environmental aesthetics emerged as a reaction to an increasing attention towards the environment in the age of the Anthropocene, characterized by a significant human impact on Earth.⁷ However, while environmental aesthetics is a relatively new field that deals with contemporary ecological concerns, the aesthetic appreciation of nature has long been embedded in cultural and artistic practices, as evidenced by the persistent fascination with natural motifs in past centuries. Floral and botanical imagery in art has, in fact, a secular history which flourishes prominently during the fifteenth and sixteenth centuries when artists became more interested in the realistic portrayal of the world around them. Yet, far from being mere decorations, flowers and plants also carried profound symbolical meanings, often serving as metaphors for virtues, vices, and human emotions. This symbolism is deeply rooted in ancient Greek and Roman mythology, where countless tales — like the story of Daphne, who morphed into a laurel tree to escape Apollo's relentless pursuit of her love, or Narcissus becoming the flower that bears his name because of his self-obsession — depict humans transformed into plants.⁸

Figures of flowers, plants, and natural elements became fashionable at the end of the nineteenth and the beginning of the twentieth century, as nature's various forms of beauty were being increasingly recognized by different scholars who tried to understand the reasons for its appeal.⁹ Nature is the epitome of the non-human, the other that ubiquitously surrounds the human, who has, in turn, historically emphasized its difference from it by constantly underlining the dichotomy between the natural and the artificial, that is between what is given and what is created. As noted by Iannilli, indeed,

the environmental tension between naturality and artificiality is something that intrinsically pertains to human experience, especially when the “difference” between “non-natural breaks” and “natural operative flows” becomes as blurred as it is today, namely, [...] when it involves experiential wholes in which we are immersed.¹⁰

Three are the aesthetic dimensions through which nature can be appreciated: the *beautiful*, the *sublime*, and the *picturesque*.¹¹ The idea of the beautiful encompasses a harmonious balance of form, color, and proportion evoking feelings of calm and admiration. It essentially refers to the parts of nature that — through their pleasing aesthetics — are capable of inspiring peace and serenity. A certain sense of perfection is thus invoked, reminding us of the interconnectedness and harmony of all things, both living and non-living. On the contrary, the sublime — as intended by Immanuel Kant and Edmund Burke in the eighteenth century — is what stems from the perception of nature as something radically different from the human: “a feeling of negative pleasure which mixes fear with delight.”¹² Humans recognize the sublime threats posed by nature, while also being inevitably attracted by its charm. Lastly, the picturesque is what stands in the middle ground between the beautiful and the sublime, as it refers to aspects of nature that are neither pleasing nor terrifying, but “complex and eccentric, varied and irregular, rich and forceful, and vibrant with energy.”¹³ As Allen Carlson points out, the term “picturesque” literally means “picture-like,” and it refers to scenes that evoke the aesthetic of a work of art.¹⁴ Therefore, it is no coincidence that, in the eighteenth century, nature's masterpieces were the protagonists or the

7. Glenn Parsons and Allen Carlson, “Environmental Aesthetics,” *The Stanford Encyclopedia of Philosophy* (Fall 2024 Edition), accessed February 17, 2025, <https://plato.stanford.edu/archives/fall2024/entries/environmental-aesthetics/>.

8. Jennifer Meagher, “Botanical Imagery in European Painting,” *The Metropolitan Museum Journal* (2007), accessed February 17, 2025, <https://www.metmuseum.org/it/essays/botanical-imagery-in-european-painting>.

9. Parsons and Carlson, “Environmental Aesthetics”.

10. Iannilli, “Aesthetics of the Environment and Environmental Aesthetics”, 10.

11. Allen Carlson, “Environmental Aesthetics,” *The Stanford Encyclopedia of Philosophy* (Fall 2020 Edition), accessed February 17, 2025, <https://plato.stanford.edu/archives/fall2020/entries/environmental-aesthetics/>.

12. Joanna Zylińska, *On Spiders, Cyborgs and Being Scared: The Feminine and the Sublime* (Manchester: Manchester University Press, 2001), 1.

13. Carlson, “Environmental Aesthetics”.

14. Carlson.

symbolical backgrounds of many artistic productions: painters, poets, and philosophers alike turned their attention to the grandeur and unpredictability of natural landscapes. Among the most significant artists to embrace this shift was Caspar David Friedrich, whose compositions masterfully captured “a potent and overawing, a beautiful, but at times also frightening, natural world.”¹⁵ In European art, a significant transformation was indeed on the way, reflecting a deep cultural change in the perception and representation of nature. The rigid and ornamental patterns of earlier artistic traditions — what Jack Goody defines as “stereotyped foliage chains” — were progressively replaced by more organic and realistic depictions of nature.¹⁶

At the end of the nineteenth century, with the rise of the *Arts and Crafts Movement* and *Art Nouveau*, natural elements once again became a source of fascination for several artists, who were thus inspired to incorporate organic motifs into architectural objects. This renewed interest led to the creation of garments, railings, balcony parapets, and entrance doors adorned with intricate floral and botanical patterns.

The *Arts and Crafts Movement* represented a strong reaction against the mass-produced art generated by the industrialization, favoring instead the use of traditional craftsmanship and manual work.¹⁷ In order to understand this movement, it is necessary to look at the socio-political and environmental atmosphere surrounding the Victorian Age in England. During that period, the Industrial Revolution led to the mechanized mass production of decorative, ornate items that many considered none other than cheap imitations of the well-made goods traditionally produced by skilled artisans. To the elite members of society those machine-made products lacked the authenticity and artistry of their handcrafted counterparts. However, the criticism against industrialization was not merely ideological, but it also highlighted environmental concerns. The increasing consumption of coal, in fact, worsened already-existing issues such as respiratory illnesses and infections, as the thick black smog produced by the multiplying factories invaded the urban areas.¹⁸ The *Arts and Crafts Movement*, therefore, emerged as a response to what was happening in the industrialized world, one that was meant to protest against the negative consequences of industrialization and prevent the collapse of human society from multiple perspectives. John Ruskin was a pioneering figure in the movement, as he completely rejected the use of machines in art and design, believing instead that traditional handwork and craftsmanship were essential to preserve artistic integrity.¹⁹ In his influential work, *The Lamp of Beauty*, Ruskin emphasizes the centrality of natural motifs in architecture, asserting that “all most lovely forms and thoughts are directly taken from natural objects and forms which are not taken from natural objects must be ugly.”²⁰ However, the true father of the *Arts and Crafts Movement* in England — and, by extension, in the United States — is believed to be William Morris, a textile designer who passionately advocated for a return to traditional handcrafting techniques as opposed to the mechanized processes employed by the industrialized society. Morris was deeply influenced by John Ruskin’s writings, as well as by nature and its beauty.²¹ For instance, the interiors of Kelmscott Manor — Morris’ beloved residence, located in the idyllic countryside of Oxfordshire, and safe retreat from the industrialized world he criticized — were a perfect embodiment of Morris’ philosophy and artistic ideals: the rooms were in fact adorned with textiles and wallpapers that featured intricate floral and botanical patterns inspired by nature, while the furniture was handmade with natural materials such as wood, whose warm, earthy tones mirrored the

15. Richard Warren, “Caspar David Friedrich, Ancient Rome and the Freiheitskrieg,” *Open Cultural Studies*, Vol. 1, no. 1 (2017): 66–74.

16. Jack Goody, *The Culture of Flowers* (Cambridge: Cambridge University Press, 1993), 171.

17. Katherine Gleason, *Alexander McQueen: Evolution* (New York: Race Point Publishing, 2012), 61.

18. Sjur Kasa, “Industrial Revolutions and Environmental Problems,” in *Confluence: Interdisciplinary Communications*, edited by W. Ostreng (Oslo: Centre for Advanced Study at the Norwegian Academy of Science and Letters, 2008), 70.

19. Rosalind Blakesley, *The Arts and Crafts Movement* (New York: Phaidon Press, 2006), 22.

20. John Ruskin, *The Lamp of Beauty* (New York: Phaidon Press, 1995), 195.

21. Chester N. Scoville, “Pastoralia and Perfectibility in William Morris and J.R.R. Tolkien,” in *Tolkien’s Modern Middle Ages*, edited by Jane Chance and Alfred Siewers (New York: Palgrave Macmillan, 2005), 93–103.

natural beauty of the gardens that surrounded the manor.²²

Significantly influenced by the *Arts and Crafts Movement* — together with the evocative imagery of the French *Symbolism* — *Art Nouveau* emerged in the 1890s as a dynamic and eclectic style, bound to triumph as the artistic movement of the century.²³ While *Arts and Crafts* revived handcrafted artistry as a reaction against the dehumanizing effects of industrialization, the “new art” embraced instead modernity and innovation, blending the organic beauty of nature with the dynamism of the emerging industrial age. *Art Nouveau* sought to create a new artistic language that could resonate with the modern world: as a result, it was able to transcend national boundaries, evolving into an international style that fully reflected the aspirations and changing sensibilities of the time. Although the movement took on distinct characteristics in different cities — Chicago, New York, Glasgow, Brussels, Vienna, Munich, Barcelona, Helsinki, Prague, Paris, among others —, each regional interpretation maintained some common principles.²⁴ Firstly, by rejecting the rigid historicism of the academic styles of the nineteenth century, *Art Nouveau* emphasized modernity and — just like its predecessor, the *Arts and Crafts* — manual craftsmanship. Secondly, its foremost source of inspiration was nature and its organic shapes with flowing vines, beautiful and elegant flowers, and curving lines appearing frequently in most of the designs. This affinity for natural elements was expressed prominently through the intricate and sinuous motifs that could be seen in a plethora of different artistic manifestations, from architecture and furniture to decorative objects and glasswork. Nature was, in fact, way more than a simple repertoire of shapes and patterns: it was “a model for transformation and metamorphosis.”²⁵ Of great interest was nature’s evolution. It is no coincidence that the first illustrated edition — the sixth one in total — of Charles Darwin’s *Origin of Species* gained a wider audience among artists of every kind, who turned to the natural world to find new shapes to inspire their artistic creations.²⁶

Nowadays, these same designs took up a new allure to decorate objects, clothes, wallpapers, and upholstery of every kind. A significant example, in this sense, is the set of prosthetic legs designed by Alexander McQueen for the American paralympic athlete Aimee Mullins, who opened McQueen’s show for their Spring/Summer 1999 collection, called *No. 13*.²⁷ The whole collection was inspired by the *Arts and Crafts Movement*, presenting various pieces adorned with natural designs, organic forms and textures. In particular, the cherry wood prosthetic legs were designed in collaboration with Dorset Orthopedic Company, and were hand-carved with floral motifs, in perfect *Arts and Crafts* aesthetics.²⁸ This fusion of traditional craftsmanship and modern innovation represents more than just a stylistic choice operated by McQueen: it is in fact a profound statement about the ever-lasting relevance of artisanal techniques in a highly technological world, blurring the boundaries between past and present, natural and artificial. This approach celebrates the beauty and elegance of natural forms, transforming simple everyday objects into veritable works of art. McQueen’s blending of old and new in Mullins’s prosthetic limbs contributed to elevate them from mere medical devices to powerful symbols of individuality and creativity, demonstrating how historical design movements can be reimagined today to address modern sensibilities. In doing so, they remind us that a deep and pure connection to nature remains as vital in the modern age as it was over a century ago, as many of the same challenges persist, though with greater complexity and force.

Yet, after a period of remarkable flourishing, the artistic and philosophical interest in nature went quickly into decline, as the latest developments in natural sciences began to outline various conceptions of na-

22. Blakesley, *Arts and Crafts Movement*, 42.

23. National Gallery of Art, *Art Nouveau* (New York, 2000).

24. National Gallery of Art.

25. National Gallery of Art.

26. National Gallery of Art.

27. Andrew Wilson, *Alexander McQueen: Blood Beneath the Skin* (London: Simon & Schuster, 2015), 228.

28. Wilson, 228.

ture.²⁹ In particular, as pointed out by Allen Carlson, the geographical work of George Perkins Marsh³⁰ had a fundamental role in demonstrating that humanity was progressively causing nature's destruction.³¹ This idea was further developed in the twentieth century, when scientists' formal acknowledgement of the damage caused by humans on Earth led to the emergence of different environmental movements, which has influenced several fields of research, including that of aesthetics.³² Thus, the twentieth and twenty-first centuries are marked by an increased interest in nature, one that is specifically concerned about its purity and survival in an age of climate change and biodiversity loss caused by human's interference. As reported by Carlson, while environmental aesthetics initially focused exclusively on natural environments, its scope has expanded in recent years to encompass both human and human-influenced environments.³³ Particular attention is given to various activities that are exclusively human. Carlson highlights, for instance, food, sports, and the appreciation of the human body.³⁴ However, I would also include fashion in this list: closely tied to the appreciation of the human body, it undeniably constitutes a kind of aesthetic practice that specifically characterizes humanity and its profound influence on the planet. If we consider that the fashion industry — the seventh-largest economy in the world — is intrinsically characterized by overconsumption, overproduction, waste, and pollution, this influence becomes strikingly evident.³⁵ Therefore, now more than ever, the question of environmentalism and sustainability in this field has come to the fore, making it a critical area of concern of the twenty-first century.

As highlighted by Mohamed Akli Achabou and Sihem Dekhili, the global economy as a whole is entering what can be described as its ethical era. This shift is particularly clear now in the fashion industry: an increasing number of fashion houses are in fact engaging with Corporate Social Responsibility (CSR), reflecting a growing awareness of their impact on Earth.³⁶ Even though fashion historically paid little to no attention to the environment, always prioritizing aesthetics and profit over sustainability, the contemporary challenges we are facing — such as climate change, lack of resources, and increasing consumer demand for ethical practices — have placed an unprecedented pressure on brands, which now must implement new strategies to face these issues and respond to the consumers' higher demand for eco-friendly approaches. As a result, many brands have intensified their efforts to adopt greener resources and more sustainable technologies, signaling an ongoing transformation within the fashion industry.

Indeed, the shift towards sustainability has paved the way for innovative approaches in fashion design and garment creation. These practices demonstrate the fashion industry's capability to evolve in order to meet the demands of a more environmentally conscious world. By embracing innovative materials and practices, brands are not only mitigating their impact on the environment, but they are also redefining the relationship between fashion and nature. For instance, the employment of biomaterials — such as algae-based fabrics or mushroom leather — has gained traction as a clever way to reduce the industry's reliance on synthetic, and thus polluting, materials. Similarly, the use of natural dyes, which are less harmful to the environment, has offered several forward-thinking brands a non-polluting alternative to chemical ones in order to create eco-friendly pieces.

29. Carlson, "Environmental Aesthetics".

30. George Perkins Marsh, *Man and Nature; or Physical Geography as Modified by Human Action* (New York: Charles Scribner, 1865).

31. Carlson, "Environmental Aesthetics".

32. Carlson.

33. Carlson.

34. Carlson.

35. Anneke Smelik, "A Posthuman Turn in Fashion," in *Routledge Companion to Fashion Studies*, edited by Veronica Manlow, Eugenia Paulicelli and Elizabeth Wissinger (New York: Routledge, 2021), 57–64.

36. Mohamed Akli Achabou and Sihem Dekhili, "Luxury and Sustainable Development: Is There a Match?," *Journal of Business Research*, Vol. 66, no. 10 (2013): 1896–1903.

Biomaterials and Natural Dyes: Paving the Way for Sustainable Textiles

Biomaterials, also known as biobased materials, have been developed as an effort to deal with the negative consequences that traditional materials (i.e. synthetic fibers derived from fossil fuels such as polyester, acrylic, or nylon) have had — and continue to have — on the environment. Textile manufacturing is actually one of the world's most environmentally damaging industries, due to its heavy reliance on harmful chemicals and its massive energy usage. At the time of their development, biomaterials were employed in medical applications, for example to replace or support human organs and bone tissues, owing to their biocompatibility properties that rendered them particularly suitable for these purposes.³⁷ Today, however, they are increasingly being employed in other fields — such as fashion, automotive, and home goods — as eco-friendly alternatives to conventional materials, since more and more sectors are beginning to move away from fossil fuel-based resources and to embrace a more sustainable and ecological approach. Synthetic materials are indeed significantly damaging to the Earth: firstly, their extraction and processing cause the release of large amounts of greenhouse gases, contributing to climate change; secondly, both their production and disposal often result in toxic waste and microplastics that contaminate terrestrial, freshwater, and marine ecosystems, irreparably harming wildlife;³⁸ and finally, they persist in the environment for centuries, causing long-term damage. A transition to sustainable alternatives thus represents an effort to limit these negative effects and protect the planet. Biomaterials encompass a wide range of materials that have a biological association.³⁹ They are either partially or entirely derived from plants, trees, or animals and they include both everyday materials, such as cotton or linen, and unusual ones, such as “leathers” made from fruit or green waste. The website *Fashion for Good* extensively explains the difference between biosynthetic materials and biofabricated or biomanufactured ones: the former labels materials that are either made “via (catalytic) conversion of biological resources (like biomass) or created in fermentation processes utilizing living organisms (biosynthesis),” while the latter indicates materials that are “crafted by living cells or microorganisms like bacteria, yeast, and mycelium.”⁴⁰ Within the biofabricated or biomanufactured ones, an interesting subcategory is represented by bioassembled materials, whose defining feature is that “the whole macroscale structure has been grown directly by the living microorganism.”⁴¹ One notable example of a biosynthetic material is Pinatex®, cited by Pedro Ferreira, Arlete Apolinário, and Gabriela Forman in their paper *Optimizing Textile Biomaterial Selection for Sustainable Product and Circular Design: Practical Guidelines for a Greener Future*.⁴² Derived from pineapple leaf fibers, a natural byproduct of agriculture, and blended with PLA (i.e. polylactic acid derived from corn sugar), Pinatex® is an example of a material that combines bio-based resources with synthetic ones. Its unique properties — such as high density, tensile strength, stiffness, good thermal stability, and high cellulose content — make Pinatex® an ideal material for the fashion industry, as it is particularly suited for textile applications.⁴³ Biosteel Fiber is another fascinating biomaterial: classified as biofabricated or biomanufactured, it was developed in 2015 by *AMSilk Fiber* through bioengineering and synthetic biology.⁴⁴ As reported by Patrizia D’Olivo and Elvin Karana, this silk fiber is a “bionic composite material that is strong, elastic, and lightweight, re-

37. Eva Pellicer et al., “Advances in Applications of Industrial Biomaterials,” in *Advances in Applications of Industrial Biomaterials* (Cham: Springer International, 2017); Paolo Tranquilli Leali and Antonio Merolli, *Fundamentals of Biomaterials* (Berlin: Biomaterials Handbook, 2009).

38. Material Innovation Initiative, “Impact of Synthetic Materials on Animals,” accessed February 17, 2025, <https://materialinnovation.org/reports/>.

39. Fashion for Good, “What Are Biomaterials?,” accessed February 17, 2025, https://www.fashionforgood.com/our_news/what-are-biomaterials/.

40. Fashion for Good.

41. Fashion for Good.

42. Pedro Ferreira, Arlete Apolinário and Gabriela Forman, “Optimising Textile Biomaterial Selection for Sustainable Product and Circular Design: Practical Guidelines for a Greener Future,” *Materials Circular Economy*, Vol. 5 (2023): 1–19.

43. Ferreira et al., 14.

44. Ferreira et al., 14.

sistant, non-immunogenic, non-inflammatory, non-toxic, biocompatible and extremely skin-friendly, vegan, 100% biodegradable and with perfect moisture management and odour control.”⁴⁵ All these characteristics make Biosteel Fiber a durable, comfortable, and flexible material that can easily be employed in sports footwear, clothing, aerospace, automotive, and textiles.⁴⁶ An interesting startup that operates in the field of biomaterials is Algiknit, a firm who has developed bioyarn from kelp, a seaweed that grows easily without the use of fertilizers. This bioyarn can be employed to replace polyester and other materials used in the fashion industry that pollute the environment.⁴⁷ In the past few years, an increasing number of fashion brands are investing in biomaterials in order to make their production more sustainable. In this regard, for example, in 2021 the German brand Adidas has obtained exclusive access to *Mylo* — a mushroom-based material created by the *Bolt Threads* company — to create sustainable versions of some of its most famous sneakers.⁴⁸ Adidas’ goal is that of completely eliminating plastic from its apparel, by only using eco-friendly materials, and it is on the right path to achieve it: in 2023, in fact, 99% of all the polyester used by the brand was entirely recycled.⁴⁹ When considering biomaterials, however, it is fundamental to identify the specific properties of each material: as highlighted by Ferreira, Apolinário, and Forman, they may not always have a low environmental impact.⁵⁰ For instance, it is possible to distinguish between materials that are bio-based but not biodegradable, and materials that are both bio-based and biodegradable. The authors — drawing on Van Den Oever et al.⁵¹ and Egan and Salmon⁵² — explain that while “bio-based indicates the biological origin of the material and has nothing to do with whether the material is biodegradable, [...] biodegradable refers to the specific property of the material to be biodegradable.”⁵³ Chen et al.,⁵⁴ for instance, show that the carbon footprint of a Bio-PET bottle containing TA (i.e. terephthalic acid) derived from forest residues may be comparable to that of a PET bottle with TA made from fossil-based sources. Furthermore, despite Bio-PET containing 20-30% biological content, it is not biodegradable. This limits considerably its potential as a sustainable alternative to traditional materials.⁵⁵ What these findings demonstrate is that the study of biomaterials is a highly complex one, as their environmental impact cannot always be considered as entirely positive. While biomaterials certainly offer promising alternatives to conventional, fossil-based materials, their sustainability depends on various factors that cannot be ignored. Nonetheless, it is crucial to increase research and innovation in this field in order to address these limitations and develop more eco-friendly solutions.

Another key trend in the modern fashion landscape is the use of natural dyes. By doing so, designers have the opportunity to minimize the environmental impact of synthetic chemicals. Discovered in 1856, synthetic dyes revolutionized the long-standing reliance on natural dyes which had been the sole option for coloring fabrics for over four millennia. Since around 2600BC, people have used various natural pigments mixed with oil as dyes, but advancements in synthetic chemistry were destined to transform

45. Patrizia D’Olivo and Elvin Karana, “Materials Framing: A Case Study of Biodesign Companies’ Web Communications,” *She Ji: The Journal of Design, Economics and Innovation*, Vol 7, no. 3 (2021): 403–434.

46. AMSilk, “Bridging performance and nature,” accessed February 17, 2025, <https://www.amsilk.com/industries/fiber/>.

47. Teo Sandigliano, “ALGIKNIT, Algae-Derived Textile Materials,” *WeVux*, accessed February 17, 2025, <https://wevux.com/algiknit/>.

48. Paola Montanaro, “Adidas, le nuove sneakers ‘Mylo’ sono fatte con i funghi,” *GQ Italia*, accessed February 17, 2025, <https://www.gqitalia.it/moda/article/adidas-sneakers-funghi-mylo>.

49. Adidas, “Adidas annual report 2023. 2023.” Accessed February 17, 2025, <https://report.adidas-group.com/2023/en/group-management-report-our-company/sustainability/environmental-impacts.html>.

50. Ferreira et al., “Optimising Textile Biomaterial Selection”, 14.

51. Martien Van den Oever et al., *Bio-based and biodegradable plastics — facts and figures*, (Wageningen: Wageningen Food & Biobased Research, 2017).

52. Jeannie Egan and Sonja Salmon, “Strategies and progress in synthetic textile fiber biodegradability,” *SN Applied Sciences*, Vol. 4, no. 1 (2021): 22.

53. Ferreira et al., “Optimising Textile Biomaterial Selection”, 14.

54. Luyi Chen, Riley E. O. Pelton and Timothy M. Smith, “Comparative Life Cycle Assessment of Fossil and Bio-based Polyethylene Terephthalate (PET) Bottles,” *Journal of Cleaner Production*, Vol. 137 (2016): 667–676.

55. Ferreira et al., “Optimising Textile Biomaterial Selection”.

the industry forever, as they made dyeing fabrics easier, more cost effective, other than expanding color options like never before.⁵⁶ However, while natural dyes are non-toxic, non-allergic, and eco-friendly, synthetic dyes pose significant risks both to the environment and human health. That is why natural dyes have become an interesting ecological alternative, as they can be extracted from a wide variety of substances found in nature: from plants to insects, microbes, fruit, and minerals, there are endless sustainable possibilities.⁵⁷

Natural dyes can be categorized according to different characteristics, which are summarized by Debnath et al.⁵⁸ as follows. The most widely used classification system is based on their chemical structure, as different colors correspond to distinct chemical groups. Among these, the *indigoids* — known for producing blue hues — stand out as particularly significant, having been used by human civilizations for the longest period of time. Natural dyes can also be distinguished according to their origin or production sources and can then be grouped into five categories: plant or vegetable, animal, insect, mineral, and waste dyes. The aforementioned *indigoids* are plant-derived dyes, as indigo is extracted from various types of plants containing a substance called indican (1H-indol-3yl b-D-glucoside), which produces the distinctive blue hue.⁵⁹ *Turmeric* is another plant-derived dye, as it is obtained from the root of *Curcuma Longa*, (i.e. the turmeric plant), which gives off a yellow hue. Given its medicinal properties, it is considered safe and poses no health hazards.⁶⁰ The second group is that of animal-derived dyes. They primarily come from insects, which are particularly known for producing a distinctive red hue. *Cochineal*, for instance, is extracted from the dried-out bodies of female *Dactylopius coccus* red bugs. Historically, cochineal was employed by the Aztecs as well as the Spaniards in Central and South America, especially in regions such as Mexico and Brazil.⁶¹ *Tyrian Purple* can instead be obtained from sea snails of the Muricidae family, found in the Levantine Sea. This dye is exceptionally costly due to the vast quantity of mollusks required to obtain just one gram of color.⁶² Mineral dyes derive from inorganic metal salts and metal oxides. Among the most well-known is probably *Red Ochre*, a naturally occurring earth pigment that has been widely used throughout history. For instance, monks traditionally used it to dye their robes, and it has also been employed in paintings and murals.⁶³ Another significant earth pigment is *Raw Sienna*, which, like ochre, was used in prehistoric cave art. It consists of iron oxide and manganese oxide.⁶⁴ As the demand for natural dyes continues to rise in a world where natural resources such as plants and animals are becoming scarcer, science has pioneered innovative ways to extract dyes. These methods now employ microbial sources, like fungi and bacteria, as well as waste material. *Bacillus* is an example of a “pigment-producing gram-positive bacterium” that can generate a wide range of pigments, including yellow, brown, orange, and pink.⁶⁵ Waste, on the other hand, can come from different sources, such as agriculture (e.g. pumpkin skin, mango leaves, almond shells, peanut skin, and bananas), forestry (e.g. tamarind seeds, walnut shells, jack fruit tree, and eucalyptus), and industry (e.g. plant waste

56. Biplob Debnath et al. “Natural Dyes: Its Origin, Categories and Application on Textile Fabrics in Brief,” *European Chemical Bulletin*, Vol. 12, no. 8 (2023): 9780–9802.

57. Sara Kadolph, “Natural Dyes: A Traditional Craft Experiencing New Attention,” *The Delta Kappa Gamma Bulletin* (2008), 14.

58. Debnath et al., “Natural Dyes”.

59. Paulina Garcia-Macias and Philip John, “Agricultural and Food Chemistry,” *Journal of Agricultural and Food Chemistry*, Vol. 52, no. 26 (2004): 7891–7896.

60. Khan, Shafat Ahmad Khan et al., “Antimicrobial activity of wool yarn dyed with Rheum emodi L. (Indian Rhubarb),” *Dyes and Pigments*, Vol. 95, no. 2 (2012): 206–214.

61. Ana Serrano et al., “Analysis of Natural Red Dyes (Cochineal) in Textiles of Historical Importance Using HPLC and Multivariate Data Analysis,” *Analytical and Bioanalytical Chemistry*, Vol. 401, no. 2 (2011): 735–743.

62. Zvi C. Koren, “The First Optimal All-Murex All-Natural Purple Dyeing in the Eastern Mediterranean in a Millennium and a Half,” *Dyes in History and Archaeology*, Vol. 20 (2005): 136–149.

63. Debnath et al., “Natural Dyes”, 15.

64. Debnath et al., 15.

65. Vinod K. Joshi et al., “Microbial pigments,” *Indian Journal of Biotechnology*, Vol. 2 (2003): 362–369.

from the food and beverage sector), and it represents a valuable source of natural dyes.⁶⁶ Biomaterials and natural dyes have thus emerged as valuable innovations for the fashion industry. Together, they represent an important effort to reduce the environmental footprint of one of the world's most polluting industries. As we have seen in the previous sections, biomaterials offer eco-friendly alternatives to traditional, resource-intensive, and non-biodegradable fabrics. Natural dyes provide, instead, a sustainable and eco-conscious alternative to the harmful synthetic dyes that the textile industry traditionally uses. This makes them not only environmentally friendly but also, and most importantly, biodegradable, reducing their impact on both ecosystems and human health. However, they have yet to gain full acceptance in the global market, primarily because of their higher production costs and a more limited color palette. Nonetheless, both biomaterials and natural dyes hold a significant potential for transforming the fashion industry, paving the way for a new era of innovation, one where fashion fully harmonizes with nature.

Green Aesthetics and the New Media

In an era that is increasingly defined by environmental awareness, the concept of green aesthetics has transcended its visual roots to become a powerful cultural and ideological force. This shift can be seen both in digital media and literature, where the narratives around eco-friendly lifestyles are flourishing and gaining unprecedented popularity. From elegant fashion magazines to digital platforms, in fact, the media plays a pivotal role in the environmental movement, as it actively shapes public awareness and is a driving force for cultural change. Environmental issues have become a pressing concern for people across the globe — from experts to non-experts — and this has contributed to shed light on the substantial environmental damage caused in particular by the fashion industry, which is characterized by overconsumption and overproduction, other than waste and pollution. As a result, consumers have come to recognize the consequences of these harmful practices and the urgent need for sustainable solutions. In response, fashion brands are being pushed to adopt more environmentally friendly practices, driven not only by their own ethical considerations but also by the need to align with the changing values of a public who, today, is more and more committed to the preservation of the environment. In the digital age, social media has emerged as a powerful tool to shape consumer behavior, influencing not only purchasing decisions but also attitudes and personal values.⁶⁷ Over the years, platforms like Instagram, TikTok, and YouTube have transformed into stimulating spaces for creating content, sharing ideas, expressing opinion, and disseminating information. Among the key players in this dynamic landscape are celebrities and influencers, whose reach, credibility, and allure make them crucial in driving new trends and promoting the adoption of sustainable practices. These figures can advocate for environmental awareness and encourage eco-friendly behaviors, effectively shaping the public opinion and consumer habits of their — sometimes millions — of followers. This is particularly significant if we consider that social media has become nowadays one of the most trusted sources of information about new trends, products, and lifestyles.⁶⁸ The influence that social media have on consumers extends far beyond mere product promotion: it has the capability to foster a sense of community and collective responsibility. For instance, viral campaigns and challenges centered on sustainability have sparked international conversations and inspired profound change among online communities. The #WhoMadeMyClothes challenge, for example, is a global movement founded by Carry Sommers and Orsola de Castro after the 2013 Rana Plaza factory collapse in Bangladesh.⁶⁹ This disastrous event was responsible for killing

66. Thomas Bechtold, Amalid Mahmud-Ali and Rita Mussak, "Anthocyanin dyes extracted from grape pomace for the purpose of textile dyeing," *Journal of the Science of Food and Agriculture* (2007): 2589–2595.

67. Mangold W. Glynn and David J. Faulds, "Social Media: The New Hybrid Element of the Promotion Mix," *Business Horizons*, Vol. 52 no. 4 (2009): 357–365.

68. Kaman Lee, "Opportunities for green marketing: Young consumers," *Marketing Intelligence & Planning*, Vol. 26 (2008): 573–586.

69. "Who made my clothes?", Fashion Revolution Italia, accessed February 17, 2025, <https://italy.fashionrevolution.org/it/about/>.

over a thousand garment workers and leaving a thousand more injured.⁷⁰ The initiative thus encourages consumers to ask brands about the origins of their clothing, demanding greater transparency in the fashion supply chain by pushing companies to disclose information about the factories and workers involved in production.⁷¹ In doing so, the #WhoMadeMyClothes challenge promotes more ethical practices and accountability. For example, in 2019, one of the major fast-fashion retailers, H&M, embraced the movement as part of its sustainability efforts, making a significant step towards transparency. The brand began sharing detailed information about its supply chain, allowing customers to access production details directly on the website. By clicking on the “Product Sustainability” tab next to an item, in fact, the users can discover details regarding its production country (or countries), the name of the manufacturing company (or companies), and the materials used, along with an in-depth analysis of the environmental impact of each fabric. For in-store purchases, instead, the same information can be accessed by simply scanning the price tag through the H&M app.⁷² Even though some critics argue that this initiative alone is not enough and more needs to be done to address the impact of fast fashion on both the environment and society, H&M’s engagement with the challenge highlights the growing pressure on companies to adopt ethical practices and meet consumer demands. The visual, interactive nature of social media platforms thus allows for an effective dissemination of a green(er) aesthetics, making sustainability a visually appealing and aspirational lifestyle.⁷³ As a result, social media has become a catalyst for transforming consumer culture, bridging the gap between awareness and action, and empowering individuals to make more environmentally conscious choices. Rebeka-Anna Pop, Zsusa Saplacan, and Mónica-Anetta Alt highlight that the attitude towards green products on social media is influenced by a variety of factors. In order to analyze consumer behavior in this context, the authors draw on the Theory of Planned Behavior (TPB), which is “a widely used socio-cognitive model aimed at explaining the variance of voluntary behavior.”⁷⁴ At the core of the model is the attempt to understand the motivation to carry out a specific behavior, known as intention.⁷⁵ According to the TPB, intention is shaped by three main factors: attitude, subjective norms, and perceived behavioral control. The first factor, that is *attitude*, refers to whether a person has a positive or negative opinion about a particular behavior. *Subjective norms* involve instead social pressure or the influence of others.⁷⁶ Finally, *perceived behavioral control* is about the perceived level of difficulty or simplicity of a particular behavior. When it comes to consumers’ attitude, purchases are often driven not so much by personal needs but by the desire to fulfill social functions, such as influencing societal perceptions, building and maintaining relationships, or enhancing social status. As noted by Pop, Saplacan, and Alt, this extends to the purchase of green products, which consumers often buy to publicly demonstrate their environmental consciousness.⁷⁷ Altruistic and egoistic motivations are also determining factors in shaping consumers’ online behaviors and emotions. Environmental concern is often rooted in altruistic values, reflecting a genuine desire to protect the natural environment without expecting any personal gain.⁷⁸ In contrast, egoistic values

70. “Rana Plaza”, Clean Clothes Campaign, accessed February 17, 2025, <https://cleanclothes.org/campaigns/past/rana-plaza>.

71. “Who made my clothes?”.

72. Nicoletta Spolini, “H&M: Who Made My Clothes?”, *Vogue Italia*, December 2019, <https://www.vogue.it/moda/article/hm-sostenibilita-tracciabilita-who-made-my-clothes>.

73. Sangeeta Singh and Stephan Sonnenburg, “Brand Performances in Social Media,” *Journal of Interactive Marketing*, Vol. 26, no. 4 (2012): 189–197.

74. Rebeka-Anna Pop, Zsusa Saplacan and Mónica-Anetta Alt, *Social Media Goes Green — The Impact of Social Media on Green Cosmetics Purchase Motivation and Intention* (Cluj-Napoca: Babeş-Bolyai University, 2020), 3.

75. Icek Ajzen, “The Theory of Planned Behavior,” *Organizational Behavior and Human Decision Processes*, Vol. 50, no. 2 (1991): 179–211.

76. Morven G. McEachern and Paulin McClean, “Organic Purchasing Motivations and Attitudes: Are They Ethical?,” *International Journal of Consumer Studies*, Vol. 26 (2002): 85–92.

77. Pop, Saplacan and Alt, *Social Media Goes Green*, 3.

78. Mohammad Nurul Alam et al., “Do Altruistic and Egoistic Values Influence Consumers’ Attitudes and Purchase Intentions Towards Eco-friendly Packaged Products? An Empirical Investigation,” *Journal of Retailing and Consumer Services*, Vol. 50 (2019): 163–169.

are tied to consumers' self-interest, either for their own health or that of their family.⁷⁹ The innovativeness of Pop, Saplacan, and Art's research lies in their exploration of social media's role in shaping consumer perceptions. The authors highlight that these platforms significantly influence the formation of consumers' attitude and subjective norms, as users often perceive information on social media as truthful and reliable.⁸⁰ This aligns with the findings Murwaningtyas et al. who studied the impact of celebrity endorsers.⁸¹ VIPs on Instagram, in fact, can influence consumers' environmental concerns, motivating them to support brands that prioritize sustainability and whose production processes have a lower environmental impact. Through these channels, green aesthetics can flourish, extending beyond a mere visual instrument to become instead a practice that challenges us to rethink our entire relationship with the environment. Social media and their interactive means, indeed, have an enormous potential in the sensibilization of users towards environmental issues, as it enables a more horizontal and democratic form of communication both between consumers and companies and between consumers and consumers, giving everyone the opportunity to access information directly and easily. Thanks to their visual potential and ability to make concepts and lifestyles highly visible and accessible to everyone, social media have a veritable influence on the spread of green aesthetics. Strictly tied to sustainability and nature, green aesthetic has some qualities that perfectly align with social media, where the visual aspect plays a central role: it is inherently beautiful and photogenic. Not only does this make sustainability more accessible and desirable, but it also creates a domino effect: the more people see and appreciate this kind of aesthetic, the more they are inspired to adopt it, influencing others in turn. By doing this, social media truly become powerful tools for turning green aesthetics into a global and durable trend.

Conclusion

The intersection of green aesthetics and the fashion industry represents a significant turning point in how we perceive and engage with the environment we inhabit. Despite recent political actions and orders — such as the EPA's (Environmental Protection Agency) deregulation of environmental protections or the withdrawal of the U.S. from the Paris Agreement under Trump's administration⁸² — that threaten to undermine all of the sustainability efforts our society has made so far, global awareness of environmental issues continues to grow steadily. As a result, the fashion industry is increasingly embracing sustainability — not merely as a moral obligation but also as a strategic response to shifting consumer values and demands for ethical practices. For this reason, more and more fashion brands are beginning to adopt innovative strategies to tackle pollution and waste, for example by introducing biomaterials and natural dyes in their production processes, thus reducing their reliance on harmful, non-biodegradable, and contaminating resources while simultaneously representing a meaningful resistance to disposable consumerism. These advancements reflect a broader movement towards redefining fashion as a veritable driving force for positive environmental change, where not only beauty and sustainability coexist in harmony, but they also give strength to one another.

Social media, in particular, plays an essential role in this sustainable revolution, acting as a catalyst for the adoption of green aesthetics, both among celebrities and influencers, and laypeople. Ever-evolving platforms such as Instagram, TikTok, and YouTube, have proven to be extremely creative spaces where sustainability is not only discussed but also visually embraced and celebrated. The photogenic nature of green aesthetic — rooted in the beautiful, sublime, and picturesque features of nature — aligns perfectly with the logic of social media, which is entirely focused on the centrality of images and visual elements to convey messages. Fashion brands, through their influencers and brand ambassadors, leverage these platforms to promote eco-conscious behaviors, making sustainability aspirational and easily accessible

79. Alam et al., 167.

80. Pop, Saplacan and Alt, *Social Media Goes Green*, 5.

81. Fransiska Murwaningtyas, Mohamad Harisudin and Heru Irianto, "Effect of Celebrity Endorser Through Social Media on Organic Cosmetic Purchasing Intention Mediated with Attitude," 6th International Conference on Entrepreneurship (ICOEN) 2019, *KnE Social Sciences* (2020): 152–165.

82. Shah, "Here Are All of Trump's Major Moves to Dismantle Climate Action."

to a global audience. By fostering a sense of community and collective responsibility, they have been able to bridge the gap between awareness and action, empowering individuals to make more environmentally conscious choices in their everyday life.

In the twenty-first century, however, while a certain progress has surely been achieved, important challenges still remain. The fashion industry must continue to innovate and be an active protagonist in the green revolution in act by addressing its environmental footprint and thus finding new eco-friendly alternatives to its damaging practices. This will ensure that green aesthetic can become a lasting commitment to sustainability rather than just a passing trend forgotten by the next season. This objective is certainly not an easy one, as it requires a holistic approach that goes beyond surface-level changes, actively tackling issues such as overproduction, waste, and pollution. Brands must navigate the complexities of new science discoveries, such as biomaterials and natural dyes, in order to ensure that their environmental benefits are maximized. Nonetheless, the industry remains vigilant against “greenwashing,” as it must ensure that sustainability claims are backed by genuine actions and transparency. Green aesthetics thus represents more than a stylistic preference, as it embodies a profound cultural metamorphosis, one that challenges us to rethink our relationship with the environment and urges us to redefine what we consider as “beautiful.” As the fashion industry continues to evolve steadily, the implementation of green aesthetics is a reminder that true innovation lies in creating a world where fashion not only *looks* good but also *does* good.

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