

On an annotated bibliography...

The following annotated bibliography deals with 3D Printing, from its polymers to its future in the manufacturing industry.

As a continuation to our reading of *Cradle to Cradle*, 3D printing with the correct polymers can result in a more ideal product lifecycle. The advancement of biopolymers and the hyperlocal manufacturing offered by the additive making process allow designers to reduce manufacturing's footprint.

This follows my post from last week, notably the products made by *Batch.Works*.

Gary Chinga Carrasco (2019). *Novel Biocomposite Engineering and Bio-Applications*. [online] MDPI. Available at: <https://doi.org/10.3390/books978-3-0365-1737-7>.

This book is a collection of articles by various researchers and details advances in 3D printing nanotechnology as it relates to the biomedical field. More examples are provided on grafts and prothesis with many authors delving into the chemical compositions of the inks they are researching for these procedures. These articles are a very in-depth and require a higher knowledge of medicine and chemical engineering but even with a base understanding, the exciting possibilities are apparent.

Izdebska-Podsiadły, J. (2022). *Polymers for 3D Printing*. William Andrew.

The author introduces 3D printing, from the basics to the more advanced. While the other books detail processes and procedures associated with additive manufacturing, this book differs in that it delves into more depth with the polymers used in the printing. Written by a collection of scientists and professors, each contributing to their field of study. Of particular note is chapter 18 on polymer biomaterials which could allow for the printing of artificial skin to act as

wound treatment. This chapter details not only the applications, but also the requirements of the polymers and the properties necessary for printing of this complexity. □

Ralf Anderhofstadt and Disselkamp, M. (2023). *Disruptive 3D Printing*. [online] Carl Hanser Verlag GmbH Co KG. Available at:

<https://app.knovel.com/hotlink/toc/id:kpDDP00001/disruptive-3d-printing/disruptive-3d-printing>.

□This book covers two sides of the additive manufacturing industry, written by a business coach and the Head of Additive Manufacturing for Daimler trucks. The first is a very top down introduction to 3D printing detailing the technical aspects involved in additive manufacturing (vs more common subtractive). Multiple interview segments with various industry CEO's discuss the advantages of this type of manufacturing. Different materials are also discussed at length in this first chapter. The second part looks at industry disruptions as a consequence of using 3D printing. Due to its unique business model, logistics and warehousing among others risk losing their place in the business status quo as consumers become "prosumers", a term used to describe a customer more involved in the product manufacturing process. The authors believe in 3D printing's ability to seriously change the way products are made and role in which consumers will play in their manufacturing. It is written to introduce additive manufacturing and to predict the disruption to the supply chain to come if more companies choose to employ this business model.

Sheng, R. (2022). *3D Printing*. [online] Woodhead Publishing. Available at: <https://doi.org/10.1016/C2021-0-02154-4>.

While still a large proponent of 3D printing, this book is less about the disruption to existing industries and more about introducing the various industries that currently utilize 3D printing. Written by an engineer with 30 years of

experience at companies like Boeing and GE, the goal is to help fellow engineers possess the skills necessary to apply existing additive manufacturing techniques to their industries. 18 different industries are profiled – from fashion to aerospace. The challenges of 3D printing are also discussed.

On Contribution

Upon receiving knighthood, Terry Pratchett maintained that his greatest service to literature was to avoid writing any (Sir Terry Pratchett, 2023). On leaving reading group this week I was thinking a lot about that comment because after discussing *Cradle to Cradle* (Braungart and McDonough, 2009), as a product designer discussing consumerism, I can't help but think my greatest service is to avoid producing anything.

I've had a long enough career in the design industry to come up against the term "value engineering" (VE) more than I care to remember. If this term is unfamiliar, it is best described as the whittling away of any part of a design that made said design interesting or unique. This is usually done to conform to a client's shrinking and shifting budget but it can also happen when designer's lose the will to fight for elements of a design they truly believe in. I have been guilty of this in the past.

It just so happened that I caught Dr. Harkness (Rachel) as I was leaving the building and we had a quick chat about this dilemma. Her take was that "de-growth" has to be explored and implemented in certain areas but that people need products so from a designer's perspective it's more about being judicious with what you're putting into the world. This is a great

place to start and for me that means when faced with VE, one has to be firm and ready to avoid producing anything.

Further to this, I was able to catch two very good talks regarding products and materials through the Design for Planet Festival this week. The first was an introduction to Batch.Works, a company using on demand fabrication techniques via 3D printing. Partnering with Morrama industrial design, Batch.Works are developing repairable



Image by Batch.Works

headphones for kids. Made from agricultural feed plastic, each part will have an identifier so that it can be replaced and utilizes biomaterial circuit boards that dissolve in hot water. The second talk featured a panel of companies using natural materials but the participant that stood out was Smile Plastics. 100% post consumer plastics in sheet form that can be fabricated using traditional wood working tools. The panels made from yogurt cups still have bits of foil present, which I found interesting. They also allow designers and fabricators the ability to send scrap pieces back to the company for processing into new sheets.



Image by Smile
Plastics



Image by Smile
Plastics

It was a week of reflection and motivation but I am really enjoying the challenges to my field and my preconceived notions about how things should be done. It's why I'm studying and I'm looking forward to the challenges to come.

Braungart, M. and McDonough, W. (2009). *Cradle to Cradle : Remaking the Way We Make Things*. London Vintage.

Sir Terry Pratchett. (2023). *About Sir Terry*. [online] Available at: <https://www.terrypratchettbooks.com/about-sir-terry/> [Accessed

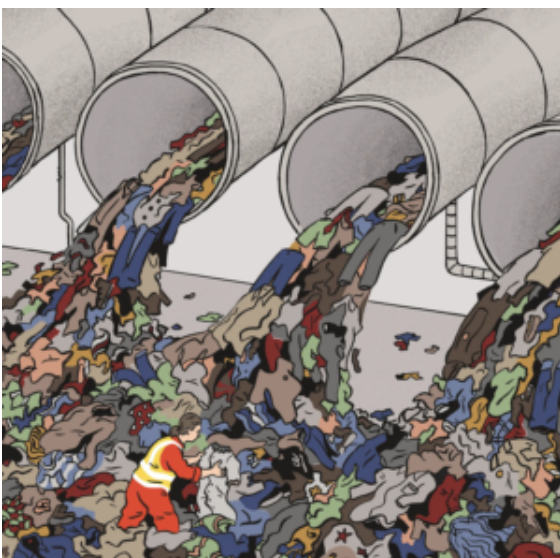
20 Oct. 2023].

Smile Plastics. (n.d.). *Smile Plastics – Recycled Plastic Materials Design*. [online] Available at: <https://smile-plastics.com>.

www.batch.works. (n.d.). *Batch.Works*. [online] Available at: https://www.batch.works/article?article_id=4fed2a8c-1cab-4a1d-9a88-7d5a2cd8a209 [Accessed 20 Oct. 2023].

On Complicity & Fashion

I left Wednesday's debate feeling slightly conflicted. My team was meant to argue in favor of the proposal, *have designers come to terms with their impact on the environment...* What I found interesting about the process of preparing my arguments was that I actually agreed (quite strongly) with the opposition. While researching I uncovered both appalling and hopeful practices, but what I really enjoyed was the exposure to some really fascinating ideas and products stemming from designers' actions regarding the environment.



Calum Heath / NY Times

Looking at the fashion industry seemed like a good place to start finding deplorable standards, practices, and designers shirking their responsibilities. Beginning with an opinion piece in the New York Times about “fast-fashion”, I learned that in this new business model 66% of textiles end up in a landfill while another 19% are destroyed at the end of their lifecycle. (Greenley 2022). While I was able to find loads of information on damaging areas of the business, no one person was named as the culprit. I continued to find more damning statistics regarding emissions, with 10% of global emissions being released by the fashion industry. (news.cgtn.com) But again, no mention of a name or a single person (or group) to blame. The more I researched the more I began to see the real culprit is the Capitalist machine driving commerce at the expense of the planet and people.

The hopeful part of my research came from the innumerable people doing innovative things on the small and large scale. One of my opposing classmates mentioned designer Stella McCartney who embraces all aspects of environmental stewardship – from biodegradable material made from banana plants to forest-friendly viscose. (McCartney 2023) Each area of focus is clearly stated on the website with substantial descriptions devoted to evidencing that this is not a marketing ploy. Another company that I thought of and personally support is Edinburgh-based Meander Apparel. Their business is built around sustainability, ethics, and lifecycle, (Meander 2023) but while their clothing is quality, they don't charge an arm and a leg for pieces.



Stella McCartney /
stellamccartney.com



Stella McCartney /
stellamccartney.com

While it's comforting to know that designers all over the world seem to understand their role in perpetuating eco driven products, I am still concerned by the vast corporations churning out junk. I know we will be discussing capital and labor's role in the economy in the next couple of weeks but for now, my thought is this: In a corporation, designers could be viewed as one part of a machine. The real power lies with the informed consumer so it is highly likely that they will need to come to terms with their complicity in order for large companies to change their course.

□Greenley, R. (2022). Opinion | This Is the Reality of America's Fast-Fashion Addiction. *The New York Times*. [online] 25 Nov. Available at: <https://www.nytimes.com/2022/11/25/opinion/warehouse-fast-fashion-return.html#:~:text=When%20we%20buy%20fast%20fashion> [Accessed 12 Oct. 2023].

McCartney, S. (2023). *Sustainability*. [online] www.stellamccartney.com. Available at: <https://www.stellamccartney.com/gb/en/sustainability/sustainability.html>.

MeanderApparel (n.d.). *Buy Sustainable Outdoor lifestyle Clothing Online | Meander Apparel*. [online] MeanderApparel. Available at: <https://meanderapparel.com> [Accessed 12 Oct. 2023].

news.cgtn.com. (n.d.). *Haute couture in the midst of a climate crisis: Does the fashion world care?* [online] Available at: <https://news.cgtn.com/news/2020-02-22/Fashion-vs-climate-Are-luxury-brands-doing-enough-0ivPbLBVHa/index.html#:~:text=Even%20where%20companies%20are%20implementing> [Accessed 12 Oct. 2023].

On Patterns & Entanglements



Westend61 / Getty Images

Apophenia (coined by Klaus Conrad in 1958), and more recently Patternicity (coined by Michael Shermer in 2008), are defined as the inclination to find patterns in seemingly unrelated information, object, or things as illustrated in the top image. In an article in *Scientific American*, Shermer argues that while some scientists dismiss patternicity as an error in cognition, he believes that:

Our brains are belief engines: evolved pattern-recognition machines that connect dots and create meaning out of the patterns that we think we see in nature. (Shermer 2008)

Upon reading the excerpt from *Patterned Ground*, I kept thinking that patternicity helps to explain the need of historical figures like John Dee to decipher and order *the true nature of things. (Harrison 2004: 21)* I did find it amusing that many of these figures began this work on the basis of Divine Creation. Religion's impact on science, or rather its hindrance of progress, is widely seen throughout history. I could argue that in this single instance, belief in a higher power prompted a desire to "decipher God's playbook" and led to the scientific grounding and the entanglements of their findings.

Entanglements is a term being woven throughout all of my classes in these early weeks. In a very “meta” way I am employing patternicity to find commonalities in seemingly different fields of design – or at least areas over overlap. Our “treasure hunt” workshop this week began with a sheet of different animate and inanimate items, but what I found most interesting was that many of these items could be connected when the classification was defined in a broader way. For example, an image I took of a pub satisfied the requirement of a pub. But because of the location in which I took the picture, I was able to identify, an island, radio, viruses, boundaries, and more if I diffused the definition of the categories.



Entanglement Treasure Hunt by LeNoir

Finally, I think it would be simple to take these ideas of order and classification into the modern age and wonder why then are so many people unconvinced of our connections and entanglements with nature. I find the notion of entanglements comforting and connected to empathy which I believe is crucial in changing behaviours. It would seem that an understanding of how we and nature are intertwined would cause a person to see from a perspective outside of their own. However as Harrison

states, pattern recognition is a long way from explanation (Harrison 2004: 31) and paraphrasing Mead, the order we place upon the world may not be the way the world is ordered. (Harrison 2004: 27) I am beginning to see the role of a designer, at a base level, is to interpret/explain connections and entanglements in order to foster consensus action to address modern problems.

Harrison, S. (Stephan), Steve Pile, and N. J. Thrift, eds. 2004. *Patterned Ground : Entanglements of Nature and Culture*. London: Reaktion Books.

Shermer, M. (2008). *Patternicity: Finding Meaningful Patterns in Meaningless Noise*. [online] Scientific American . Available at:
<https://www.scientificamerican.com/article/patternicity-finding-meaningful-patterns/> [Accessed 6 Oct. 2023].

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