Proposal

The following thesis will investigate the effects of rapid industrialization in my hometown, Pittsburgh, that took place in the 19th century. In response to this research, the thesis will be centered around the philosophy of zero-waste. In its heyday, Pittsburgh was one of the centers of the American manufacturing boom. With an abundance of natural resources and an advantageous geographic location, the city was perfectly primed for rapid growth through industrialization. This surge in development improved the city’s economy, transportation, and living standards; however, these improvements were not without negative repercussions. The air pollution resulting from the steel, iron, and coal industries are all well-documented issues that will be integrated into this thesis. Through the sacrifice of the environment and people’s health in the past, society today is now much more informed of the dangers of pollution. Besides the adverse effects on the environment, there are strong correlations between economic growth, overall living conditions, and wastefulness. These correlations can be observed in all instances of rapid industrialization, including the Industrial Revolution from the 18th to 19th century [and the modern case of China]. This trend can also be applied to the fashion industry, one of the fastest growing industries in modern society. As living standards improve and clothing consumption skyrockets, massive amounts of waste are created. Much like the industrialization of Pittsburgh, clothing production to meet increasing demands consumes more energy and creates even more pollution in every step of the process. It is no surprise that in terms of pollution, textile waste is the second “dirtiest” industry in the world. The amount of textile waste produced today mirrors the amount of pollutants resulting from Pittsburgh’s industrialization. To avoid repeating the mistakes made in 19th-century Pittsburgh, the fashion industry needs to make advancements towards sustainability from its roots—the initial design process. This thesis will address the issues the fashion industry faces through a zero-waste design approach. By recounting the dark history of Pittsburgh through my designs, I hope to shed more light on the challenges the fashion industry faces as well as emphasize the sacrifice the city has made to tell this
cautionary tale. Everyone is impacted by their actions and any form of pollution/waste will affect the future- just as the shockwaves of the industrial revolution continue to reach even into the twenty-first century.
LITERATURE REVIEW

Industrialization of Pittsburgh

Known as the “Steel City” or “Smoky City”, Pittsburgh established itself as one of the major centers for innovation around the nineteenth century. Endowed with a seemingly endless source of natural resources like coal and the ideal geographic location between the rivers, Pittsburgh thrived in the industrial revolution. “Coal Hill”, thought to be one of the most valuable coal deposits in the United States, became the constant supply that emerging business and industries needed to become successful. With all the resources and manpower at arm’s reach, the city was crippled by the increasing pollution and by 1884, three million tons of coal were burned per year (Exploitations). In order to achieve these results there needed to be a large workforce to accommodate. In this case, Pittsburgh’s population skyrocketed with the growing industry. Laborer’s were provided plenty of opportunities to work in the factories, thus fueling the economic growth and inspiring innovators to take charge of the industry (Duverge).

Industry titans Andrew Carnegie, George Westinghouse, and Henry Frick built their wealth around Pittsburgh. With the industries thriving innovation and increasing wealth, the overall well-being of the city was declining; however, it was of no concern to these influential men. Chicago businessman, W.P. Rend, stated that “Smoke is the incense boring on the altars of the industry. It is beautiful to me. It shows that men are changing the merely potential forces of nature into articles of comfort for humanity (Exploitation).” His vision of the industrialization dismissed the byproducts of such labor intensive and environmentally straining productions. The wealthy escaped the sooty air by moving to neighborhoods miles from the factory ridden city while less fortunate residents remained and tolerated the effects of the industrial revolution (Duverge).
Willard Glazier recounts the city as a “smoky, dismal city at her best. At her worst, nothing darker, dingier or more dispiriting can be imagined; the smoke from her dwellings, stores, factories, foundries and steamboats, uniting, settles in a cloud over the narrow valley in which she is built, until the very sun looks coppery through the sooty haze (Exploitation). " Besides the noticeable decrease in air quality, the burning of coke added even more impurities to the city. The results of the constant burning in the coke ovens left the city covered in ash, continuously raining down upon the surrounding landscape. The byproducts created a “general wretchedness” that polluted the waterways, poisoned the soil, and killed the organisms residing in the area as well.

**Sustainable Design**

Pittsburgh’s dark and cautionary history has become lesson to all regarding pollution. With this knowledge, people have taken greater steps to ensure the wellbeing of the planet; however, there are still progress to be made. In contemporary society, fast fashion has grown due to the rising need for cheap and accessible clothing. Claudio delineates the effects of disposable fashion and how history is repeating itself. The lifecycle of fast/disposable fashion damages the environment every step of the way, starting from the energy intensive, by-product creating demand of producing man-made textiles (Claudio). In order to combat the ever-growing need for fast fashion, designers are implementing practices of slow fashion, zero-waste designs, and more.

As more designers realize the importance of sustainable design practices, consumers will find the importance in engaging with their environmental responsibilities and find more sustainable consumption methods as well. *Nordic Textile Journal* correspondent Kirsi Niinimäki opens her research by affirming that products are configured based on consumer needs and thus making design “practice-oriented” — sticking to possibly unsustainable methods to satisfy the desires of consumers. She places an emphasis on designing with a purpose— whether it be personalized, tailored, symbolic, high quality, functionality, etc.— to extend the life of a garment and become a more proactive industry (Niinimäki).
One of the key leaders in practicing sustainable design methods is Holly McQuillan. Her focus is on Zero Waste Pattern Cutting—a design practice that responds to the sensitivity of the materials and the unpredictability of the environment (McQuillan). Through experimentation, McQuillan creates a puzzle of pattern pieces that lay perfectly together and avoid any amount of waste. Many other emerging designers are also accounting for the increase in textile waste—producing collections that withstand the test of time and/or utilizing sustainable methods to carry out their visions. In the book *The Beautiful and the Good*, Fabio Guenza makes his very opening point that fashion is dependent on innovation; however, innovation is not necessarily sustainable and sustainability does not always mean innovation. Today, that clause is no longer applicable. Guenza emphasizes early on that for the fashion industry, sustainability is one of the key driving forces of innovation and change (Ricchetti). Sustainability in the fashion industry is encouraging research and experimentation on fabric manipulation, creative patternmaking, etc.—all of which will lead to a change that will positively impact everyone’s lives.
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METHODOLOGY

This thesis focuses on the rapid industrialization in Pittsburgh, its effects on the environment, and how the garment industry is inadvertently pursuing the same route. In order to tie the two concepts together while conveying an underlying message, *Up in Smoke* utilizes a zero-waste patterning approach as a way to visualize the pollution caused by the extreme industrialization of Pittsburgh in the eighteenth-nineteenth century and the excessive amounts of fabrics produced in the fashion industry today. Much like the industrialization of Pittsburgh, clothing production to meet increasing demands consumes more energy and creates even more pollution in every step of the process. However, the processes used in the conception of this thesis are clear proof that the fashion industry does not have to be extravagantly wasteful, and that there is hope for the industry to move beyond its current reputation as such.

To help better communicate the issues of the pollution in both industrial Pittsburgh and the current state of the fashion industry, the collection relies on the introduction of black dye to contaminate the natural white fabrics—all of which are then translated into effortlessly elegant silhouettes that are derived from the boom in economy, signifying an increase in wealth and the need to live luxuriously. Throughout the collection, the “bubbled” areas made from taffeta also recalls puffs of smoke and noxious vapor emerging from smokestacks.

Conventionally, zero-waste designs are incredibly abstract and are not body-conscious. In order to challenge the conventional methods of creating a zero-waste collection, *Up in Smoke* is not afraid to explore body-conscious designs that are more reminiscent of the eighteenth/nineteenth centuries. By utilizing the zero waste pattern development, the entire collection uses X yards as opposed to Y yards had it been done the conventional pattern cutting method. The remaining scraps from the cutting
process were used to create white appliques, which are symbolic of the excessive amounts of ash in the air and are used to further serve to reduce the remaining amount of waste.

On the other hand, the process of fabric dyeing alone has also been a huge contributor to waste and pollution in waterways. To address this issue, Up in Smoke uses an ice dyeing technique that requires a minimal amount of water. An organic soda ash was used in order to fix the dye powder. Through extensive research, the black dye powder could not have been organic. Due to the seasonal variables, the fabric could not have been dyed with a natural substance; therefore resorting to a procion dye was a much more practical solution. The small-scale issue faced here is magnified exponentially when it comes to the high-volume production the industry deals with—toxic/unnatural dyes are more convenient and cost-efficient compared to natural dyes. A pure black dye color is also relatively uncommon in nature and harder to achieve with organic materials when compared with manmade substitutes. Having the fabrics used in Up in Smoke be dyed black despite not having organic dyes is a testament to how dependent the industry and designers have become on chemical dyes.

Up in Smoke is not just a cautionary tale focusing on the importance of sustainable design. Through the processes and challenges of designing and creating each garment, this collection is, at its heart, a statement about not conforming to the damaging standardized practices of the fashion industry.

“Here's to grim Pittsburgh the city of smoke, Where the sky's but a memory and sunshine a joke, where the incense of stogies perfumeth the air- but in spite of her faults we all love to be there.”