

Deathly and dangerous dress

To know the history of the dress is indispensable to any costume designer. As we dive into depths of trying to understand what kind of costumes different centuries and nations have embraced we're not only looking into shapes and colors of the costumes but also into social history of the man; class differences and personal stories. The dress is an intermediate between the body and society; it can link us to it and also divide us from our peers. The dress is not innocent; it contains meanings and sometimes even dangers inside its seams and pleats. When I first stumbled on a story of a Victorian woman who had burned alive because of her huge crinoline, I couldn't believe what I had just read. The idea of deathly dress was terrifying yet it made me want to know more about this topic. In this essay I'm presenting some of the most hazardous examples of the dangerous dress in a period of 100 years starting from late 18th century and reaching to the late 19th century. My main resource has been an excellent book on the subject by Alison Matthews David "Fashion Victims: The Dangers of Dress Past and Present" and as I started to ask further questions I found Leigh Summers' "Bound to Please, History of Victorian Corset" extremely useful. I have also used a wide range of online articles and museum databases as a source material

Hems get stuck

The idea of a dress that makes moving somewhat impossible or at least not easy may seem incomprehensible to present day viewer but history of the costume has known various examples of these kind of dresses. Hoop petticoat came into fashions as early as 17th century but only after its arrival to English court did it become more widely popular even amongst bourgeois not only in nobility. The hoop was a structure that supported the skirt and it was wide in sideways but rather slim in depth and resembling somewhat hanging curtains.

"The hoop petticoat was constructed from a series of hoops of wale bone or cane, which allowed material to be draped over it on display. After its entry into the English court in the 17th century, it remained, in various forms, as a garment solely worn by royal and aristocratic women. In the 18th century, however, it became a ubiquitous garment, worn not only by women of the court, but also by the increasingly fashionable bourgeoisie." Traw, 2015

One starts to wonder how the tea and living rooms were decorated furniture wise if women needed to move around in dresses like this with a girth of several meters. Not to mention what kind of problems appeared when moving out and about. There are indeed some recorded accidents involving hoop petticoat in 18th century. "In one recorded accident a women's hoop became entangled with the horns of an old ram: 'she shriek'd, the ram baa'd and the rest of the sheep echoed the cry'... The ram pushed the lady over into filthy streets... but her feelings were more hurt than her body". Matthews David, 2015:22



Court dress worn by Mrs. Ann Fanshawe: 18th century, 1752-1753. Courtesy of the Museum of London. Traw, 2015

As hoops caused some dangerous situations due to their wideness, there was also a positive side in wearing them, at least on women's side. "The wearing of the hoop petticoat was, therefore, not a symbol of patriarchal restrictions as it came to be figured in the late 19th century, but in fact a non-verbal expression of the increasingly independent bourgeois woman... Aside from decorative appeal, it served an intensely practical role for the urban woman: to provide 'shelter and protection' by keeping 'men at a proper distance'. Traw, 2015

In Flames

Hoop petticoats had changed the dress into fairly huge; the bottoms were sometimes five times bigger than the person due to several underskirts and layers, the new inventions made the skirt much more lighter. By 1850's the hoops had become old fashioned and there was room for something new. The hoops were to be replaced by something that became even more popular amongst all the classes: "A century later the hoop skirt was reincarnated as the more circular steel cage crinoline, with one significant difference: it was worn by everyone." Matthews David, 2015:24



Painting of Empress Eugenie, (Eugénie de Montijo, Condesa de Teba, 1826-1920)

Frank Xaver Winterhalter

The changes in style derive from somewhere and in the case of crinoline there was a certain someone who paved way to new fashion. In 1853 French emperor Napoleon III engaged young Spanish Eugenie de Montijo, daughter of count de Montijo. She was to be the last empress of France and despite her young age at the time of engagement she became fast the fashion icon all over in Europe.

”When Eugenie purchased herself a crinoline dress 1855 from Paris to hide her pregnancy masses of women followed her example. This crinoline was a kind of a cage that pushed the hem part away from the body thus making the waistline seem smaller. Another advantage of crinoline was that now the need for fabric for the skirt was smaller since there was no need for so many layers underneath. Also the moving about became much lighter since the structure itself didn't weight as much as it's predecessor.” *Världens Historia*, 3, 2016:42 (*author's translation*)

Fashion designer Charles Fredrik Worth, 1825-1895, who's been called as a father of haute couture paved way to crinoline alongside Empress Eugenie. ”Worth opened his house in 1858. He didn't invent the crinoline, already well established by 1855, but he was its ultimate proponent, pushing it to extreme proportions by 1860. Eugénie was his willing accomplice... by 1868 they jointly agreed crinoline was 'out', pricked it with a pin and pulled dresses snug around the hips, looped up in a bustle behind.” *Fury*, 2013

In the beginning the crinolines were made using horsehair and linen (the name derives from French 'crin': horsehair but soon it started to be mass produced in factories using steel. The steel-hooped cage crinoline, first patented in April 1856 by R.C. Milliet in Paris, and by their agent in Britain a few months later, became extremely popular. Alternative materials such as whalebone, cane, gutta-percha and even inflatable caoutchouc (natural rubber) were all used for hoops, although steel was the most popular. ”The Peugeot factory of later automobile manufacturing fame swiftly opened an entire factory dedicated to the production of steel 'cages'. Along with Thompson factory in England these two firms produced 2,400 tonnes of crinolines annually between 1858 and 1864. This represents total of some 4,800, 000 units a year.” *Matthews David*, 2015: 243

Not everyone warmed up to the new frenzy just that fast. Even though she started to use crinoline later on Queen Victoria who became huge fashion icon was at first openly opposing the style. ”In 1855, an observer of Queen Victoria's state visit to Paris complained that despite the number of foreigners present, Western fashions such as the crinoline had diluted national dress to such an extent that everyone, whether Turkish, Scottish, Spanish, or Tyrolean, dressed alike. Victoria herself is popularly said to have detested the fashion, inspiring a song in *Punch* that started: “Long live our gracious Queen/Who won't wear crinoline!” *Rare Historical Photos database*, 2021

Even women who worked in factories wanted to show up to work with wearing a crinoline. There were accidents where the hems got stuck in heavy machines and attempts to deny the use of crinoline at workplaces but these restrictions seldom worked. ”For the 18th century the hoop -skirt was potential ticket to hell; for the Victorians it was potential trip to hospital or morgue.” *Matthews David*, 2015:24

And it was not only the workplaces where crinolines proved to be hazardous. There was something peculiar in the structure of crinoline that made it gain a not pleasant nickname as a death trap. As the big cage of crinoline was empty inside it created a tunnel for air and combined with open fire places this proved to be fatal for many women.



Cage crinoline with steel hoops, 1865

Rare Historical Photos, 2021

”Mrs. Steel was in her shop in Tacket Street in Ipswich 23.11.1868 as usual when she heard a panicky shierk from the back room kitchen. She rushed to see what was going on and found young kitchen maid Emma surrounded by the flames. Girl's crinoline had swept too close to the fireplace and now her whole skirt was in flames. Mrs. Steel tried her best to suffocate the flames and she finally managed with the help of the passerbyer and the staff of the next shop but it was too late. The doctors in Ipswich and East Suffolk Hospital could not save the girl due to such severe burns. Emma was only 12 years old.” *Världens Historia*, 3, 2016:42 (*author's translation*)

According to an article ”The Dress that killed” in *Värdelens Historia* this story is by no means the only one. Besides the structure of the crinoline there was also another aspect that made it extreme flammable and it was to due with how women cleaned their dresses. These kind of dresses were not washed but instead cleaned with a polishing fluid. ”Women cleaned their pretty gowns with tender care, using cleaning fluid. The process was similar to dry cleaning today. They’d spray the gown and blot away the spots and stains of a party or even everyday life.” Carrol, 2021

This cleaning fluid was not harmless; it was petroleum; kerosene. And kerosene that was and still is used as a fuel in aviation and in regular households is of course highly flammable.



Left: Oscar Wilde's half sisters, right: a fire in Philadelphia's Continental Theater in 1861, Frank Leslie's Illustrated Newspaper, September 28, 1861, Carrol, 2021

Despite the period journals wrote constantly about the dangers of the crinolines, women continued to use them. "Even when the British medical journal *The Lancet* decided to publish their findings regarding the surge in deaths, it did little at the time to deter prevailing trends. *The Lancet* estimated in 1860 that at least 3,000 woman were killed in a single year by fire." Allan, 2019

Crinoline dresses caused also difficulties and dangerous moments when moving around in town. After a stormy afternoon in February a weather reporter wrote "The air was freezing cold and the wind was blowing in heavy blasts. As women tried to move forward in their fluffy crinolines the hems took the wind and women were pushed forward in jerky moves and colliding into each other." *Världens Historia*, 3, 43, 2016 (author's translation)

In those days moving around in a dress became an art of it's own. Even to get in through doorway was sometimes tricky. So to travel from place to place, laying down, playing with children and even handshaking became as something that demanded quite a bit of good will in order to happen.



Rare Historical Photos database

Dangers under the hat rim

Nowadays it may seem to us that only women are portrayed as victims of fashion but men have been and still are as likely to be as impressionable to fashion's whims as women. This may be result of the changes that the dress went through from 16th to 17th century: while women's dresses were becoming bigger the male suit developed into a much more functional attire. However for example men's hat styles changed rather rapidly from mid 16th century wide brim ones through bicorns into a narrow brimmed Victorian ones. There's nothing wrong wearing a beautiful big hat, but under the brims lurked some ghastly dangers. The top hat became fast an icon of 17th century and it was worn by different classes however there was differences in hats according to from what material they were made of. "The best hats worn by those in the upper classes were made from felted beaver fur. (Fellow Canadians might know all about that beaver pelt fever, as it is a major part of Canadian history.) Rabbit hair was sometimes used as well. Silk, linen and flannel were also used, especially as the trend spread to lower classes." Hamilton, 2020

Mercury was used in making the hats in the process of felting rabbit hairs. The beaver fur was fairly easy to get felted and it didn't need mercury to be felted but rabbit hair and other cheaper furs needed more work and in order to make them turn into malleable felt. "... the hair had to be removed from pelt and 'felted' or entangled through combination of friction, pressure, moisture,



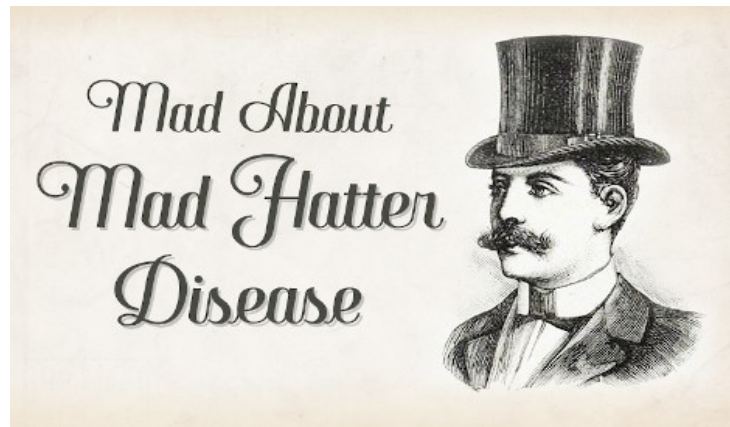
Hands damaged by arsenic dyes, lithography from an 1859 medical journal (via Wellcome Library)
Meyer, 2014

chemicals and heat. Brushing the mercury and acid solution onto the pelts broke down the keratin proteins in the hair and it turned into reddish orange, which is why the operation is called carroting.” Matthews David, 2015:69. And mercury just happens to be one of the most dangerous compounds to human health. But mercury had come into hat making process through industrial revolution: "...new techniques using mercury were introduced to felt cheaper furs and speed up the process of hat making, but across a range of industries new procedures and the acceleration of production 'provoked the appearance of new health conditions.” Matthews David, 2015:82

For an upper class 19th century man it would've been incomprehensible to leave house without his hat. It was a status symbol but it also had its functional purpose in keeping the carrier's head warm. "Mercury persisted for more than 200 years in the hatting trade because it was not perceived as a threat to male fashion consumers.” David Matthews, 2015:101

However hatters became ill with hatter's disease and even died from mercury poisoning. The symptoms of mercury poisoning were severe involving many cases the whole nervous system.

Symptoms included depression and suicidal thoughts, insomnia, irritability, loss of memory, hallucinations, trembling hands, rashes, kidney problems and several other manifestations of declining health.



Hamilton, 2017

It's not clear how mercury became originally to be part of hatting process but it's known fact that hatters used urine to top up the acidic fluids used in hatting. Urine is a good mordant in order to bind the dye to the fabric. There's a legend claims that "In one workshop a hatter supposedly produced better-quality felt than his colleagues. His syphilis was being treated with mercury bound compound inserted into his penis. This mercury-laced urine miraculously helped to felt his hats..."

David Matthews, 2015:83

The 17th century had already witnessed the rise of different artisanal guilds that were able to regulate the working conditions and prices of consumer products and mercury was outlawed first time by hatters guild already in 1716. However it persisted in the trade more than 200 years "...because it was not perceived threat to male fashion consumers... fashion was not supposed to victimise middle- or upper-class men, who were supposedly immune to it's lures and dangers."

David Matthews, 2015:101

Deathly color

When observing costumes the color is something we react to immediately; be it bright or dark it's there often as a first thing we may analyse before going into details. It's power can be so strong that it affects us in sensorial level in a powerful way. Green in modern times has been viewed as a color of spring; it's linked to nature since it's the tone of grass and leaves and it's been considered as a color of growth and renewal. But the history of green color is anything but "green".

Until 1780's green shades were produced by dipping cloth in yellow and bluish green woad. Skilled dyers could create beautiful shades even with these techniques, but the colors tended to fade over time. But all this changed because of a chemist called Karl Scheele.



Green Day dress; very likely dyed with Scheele's green (*author's comment*)
photo Hamberger, 2018

”As was common for the late 1860s, the dress has a flat-front crinoline headed into a bustled silhouette. The bustle creates more volume at the back of the dress with draping and folding of fabric, completed with a small train. The top of the dress has a high neckline with a mandarin-style collar, and nine buttons down the center front of the bodice. Sleeves are attached to a slightly dropped shoulder, executing a softer shoulder line into the armholes and sleeves.” Hamberger, 2018

”Green was a very popular color in the 19th century, made possible by advancements in dyeing techniques. In 1778, the Swedish chemist Carl Scheele discovered how to make “Scheele’s green,” a pigment made with copper arsenite. The pigment became a sensational success and was used enthusiastically during the period, most commonly in wallpapers, paints, but it was also used to color textiles.” Plaza, 2022

There followed a frenzy where people purchased beautiful green shaded wallpapers; William Morris was very much in vogue at that time and his flower patterns decorated many upper class homes until ”Illness and even death were often attributed to wallpapers, described as "highly arsenical". This was yet another reason for avoiding wallpaper in bedrooms.” V&A database

This new green became so popular it was used all over in indoor decorations as well as in accessories that imitated natural leaves and flowers. There were workshops where young girls worked in "fluffing" the artificial leaves with beautiful green powder to create head pieces for upper class ladies. "The brilliant hue of this green pigment, which was used to color dresses and hair ornaments was achieved by mixing copper and highly toxic arsenic trioxide or white arsenic as it was known." David Matthews, 2015: 110

As Scheele's green was a pigment it stayed on top of the products it was coloured with. So when in a ball women danced around in their green dresses they actually produced a cloud of arsenic that floated in the air. And as if this was not already serious for health the arsenic also made the dresses more flammable. "Burning an arsenic dress could release toxic fumes into the air which, of course, the woman wearing the dress would inhale. Even if she wasn't killed immediately by the flames, just breathing the smoke could cause serious health problems and lead to her early demise." Allan, 2019



Tin can of Paris Green as Scheele's green was later called (also emerald green) Image Chris Goulet English Wikipedia Image Chris Goulet English Wikipedia

One female worker died from arsenic poisoning in 1861 and after that opinions against the use of this toxic substance started to appear. Organisations like Ladies Sanitary Association published articles on the topic and in a report called "Dance of Death" famous chemist Dr. A.W. Hoffmann stated that "an average headdress contained enough arsenic to poison 20 people." David Matthews, 2015: 113

Female activists spread the word and awareness on this toxic issue spread wider but in Britain the Scheele's green continued to blossom in many products while in France and Germany the legislation was passed against these poisonous pigments in 1860. But the popularity of this new green trend overcame the critical voices; manufacturers also organised tests on their products by

chemist who commonly exclaimed the test toxic free. At the the International Health Exhibition in London in 1884 where test results were shown alongside with wallpapers "one critic remarked, "with our walls covered with such papers we can gratify our artistic taste and at the same time may rest assured that we are not slowly being poisoned". V&A database

It was hard to find exact years when the shifts into safer dyes happened but wikipedia source reveals that "By the end of the 19th century, both greens were made obsolete by cobalt green, also known as zinc green, which is far less toxic. Scheele's green was used as an insecticide in the 1930's."

Perkin's mauve

Green was not the only desirable color in late 19th century. An attempt to create new medicine resulted in a something quite opposite to medical wonders. Sir William Henry Perkin (1838-1907), discovered the first famous artificial colour by accident in 1856 when he was a student at the Royal College of Chemistry in London. While experimenting with a synthetic formula to replace the natural anti-malarial drug quinine, he was doing experiments with coal tar. Coal tar is a liquid by-product from coke and coal gas from coal. "Perkins produced through his experiments a reddish powder instead of the colourless quinine. To better understand the reaction he tested the procedure using aniline and created a crude black product that 'when purified, dried and digested with spirits of wine gave a mauve dye'. This dye created a beautiful lustrous colour that Perkin patented and which became known as 'aniline violet' or 'mauveine'." V&A, 2006

But it is not enough to come up with new inventions, to be able to profit from your work whether it's born by chance or planning you need skills in marketing and commercializing. As I learned from looking into the history of mail-order catalogs (Formicella, 2021) I assume the changes in people's consuming habits made this marketing process easier also for Perkins, since mail order catalogs started to appear in early 1870's. As the catalogs could reach millions of consumers despite their whereabouts news of latest fashions spread fast.

The difference between dyes and pigments is their relative solubility; dyes are soluble while the pigments are essentially insoluble in the liquid media in which they are dispersed. So the pigment stays on top of the cloth when attached to it while dyes mix in with the fibres. As I've studied dying methods both with pigments and dyes in the past I've learned how easily the pigment can be transferred into the skin from the fabric due to sweating or just in particles the human eye is incapable of seeing. So it's feels easy to jump into conclusion that women at balls in late Victorian times were like toxic spirals swirling around and around spreading poisonous particles to their surroundings.



“Perkin mauve” dyed silk, 1860

Photo courtesy of National Museum of American History

Smithsonian Libraries, “Making Colour”

Until Perkin's discovery the purple dyes had been produced using natural dyes like “milking” sea snails and using plants like madder's roots. “Perkin's unexpected result revealed the cheap and easily applicable nature of coal tar-derived aniline dyes, and drove the development of a rainbow range of mass-produced synthetic dyes in the UK, as well as in Germany and Switzerland. The artificial dyes completely replaced traditional dyes derived from plants, insects and shellfish in mere decades (though the ethics behind animal-derived dyes remains controversial).” Janice Li, 2020



Meauvine purple day dress, wool, early 1880's, possibly dyed with Perkin's meauve, Augusta Auctions

To understand better how the new purple color was linked to the wider changes in 19th century societies we have to remember as Allison David Matthews, 2018:164-165 points out that Industrial Revolution affected almost every aspect of the society. Coal was in demand for both gas lighting as well as for heating so the chemists were interested to find out how to use efficiently it's by-products. So as the color was born accidentally there was a bigger trend on benefiting from coal in both medical but also commercial ways. The late Victorian times witnessed a boom of scientists and chemists turning into succesful businessmen and unfortunately as a result a cycle of sad events of poisoning people and also the environment.



The size of a crinoline could be as wide as 4,5-6 in width.

In the back: silk day dress in one of many aniline purple shades (*author's comment*)

photo FASHION, Une Histoire de la Mode du XVIII au XX siècle

As learned from Matthews David, 2015 the chemical benzene that was used to produce new chemical aniline dyes was already in itself toxic but the need to make them even more vivid made things worse. "Early aniline colors were made more vibrant by using arsenious acid dyeing process. The toxin was not always washed out in the final product and could be absorbed through the skin. The arsenic also leached into the water and soil near dye factories, killing a women near a French factory making fuchine (magenta)." Matthews David, 2015:171

When having problems in understanding why people continued to wear toxic garments despite their known dangers that different newspapers warned them against it's good to remember that the rate of changes was extremely fast in late 19th century. Even though the facts were spread widely "The speed of change left civilian and military doctors, toxicologists and even veterinarians scrambling to understand the chemical compositions of particular shades that were causing health problems."

Matthews David, 2015:172

As Matthews David, 2015 has found out by the time of World War I it was known and also proved fact that men working in aniline dyeing business became ill with acute and chronic aniline poisoning. When it comes to the environment imagine as Li, 2020 points out that if and when there was a aniline dye factory that released some of its toxic end products to the waters of London how fast and widely the toxic waste could spread. "As Perkin's Wembley dye factory discharged effluent into the Grand Union Canal, it notoriously turned London's waterways changing colours of purple, green, violet and red. London is connected by waterways – although released locally in Wembley, the pollutants travelled along the canal as far as Birmingham." Li, 2020

Style first or...

It's easy to be judgemental afterwards and question the motives of the people from past decades when embracing fashions that actually killed thousands of people. However many of us as modern consumers continue to buy harmful products even though we know for example that mass production of affordable clothes is highly questionable in terms of working conditions. The so called "modern" working methods in the countries where the work force is cheapest still cry for a revolution. We continue buying jeans dyed with indigo even though the dyeing process is highly toxic due to the compounds that are needed in order to get the proper color shades. There's brutality in knowing that the workers are calf deep in the dyes, exposing their skin to these dangerous substances and it makes one ask how much have changed in 150 years...

As costume designers we can affect what kind of choices are done when choosing fabrics for productions, but not only that; we can enhance the base of values in the stories of those productions. We can ask what kind of choices the characters in the story would make when choosing their own clothing: would Victorian women character choose a dress dyed with Scheele's green and if she would what does it tell about her? It may very well be that the so called "big audience" might not always be able to read each and every hidden message, but I think it is important to ask these questions.

We can not know the mind of a Victorians and why they continued wearing hazardous costumes but theories have been published relating the topic as how death was perceived very differently in those times. Memento mori's, pictures of dead people, were extremely popular in those days and as death by young age was more common, people were maybe more prepared in accepting it's existence than in our times. Summers (2001:124) has stated that especially women were intimately connected to death by multiplicity of cultural and physical ties. In the frame of this essay it's impossible to delve into these questions since the topic needs it's own research and reading but it leaves us at the interesting ending. One statement can be made though and that is that the uses of costumes affect not only individuals but whole societies and by delving into the history man we may be able to understand the importance of costume better.

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