



Nick Relph: A LIST OF INCORRECT THINGS

The piece in this bulletin was originally written to accompany an exhibition by the author at Gavin Brown's Enterprise, New York, in 2009. Any differences are purely cosmetic.

The leaves of the subtropical shrub *Indiofera Tinctoria*, when carefully harvested, soaked and fermented, produce the dye indigo. India was the first country to cultivate the plant and master the labor-intensive process that resulted in textiles dyed with a blue color so deep it almost reaches into black. The richness and depth of indigo seem commensurate with the effort exerted to produce it. This quality proved extremely desirable, and India supplied the powdered dye to the Greco-Roman world and the Middle East.

After shipping routes to India were successfully set up by the Portuguese in the late 15th century, trade began with other colonial powers, among them Great Britain and France. The British presence was represented by a group of merchants who, having been granted a Royal Charter by Queen Elizabeth I, arrived under the auspices of the East India Trading Company. The company began importing silk, tea, spices, and indigo back to Britain, which embraced the rare blue in a rush of exoticism and power. The demand was such that European colonial powers, using slave labor, expanded indigo plantations beyond India and into other territories with suitable climates—the Spanish in Central America, the French in Haiti and Louisiana, and the English in Jamaica and South Carolina.

Concurrently, Spain was exporting a red dye from Mexico that was also popular in Europe (which had failed to produce a red that was stable and bright). Made from the dried and crushed insects of the same name, cochineal (a.k.a. carmine) produced a vivid red that, owing to the fact that it was relatively scarce, would have been especially seductive in Europe. This, coupled with the high cost of harvesting tens of thousands of insects for a tiny amount of dye, made wearing a true red a marker of wealth and status. The same distinction was codified within the British Army, where someone of a higher rank such as an officer, would wear a jacket dyed with cochineal, whereas the majority of soldiers wore jackets using the dye of the madder root.

Furthermore, indigo would come to be used for naval uniforms and is likely the root of the color now known as navy blue. It follows that both of these prized dyes would be put to use for the flag of Great Britain, the Union Jack. The Union Flag and, prior to the Acts of Union, the St. George's Cross, also featured within the canton of the East India flag together with

alternating red and white stripes across the length. The company flag is identical to the Grand Union Flag, the precursor of the American flag, and it seems reasonable and fitting to assume that this served as the model for the Stars & Stripes.

Perhaps in light of the competition spurred by the European discovery of indigo, Spain made every effort to keep the source of cochineal a secret. This worked for a time, in part because of the structure of the economy and how information was exchanged. The guild system worked by controlling and protecting the skills and knowledge particular to a craft in order to ensure a measured ascent from apprentice to master craftsman and to maintain a regional monopoly. The dyers' guild kept the origin of the brilliant red to themselves, and anyone who might do otherwise was threatened with death. But by the 18th century, developments in technology had given rise to an increasing number of people interested in studying the world via scientific means who actively engaged in and encouraged the exchange of information. Many members of this scientific class were intent on understanding just what the origin of cochineal was and how its unique properties of color came to be.

One of these men of science, the Scottish physicist James Clerk Maxwell, was interested less in the qualities of a particular dyestuff than in the way in which we perceive that color information. The groundwork for Maxwell's work in optics was based on the trichromatic theory proposed by Thomas Young and Hermann von Helmholtz, which suggested the human eye contained three types of sensors, each receptive to a different part of the spectrum of visible light. These photoreceptors are most manipulated by wavelengths perceived in the brain as red-orange, green and blue-violet, which create white light when mixed. This blending of colored light to produce secondary colors and white is called the additive color model (as opposed to subtractive color in which colors are combined to create black).

Maxwell demonstrated these principles in an 1861 lecture at the Royal Institute in London. He did this by taking three black-and-white photographs of a tartan ribbon, each time with either a red, green, or blue filter placed in front of the lens. At the lecture these black and white slides were projected through the same filters again which, once properly aligned,

combined to form an image of the tartan in full color. The Royal Institute lecture was an unintentional advance in what was by then a decade-long saga of various attempts to document a history of tartan. Maxwell eventually managed to construct an accurate color record of the woven patterns, or “setts.” Originally a cottage industry, tartan would have been made by a weaver who would supply their immediate locale with whatever they were making at the time. With the onset of the industrial revolution, mills had begun producing large amounts of tartans in an array of patterns and colors and needed a system of classification in order to differentiate them all. The largest tartan manufacturer of the 19th century, Wilsons of Bannockburn simply assigned a number initially, but gradually began the practice of naming tartan for no other reason than to evoke famous events, areas, or names. This coincided with a burgeoning romantic revival of highland culture, spearheaded in part by the Highland Society of London, a group that encouraged clan chiefs to send them their clan tartan in a misguided attempt to conserve a clan-tartan system that had never actually existed, but which was now perceived to be under threat.

Clan chiefs, who had no idea what a clan tartan actually was, nonetheless responded to these requests either by writing to a supplier such as Wilson’s or choosing one from the many differing opinions offered by members of the clan. Either way, the result was confusion, and coupled with George IV’s 1922 visit to Scotland, for which Walter Scott encouraged people to don traditional highland wear, a tartan fad ensued among those hungry for history, or the illusion of it. Wilson’s records hold a letter from a vendor that reads, “Please send me a piece of Rose tartan, and if there isn’t one, please send a different pattern and call it Rose.”

Enter John Sobieski Stuart and Charles Edward Stuart, two reportedly dashing brothers rumored to be the grandsons of Bonnie Prince Charlie, who managed to charm their way into Scottish society with tales of their colorful history. They claimed to own a manuscript dating back to the 16th century, which documented over 70 clan tartans. They eventually published a version of this manuscript in a small edition entitled *Vestiarium Scoticum*, illustrated by a curious method called Mauchline machine painting. The technique used a variant on the pantograph, a device that employed a number of arms to copy the movement of a line by tracing and to mechanically reproduce the line either to scale or enlarged.

The Mauchline system modified this process to layer strips of color in an effective mimic of the warp and weft. In so doing, Mauchline developed a lucrative business in tartan-branded souvenirs. Recent study reveals the book to be an elaborate hoax: most of the tartans contained within are thought not to have existed prior to its publication. But many of these tartans had already been accepted as official clan tartans, put into production, and eventually sold to a public eager for sartorial authenticity. Another book published during the same period, *The Clans of the Scottish Highlands*, laid the ground for more confusion, albeit unintentional. Lavish, fantastical illustrations of clansmen looking wistfully across the moors or engaging in sword fights were created by hand-painting color over black-and-white lithographs. This, along with the fading of some inks over time, resulted in color variations from copy to copy of a book that would long be used as a reference for historians and weavers alike.

Despite the faltering attempts of these publications, the mills themselves were able to standardize and expand their range of colors thanks to the nascent chemical dye industry, pioneered by William Henry Perkins. Perkins created mauve dye from coal tar, a by-product of the gas light, and his innovation sparked fierce competition among the businesses that developed, manufactured, and marketed synthesized dyestuffs with increasing colorfastness at decreasing cost. This was the emergence of corporate color.

In addition to introducing a wealth of new shades, scientists managed to replicate exactly the chemical structure of natural dyes. In 1868, two German chemists working for BASF learned how to synthesize Alizarin, a pigment present in madder dye. This, and later the discovery of synthetic indigo, virtually destroyed the market for natural dye and cemented Germany as the market leader (BASF is now the largest chemical company in the world.)

On the cusp of the 19th century, nearly 40 years after Maxwell's key lecture, the world of color photography was full of competing color techniques. Along with the Lumière Brothers' Autochrome, other methods used colored screens in different patterns, some of which resembled the Bayer mosaic of colored filters layered atop photosensors and found in nearly all commercial digital cameras today. The new world of motion

pictures initially worked with color in two ways—the first came from experiments with painting directly onto the print and evolved into the stencil method belonging to the Pathé film company. A series of stencils were cut out frame-by-frame to allow for the application of each given color to each frame. Up to seven colors would be layered onto the print which, once projected, conveyed an impression of full color. A 600-person, mostly female workforce utilized aniline tints (distilled from indigo and essential to the creation of synthetic dye) to color films such as *La Création du Petit Monde* and *Le Lis du Japon* in a half mechanized, half labor-intensive operation reminiscent of the garment industry.

A system called Kinemacolor emerged in the UK around the same time. Kinemacolor consisted of a spinning wheel fitted with red, green, and blue filters, which was positioned behind the lens. Each black-and-white frame recorded the color dictated by one filter. The developed print would then be projected through the same spinning wheel, each frame synchronized with its appropriate color. The film passed through the projector at three times the normal speed, in order for the rapid succession of red, green, and blue images to be read by the brains of the audience as a naturally moving, full color scene. This resulted in a parallax image with a disturbing flicker that was almost painful to watch. The system was modified to use only an orange-red and bluish-green, which together conveyed an approximation of now-absent blue. At the time, film stock was sensitive only to the blue and green range of the color spectrum, causing a further impediment. To make a wholly panchromatic stock, the unexposed film had to be bathed in a series of chemical dyes imported from Germany. Kinemacolor was co-devised by George Albert Smith, who had previously found success in the music halls of London, where he performed as a mesmerist. In one of his acts, Smith would pretend to relay information about various objects (volunteered by the audience) using his mind alone. Smith called his act a demonstration of second sight.

Smith announced the first public screening of Kinemacolor films in 1909 with the subheading, “Animated Scenes and Moving Objects Bioscoped in the Actual Tints of Nature.” Many of the programmed films, such as *View of Brighton Front*, *Riviera Coast Scenes* and *Water Carnival at Villefranche*, were filmed at tourist spots across the UK and abroad to complement the feeling of transformation and wonder at seeing moving

color film for the first time. In his travels, Smith visited Scotland, where he shot *Tartans of the Scottish Clans* as a test of the color reproducing capabilities of the two-filter camera. Filmed in one continuous take, the film shows tartans in full frame, together with their corresponding clan names. Although we cannot see the blue of the Gordon tartan, it registers in the mind the same way as when we see the word “blue.” After a few seconds the piece of tartan is slowly removed by an unseen hand to reveal a new tartan beneath.

After modest success the company began to license the rights to produce Kinemacolor films abroad, with relative popularity in Japan, which filmed adapted Kabuki plays. Meanwhile, the other partner in the company, Charles Urban, produced the greatest Kinemacolor achievement, a documentary about the spectacular ceremonies in India marking the coronation of George V. Known as the Delhi Durbar, the event was a lavish display of the wealth and pomp of empire—the King-Emperor resplendent in sapphires and velvet, honored by various dignitaries, regiments and royalty, along with hundreds of thousands of commoners. The ceremonies spanned four days and included a parade of elephants covered in silver cloth, a group of Highland men blazing bagpipes, a polo tournament and an incredible display involving 50,000 Indian and British troops passing before the King. The Kinemacolor trade catalog pays particular attention to the description of how the various silks and precious stones are replicated on film. One scene is noted for how it “resembles a Dutch tulip garden, owing to the great variety of colors of turbans of the natives.” Titled *With Our King and Queen Through India*, the film was presented at London’s Scala Theater, the stage of which was customized to resemble the Taj Mahal. The film was accompanied by an array of over 40 singers, drummers and bagpipe players.

While Urban was shooting in India, the fledgling Kinemacolor Company of America was working on their first dramatic feature film, since dramatic productions from the UK had been so dire. *The Clansman*, based on the novel of the same name, was shot on location in Louisiana, where it proved too ambitious a project. It never made it to theaters, though the thwarted attempt did inspire D.W. Griffith to make his own version of the story, which eventually became *The Birth of a Nation*. The company went bust in 1914, and almost no American footage survives today.

With the outbreak of war in Europe and the cessation of imports from Germany, the USA faced a severe shortage of dye. Concerns of a dye famine were voiced in April 1915, when it was announced that supplies would last the country only two more months. The looming shortage posed a serious threat to the textile, printing, and automotive industries, the last of which benefited from the chemical color boom by providing customers with a choice of what color car to own. The panic spurred growth in the American dye industry, which until then had struggled to compete with superior German product. The American dye business, small as it was, had been based almost entirely in Brooklyn, with Greenpoint and Williamsburg being particularly popular places to build plants owing to their proximity to Newton Creek and the Gowanus Canal into which the dye effluent was disposed. The resulting pollution and frequent factory explosions led to some resentment among the densely populated neighborhoods. In addition, a number of these companies were producing an extremely toxic bluish-green colorant called Paris Green that caused respiratory problems among factory workers. It was so harsh that it had a second life marketed as rat poison and was commonly used in suicides and murder.

In March 2010, the Environmental Protection Agency announced that the Gowanus Canal would be awarded remedial superfund status, the federal designation given to a site of extreme toxicity. The project, which could take as long as 12 years, would eventually clear the way for developers to construct luxury housing and retail units in renovated industrial buildings now largely occupied by artists. Once dredged, the contaminated sediment will be processed in different ways, finding new form in cement and vapor.

*



Indigofera Tinctoria