

Innovation in Fashion – a very short introduction

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Introduction

This year (2018) the ICOM Costume Committee meeting was being held in the Netherlands, a country below sea level whose inhabitants have been forced to be innovative over centuries in order to preserve their habitat. Therefore this year's theme of 'Fashion & Innovation' seemed a given straightaway. Yet, innovation is such a vast subject that covers so many areas (medical, technological, economic, scientific) that from the 1990's the study of innovation recognised *Regional Systems of Innovation* (RSI) to follow new developments on a micro rather than a macro level. In 2016 – a time of mass migration in the world – the concept of *Migration and Innovation Diffusion* was put forward. It turns out that migrating religious minorities are often key to the diffusion of new ideas and advancement in a variety of fields. A case in point are the protestants who fled the Low Countries during and after the Iconoclasm (1566) to avoid the Spanish inquisition. The Flemish weavers introduced extremely fine cambric (*camericx doeck*) in England as well as the use of starch and are credited with enabling a fashion for large ruffs and cuffs in the Elizabethan era.

Innovation in the Netherlands

Ever since fashion designer Iris van Herpen (1984) graduated from ArtEZ Institute of the Arts Arnhem in 2006 she attracted the attention of the fashion world. After internships at Alexander McQueen (London) and Claudy Jongstra (Amsterdam) she started her own fashion label in 2007 and presented it at the Amsterdam Fashion Week in the same year. Van Herpen stood and still stands out because of her 3D printing, experimenting with new materials and shapes often in collaboration with institutes as the Delft University of Technology. In 2011 she was admitted to the Chambre Syndicale de la Haute Couture in Paris and presented a fashion show of highlights from past collections. Over the years Van Herpen has been granted many awards at home and abroad, and her 3D printed dress was counted among the 50 best inventions of 2011 in the internationally renowned *Time Magazine*. In 2017 she received the Johannes Vermeer Award, the Dutch state prize for the Arts in honour of exceptional artistic talent.

In the fall of 2016 Van Herpen presented a haute couture collection (*Seijaku*) inspired by 'cymatics', a subset of modal vibrational phenomena. In laymen's terms: sounds waves visualised as evolving geometric patterns. In 'cymatics', the higher the frequency of the sound wave, the more complex the visible patterns. Although, Van Herpen didn't use actual sounds or compositions to create her plissé dresses but she experimented with Japanese organza woven from polymer threads five times thinner than human hair. (N. Phelps, *Vogue*, 4-7-2016) In the spring of this year her haute couture collection (*Ludi Naturea*) 'examines the natural and manmade landscape of our world from a bird's-eye view, tracing the laws of entropy', according to Van Herpen's website. (www.irisivanherpen.com) This time leaf-like patterns, as thin as 0.8 mm were printed in 3D by the Delft University of Technology creating a look of foliage. Van Herpen explained: 'Don't forget how engineered nature is, itself. It's

funny how people think that nature is simple and technology is complex – it's the opposite; technology is simple and nature is complex.' (A. Verner, *Vogue*, 22-1-2018)

Yet, Iris van Herpen isn't the only innovator in the Netherlands inspired by nature and our surrounding world. Daan Roosegaarde (1979) is a Dutch artist, designer and inventor who studied at the Academy of Art and Design AKI (Enschede) and graduated with the highest honours. In 2007 he started his own social design lab 'Studio Roosegaarde' in which he works together with a team of designers and engineers in an effort *'to improve daily life in urban environments and spark imagination. Roosegaarde's mantra 'Schoonheid' is a Dutch word which has two meanings: 'beauty' and 'clean' as in clean air, clean energy and clean water.'* (www.studioroosegaarde.net) The latter is a premise for this innovator. Just as Van Herpen Roosegaarde has been showered with awards at home and abroad.

One of his early projects (2010-11) was INTIMACY, consisting of high-tech garments made of smart e-foils which became transparent based on the wearer's interactions with people, creating a sensual play of disclosure. In response to this interaction the wearer's heartbeat would change making the garments more or less transparent accordingly. INTIMACY 1.0 and 2.0 featured wearable dresses composed of leather and smart e-foils which, according to Studio Roosegaarde *'are daringly perfect for the red carpet.'* Not something for the faint hearted! His latest project (2017) WINDVOGEL, are energy generating kites which produce green energy. Floating in the air with their green light emitting cables they create a play of light and new energy. It won him two Dezeen Awards this November.

(<https://www.dezeen.com/2018/11/27/windvogel-studio-roosegaarde-dezeen-awards-design-winners-2018/>)

What exactly is innovation?

<p>OXFORD DICTIONARY: innovation The action or process of innovating A new method, idea, product, etc. Late Middle English: from Latin innovatio(n-), from the verb <i>innovare</i>, 1540's</p> <p>change, alteration, revolution, upheaval, transformation, metamorphosis, reorganization, restructuring, rearrangement, recasting, re-modelling, renovation, restyling, variation new measures, new methods, new devices, novelty, newness, unconventionality, modernization, modernism a break with tradition, a shift of emphasis, a departure, a change of direction</p>	<p>LAROUSSE: innovation Action d'innover ; son résultat Introduction, dans le processus de production et/ou de vente d'un produit, d'un équipement ou d'un procédé nouveau 1297: <i>innovacion</i>, transformation d'une ancienne obligation par substitution d'un nouveau débiteur à l'ancien, seulement terme de droit au Moyen Âge; 1559 : faire des innovations dans l'etat de la chose publique Processus d'influence qui conduit au changement social et dont l'effet consiste à rejeter les normes sociales existantes et à en proposer de nouvelles Changement, création, invention, nouveauté, révolution, transformation</p>
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It is interesting to note that the French word '*innovation*' seems to hold a social element dating from 1559 when the word was limited to legislation and innovations were considered only to be done in the public interest. This is reiterated by the next definition stating that it is a powerful process which causes social change(s) and results in rejecting existing social standards and proposing new norms. In comparison the English interpretation however seems less radical.

Innovation & Production

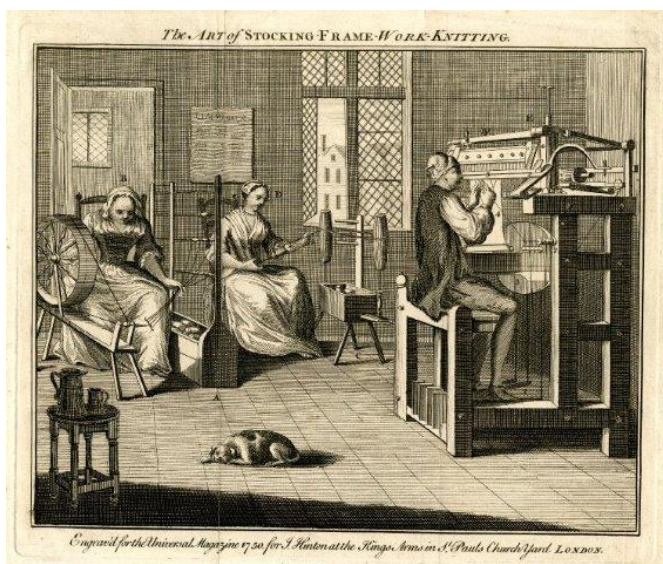


Figure 1: Anon., *The Art of Stocking-Frame-Work-Knitting*, London 1750, British Museum, inv. Y,4.429

The English clergyman William Lee (1563-1614) from Calverston, near Nottingham is credited with inventing the first knitting machine for stockings in 1589 (figure 1). His intentions were obviously to limit the time needed but initially the experienced knitters were much faster than his new contraption. Besides, the hand knitters were extremely worried that this might cost them their jobs and fiercely resisted the introduction of the knitting machine. At first only used for coarse wool and rejected a patent from Queen Elizabeth I, Lee improved his machine to produce finer silk stockings in 1598. Yet, he was still denied a patent as the Queen was worried about the economic and financial consequences. Thus Lee moved to France where set up the manufacture of stockings in Rouen, under the patronage of King Henry IV who unfortunately was assassinated in 1610. But the knitting frame became a permanent feature and on January 23, 1662 it is recorded in Amsterdam that a certain John Keate bought 'two instruments for knitting silk stockings' and paid the very substantial sums of respectively 300 and 200 Carolus Guilders – around and about the annual wage of a master craftsman.

Also in Amsterdam on August 3, 1669 a certain Thomas Gee (maker of silk stockings) sells an 'instrument to make silk stockings' to a councillor of the Elector of Bavaria for 240 'rijxdaalders' – substantially less than for the previous machine. However, if the machine proves to be satisfactory Gee will supply the Elector with three, four or even more of these. Besides, Gee committed his assistant Baye Watson to travel to Munich and stay there for three months to help with the installation and introducing the Bavarian crafts men to the workings of the machine. In both instances the names of the sellers sound very English and it seems to suggest that English crafts men brought the new technique to the continent – i.e. innovative dissemination in action.

Knitting has evolved over the centuries and nowadays most of it is done by machines. But some of the larger fashion brands, such as Dior market their products emphasizing craftsmanship or 'savoir faire'. On April 20, 2018 the digital *Dior Mag* (https://www.dior.com/diormag/en_gb) posted a short film on the production process of their colourful knit jump suit inspired by the work of the famous French sculptor and painter Niki

de Saint Phalle (1930-2002), from their Spring/Summer ready-to-wear collection. The designing of this garments takes place behind a computer in Paris and the necessary data are digitally transferred to the knitting machines in Italy. Nevertheless the human hand is still needed at crucial points in the knitting process – or so Dior leads us to believe. Today human involvement recreates the illusion of the ‘exclusive’ or ‘bespoke’ which has been lost along the way.

Heritage & Innovation

This is probably also one of the reasons why Dior regularly taps into its own heritage and follows an active policy of acquiring many of the highly specialised French artisan workshops and suppliers of the fashion industry, and gather them under one roof. For her Spring/Summer collection 2018 fashion designer Maria Grazia Chiuri envisioned tiered lace skirts and contacted – as *Dior Mag* points out – lace maker *Potencier Broderies* who set up their *Manufacture Broderies- Dentelles* in 1883 in the town of Villers-Outreaux, some 148 kilometres north of Paris (Dept. Nord-Pas-de Calais). *Potencier's* antique sample books provided enough examples of the desired *guipure*, a bobbin lace with a pattern connected by *brides* [large connecting stitches] rather than by a net ground. Once the chosen lace was transferred into a digital design a *guipure*-like fabric was machine made and used for the tiered skirts with a lace effect. Even at this high end of fashion it is not only cost-effectiveness that drives these decisions, it is also a lack of time. And time is of the essence!

Innovation & Speed

Sewing by hand is a time-consuming process and American inventor and businessman Isaac Merritt Singer (1811-1875) tried to find a solution. In 1851 he presented his new and improved domestic sewing machine, based on a Lerow and Blodgett sewing machine he was asked to repair (figure 2).



Figure 2: I.S. Singer, *Sewing machine, patent model*, 1851, Nat. Mus. of American History, Smithsonian Institution, Washington

August 12, 1851 he started his firm *Singer & Co.* and by 1860 he was the world's largest producer. In 1854 the first 'American stitching- and sewing machines' became available in

Amsterdam, but it took until 1864 for the first Singer sewing machines to be advertised in The Netherlands: by an *Eduard Struck* on Kalverstraat in Amsterdam (figure 3).

De meest vermaarde en geperfectioneerde NAAI-MACHINES van **SINGER & C^o**. te New-York, zijn wederom in ruime sortering voorhanden en in werking te zien in het Hoofd-Depôt bij **EDUARD STRUCK**, Fabrickant van SPRING MATRASSËN, etc., Kalverstraat, E 33.

Behalve de wereldberoemde FAMILIE-NAAIMACHINE om te stikken, zoomen, koorden, boorden, rimpelen en soutachères, zijn er zeer soliede bewerkte MACHINES, tot het vervaardigen van Schoenen, Laarzen, Civiel en Militaire Kleederen, Petten, Passement-Gallons, Rijtuig-bekleedingen, Paardentuig, Rokken, Tenten, Zeilen, Bedden en Matrassen, Behangerswerk, Parapluies, Breukbanden enz.

Proefwerk, Prijs-Couranten en Brochures op Franco aanvraag gratis te bekomen in bovengenoemd Magazijn, alwaar mede alle Reparationen en Verbeterigen van alle soorten NAAI-MACHINES worden bewerkstelligd. (1619)

Figure 3: Singer naaimachine, in *Algemeen Handelsblad*, 24-2-1864 (Delpher)

Not only does he sell the 'world famous family [domestic] sewing machine' but also machines for stitching boots, tents, blankets, civil and military uniforms, sails, umbrellas and much more. *Struck* also took care of the repairs and even offered improvements to existing machines. I wonder what *Singer & Co.* will have thought of the latter – they probably were blissfully unaware. In the same year the design for a patented sewing machine for button holes, invented by 'the famous New York tailor Wilhelm Westling' was sold to Singer for \$30.000, according to a Dutch newspaper (figure 4).

— De *New-Yorker Abendzeitung* meldt, dat de bekende kleermaker Wilhelm Westling eene naai-machine om knoopsgaten te maken heeft uitgevonden en zijn daarop verkregen octrooi aan den fabrickant **Singer** voor 30,000 dollars heeft verkocht.

Figure 4: Sewing machine for button holes, *Nieuw Amsterdamsch Handels- & Effectenblad*, 28-4-1863 (Delpher)

Of course other producers wanted a piece of the cake and in 1860 the Parisian firm of *E. Brion Frères* introduced their 'hand- and treadle family [domestic] machines', of which their aptly named '*Bijou*' became a firm favourite (figure 5).



Figure 5: Brion machine, in *Le Miroir Parisien, Journal des Dames et des Demoiselles*, July 1870, Rijksmuseum, inv. RP-P-2009-3554

With the domestic sewing market expanding there was a growing need for patterns and many fashion magazines around the world started including paper patterns in their issues. In the Netherlands *De Gracieuse, Geïllustreerde Aglaja*, published in Amsterdam was the first to pick up on this new trend. During its existence (1862-1937) some 963 separate paper patterns were included (figure 6).

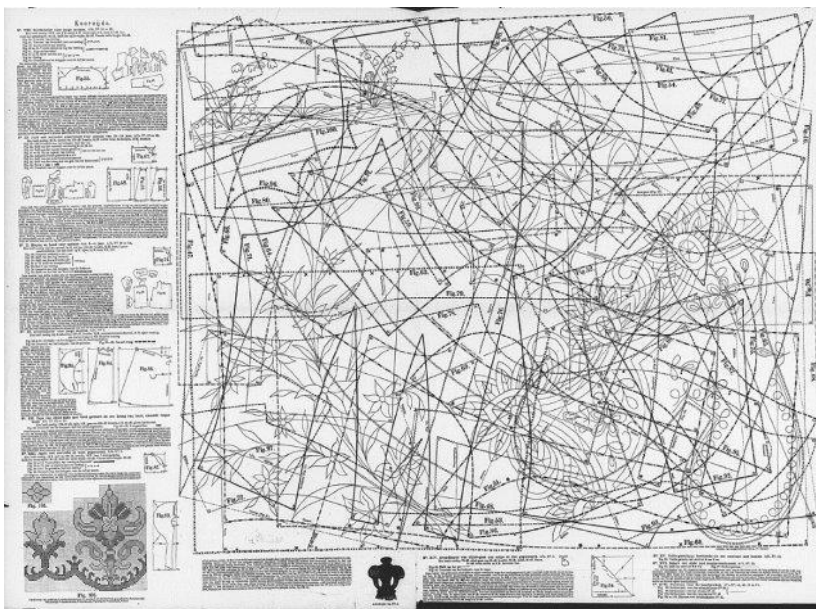


Figure 6: *De Gracieuse, Geïllustreerde Aglaja* 6 (1896), p. 48-4

An annual subscription consisted of 24 issues, illustrated with c. 1000 black and white engravings of patterns of embroidery, needlework, knitting, crochet and a large variety of other techniques as well as patterns for accessories (such as purses, shawls, kerchiefs, sleeves) and simple garments.

Science & Innovation

In 2016 *Surrey NanoSystems* in the UK revealed their Vantablack®, a super-black coating: the darkest man-made substance to date. It is not a paint, nor a pigment or a fabric but consists of millions of carbon nanotubes together forming a coating and was developed for use in space. ‘*Vantablack absorbs virtually all incident light, making it ideally suited to addressing a host of light-suppression and light-management problems. In fact, Vantablack absorbs more than just visible light, and is equally-effective across a whole range of the spectrum that is invisible to the human eye.*’, according to *Surrey NanoSystems* website. (<https://www.surreynanosystems.com/vantablack>) Later that year the high-end Swiss watchmakers *Manufacture Contemporaine du Temps*, in collaboration with British sculptor and artist Anish Kapoor released a limited edition Vantablack watch (*Sequential One – S110 Evo*) which is still available for 95.000 CHF. (<http://www.mctwatches.com/collection/S110%20EVO%20Vantablack>)

In this case the coating was deposited on the back dial as well as on one end of the minutes hand using a spray based process, and resulting in the movement appearing to be suspended in mid-air. In 2018 the German brand *Powerslide* introduced their lace-less performance skate *Powerslide V. Vanta Black*. Although the name refers to the super-black coating there is no mention of it in the promotional material. Perhaps a case of riding the publicity wave of *Surrey NanoSystems*’ invention? Besides, the selling price of c. €200 is a clear giveaway. Another example are the black sneakers *Foempies® Vanta Black* produced and sold by the large Antwerp shoe shop *Drie Koningen Shoe* established in 1964. Marketed as being ‘*the fashion must-have*’, eco-friendly, durable and produced in Europa they retail at only €39,95. A great example of dissemination of innovation, however by name only. Sometimes a new colour is not specially invented but the by-product of other research.

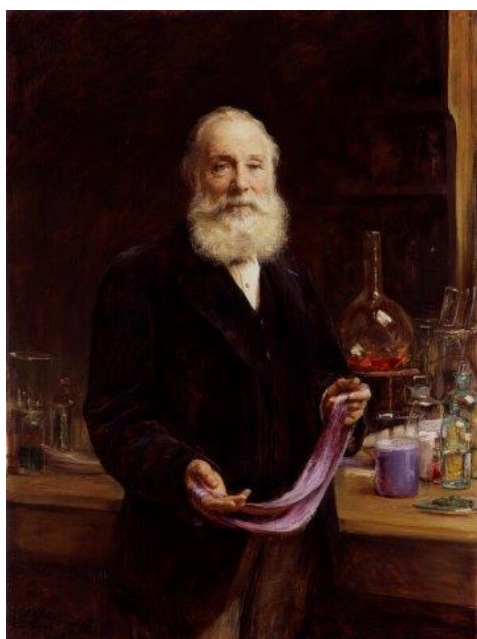


Figure 7: A. Stockdale Cope, *Sir William Henry Perkin*, 1906, National Portrait Gallery, London, inv. 1892

This is what happened to British chemist William Henry Perkin (1838-1907) (figure 7) who from 1853 was working on the chemical reactions of quinine – a drug used in the treatment of malaria and badly needed for the workforces on the plantations of Britain’s vast empire. While undertaking the synthesis of quinine Perkin came up with a bluish substance with excellent dyeing properties that later became known as mauveine, mauve or ‘aniline purple’ (figure 8). It was the first synthetic dye ever produced and was shortly to be followed by many other new and vibrant colours. In 1856 Perkin obtained a patent for the production of

his mauveine dye and set up a factory near Harrow. Of course all the fashionable ladies were craving for a garment in this new colour and obviously Queen Victoria was the first to be presented with fabric for a dress.



Figure 8: Anon., *Sample of silk fabric dyed with mauveine supplied to Queen Victoria for dress, ca. 1860*, Science Museum London, inv. 1947-117

The fashion forward French Empress Eugénie instantly took wearing mauve and introduced the colour on the continent. By 1863 the Dutch government granted permission for the import of aniline as a fluid substance and sales started. According to the first newspaper advertisements now even '*Ladies at the tea table*' could easily dye silk, wool, feathers and such in seven different colours. By 1864 the palette for these home dyers had extended to '*Bleu de Lyon, Blue de Lumière, Fuchsine, Lemon, Orange, Green, Rose, Marengo, Pensé [and] Violet (Reddish Blue), Red (Several)*' and these dyes were made available through chemists around the country.

Innovation today

We are living in a world where innovation is key to preserve our habitat and make future life possible. Sustainability should be our major priority. There is still so much to be done to minimize climate change – or better still, to stop it. Fast fashion is one of the main problems in our field of research and perhaps we can contribute by elaborating more on eco-friendly, durable and sustainable practices and fashions from the past. Smart textiles are very versatile but shouldn't we by now ask ourselves if they are bio-degradable? There is still a lot of innovating to be done...

For further reading

James Essinger, *Jacquard's Web: How a hand-loom led to the birth of the information age*, Oxford 2007, ISBN 978-0-19-280578-2

Jan Hein Furnée, Clé Lesger (eds.), *The Landscape of Consumption: Shopping Streets and Cultures in Western Europe, 1600-1900*, London 2014, ISBN 1349347191

Simon Garfield, *Mauve, How one man invented a colour that changed the world*, London 2002, ISBN 978-0393 323139

Marie O'Mahony, *Advanced Textiles for Health and Wellbeing*, London 2011, ISBN 978-0500515877

Pascal Ory, *L'invention du bronzage*, Paris 2018, ISBN 978-2081422407

Rebecca Pailes-Friedman, *Smart Textiles for Designers: Inventing the Future of Fabric*, London 2016, ISBN 978-1780677323

Joy Spanabel Emery, *A History of the Paper Pattern Industry: The Home Dressmaking Fashion Revolution*, London 2014, ISBN 978-0857858313

Naomi E.A. Tarrant, '“Cut your Coat to Suit your Cloth”: How a Textile Affects the Cut of a Garment', in R. Schwinges & R. Schorta, *Fashion and Clothing in Late Medieval Europe*, Basel 2010 (Abegg Stiftung)