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Tracing the Temporary Thread: Decorative and Functional *Devoré* Textiles of the Early Twentieth Century

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The temporary or supplementary thread has been employed as a supportive structure in the manufacture of utilitarian and decorative woven textiles for over a hundred years. First developed by wool cleaners and finishers during the mid 19th century, the technique has been repeatedly employed to aid innovative yarn and fabric development by some of the textile industry's leading engineers. The devoré technique, also known as burn out, developed from this temporary thread process during the late 1880s. The popularity of devoré with textiles engineers reached its peak in the 1920s when a period of high decoration coincided with innovation in new artificial fibers such as viscose rayon and cellulose acetate. The post war resurgence in textile engineering and fashion designing during the Art Deco period engendered numerous highly decorative devoré and temporary thread processes that utilized metallic, rayon, wire and latex threads.

Fabric Innovation from Established Processes

The devoré procedure of chemically removing single or multiple fibers from a constructed fabric can be traced to the wool cleaning industries of the mid to late 19th century and the carbonizing treatment, employed to remove plant debris trapped within wool fleece. By treating wool in sulphuric acid solution, contaminating plant matter was reduced to dust when the wool was heated.[1] The earliest forms of woven devoré follow the same principle of destruction, only the plant matter was replaced with cotton threads constructed within a wool woven textile.

Initially it was American and European yarn manufacturers who recognised the economic potential of the temporary thread technique.[2] Delicate wool fibers were twisted (spun) with a cotton thread which acted as a secure rigid guide during fabric construction.[3] The earliest forms of fabric patterning using carbonizing treatments favored localised thread removal using printed carbonising pastes, whereupon cotton or linen threads previously twisted with wool or silk threads, and used for the warp or weft (or both), were burnt away revealing delicate lace-like open work effects.

For the early devoré processes to work a chemically vulnerable and chemically resistant fiber were required, with the composition and inter working of the resistant yarn within the

[1] Carbonsing treatments: as a technique burn out traces its origins to textile industries involved in the processing and cleaning of wool, where cellulose debris trapped in wool fibre was removed by saturating the wool stock in a chemical bath and then heating to ensure chemical disintegration of the contaminating matter.

[2] Jacob Steiger, (1882) *Improvements in theProduction of Embroidery.* BP 4143; Frederick Suter, (1883) *Process of Producing open-work fabrics.* US patent 280,094; Louis Chaux. (1883) *Art of Manufacturing Woolen Fabrics from Short-Staple Fibre.* US Patent 288,015; Edward Scheppers and Emile Scheppers, (1887) *Art of Making Fabrics from Coarse Long-Staple Wool or Hair.* US patent 362,317.

[3] Cotton was a popular choice of temporary thread. However, linen and other cheaper cellulose based threads were also employed. When cotton became more valuable than wool the technique was reversed and low quality wools were employed as the temporary thread.

woven textile paramount to the success of the process as it constituted the scaffold, ground or networking of the fabric, sustaining the textiles overall shape and strength.[4]

Therefore, for the successful eradication of a fibre from a two-element weave textile the arrangement of the vulnerable yarn was designed in such a way as to aid the actual creation of the textile. Furthermore, when the temporary yarn was partially removed from the structure of a two or three element weave bands of lightweight yarn or threads could be revealed if, for instance, the vulnerable yarn was woven in strips at irregular intervals and then removed from the textile structure, with reference to Bowman (England,1888) and Stevenson (Ireland,1925).[5] Partial elimination of a vulnerable yarn could also be executed in such a way as to create delicate patterning of satin and pile woven textiles. Often fluid in shape and form, the first devoré patterning of these fabrics (France, 1895) tended to be figurative in style and imitative of popular design trends of the period.[6]

The printed style of woven devoré was largely favored by velvet manufacturers and finishers, as its manufacturing matched their pre-existing procedures and worked well with new automated printing processes. The latter period of the nineteenth century was extraordinary for its development of textile machinery. The pile woven devoré technique was part of this revolution in mass produced decorative textiles. However, while pile woven burn out manufacture during this time was remarkable for its diversity and breadth of practice, the decorative character of the woven burn out product was far from ground breaking with popular patterns and hand work features crudely imitated.[7]

The devoré patterning styles still familiar to us today were actually established in the mid 1920s. Geometric and floral designs were the mainstay of pile devoré textiles created between 1923 and 1935. The design, manufacture and retail of woven devoré textiles experienced considerable development during the 1920s, being influenced by a broad range of economic and social factors, which ultimately resulted in the establishment of new woven devoré textiles structures. The dramatic fluctuations in world trade, advance in textile manufacturing and chemical fiber innovation that influenced the woven textiles industry at this time correspondingly stimulated devoré woven textile manufacturing.

The 1920s woven devoré textile initially appears to have been developed to simulate the structural look of exclusive patterned woven textiles such as brocades, although it is important to note that the style of patterning was not necessarily derived from traditional sources. There is also evidence of a move towards the use of original patterning design within woven devoré textile design at this time, a possible result of the development of floral and then geometric inspired floral prints and weaves. F. J. Ringo in her guide to *Draperies*, published in 1925, inadvertently provides an explanation for using the devoré process to create originally patterned

[4] Later developments proposed two similar fibers could be included within a fabric for burn out treatment, only one fiber was pre-treated with a coating or resist, while the other removed during finishing.

[5] A. J. Bowman, (1925) *Improvements in the Manufacture of Lace and other Reticulated Fabrics from Wool and other similar Animal Fibres.* BP 16,420, 1889; Stevenson and Wakefield, (1925) *Improved Method of Manufacturing Decorated and Mercerised Woven Fabric,* BP Patent 240,378.

[6] Wissel, Girard and Brunier, (1896) *Ornamentation of Velvet*, US patent 556,794.

[7] The lack of pattern development of the technique during the late 19th and early 20th centuries is a reflection of the processes primary purpose that being the creation of decorative pile textile goods that were cheaper to manufacture than woven decorative fabrics, although often equal in quality to the products they aimed to compete with in the market place.

fancy weaves. Accordingly, she noted "Since it is very costly to make Jacquard patterns, cloth with a complicated surface is necessarily expensive. When new patterns are developed, it requires an expenditure of thousands of dollars before a single yard of salable fabric can be produced."[8] Even the creation of new fairly simple pattern was said to have been conservatively estimated at $2000.[9]

Surviving examples of pile woven devoré textiles from this inter war period show three distinct styles of fabric etching that have since become synonymous with the technique.

Figure 1. J. B. Martin devoré velvet in bronze pile with bold floral linear repeat. The sample measures 56cm by 91cm wide. The light face is contrasted against the dark carbonizing (possibly chocolate coloured) print on the background. Photograph by Irving Solero, Courtesy of the Museum at the Fashion Institute of Technology, New York.

The first style has a simple negative design whereby limited areas of pile fiber are removed. This print effect is often linear in style with floral outlines and abstract marks applied as all over repeats (fig. 1). This J. B. Martin pile fabric currently held within the archive at The Museum at F.I.T. in New York was created by printing the fibre destroying chemical on the reverse of the fabric, where the pile loops can easily be detached from the fabric backing.[10] The dark print to the right shows the effect of the carbonsing printing, although this may also have been caused by the application of a coloured devoré paste. Using the fabric colouring and style of the graphic print as a guide a manufacturing date of between 1925 and1928 is likely.

The printing of a devoré pastes onto velvet or other pile fabric backing was easily controllable, with the burnt fiber mechanically brushed out of the fabric. Many early forms of pile woven devoré used this limited etched effect because excessive fiber removal could lead to a weakening of the textiles overall structure. Not until the introduction of innovative lighter weight pile fabrics such as transparent velvets, or 'georgette velvet' during the mid 1920s were larger areas of fiber removal by devoré considered viable.[11]

[8] F. J. Ringo, *Draperies.* (Chicago: A.W. Shaw Company, 1925), p. 24.
[9] The average salary in the USA at this time was approximately half of this cost.
[10] A significant number of woven devoré manufacturers were based in New York and New Jersey during the late 19th century and early 20th century.
[11] 'Georgette' velvet as described by Vogue, "Vogue's Gallery of American Fabrics." *Vogue New York,* (1 September 1927), p. 56.

The popularity of these new velvets and other such pile fabrics with both designers and fashion magazine editors was said to be as a direct result of the new and improved weight of the fabric. The availability of georgette velvet, as reported by Vogue in Sept 1927, with its lightweight sheer backing described at the time as being "scarcely thinner than semi-sheer crêpe," gave designers a striking textile to include within their collections.[12] When profiled in *Vogue's Gallery of American Fabrics*, readers were advised "You could pull a width of it through your favourite bracelet and almost leave room for your arm."[13] Consequently the pile woven devoré textile manufactured with a lightweight silk sheer ground was an inevitable development during this period.

Figure 2. Sample Gg12108-110. Novelties sample book. Liberty of London c. late 1920s -1930. Multi coloured pile fabric with devoré blotch print. Photograph by Anna Buruma, Courtesy of Liberty of London of Archive, London.

The second style of patterning popular with devoré manufacturers promoted the removal of large areas of fiber from a sheer pile fabric, as in the style of a blotch print. The background of a design was frequently destroyed revealing a light weight sheer ground, with reference to Otto Timme (1902).[14] An example of this large scale etch technique is shown in a 'novelty' sample sold through the Liberty of London store during the late 1920s and early 1930s.[15] Printed imagery was first applied to the woven textile which was then enhanced by the secondary removal of the unprinted background revealing a light weight ground weave, frequently referred to by devoré manufacturers of the period as multi-coloured brocade effects (fig. 2).[16] This style of devoré fabric

[12] *Ibid*., p. 59.
[13] *Ibid*., p. 56.
[14] Otto Timme, (1902) *Method of Producing Figured Pile Fabric*, US patent 705,977.
[15] Liberty of London archive fabrics G12108-110. These 3 small swatches from a novelties sample book of fabrics sold within the Liberty of London store show the combining of the burn out technique with colour discharge printing. The fabric was first dyed a dark colour. The floral design was printed using colour discharge, and the burn out print applied subsequently to the reverse of the fabric. Although no indication as to the manufacturing origin of this fabric it has elements of an Arthur Swallow patent registered technique in1926 in association with The Calico Printers' Association Limited, London.
[16] Arthur Swallow & The Calico Printer's Association Ltd, (1926) *Improvements Relating to the Decorative Printing of Textile Fabrics*, BP patent 261,448.

was used for daywear or evening capes and coats and always in conjunction with a slip or other fabric under layer.

Figure 3. Dinner dress and matching coatee, silk crepe and silk velvet pile printed with flowers and fish scale pattern, c.1932-1934.Accession no. 1967.187.85. Courtesy of National Museums Liverpool.

The removal of large areas of pile left always created relief areas of residual pile fiber. Early on in the techniques development this area of pile fiber was rarely shaped but usually designed to fit around a previously applied printed design. Subsequently in the mid-1930s devoré manufacturers began to add shaping to this element creating a floral design or geometric pattern often in association with color printing which was applied to the transparent ground weave on the fabric backing. An example of this style of combined background printing and devoré shaping can be seen in an exciting fish scale print fabric with floral detailing incorporated sparingly into various sections of a structured but low waisted dress and accompanying jacket. (fig. 3). Abstract style carp patterning of white triangles with yellow spots move upwards across the textiles scaffold weave, bunches of tulip flowers in bright yellow and orange are scattered amongst the first print. A blotch print has removed a considerable amount of pile fibre, what remains is shaped in large floral with 6 or 7 petals surrounding small spot of pile fibre, randomly over the fabric some pile fibre is left in the areas of the fish scale print, when this catches the light a reflective silvery effect is created. This dress is part of an extensive wardrobe of clothing donated to National Museums Liverpool, UK and housed as part of the *Mrs Tinne's Wardrobe*, it is thought to be French in origin.[17]

[17] It is possible that this is a Bianchini Férier fabric, although this requires some further research.

Figure 4. Sample G12173. Novelties sample book. Liberty of London c. late 1920s -1930. High lustre devoré viscose rayon or acetate pile floral design. Photograph by Anna Buruma, Courtesy of Liberty of London of Archive, London.

Simpler forms of blotch style devoré print were often employed in unison with single coloured pile fabrics, with the intention of creating a subtle contrast between light weight and sheer colour ground weave and dense pile (fig. 4). The all over decorative patterning created by using the pile motif style of devoré is still employed by contemporary devoré designers, as the fabric has an attractive level of weight and drape suitable for evening wear and dress accessories.

The use of black and white devoré fabrics for evening wear may also suggest the pile fiber may be rayon or acetate in origin. By the early 1930s, black and white cellulose acetate fabrics had become a popular choice of fabric process within the textiles industry, though a distinct name for the devoré effect created by the technique was still lacking.

The development of ‘artificial silk’ filament during the latter part of the nineteenth century had a profound effect on the advancement of the woven devoré process. Popular as an economic substitute for natural silk, even today the preference for its use within woven burn out textiles is apparent. Textile manufacturers of the early twentieth century previously limited to utilizing cottons, other vegetable fibres, silks and wools gradually introduced this ‘new’ fiber within their devoré textiles despite its initial visual and physical limitations.

Figure 5. Dark blue devoré velvet dinner dress c.1932-1934, possibly silk viscose velvet. Accession no. 1967.187.513. Courtesy of National Museums Liverpool.

The final and third style of devoré designing fashionable during this period combines the first and second styles often using a metallic thread within the weft. The technique is illustrated by a sample also part of the *Mrs Tinne's Wardrobe* archive at the National Museums Liverpool (fig. 5). Areas of patterning are created either by using the visible scaffold or the remaining pile motif, a balance of negative and positive printing with bold silhouette leaf etched shapes. In this instance a fluid semi-geometric design moves along the length of the fabric. This style of devoré removes approximately 25% of the pile weave. Therefore, the weight of the finished textile is heavier than the second process but lighter than the first minimal etching style.

By 1930 woven pile devoré was regularly employed in conjunction with bright colour and bleach prints. Moreover, the woven devoré process at the beginning of the 1930s clearly underwent a resurgence of development. A time of relative stability had given textile inventors an opportunity to take advantage of new fibres and mixed fibre fabrics. For the most part woven devoré manufacture during the mid 1930s remained orientated towards the production of textiles that were considered purely ornamental in purpose.

For example, a Bianchini-Férier devoré sample of black chiffon velvet with burn out design of hollyhocks has a pile yarn made of rayon and a crêpe yarn for the ground weave, a style of fabric highly popular from the winter season of 1925 and 1926 onward (fig. 6).[18]

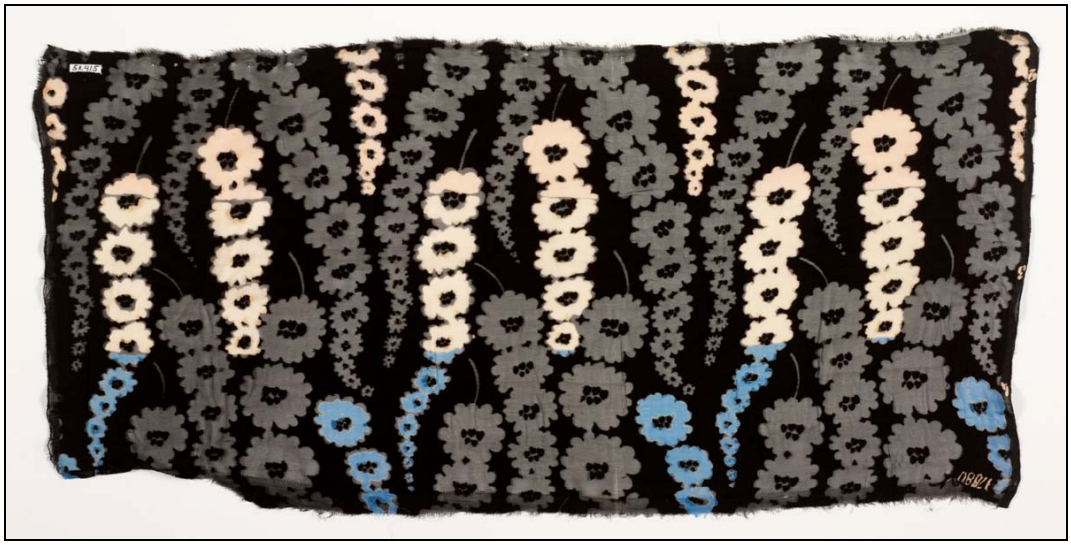

Figure 6. Devoré printed silk viscose rayon velvet. Bianchini-Férier sample 51.415. Courtesy, The Museum of Art. R.I.S.D.

The use of plain and colour discharge in the areas of devoré print is unusual. An enlargement of this sample reveals a print repeat line from plain bleach to colour. It is possible that the colour and plain discharge prints were applied to the back of the fabric and then steamed and over printed with the devoré, or the devoré print was applied to the front of the pile fabric and the colour and plain discharge print to the reverse at the same time, as in duplex printing. What is clear from this fabric is that the devoré and discharge paste were not combined, as the edge of the devoré is considerable wider than the discharge print.

[18] Bianchini-Férier devoré sample described by Madelyn Shaw, Curator at The Museum at R. I. S. D., as a "black chiffon velvet with burn out design of spikes of flowers, overprinted with same design in different colors, not aligned with the burnout design; Chiffon type semi sheer ground is alternating S and Z twist yarns."

Colour printed devoré textile production was further enhanced by the establishment of hand screen-printing fabric methods. This process developed during the 1920s and 1930s, presented an expressive and rapid means by which to create devoré prints with a variety of colours and on a range of woven fabrics, and used primarily in conjunction with 'art silks' such as viscose and acetate rayons**.** Generally it was the couture fashion designer who found this new printing process to be incredibly versatile as it allowed for the creation of smaller fabric runs that were essentially more exclusive in their manufacture. Moreover, screen printing fabrics provided a means of counterbalancing the mass production and standardization of interior and dress textiles. For the producers of woven devoré fabrics the screen-printing process was found to work equally well with any style of chemical devoré pastes.

The impact of world economics on the manufacturer and consumer of woven textiles, and textiles goods in general, was also reflected in the development of woven devoré techniques registered during the 1930s. Cellulose acetate remained a popular fibre on which to base woven devoré techniques as it had considerably reduced in cost, with the printing of destructive pastes rather than the dissolution of fibres seemingly much preferred as the chemical expenditure was significantly cheaper. A series of devoré processes were developed for use in association with acetate filament. Acetate fibre because of its manufacturing process was known to dissolve in acetone, while triacetate swelled, weakened, or dissolved. A printed solvent for the patterning of cellulose acetate velvet was first suggested by Camille Dreyfus in 1924 (for Celanese), while René Clavel proposed the partial destruction of cellulose acetate while simultaneously adding a metallic powder to the fabric. Ellis, Olpin and Walker, working for The Celanese Corporation of America, also proposed a "weakening agent" (a solvent for cellulose acetate) be applied to the back of a pile fabric by stenciling or spraying to loosen the connection of acetate rayon pile fibre to its backing of silk, wool, cotton or artificial filament (though not a cellulose derivative). A series of patents that promoted the decorative etching of cellulose derivatives fabrics also refer to the practice of saponification, in this instance the localized conversion of the derivative of cellulose fibre to a cellulose fibre (as in cotton or regenerated cellulose fibre such as viscose,) which exploits the effects of a strong base on acetate.[19]

In the dress textile market an increase in the use of velvets in the early 1930s was regarded as a consequence of the development of crush resistant velvets. Meanwhile, other popular novelty dress velvets such as tinsel velvets, "Cellophane" velvets and glass velvet were also in existence prior to 1936.[20] The development of more unusual fibres and woven textile products intended to be economical, hard wearing and generally functional, such as those made of rubber, were also created by means of woven devoré manufacture during this time. The velvet devoré innovator Carl T. Pastor envisaged rubber thread being formed into woven or knitted textiles, to create partially elastic and non-elastic textiles suitable for belts and bandages, corsets and under wear which importantly retained their manufactured form. While wire and difficult to control metallic threads were also wrapped with cotton and silk threads to ensure successful manufacture, such products were used for accessories and early radar equipment.[21]

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[19] Rivat and Dreyfus for the Celanese Corporation of America. (1931). *Process of Treating Fabrics.* US patent 1,818,505; René Clavel, (1928) *Process of Obtaining Metallic Effects on Fabrics containing Organic Derivatives of Cellulose.* US patent 1,694,466; Ellis, Olpin, Walker, Celanese Corporation of America, (1930). *Treatments of Fabrics*. US Patent 1,783,608.

[20] B. S. Hillman, "Soda Prints on Pile Fabrics," *Rayon and Melliand Textile Monthly* (1936):71. Note Cellophane fibre was manufactured in much the same way as viscose rayon.

[21] C. T. Pastor, (1933/7) Process to make Rubber Textiles and Rubber Thread Textiles, US patent 2,095,529.

Towards the end of the 1930s woven devoré was still utilized in the generation of new textile products. However, it was the design and manipulation of fibers including new techniques of coloration and chemical treatments that clearly interested the majority of its innovators. With the onset of the Second World War the innovation of woven devoré processes was immediately halted. Although devoré was designed to be a process that was popularly employed in the creation of economical textiles, the destructive nature of its approach meant in times of true shortage it was materially expensive in its use of raw fiber.

The woven devoré technique continues to be employed by artists and designers and the fabrics use within couture and retail collections is on the increase. However, the limited and repetitive fabric weaves that are employed seem to lack the glitz and glamour of their Art deco period forebears. The reliance on two or three yarns, for instance viscose rayon, silk, wool and polyester in particular, and limited design development is either a consequence of the necessary environmental risk assessment policies now in place within the textiles industry or we are not as bold and adventurous in our every day dress and no longer see a connection of these beautiful 1920s and 1930s fabrics, remarkable for their manufacturing and design innovation, and our modern way of living and dressing.

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