

GUIDO LENGWILER

A HISTORY

HOW AN ART

OF SCREEN

EVOLVED INTO

PRINTING

AN INDUSTRY

Design: Naomi MacDougall, Vancouver

As the screen printing industry rapidly expands, it is important for imagers to remember the history of how it all started. Guido Lengwiler, a teacher of screen printing at the Schule fuer Gestaltung Bern und Biel, Switzerland (Bern and Biel School of Design) and Academy of Screen and Digital Printing Technologies (ASDPT) member, documented the forgotten past of screen printing beginning in the first half of the 20th century. His book, *A History of Screen Printing: How an Art Evolved into an Industry*, won the 2014 Dave Swormstedt, Sr. Memorial

Award for his exceptional writing ability and industry insight — and for bringing the past back to life.

*This article was excerpted from Lengwiler's book, *The History of Screen Printing* and has been reprinted here with express consent.*

Decoration and Sign Painting

Open stencils were used for decorating walls, furniture, textiles and other everyday objects into the 20th century. In both Europe and America, churches and public buildings, as well as upper middle class homes, were decorated using stencils,

Guido Lengwiler, Author, *A History of Screen Printing — How an Art Evolved into an Industry*



KALEIDOSCOPE par Ad. et M. - P. Verneuil

PL. 13

Pochoir by Maurice Verneuil. From the "Kaleidoscope" series, France, circa 1925 (image size approx. 11.5 by 14 inches).

usually in bold colors. This was the simplest method for creating colorful ornamentation or other repeating patterns in rooms or stairwells. House painters and ornamental painters both used this technique. In many cases, a selection of prefabricated stencils was available from which the client could choose the desired pattern. Sometimes stencil techniques would be combined with painting as well.

Stencil Coloring

Printed matter in Europe and Asia was also largely colored by means of stencils leading up to the 20th century. First, the outline of a motif was printed in a single color (in woodcut technique, for example) and the other colors were stenciled on afterward. Stencil coloring required less technical effort than multicolored woodcut printing, and was more economical than hand coloring.

In medieval Europe, colored playing cards were among the first types of popular printed material to be produced in large runs. In the 19th century, stencil coloring was used mainly to produce illustrated broadsheets in France and Germany. These depicted subjects from religion, folklore, the natural sciences, militaria and fairy tales, among others. At the beginning of the 19th century, they were still being printed in runs of a few hundred, but with the introduction of lithography at mid-century, the print runs grew to tens of thousands in many cases. The prints were produced in factories where the work process was divided up and performed by various specialists: Illustrators, lithographers and colorists. The sheets were colored primarily by means of cardboard stencils and brushes. Large factories employed hundreds of colorists for this purpose, often including children. Sometimes coloring work was done as home labor, or contracted out to prisons.

Art Deco

Between 1895 and 1935, open stencils were used in France to decorate books, magazines and art journals. Both the stencils and the finished prints were called pochoirs. The artisanal and artistic high point of this technique came during the Art Deco era. Artists worked together in ateliers specializing in pochoir work. Jean Saudé's atelier in Paris, perhaps the most important of them, perfected the technique. Working from an original, the artist would first determine the number of stencils needed for duplication. The image — often just the outlines of the image — was then printed in a single color, in intaglio or lithography. Using these pre-printed images, the stencils could be positioned in exact register and the colors applied with soft brushes. Thin zinc or copper plates were used as the stencil material, as well as impregnated cardboard or celluloid. Coloring was done with gouache ink, which would be applied in an opaque layer or as a glaze, depending on the design.

Starting in the mid-19th century, patents were filed in the United States and Europe for methods of creating open stencils, the pieces of which were connected to one another by ties. In the decades before the turn of the 20th century, methods were patented that attempted to eliminate these ties, since they were nonprinting elements. The various methods proposed involved connecting the stencil sections with overlying bridges, wires or grids, or

the use of a second stencil in order to avoid nonprinting areas.

Silk Gauze as a Stencil Carrier

By the end of the 19th century, the main stencil carrier materials used in the US were wire grids and wire mesh. However, there as in Europe, woven fabrics like silk gauze were being used to an increasing extent. Silk gauze, or bolting cloth, was originally used for sifting flour, and was manufactured primarily in Switzerland and France. Patents filed by William Henay (USA, 1899 —an improved version of his 1897 patent), Antoine Vericel (USA, 1902), Hiram Deeks (USA, 1903), Jehan Raymond (France and England, 1906), Arthur Bostwick (USA, filed 1907, effective from 1914) and Samuel Simon (England, 1907) all mentioned silk gauze. This precision-woven gauze was available in various degrees of fineness and had good ink permeability, making it possible to produce perfect prints.

Duplicating machines in which the printing form consisted of coarse-fibered stencil paper (the master) were used in office work well into the 1970s. They made it possible to produce several thousand copies of texts or simple artwork with little technical effort.

In 1887, Charles Nelson Jones, a professor of mathematics at the University of Michigan, got a patent for a stencil printer that took the technology one step further than Gestetner's Cyclostyle. In this device, the stencil frame was raised and lowered automatically by spring mechanisms. A foot pedal actuated the process, so the operator could concentrate on placing and removing the sheets of paper and working the roller. First the printing frame was covered with a silk or linen mesh, which acted as the base for the paper. The paper stuck to it during printing because of the adhesive power of the ink on the mesh. There is no record of whether Jones' printer was ever mass-produced and marketed. This version of the technology never caught on in the market.

The stencil duplicators built from the 1890s on bore a remarkable resemblance to the first screen printing presses at the beginning of the 20th century. Both technologies involved devices with a flat plate and a stencil frame covered with silk gauze that could be opened and closed on a hinge. Elinor Noteboom even postulated a direct connection between Charles Nelson Jones' invention and the later development of the screen



Instructions for coloring. Jean Saudé, France, 1925. Swiss National Library



Gestetner's Neo-Cyclostyle Stencil Duplicator, late 19th century

No. 628,315.

Patented July 4, 1899.

A. HABERSTROH.
ART OF MAKING STENCILS.

(Application filed Feb. 13, 1899.)

(No Model.)

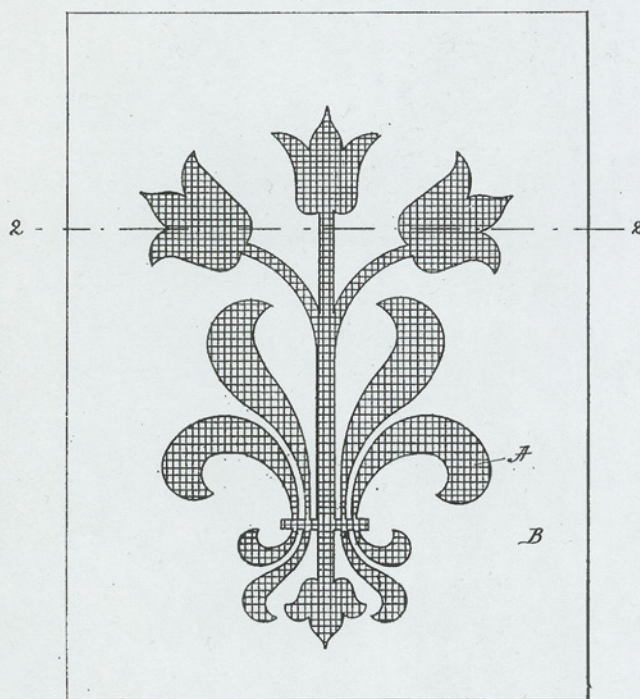


Fig. 1.

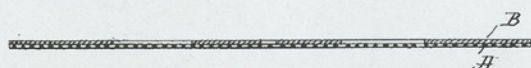


Fig. 2.

Witnesses.
Karl A. Andrin
Sydney Harris.

Inventor.
Albert Haberstroh
By *Alban Kudzu his atty*

Illustration from patent application by Albert Haberstroh, 1899

duplicators evolved along separate lines from screen printing, eventually leading to the creation of offset duplicators and photocopiers. We can, however, neither reject nor verify the possibility that their widespread use at the turn of the century may have provided some stimulus for the development of the screen process.

Felt pennants as the first major screen printed products

Felt pennants were popular souvenirs in the US starting in the early 20th century. They sold very well at major events and fairs, in amusement parks, schools and colleges, and on commemoration days and holidays. They came in various sizes ranging from about eight inches to a yard in length. By the end of the 1900s, the pennants were being lettered with simple texts, such as the name of a city or a school. Each letter would be cut out individually from felt and sewn onto the pennant by hand, a time-consuming task. This production method called for fairly large letters, since small ones did not lend themselves to the sewing process. The ability to print on felt made it possible to produce the pennants more efficiently, and opened up the creative possibilities to include illustrations as well. In 1927, the screen printing pioneer Edward Owens described the situation:

"Twenty-five years ago a popular form of decorative souvenir was at its height. This was the college pennant and consisted of felt letters sewed upon a felt field of contrasting color. The vogue of the all-felt pennant gradually widened to other uses. Gradually souvenir merchants began to sell them bearing city names or commemorating special events and celebrations. As automobiles increased in number, the custom of flaunting a pennant from the hometown also became prevalent. It was immediately following this era that advertisers saw possibilities in the pennant for advertising their wares, but the limitations of the all-felt sewed pennant for pictorial illustration and small lettering was far from adequate for their purpose. It was with open arms that the advertiser took a new type of pennant, which presently appeared. The 'innovation' was of the same general character as the college pennant, but in place of sewed letters it bore in paint colors a fairly representative illustration, sufficiently small to enable an advertising text to be displayed on the felt field. The tieless stencil made this possible."

printing process. However, no sources have yet been found to document this. The authors of journal articles and books during the early years of screen printing do not mention the stencil duplicators used in office work. Likewise, the developers and manufacturers of the duplicators never suggested that the adoption of their technology might have led to the development of the screen process. The



The first major screen printed products: Souvenir felt pennants. Postcard, circa 1910s.

Before screen printing became the established method for printing on pennants, illustrations (quite unusual at the time) were applied by block printing, or automated letterpress for larger runs. The weakness in this process proved to be the thin color application: Single-color printing with black ink was the only way to get opaque prints on colored pennants. For multicolored illustrations, the outlines of the design had to be printed on white felt, and then colored in with airbrush using cutout stencils and transparent inks. If the customer desired, the decorated white felt piece could then be sewn onto colored felt to make a complete pennant. The screen process made it possible, for the first time, to print a complete colored pennant with opaque ink coverage in any color desired, thus eliminating the need to stitch pennant sections together or sew on letters — text and images both could now be printed in a single step. Often the design would be printed in white ink and then colored with airbrush, which was typical at that time.

The change over to screen printing took place within a short time: Until the late 1900s, pennants were still mostly being made with sewn-on lettering, but then the screen printing process, which was more economical and provided better ink coverage, took hold. Manufacturers in New York and the Midwest led the way. Examples of pennants dating from 1908 exhibit high-quality screen printing work.

After that time, only elaborately decorated pennants in small runs were still being made with sewn lettering.

Graphic screen printing originated in California. The process was actually borrowed from the field of felt pennant printing and then adapted for printing signs, posters, displays, etc. The Pacific Printer & Publisher article mentions the most important figures involved in making the process a technological and commercial success. However, the collaboration among these parties also contained an element of competition, apparently even to the point of conspiracies.

Three companies played a decisive role in the development of graphic screen printing: Velvetone and Selectasine in San Francisco, and Vitachrome in Los Angeles. The Velvetone Company, founded as a sign painting shop by Frank Otokar Brant in 1908, was first on the scene. Velvetone did its first screen printing jobs starting in 1912, and for decades it was among the leading graphic screen printing firms in America. Selectasine was founded in 1915 and Vitachrome followed one year later. During this early period, the three companies were connected in a variety of ways. The events can be reconstructed from four sources: Brant's autobiographical notes; the sometimes divergent reports from Selectasine's founders, Roy Beck and Edward Owens; and those of Charles Peter, a graphic artist who was a friend of Owens.



Felt pennant, circa 1912, 24 inches long. Unknown manufacturer. Printed from a photographic stencil with four-color brush and airbrush coloring.



Selectasine played the decisive role in spreading the screen printing process within the graphics industry by granting licensing rights for the technology it had patented in 1918. Selectasine's process represented an innovative complement to lithography, the dominant image printing process in the market at that time. Screen printing had some crucial benefits compared to lithography: It was more profitable for smaller runs but was also suitable for large formats. The process also permitted printing opaque colors on materials like cardboard, tin, wood, glass and textiles — materials that could not be used in lithography at all, or only with great difficulty.

Why was Selectasine able to sell licensing rights for so long for a printing process that had been known since the early 20th century and described in technical literature? The key to its success came in the form of the comprehensive service package that the company offered. In addition to the basic licensing rights for the "single screen" process, the package included training by instructors, directions for making screens, formulas for the inks to be used, as well as the option to rent printing presses. In 1923, Selectasine produced a handbook that was provided to the licensees on loan. It contained detailed instructions for various stencil and printing techniques, with corresponding printed samples, as well as for building printing equipment, along with information on the supply industry. Selectasine held the copyright on many of the instructions. All printed sheets had to be marked with the patent

number. Starting in 1925, the licensees were periodically updated on the latest developments in the process through bulletins ("Service Features").

In 1924 Selectasine began developing the first automated printing presses with comparatively high speeds. However, according to the terms of the license agreement, the presses could only be rented, not purchased. This bound the licensees even more tightly to Selectasine.

"This method is now used very little"

Starting in the 1930s, printers and sign or poster painters had an ever-increasing range of inks, stencil products and printing equipment to choose from. Articles and books provided detailed information about the process. Despite all its vigilance, Selectasine was not able to protect its patent in the long run. Demands for compliance went unheeded — why should anyone pay license fees for a printing technique that was common knowledge? Bert Zahn described the "single screen" process in detail in 1930, and just eight years later the industry writer Jacob Israel Biegeleisen observed that the once revolutionary process had rapidly lost its relevance because screen printing technology had changed. Although the relief-type color application characteristic of the Selectasine process had once been in favor, people now preferred applying thin layers of color, which consumed less ink and dried faster.

With the advent of ready-made hand-cut stencil films, the single screen process finally became obsolete, and was replaced by the multiple screen technique: Now an individual screen was made for each printing color, and the colors were printed side by side. Selectasine had to reorient itself within the growing screen printing market, and therefore became a provider of screen printing supplies.

Vitachrome Company, Los Angeles

In 1916 Young & McCallister, an important letterpress printer located in Los Angeles, adopted the Selectasine process and set up a separate department for graphic screen printing work, which was given the name Vitachrome. Like Velvetone, it was among the first licensees of the Selectasine patent. John Pilsworth first made Young & McCallister aware of the process; despite any personal differences, he was still supportive of it. Vitachrome became an independent company in 1926, and today it is probably the oldest active screen printer in the world. Along with Velvetone and Selectasine, Vitachrome was one of the pioneering firms in graphic screen printing.

Young & McCallister, "The First Fine Printer of Los Angeles"

The printing house began life in 1912 as a partnership between Frederick Arthur Young (1875–1949) and Albert Bruce McCallister (1881–1945). Young was born in Wakefield, England. He became a letterpress printer and emigrated to America in 1907, starting a small printing house in Los Angeles. McCallister, born in South Dakota, began doing odd jobs at a newspaper printing company after school when he was just 10 years old, and over time, he acquired considerable expertise as a printer.

Tonge Art Company, Los Angeles

In 1918 the artist Gilbert Tonge joined the Velvetone Poster Company. "He was an excellent artist and designer and had a number of accounts, such as The Gunes Cigar Co., etc.," Brant recalled. "Tonge had done some work for us before so we knew him well and so we were glad to get him to share our miseries. [...] He loved to sell rather than do artwork for which he was best fitted. His jobs were never very profitable because he would forget such extra items as die cutting easels, shipping costs, etc., but it all helped." Tonge left the company in 1922 and founded his own screen printing shop in the same year, Tonge Art Company, specializing in elaborate, high-quality art reproductions.

He first became acquainted with the paintings of Fred Grayson Sayre (1879–1939), one of the most important early California Impressionists, at an exhibition in San Francisco in 1922. In his gouache paintings, Sayre often applied paint in several layers, using tiny brush strokes. Tonge became fascinated with the

idea of reproducing these works by the screen process, still in gouache and with comparable color composition, and he suggested as much to Sayre. This would lead to years of collaboration between the two. Tonge reproduced seven of Sayre's works in gouache in as many as 30 colors. Between his use of the screen printing process and the large number of colors, Tonge achieved an unparalleled level of quality. For almost a decade, Tonge's prints were referred to not as silk screen prints, but as "Sayrographs," which gives some idea of the uniqueness of the resulting products. He rightly considered himself the "originator of the art replica." Three decades would pass before this technique was refined by Günter Dietz (1919–1995) in Germany; in 1964 Dietz began using photographic images of the paintings in order to create color separations, and sometimes printed in up to 180 colors.

Vanton Company, Los Angeles

At some point before 1928, Tonge and the art publisher John Henry Van Patten started the Vanton Company in Los Angeles, which absorbed the existing Tonge Art Company. The name was derived from the first syllables of the founders' names.

Although the Vanton Company also made traditional advertising items like displays, posters, signs, calendars and decals, its primary business was printing oil painting replicas. Six works by the Californian artists Edgar Payne, Duncan Gleason, David Stirling and Tonge himself were reproduced in oils in up to 50 colors. The Vanton Company did not use the Selectasine single screen process, but rather created one screen for each color printed (multiple screen process). About 2000 copies per original could be produced in a period of three months. The substrate was either plain cardboard or canvas-covered cardboard, with the latter bringing a higher price. Both types were sold ready framed. The large number of colors, use of oil paints on canvas, and heavy color application resulted in replicas that looked like originals. They could even fool experts: Until just a few years ago, Tonge replicas were being mistakenly auctioned as the artists' original work — for tens of thousands of dollars.

Moving Through the 20th Century

Screen printing got its foothold in Canada and Australia after World War I and in England in the mid-1920s, but it took longer to reach the European continent.



Stencil for decorating building facades, France, 20th century. 11 by 12 inches

The Selectasine process made its way from England to Zurich in 1926, with the direct involvement of the painter Hans Caspar Ulrich. With support from the Swiss bolting cloth manufacturers, he became deeply involved in learning the process and spent several months studying it in the United States. While there, he had contact with the leading screen printing firms of the day. His observations—several notebooks full of handwritten comments and drawings—give us unprecedented insight into the early years of the process, and complement the records left by the American pioneers.

The outbreak of World War II caused a dramatic decline in the advertising industry, which often threatened the survival of the printing houses. They faced additional difficulties in the form of government rationing programs, which affected even common items like paper and cardboard, and the loss of trained workers to the draft. The sharp decline in indoor and outdoor advertising and

lettering work is attested to by the size of the journal *Signs of the Times* during the war years: Throughout the 1930s and up to America's entry into the war in 1941, issue length was 100 to 110 pages, but in 1942 this dropped to 80 pages, and then to an average of 60 pages in 1943. The last two years of the war saw an increase to 80 pages or more.

For the screen printing industry, this slump in the advertising sector was offset by an increase in government work, which included propaganda posters and various military applications, ranging from maps to marking aircraft and other equipment. "The importance of screen process printing to many manufacturers can best be demonstrated by the extensive development and use of it in this wartime period. To all of us in the process field this is obvious, as we are working on orders that seem quite divorced from the advertising field, for which we know the method was originally developed."

Stencil Making

Stencil making represents just a small part of the overall production process today, but in the first few decades of the 20th century it was one of the biggest jobs. Creating stencils by hand required intricate drawing or cutting work, and photographic stencils often involved numerous steps, from preparing one's own photo emulsion to post-hardening of the exposed screens. Thanks to modern materials, good printing results that once required years of professional experience can now be achieved by laymen, sometimes after just a one-day training course. "It used to take a stencil maker a day to make a screen that is now cut in 30 minutes," Bert Zahn recalled in 1950. That made it all the more painful to lose a screen, perhaps because the stencil pieces failed to adhere properly or the mesh ripped. At that time there were many more potential sources of trouble during stencil production than there are today. Nevertheless, even with the rudimentary tools at hand, it was possible to achieve results that come up to modern standards of quality.

Profilm, "a tremendous boost for the process"

In May 1929, Louis Francis D'Autremont (1891–1982) filed a patent for his duplex stencil paper, which simplified stencil production significantly. It was sold under

the trade name of Profilm. Its two layers were a transparent paper backing and a stencil layer consisting of shellac. The Profilm was laid over the image to be printed and the design was cut into the shellac layer without cutting through the backing, which left all the elements of the stencil in place and in register. After the printing areas had been removed and the shellac layer ironed onto the screen, the backing was peeled away. It was possible to achieve good results even with cheap ordinary screens because of the sharp edges and absence of sawtoothing. D'Autremont described the advantages of his invention: "The principal feature of this material is that it is transparent and can be placed over the most colorful design and all colors plainly distinguished through it. This, of course, simplifies the operation of cutting and registration when working on a number of colors. [...] After using, the screen can be cleaned very quickly and another stencil film placed thereon. [...] Thus the most colorful member of the printing crafts, the paint process, is coming rapidly to the front and proving to be an equal, if not an improvement, over lithographing and printing on certain classes of work."

The History of Screen Printing is available for purchase on Amazon.com or STMediaBooks.com

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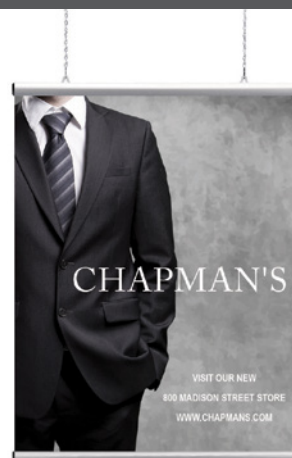
About the book project:

With support from the Academy of Screen and Digital Printing Technologies and industry, this valuable historical document was able to be produced in book form. Christoph Tobler, CEO of Sefar Holding AG, has been involved with the project for nearly a decade. He and his company have played a vital role in making this book a reality. The late Richard Eisenbeiss and his son R. David, president of the KIWO group (Kissel & Wolf) and the Ulano Corporation, have also provided their ardent support for many years. Eisenbeiss brought a binder with a working manuscript to the annual ASDPT luncheon in 2008, where members were so impressed with the research Guido had conducted, and the stunning photos he had collected, they began the long process of gathering sponsors in order to edit, translate, design and print the 496 page book in both its native German and in English. SGIA, Proell, Nazdar, M&R, Ryonet, Printcolor, Serico, Vitachrome Graphics, Grunig, Newman Roller Frames, Fimor, RH Solutions, Edition Domberger, and individual ASDPT members all contributed to publish the book.

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