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Jakob Schlaepfer: A case study in laser innovation and the unexpected

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Abstract

This report aims to counter some assumptions about the nature of industrial technology by exploring the creative potential of the distancing effect inherent in laser materials processing.

A case study of an industrially based project involving the textile company Jakob Schlaepfer, based in St Gallen, Switzerland, will provide the research material and underpin the report. The case study presents the development and expansion, by Schlaepfer, of self-customized laser technologies and how different laser processes have come to form an integral part of the design and production innovation process. Through this historical picture of Schlaepfer's commitment to new technologies and investments that encourage innovation, we aim to offer two propositions that are facilitated by the distance inherent in the creative use of lasers.

Firstly, that it is possible to utilize technologies normally linked with impersonalized standardization in production, to instead create experimental products; and secondly, that technologies normally used to repeat and replicate the unexpectedly unique capacities of traditional making, can be in-themselves capable of un-programmed unpredictability.

Report

This report aims to counter some assumptions about the nature of industrial production by exploring the creative potential of the distancing effect inherent in laser materials processing. Case study material illustrates the development and expansion of laser technologies at the textile company Jakob Schlaepfer, and how different laser processes have come to form an integral part of the company's innovation process.

The craft object is often perceived to embody qualities such as flexibility, intimacy, uniqueness and variety, afforded by the integration of design and production; whereas, the industrial product is thought to have qualities such as standardization, routine and precision, rendered by the distancing effect of mechanized production. However, design theorists and historians generally agree that there is a complex overlapping of industrial design and craft practices. Friedman for example, proposed that 'many of the acts of design, especially the physical acts, [are] embodied in craft practice and guild tradition' (Friedman 2000: 8). For Friedman, 'craft practice gradually evolved into a distinct practice of design only in the aftermath of the industrial revolution' (Friedman 2000: 8). Woolley's more recent contribution to this debate supports the concept that the once polarized position of craft to design is now problematized. The contemporary designer/maker may, for instance, 'draw on traditional techniques [and the] traditional craftsperson may create both one-off's whilst also engaging in batch production' (Woolley 2008). This constitutes a blurring of the boundaries of craft and design.

Woolley suggests that

> the craft versus design debate centres on the validity, or otherwise, of employing technologies that are perceived as intervening between the physical presence of the maker and the object, as Aldersey-Williams suggests, 'a tool or technology always distances [the] maker from [the] object'.
>
> (Woolley 2008)

A key to the concept that technology distances the maker from the object is how great the distance afforded by technology can become before the object produced is diluted of its craft. For today's makers the relationship between making and the use of intelligent technological tools is therefore significant. Many new and sophisticated tools that inspire and enable unique craft forms are available and celebrated. Similarly, ‘flexible post-industrial production systems that involve less division of labour and greater flexibility [can] be closely associated with craft practices’ (Autonomatic 2010). For some, however, when hand-held tools or primitive technologies are not integral to the made object, the object cannot be properly claimed to be crafted and therefore personalized, unique and non-standardized. In this sense, more complex technologies continue, by extension, to be perceived, by some, to have negative connotations.

Lasers are perceived to be a classic example of a complex technology. This popular view is encouraged by science fiction and by such real actions as the use of lasers to measure the distance between the Earth and the Moon and laser targeting in weapon systems. The complex ranges of laser properties enable a vast array of applications in, for example, the military, commerce and the life sciences. In industry, laser technologies offer distinct advantages over conventional manufacturing processes and have enabled much industrial innovation. Laser applications are, for instance, at the forefront of rapid prototyping, communications and the fabrication of three-dimensional objects. Other laser applications such as the cutting, drilling or shaping of materials, enable faster manufacture of products with higher precision detailing. Although the properties of lasers have been important in enabling the development of advanced manufacturing, the use of laser technologies necessarily require practices and methods that can appear to mediate between the maker and the made object. By way of illustration, regulations for the safe operation of lasers necessarily establish a very important barrier between the operator and the process. In other words, the technology requires that, to be safe, the laser manufacturing process must always operate at a distance from the maker. Despite the obvious safety aspects of laser technology it is not necessarily the case that laser technologies, in industry, facilitate a distancing effect between craft and industrial production.

At the recent ‘Cutting Edge: Lasers and Creativity Symposium’ at Loughborough University, School of Art and Design, the co-authors of this report presented a case study which proposed that craft, design and technology can best enable creativity and result in innovation if they are approached as interdependent methods and practices. The case study material that supported the proposition focused on the textile company Jakob Schlaepfer’s approach to laser processes.

Jakob Schlaepfer is renowned worldwide for the creation of innovative decorative fabrics, for haute couture and prêt-à-porter de luxe collections, exclusive ranges for couturiers, designing for royals, and since 2008, for its own ‘Décor’ collection. The company’s most recent awards include the Première Vision 2009 Imagination Prize, the ‘Best of the Best’ red dot award 2009 for the decor fabric ‘Phantom’ and the ‘Highest Distinction for Design Quality’ red dot award for the decor wallcovering collection ‘Glinka’.

Schlaepfer was founded in 1904 as an embroidery business in St. Gallen, Switzerland. The area had been producing high quality linen since the Middle Ages, and became distinguished, in the eighteenth

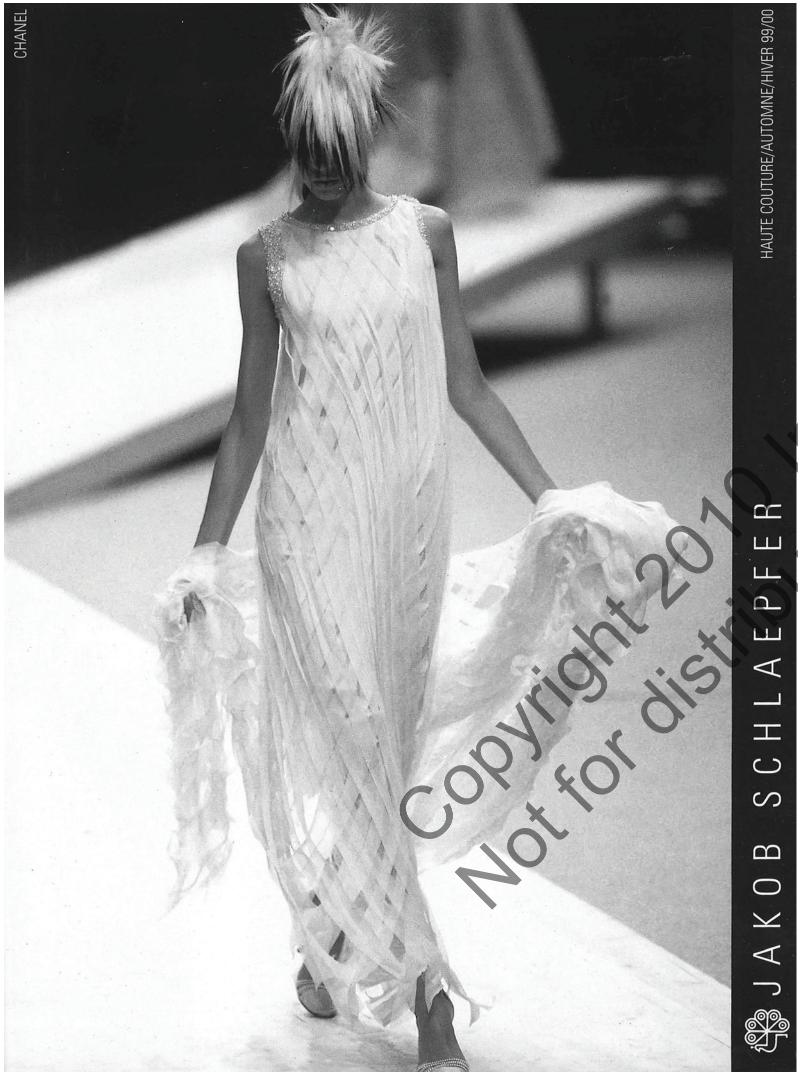

Figure 1: Chanel. Autumn/Winter 1999/2000. Laser-cut fabric by Jakob Schlaepfer. © Jakob Schlaepfer.

century, for the production of fine cotton mousseline. During the early industrialization period of the nineteenth century, it became famous for the design and manufacture of embroidery. Since the 1970s, Schlaepfer has undertaken a programme of modernization that diversified its traditional embroidery methods. This has been supported by the customization and integration of mixed media fabrication techniques. Schlaepfer's evolution of its fabrication techniques is exemplified by its flexible approach to technologies such as lasers. Inspired by the prospect of revitalizing craft-oriented embroidery such as broderie anglaise, in 1996, Schlaepfer began researching the possibility of transferring industrial laser technologies, from fields such as medicine and the automotive industry, to textiles. Crucial to this development was Schlaepfer's introduction of *composé* techniques in the early 1970s.

The term *composé* refers to fabrics that are composed through a combination of improvised manual and mechanical mixed-media techniques. *Composé* methods regularly encompass intricate manual techniques, such as sewing with appliqué details, *plissés*, ribbons and embossed fabrics. They also often require the in-house adaptation of machinery and the construction of new processes for specific designs. Schlaepfer's introduction of *composé* paved the way for the company to develop laser technologies and, in particular, innovate through lasers because *composé* encourages an open-ended approach to design and manufacture, and a synthesis of diverse improvised fabrication techniques. Schlaepfer's commitment to experimentation, exemplified by *composé*, enabled the company to develop a hybrid technology known as 'Emboscan' that unconventionally combines distinct but complementary techniques.

Introduced by Schlaepfer in 2006, Emboscan is a computerized technology that integrates laser cutting and industrial embroidery so as to enable the industrial production of qualities consistent with the versatility of manual processes. It utilizes a laser unit that has been adapted to a Schiffli embroidery machine. The mechanization of embroidery was of key importance to the mass production of fine embroidered textiles in the late nineteenth and early twentieth century. The hand-embroidery machine was invented in 1828, and it was Issac Groebli of St Gallen who invented the Schiffli machine, a faster multi-needle version of a hand-embroidery machine, in 1865. Emboscan advances the embroidery techniques of the Schiffli machine by using a system that, in addition to producing low-relief decorative effects, can also cut out and anchor fabric shapes to a foundation fabric to create various three-dimensional forms. As the synchronized production of fabrics of this kind, i.e. stitched, cut and formed, could previously only be achieved through different machine and manual processes, it can be argued that Emboscan begins, in a way consistent with Woolley's thinking, to problematize the boundary between the crafted object and the industrialized product. The technology, in effect, combines industrial techniques and qualities consistent with intricate manual processes and translates the handmade, thereby making the distinction between craft and industrial production problematic.

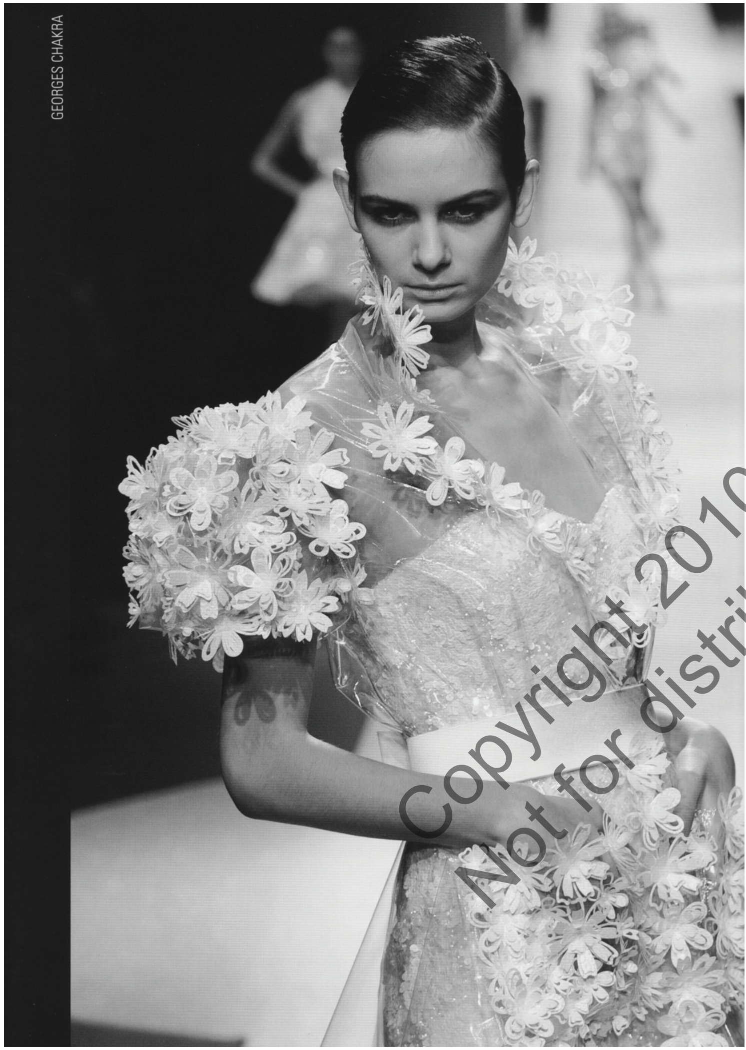

Figure 2: Georges Chakra (Spring/Summer 2009), Emboscan fabric by Jakob Schlaepfer.
© Jakob Schlaepfer.

Although Emboscan might complicate the boundary between craft and industrial production, the real innovation afforded by Schlaepfer's investment in laser technologies is the capacity of lasers to facilitate qualities that are in themselves non-standardized. By way of illustration, Schlaepfer's recent laser development has concentrated on exploring interactions between different laser systems and new materials. Based on the properties of lasers that enable high precision detailing, Schlaepfer recognized that, when applied to new materials or complex substrates, lasers often produce unexpected outcomes. Among the substrates tested, many have been selected or constructed by Schlaepfer to consist of complementary elements, such as precious metals and thermoplastic polymers, with the aim of establishing conditions whereby their distinct properties can produce opposite outcomes. As an illustration, a laser beam only affects the part of a material where enough energy is absorbed. Metals absorb the energy of the beam very well, whereas a polymer textile substrate can be more resistant. The diffraction or reflection of a laser beam when it interacts with a metal relief surface can, for example, result in unpredictable surface qualities. For Schlaepfer, the results of their experiments propose a number of conclusions. Firstly, that the capability of lasers to selectively interact with different elements of a complex substrate enable unpredictable and un-programmed outcomes; and secondly, that the combination of lasers and new materials can positively encourage qualities of unique subtlety and delicacy that can be exploited in industrial production. In other words, the application of lasers to complex new materials can produce non-standardized fabrics that have qualities of uniqueness most often associated with craft objects.

This report set out to counter some assumptions about the nature of industrial production by exploring the distancing effect inherent in laser materials processing; in particular, the view that when traditional craft-based technologies are supplanted by industrial media the object is diluted of its craft and by extension its uniqueness. The study of Jakob Schlaepfer's recent development of laser processes (and the company's experimentation with combinations of lasers and new materials) suggest, however, that rather than prevent uniqueness, industrial laser technology, can enable the production of non-standardized products that have qualities normally associated with the hand-crafted. As we have seen, the craft sensitized, new technology Emboscan blurs the boundary between craft and industry but Schlaepfer's recent experiments with laser diffraction and new materials represent an innovation that positively encourages and celebrates the unexpected.

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