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From Traditional to Digital Tools

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From the invention of digital thread control and digital subject processing programs, new possibilities for creating woven textiles have come into existence. I will describe my transition from working with traditional tools—watercolour, pencil, shaft-loom and damask-loom—to using advanced tools: Adobe Photoshop as drawing program, After-effects for video animation, digital thread-control, TC1 and digital jacquard power-looms for production. Over the last ten years this development has led me to new expressions in woven textiles—elusive optical phenomena, colour-gradations and a weave-construction based on digital technology.

I have chosen woven textile constructions as my personal medium of expression. To me, the experience of a motif emphasized by threads and construction is essential. It has always been a challenge for me to develop new expressions in woven textiles. For 30 years my tools have been the shaft-loom and the damask-loom. I see my work as a kind of personal textile research where I find inspiration in exploring the artistic possibilities in weaving techniques, materials and colours. This exploration has resulted in many different kinds of textile works over the years, with varied expressions according to what has been my point of departure—whether I was exploring complex weaving in multilayered works, three-dimensional weavings, inherent characteristics of materials, or special dyeing techniques.

My first meeting with digital weaving was in 2000. The College of Art and Design, located in Kolding, near to where I live, bought a TC1 loom from Digital Weaving Norway. Half of the time this loom is at the disposal of external weavers. I got the chance to use the loom for a period of four weeks, twice a year. I had to size up and test this new tool in all possible ways until it eventually became an integral and familiar part of my world. Before then, I had only used my computer for writing and for digital shaft-control. It has been a long, and still ongoing, learning process. I have not taken any courses, but found my own personal way into the digital world. For each little step forward I have made, I got a double reward in return, in the form of new experience and inspiration.

Anyone's challenge is to become so familiar with the new devices that one is no longer hampered by lack of technical skills, but reach a point where one is free to avail oneself to all the possibilities and explore the new landscapes which digital tools give access to. The challenge for me was to create something totally different from what I had done before—and an obvious way to search for new expressions was to create them digitally.

Earlier, I used watercolour and pencil for sketching. Now I work with Adobe Photoshop and Adobe After-effects for sketching; and the TC1 on a handloom, and digital jacquard power-looms for producing one off pieces. My motifs have changed to become projects over various themes, series of tapestries with motifs as well as weave-constructions based on digital technology. These are the results of my investigation of the artistic possibilities I found in my play with the new powerful tools.

For a long period I was working with identical patterns in layers, examining the interference between them. When a layer is turned a little bit, the patterns interfere and create new patterns—a kind of mechanical patterning known as *moiré*. I was fascinated by this phenomenon. I pursued it in many different ways—as outlines, as solid stripes, as dots and in different colours. When I started to make solid coloured layers with holes, strange and beautiful three-dimensional forms manifested themselves as I turned, evolved and twisted the perforated layers. I was spellbound—they were pictures out of this world. I was able to reconstruct elusive, optical three-dimensional phenomena in my computer. (These - the phenomena are usually experienced in architecture where perforated plates are used.)

I could manipulate this pattern into the shapes I wanted, freeze them, and use them as motifs for my first exhibition project with a specific theme: “Interference” in 2005. I produced a series of black and white tapestries in satin weave. (Fig. 1) In the woven material the two layers are underscored by different structures on a white background. (Fig. 2) The complexity of the subject matter is incompatible with the traditional loom. It is here that the digital control comes in as a direct extension of digital subject processing, and makes feasible what up until now had been impossible. I started weaving “interference” in 2004 when, needing bigger equipment to realize the big tapestries, I bought a TC1 thread-controller.

Figure 1. *“Interference 5” 2005 / Image by Ole Akhøj*

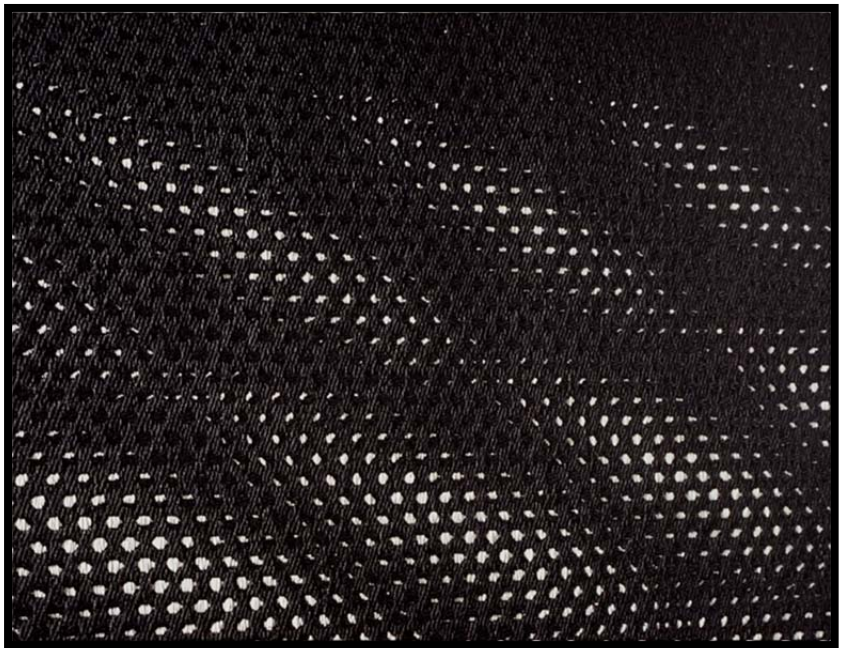

Figure 2. *Interference detail 2005 / Image by Ole Akhøj*

After this project I started working with colours. One of the first multicoloured challenges I gave myself was to weave a colour spectrum with all the basic colours and the shades between them. When I was striving to make a comprehensive colour palette based on traditional weaves, it struck me that with single thread control on my loom I was not constrained to work in this way. I now had total freedom of choice in methods to construct weaves. I could use any pattern in black and white to move the threads up and down. Anything that could be digitalized could also be transformed to black and white, and thus could end as a weave-construction. A thought so obvious and simple—but to me it was revolutionary!

The similarity between pixelated images and the graphic expression for a weave construction gave me the idea of a fundamentally different approach to constructing a weave based on colored pixels. I call it "random weave". In principle, the technique "translates" each colored pixel in the digital motif into a visible thread in the motif of the woven fabric. As in four color printing, where all the shades are created by mixing four colours on white paper, the shades in my woven motifs are created by mixing threads of the basic colors Red, Green, Blue, Cyan, Magenta, Yellow, Black and White. This technique gives the possibility of making smooth color-gradations and an almost photorealistic reproduction of the image. (Fig. 3) (Fig. 4)

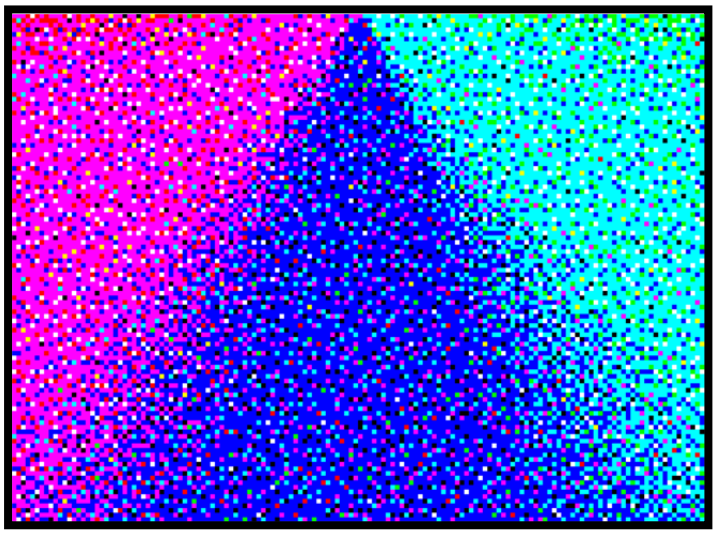

Figure 3. *Pixelated image by the author*

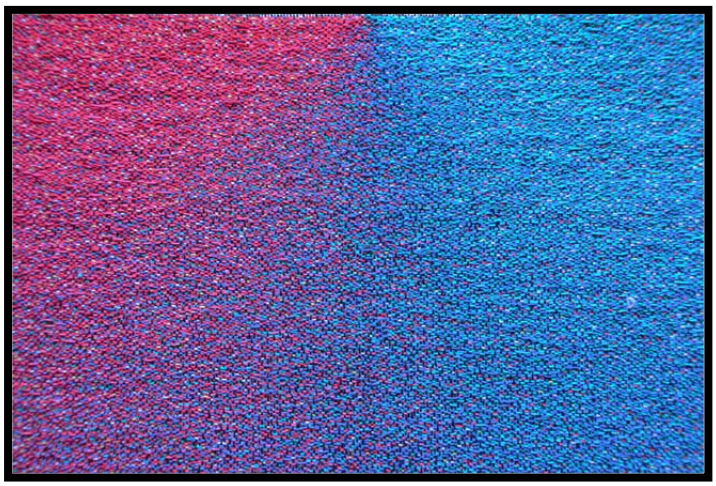

Figure 4. *Fabric construction based on pixels 2006 / Image by the author*

I could transform the beauty of my colour spectrum on the screen directly into a weave construction. The colour spectrum was transformed into pixels of basic colours, and based on these pixels I made a construction where the coloured threads appear in the weave in the same order as the coloured pixels appear in each line of the motif. I had found a way to make unsystematic weaves based on the random systems by which the computer program spreads the pixels, when an image is transformed to indexed basic colours. These unsystematic weaves have their own character. I see them as an expression of nature created by means of digital technology, and as a new expression in woven textile. (Fig. 5) (Fig. 6)

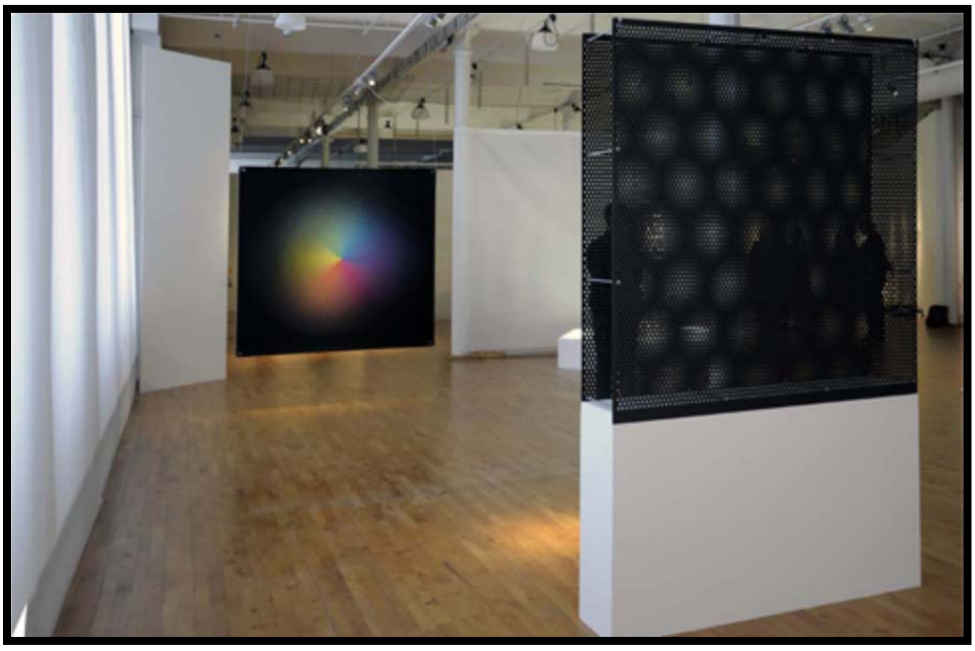

Figure 5. *"Color Spectrum" 2006 / Image by Bo Hovgaard*

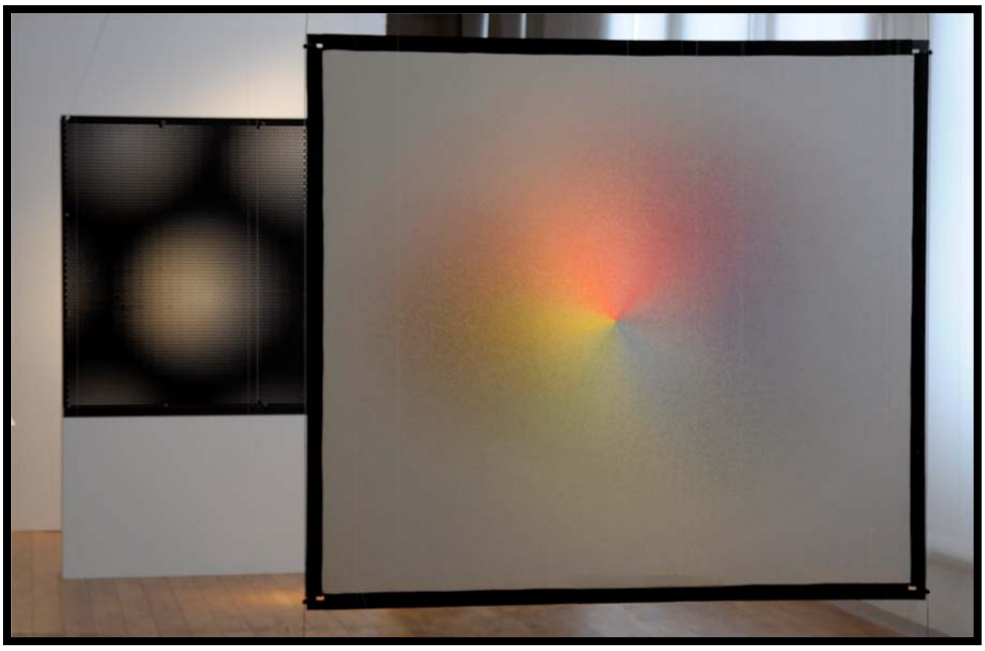

Figure 6. *"Color Spectrum" 2006 / Image by Bo Hovgaard*

In my next work I was playing with the smallest parts of the digital image, the pixels—spending days and nights, weeks and months exploring what happened when I enlarged, stretched and manipulated pixels in different ways. From this play came the inspiration to weave a blow-up of pixels, a work I called "out of focus". In this work the starting point for the motif, as well as for the weave-construction, was pixels in basic colours. (Fig. 7)

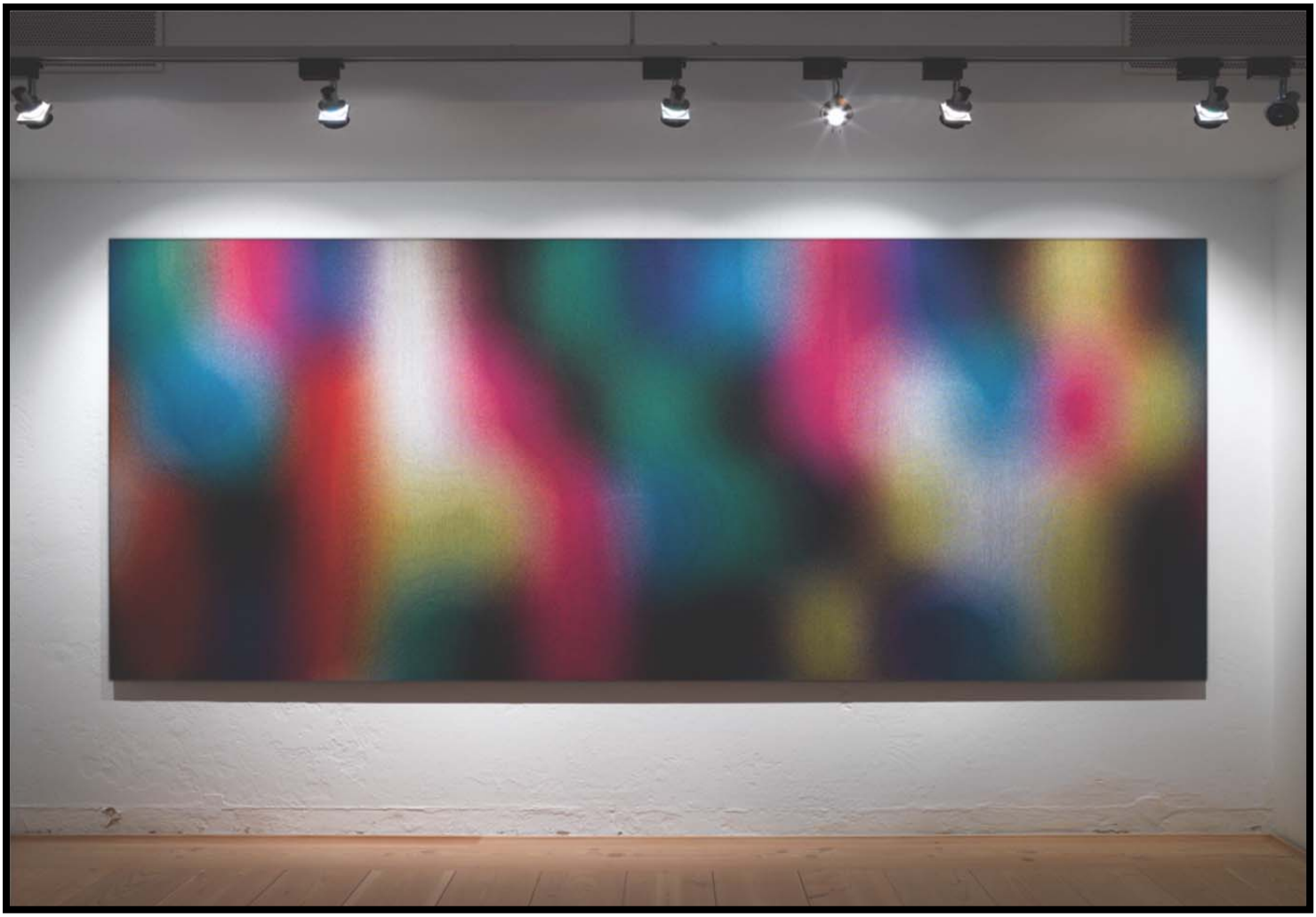

Figure 7. *"Out of Focus" 2006 / Image by Anders Sune Berg*

At the same time as my loom became digitalized, so did the film and video equipment my husband (Bo Hovgaard) was using. He is a filmmaker working with animation and documentary film. Suddenly we were working in the same media and that gave us a new possibility to work together. Until now we have been cooperating on two video-animations for my exhibition projects 'Interference' and 'Out of Focus', where the video-animations have complemented the woven projects. The animations have been based on the digital sketches for the tapestries. They show a continuous development of the motifs. Using my methods from the play with coloured pixels in "Out of focus," we made an animation based on a blow-up of pixels over time. By manipulating it in an editing program we made the most beautiful images in motion with slowly streaming movements of fluid colours.

Figure 8. *"Millions of Colors" 2009 / Image by Bo Hovgaard*

The work with animation inspired me to make a series of works based on frame-grabs from the animation. These works were the starting point for the series "Millions of Colours" from 2009, woven on a digital jacquard loom. (Fig. 8) In these tapestries I have developed my weave constructions further in order to make a better fabric, and in order to intensify the colours.

The digital tools have given me an opening to a new world of imagery. It builds bridges that give me access to other media where I can work and express myself. I am still rooted in woven textiles - but the combination of the two media enriches both and I draw inspiration from both, from the textile to the video and from the video to the textiles. I combine both media in my exhibition projects.

Photorealism has not attracted me before, but in my still ongoing exhibition project "traces of light" (I cooperate with Bo Hovgaard) we take point of departure in video frame-grabs from the real world—video shots from big cities at night. Un-focused pictures of light from driving cars and advertising signs live their own lives. They form streaming movements–absolutely wonderful–as a picture of the life of the city seen on cellular level. The un-focused camera works as a filter that transforms the realism of the coloured lights and signs into patterns of circular spots of colours at different levels. This imagery, created by the elusive light, fascinates me. It has a delicate transparency and a fine touch of colours. (Fig. 9) The combination of the two media—the slow streaming movement from the video-shots and the depth of colour and structure in the woven tapestry—is a happy one. I am looking forward to present it next year.

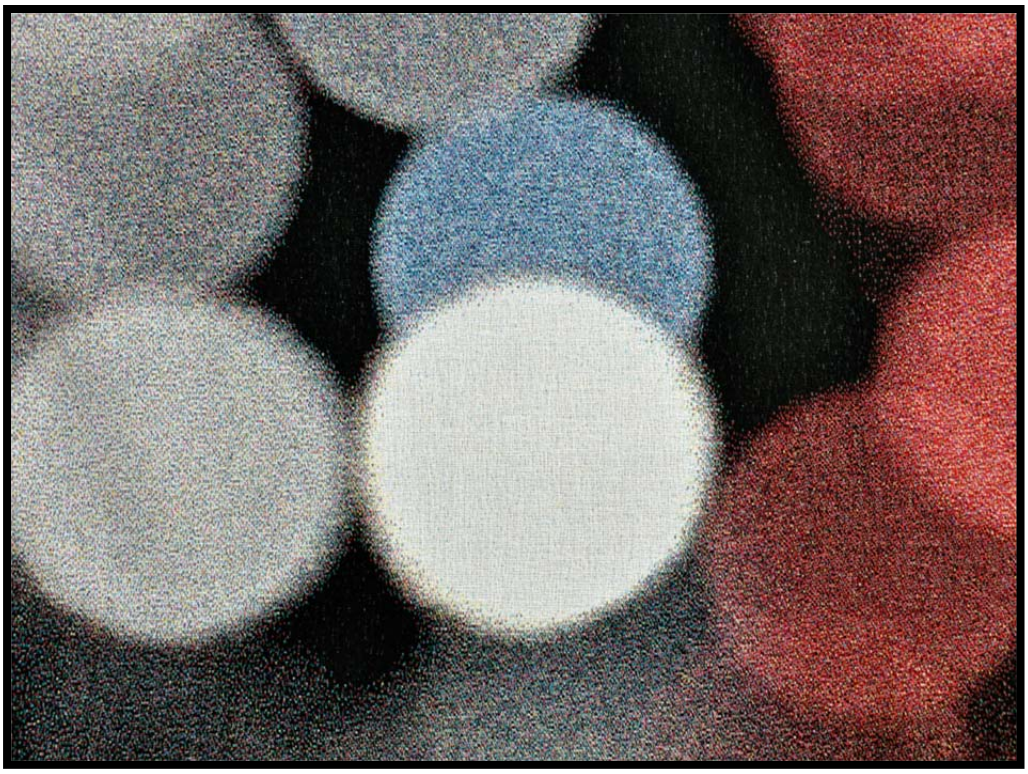

Figure 9. *"Rush Hour" 2010 detail / Image by the author*

Some of my works are woven by hand, including those utilizing the TC1. Larger works are produced as one -off products on an industrial jacquard loom. The decimation of the traditional weaving industry has created a never-before-accessible bridge to contemporary production machinery. Where large mills traditionally had emphasized long runs, small mills allow the possibility of weaving one-off products, individual design, small series and site specific textiles etc. on industrial jacquard looms. My work has never before been so inspiring and intensive. Last year I had only a vague feeling of the enormous potential this way of production implies. Right now I am in the middle of it, having finished a major commission on digital jacquard loom at the Textile Museum in Tilburg, Netherlands in September. Then I started producing site specific furnishing fabric as a special order on jacquard mill in Finland. Then I went to Hendersonville, North Carolina, where I experimented with designs at The Oriole Mill.

I feel privileged to have gotten this chance to continue my work and use my knowledge about weaving in a new and inspiring way. My experience with weaving and weave constructions has played a very important role in the way things have developed for me in the meeting with digital technology. At a time when production and knowledge are disappearing from the western countries, when specialized arts and crafts are ousted by design, it is important to be conscious about the importance of materials and "hands on" production, and to draw the attention to them. Designers and artists with hands in the production are the developers of new expressions. The manual work with thread and construction is essential in order to be able to play with the tactile values embedded in textile. The coincidences that happen while playing with materials and constructions are invaluable and cannot be replaced by computer screens. In spite of the fact that most of my work will end up being woven on a jacquard-machine, it will always pass through my hands in the developing process - to me this sample-weaving process is essential. Even though computer-programs may be able to visualize anything you can ever dream of constructing, they will never have the sensuous knowledge of your hands.

Grethe Sørensen