

# patterning sounds

exploring contemporary textile design  
through collective making

Aura

This project and pattern book were funded through a generous grant from the Royal Society of Edinburgh and the Innovation School of The Glasgow School of Art | Highlands and Islands.



**INNOVATION  
SCHOOL**  
**THE GLASGOW**  
**SCHOOL OF ART**

# Contents

People	7
Process	11
Patterns	13
References	52



# place

Welcome to 'patterning sounds', the pattern book of the Aural Textiles research project. We are showcasing the efforts and collaboration of our six textile practitioners from around Scotland. They have participated in a six-month exploration of bio-acoustic pattern making and experimental distributed making. This pattern book shares the designs and patterns created from this collective.

The Aural Textiles project arose from an initial collaboration between George Jaramillo and Lynne Mennie, both enthusiasts of data-driven design and textiles. We saw that existing ways of pattern making in Scotland can tend to focus on tartans and tweed and, though important to the overall culture, these limit the potential for new designs that promote contemporary Scottish culture. We are interested in exploring the use of the Scottish sound landscape to influence contemporary textile design through a collaborative design process. The project provided an opportunity for designers/makers to collaboratively understand and relate to their local soundscape as a source of inspiration and begin to formalise a design narrative based on the non-visual environment, promoting innovative multi-sensory approaches to traditional pattern creations.

This pattern book is one of the outcomes of that collaboration where our participants learned to listen to the landscape, record the sound and transform it into patterns useful for textile creation.

Using spectrograms as the audio/visual link, the participants created and iterated a series of patterns and designs using their respective practices to visualise those sounds. In the end, we have not only come up with a series of experimental and contemporary interpretations of the Scottish landscape, but have also provoked hybrid ways of making between the participants. We welcome you to enjoy the patterns and textiles created in our project.

## Attuning to place

Human beings are excellent pattern finders and makers, encountering patterns in what they see, hear and feel. Vision plays a dominant role in how these patterns come about, and pattern creation is developed primarily by that which is seen; this is one of the fundamentals of common design practice in most design disciplines. Traditional Scottish textile patterns include woven Highland tartan, Celtic knot work and Fair Isle knitting patterns, as well as industrial developments of Paisley pattern. Most of these are generated, whether pattern and/or colour, from visual stimuli based on the visible landscape.

Patterns for textiles can originate from many stimuli, and multi-sensory approaches to contemporary pattern creation offer the opportunity to maintain the link with the specific environment of the site of origin while bypassing the norms embedded within "traditional" visually-inspired patterns.

The sound landscape is a key component of our multi-sensory environment. Transcending the realm of music, Schafer (1994) introduced the concept of the soundscape in the late 1970s, seeking to make people more aware of the nuanced sounds around us and of listening attentively to the landscape. He suggested that much of the aural landscape is not perceived, yet each of us make sound and nothing is ever silent. In this sense, Schafer tried to engage us with a sonorous world that exists if we just pay attention.

The aural landscape is a significant, yet often ignored, component of the embodied multi-sensory landscape –from the buzz of fluorescent tube lights in an office to the intermittent roar of aircraft flying overhead, no space is ever silent. This attunement to the soundscape is key to developing awareness of the landscape as well as to the space of listening. For example, human voices have internal overtones yet our brains and senses tend to cancel out these sounds. This project attempts to engage with a sonorous world that exists beyond our conscious, and asks us to listen to it. In this project, we sought to understand how textile patterns could be developed in response to these environmental sounds. The patterns in

## Textile production in a digital age

The nature of textile creation requires physical co-location of maker and equipment to produce items, with some equipment more portable than others: crochet hooks and knitting needles can be carried easily, but not a weaving loom, knitting machine or printing equipment. Designers can be located separately from the place of creation, typically requiring access only to paper & pencil, computer and material swatches, and the ability to interact with the site of creation. However, many practitioners are both designer and creator, particularly in micro-businesses, working within individual studios. The notion of the lone textile designer-creator is a limiting concept for the modern practitioner, particularly in an age where remote geographies are digitally accessible.

Modern practitioners are mobile, diverse and interdisciplinary; they expect to access information, skills and knowledge digitally; and they need to compete more and more with larger commercial/industrial enterprises across the same media platforms. The need for new techniques and acknowledgement of cooperative approaches to textile making, whether between groups of designer-creators or co-creating designs with end consumers, are expected to develop in the next few years. Exploration of mechanisms that support these new interactions (with our environment, between designer-creators and with end users) are needed, and were examined as part of this project.





# people



At the heart of our project is the collective of people who volunteered to take part in our distributed experiment. It began with the original pair of collaborators.

George is an innovation designer at The Glasgow School of Art, whose background runs from heritage and architecture to landscapes and practice. His main focus is on challenging historic Highland Romantic perceptions and acknowledging contemporary ruralities.

Lynne is a handwoven textile designer and creator and a trained scientist, who works at the intersection of art and science. Coming from at least seven generations involved with the weaving trade in the north-east of Scotland, weaving is in her DNA.

Lynne and George discovered a shared passion for textile pattern design from data sources. Initial pilot work allowed for the two to collaborate and test out some initial ideas (Mennie and Jaramillo 2018). This allowed them to secure funding from the Royal Society of Edinburgh, and extend the collaboration to include six textile practitioners from across Scotland. The following section shares short biographies of those six participants.





## Dwynwen Hopcroft

### **Knitting**

Dwynwen is the owner of Loch Ness Knitting based in Drumnadrochit, where she sells knitting patterns, yarn, knitted items and holds workshops on natural dyeing. She designs practical modern garments inspired by the natural sights, sounds and weather around Loch Ness and is passionate about developing environmentally conscious business. She has formed partnerships with local business and voluntary groups to provide resources for sustainable natural dyeing.



## Orla Stevens

### **Screen Printing**

Orla is a Textile Designer and Artist based in central Scotland. Recently graduated from Edinburgh College of Art in Textiles, Orla works between mixed media drawing, painting and textile processes. Whether the outcome is on paper or fabric; abstraction, mark making and an experimental approach to medium lies at the heart of Orla's work.



## Cally Booker

### **Weaving**

Cally is a textile designer, a maker, and a teacher, but above all, she is a handweaver. Everything she does in her creative practice, from drawing to dyeing, ultimately leads back to the interlacement of warp and weft. She makes extensive use of multi-layered warps and complex weave structures. In her most recent work she explores the natural colour palette, using up-to-date ecological methods of working with natural dyestuffs, and is focused on developing the sustainability of her practice.

## **Beth Farmer**

### **Screen Printing**

Beth is a textile designer and community artist and her true passion is to enable others to be creative. She facilitates therapeutic art sessions for Creative Therapies for children, young adults and carers across various mediums, with a particular focus on print. Beth's own practice is about experimentation and collaboration and she designs with the traditional technique of screen printing in mind.



## **Marie Melnyczuk**

### **Weaving**

Marie is an Artist/Weaver who lives and works on the Isle of North Uist for the last 15 years. She is a sole trader working on developing a 'new' kind of Scottish textile selling work locally, online and also accepting commissions. After completing a short 'Wool' course at Uist Wool in 2012/13, she discovered the craft of weaving translated well from painting; the ability to mix multi-coloured yarns within a defined construct (rules of warp, weft and the confines of the loom) echoes both painting and printmaking; she is attempting to map the machair through the sounds of its wildlife.



## **Olive Pearson**

### **Knitting**

Olive is a designer-maker specialising in contemporary knitted accessories. A lover of colour, geometry and small scale repeat patterns, she is fulfilling a lifelong ambition to design and make her own products. Her distinctive designs are 'simple', colourful repeat geometric patterns that play with perceptions, mixing contemporary colours and patterns with traditional knitting techniques. She constructs fabrics on a manual, vintage, machine with current designs inspired by wind turbine blades, morse code and Scotland Street School details



# CAPTURING



## FIND YOUR SOUND.

BIRD OPTIONAL. ANY SOUND CAN MAKE A UNIQUE PATTERN



## OPEN UP YOUR PHONE AUDIO RECORDING APP.

YOU CAN ALSO USE A SMALL DICTAPHONE OR STAND ALONE AUDIO RECORDER



## RECORD YOUR SOUND.

REMEMBER TO TURN YOUR PHONE UPSIDE DOWN AS MOST HAVE THEIR MICROPHONE ON THE BOTTOM



## SAVE YOUR SOUND.

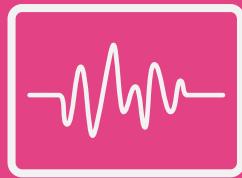
REMEMBER TO KEEP TRACK AS TO WHERE, WHERE, AND WHAT WAS HAPPENING WITH THE SOUND



## TRANSFER YOUR SOUND

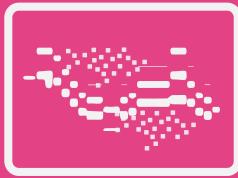
YOU CAN UPLOAD THE FILE TO A CLOUD SERVICE OR DOWNLOAD TO YOUR COMPUTER

# TRANSFORMING



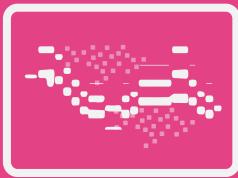
## OPEN YOUR SOUND IN PROGRAMME.

AUDACITY OR ADOBE AUDITION ARE TWO GOOD CHOICES. THIS PART OF THE PROCESS CAN ALSO BE DONE ON YOUR PHONE.



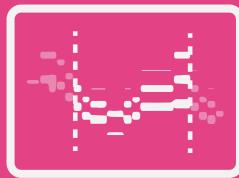
## TRANSFORM YOUR SOUND TO A SPECTROGRAM.

THE SPECTROGRAM IS A USEFUL VISUAL REPRESENTATION OF SOUND FOR KNITTING OR WEAVING. HOWEVER, FEEL FREE TO EXPERIMENT WITH THE AUDIO WAVE FORMAT.



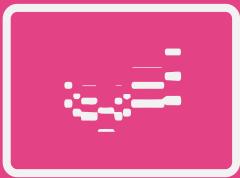
## CLEAN UP YOUR AUDIO WITH A (DE) NOISE FILTER.

USE A SECTION OF SOUND WITH BACKGROUND NOISE AS REFERENCE FOR THE FILTER.



## CLIP AND SCALE YOUR AUDIO FILE TO THE AREA OF INTEREST.

LOOK FOR A UNIQUE SEQUENCE OF PATTERNS OR GATHER THE ENTIRE TRILL OF A BIRD SONG.



## TAKE A SNAPSHOT OF YOUR IMAGE SAVING YOUR FILE.

EXPERIMENT WITH THE TYPES OF PATTERNS ENCOUNTERED AND KEEP MULTIPLE FILES.

# VISUALISING



## PRINT THE IMAGE.

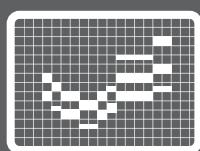
PRINTING THE IMAGE ALLOWS FOR ANALOGUE FORMS OF EXPERIMENTATION.

OR



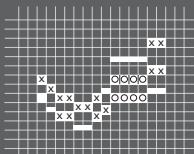
## UPLOAD TO A DIGITAL PATTERN GENERATOR APP.

UPLOADING THE IMAGE TO AN ONLINE PROGRAMME ASSISTS IN PATTERN GENERATION.



## PIXELATE YOUR PATTERN.

PIXELATING YOUR IMAGE HELPS TO PROVIDE CONSISTENCY AND EASE OF FABRICATION.



## RECORD YOUR PATTERN.

REMEMBER TO KEEP A RECORD OF YOUR PATTERN IN THE FORMAT THAT IS MOST APPROPRIATE TO FINAL OUTPUT.



## MAKE YOUR PATTERN.

GO AND MAKE YOUR PATTERN BE IT KNITTED, WOVEN, EMBROIDERED OR PRINTED. HAVE FUN AND EXPLORE!

# process

## From sound to spectrogram

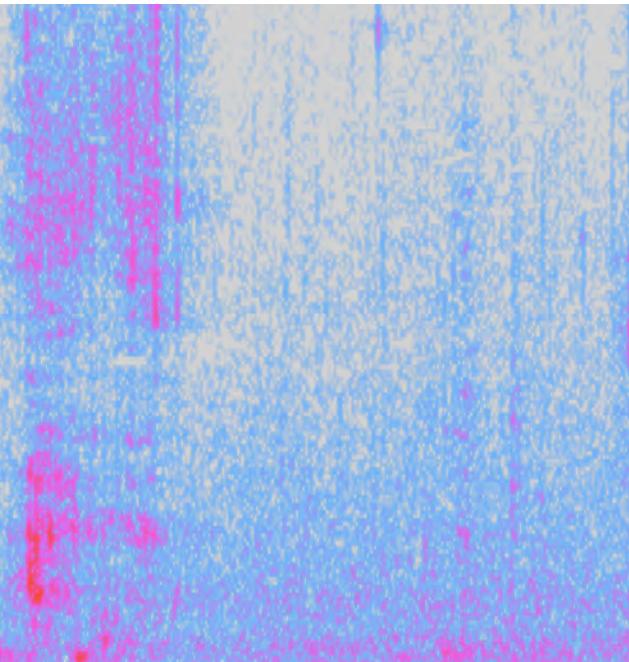
Visualising sounds has existed since the first notation of music was developed in ancient societies (West 1994). Early Medieval monastic organisations developed musical notation with the rise of polyphony, which necessitated a way of allowing many people to understand and follow a series of sounds. By the nineteenth century, these early visualisations and recordings included Edison's phonograph. These systems allowed soundwaves to be visualised on a type of paper or physically carved into grooves and able to be reproduced. These audio wave impressions would be the predecessors to today's digital visualisations, including oscilloscopes, wave displays, and spectrograms.

Spectrograms are a type of audio visualisation where, rather than the pitch and amplitude (as is normally portrayed through wave modulation), the intensity and multiple frequencies are displayed across time. It is a useful tool in understanding phonetic speech, and even the vibrations of the earth in seismology. The field of bioacoustics is especially useful in spectrogram use as different animals that normally cannot be tagged, like large underwater mammals or migrating birds, can be tracked by their specific call (like a voiceprint). The spectrogram becomes the foundation of the pattern and can be transformed into the pattern.

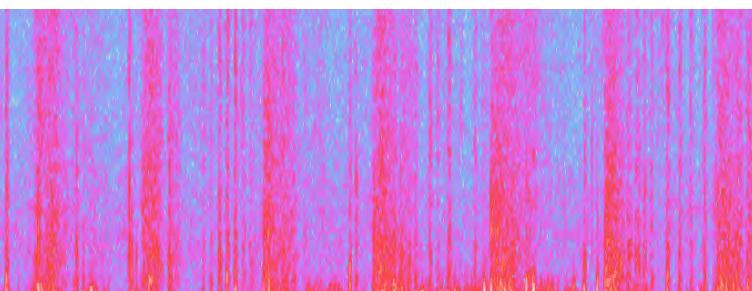
The basic process is broken down into three main steps of capturing, transforming, and visualising. Participants spent time capturing their soundscape - recording sounds including lapwing and other bird calls, waves, the wind and man-made sounds such as machinery and airplanes overhead - in an attempt to better understand their local environment beyond that which was simply seen. Using smartphones and small audio recorders, we can capture the sounds around us. From this point, through the use of audio software, we are able to transform the sound into a spectrogram. The image can be digitally manipulated to reduce background noise and simplify the bio-acoustics pattern, transforming it into a pattern that could be 'read' by others.

From this transformation point, it is up to the designer/maker to manipulate the image into a textile pattern. For example, segments can be abstracted, repeated, rotated, inverted, and recombined, as is typical for any design process. However, the textile designer must do all of this with reference to the constraints of their specific discipline (whether the number of shafts and treadles on a loom, punch card size on a knitting machine, or screen print dimensions) and the materials used. From a single spectrogram, a huge variety of samples can be visualised both within and across textile disciplines.

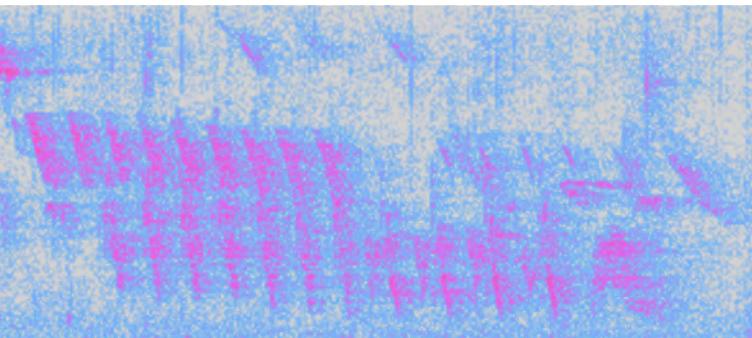
On the following page we present the six sounds and eventually six spectrograms from a variety of sources that were recorded and visualised to create the initial patterns. Each practitioner chose two of the six as inspiration for their designs.



« Waves lapping against rocks on  
the beach at Pittenweem, Fife.  
Cally Booker

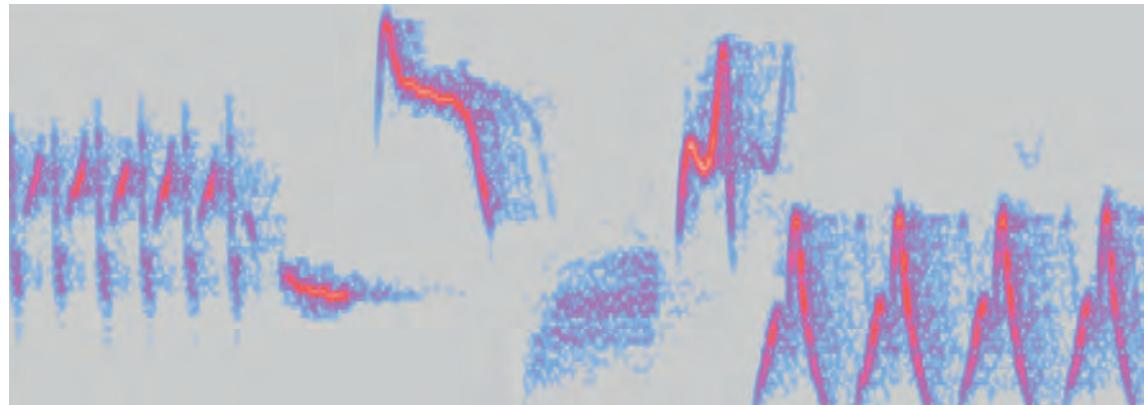


« Footsteps in the snow during  
the first Aural Textiles workshop,  
Newtonmore, Highlands.  
Olive Pearson

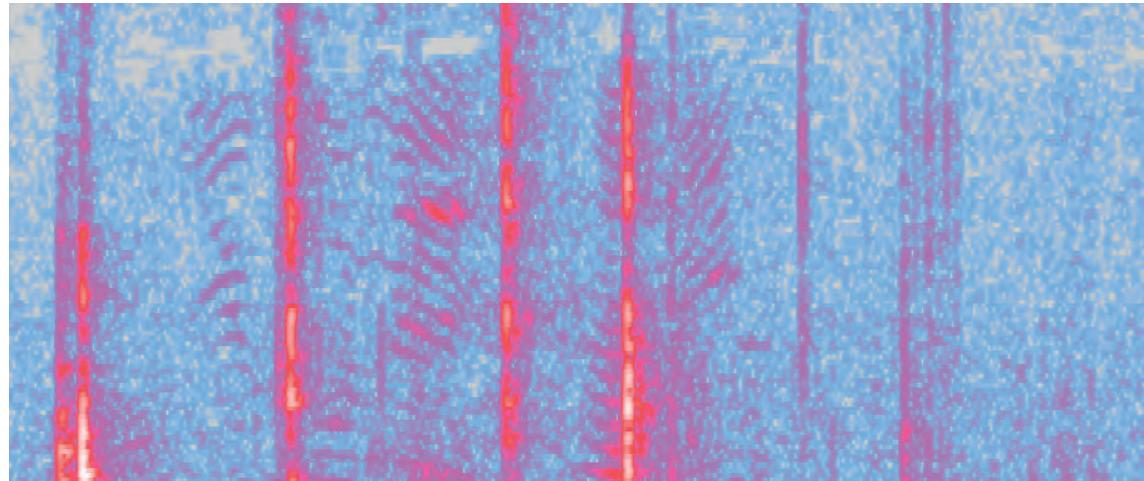


« Great tit bird call from the Highlands.  
Beth Farmer

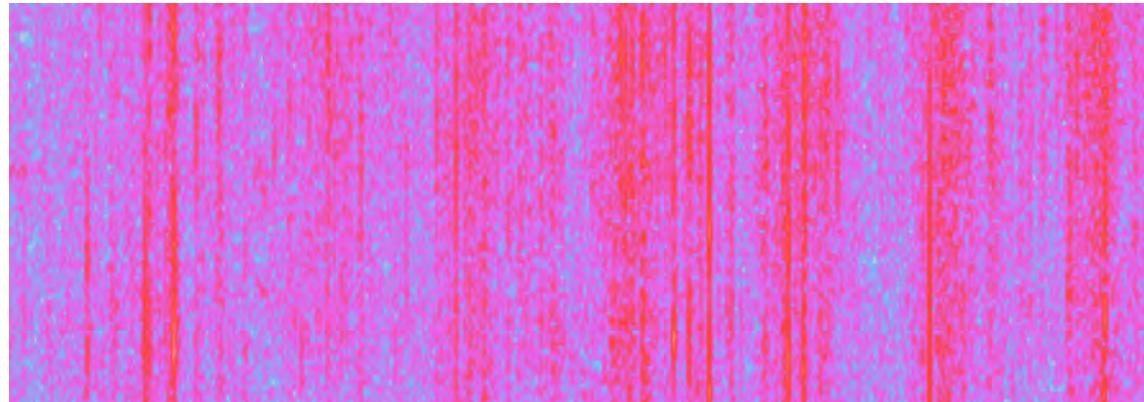
Wren song »  
machair on North Uist, Outer  
Hebrides. Marie Melcnyczuk



Horse clopping through »  
the water where the rivers  
Enrick and Coiltie meet at  
Urquhart Bay Woods (known  
as the Cover), Drumnadrochit,  
Highlands. Dwynwen Hopcroft



Shaking branch from a tree, »  
whilst on a participant walk  
during the first Aural Textiles  
workshop, Newtonmore,  
Highlands. Orla Stevens





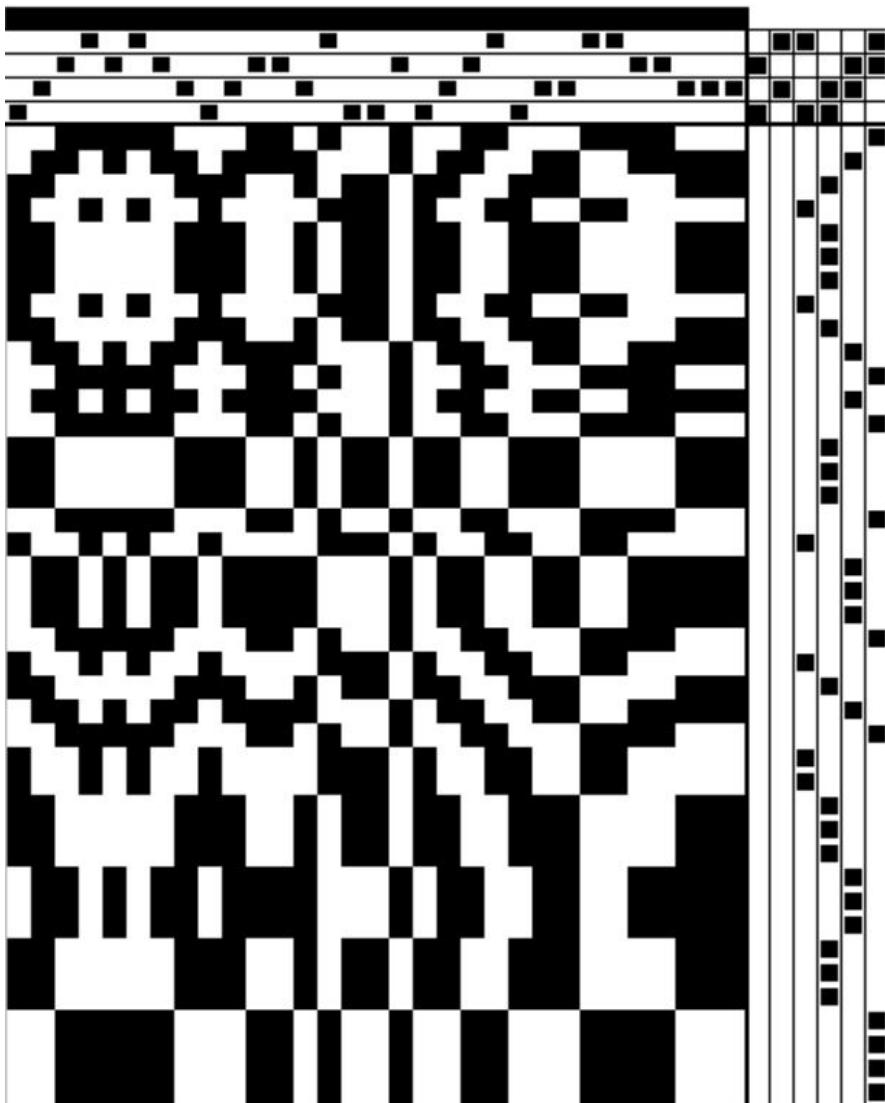
# patterns



Our project included two collaborative workshops where our textile practitioners worked together with us to develop new processes for inventing and generating textile designs using the sound-to-pattern process.

It provided an opportunity for the practitioners to share skills and experiences of their different textile disciplines with each other and the researchers, and to consider the challenges and opportunities of considering a non-traditional design process (from sound + collaborative). Along with sharing and reflecting upon their own practices, a selection of sounds were chosen to form the body of our final work. Here we present a series of weaving, knitting and screen printing patterns developed by project participants for you to try out and adapt. All patterns are open sourced.

Final piece showing the motif »  
of the birdsong across the  
fabric.



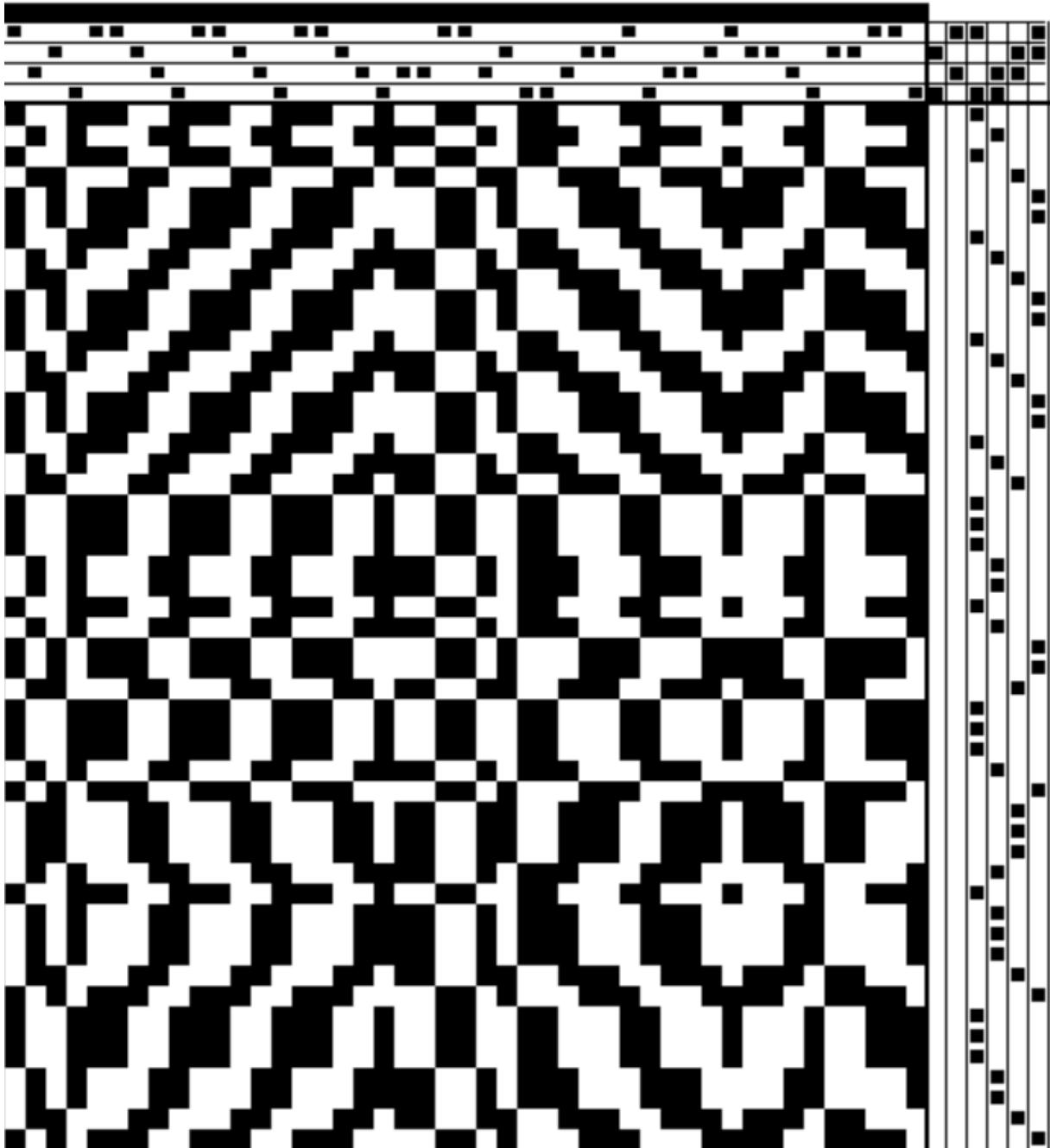
≈ Final draft plan. Note the  
sequence of lifts that follow the  
birdsong spectrogram.

## Wren Birdsong

A weaving draft is shown for a single repeat of a four shaft & four treadle pattern inspired by the wren birdsong spectrogram. The warp is one colour and the weft a contrasting colour. A single repeat requires 31 ends and 41 picks, and can be repeated as desired. A 2/2 ascending twill tie-up was used. Two additional tie-ups are shown for tabby, which were used to create a header and footer at the start and end of the weave.

The sample shown was woven in Harris tweed wool with warp at 12 EPI 2 x single per dent (= 24 ends) and weft at 15 PPI of Aran weight yarn. For your own project, determine sett based on the yarn you plan to use as if for balanced twill.





View of finished sample piece. »  
Note the variations in striped  
and angled sections.

# Great Tit Birdsong

A weaving draft is shown for a single repeat of a four shaft & four treadle pattern inspired by the Great Tit spectrogram. The warp is one colour and the weft a contrasting colour. A single repeat requires 45 ends and 51 picks, and can be repeated as desired. A 2/2 ascending twill tie-up was used. Two additional tie-ups are shown for tabby, which were used to create a header and footer at the start and end of the weave.

The sample shown was woven in Harris tweed wool with warp at 12 EPI 2 x single per dent (= 24 ends) and weft at 15 PPI of Aran weight yarn. For your own project, determine sett based on the yarn you plan to use as if for balanced twill.

« Final draft plan. Note the sequence of lifts that follow the birdsong spectrogram.

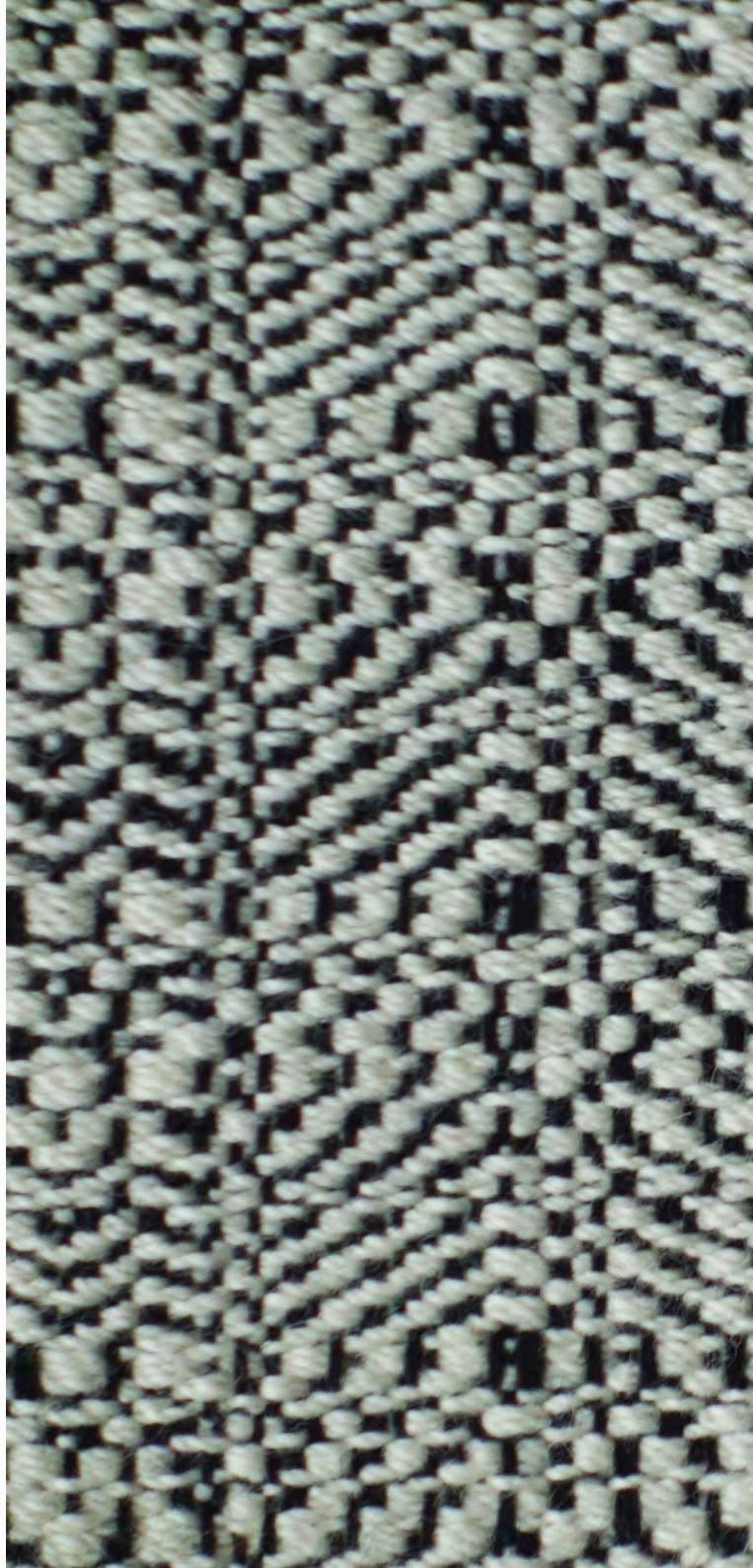




Image of final pattern from »  
digital weaving programme.

# Sound of the Sea

A threading pattern and a treadling sequence are shown for an eight shaft & eight treadle pattern inspired by the spectrogram of waves lapping against rocks. For the threading pattern, the outline of two distinct parts of the spectrogram were super-imposed, and interpreted using network drafting. The two segments of the spectrogram were interleaved, and each one assigned a separate colour in the warp. A 1/2/3/2 descending twill tie-up was used, and a treadling based on one of the outline segments. The draft shows 312 ends and 424 picks, which allowed for three repeats of one segment of the spectrogram and around 3.5 repeats of the other segment in the threading. The individual threadings for each segment can be repeated as often as necessary to achieve an interleaved design of the desired width.

## Yarn specifications

Warp and weft: 2/11.3 Nm supersoft lambswool (JC Rennie)

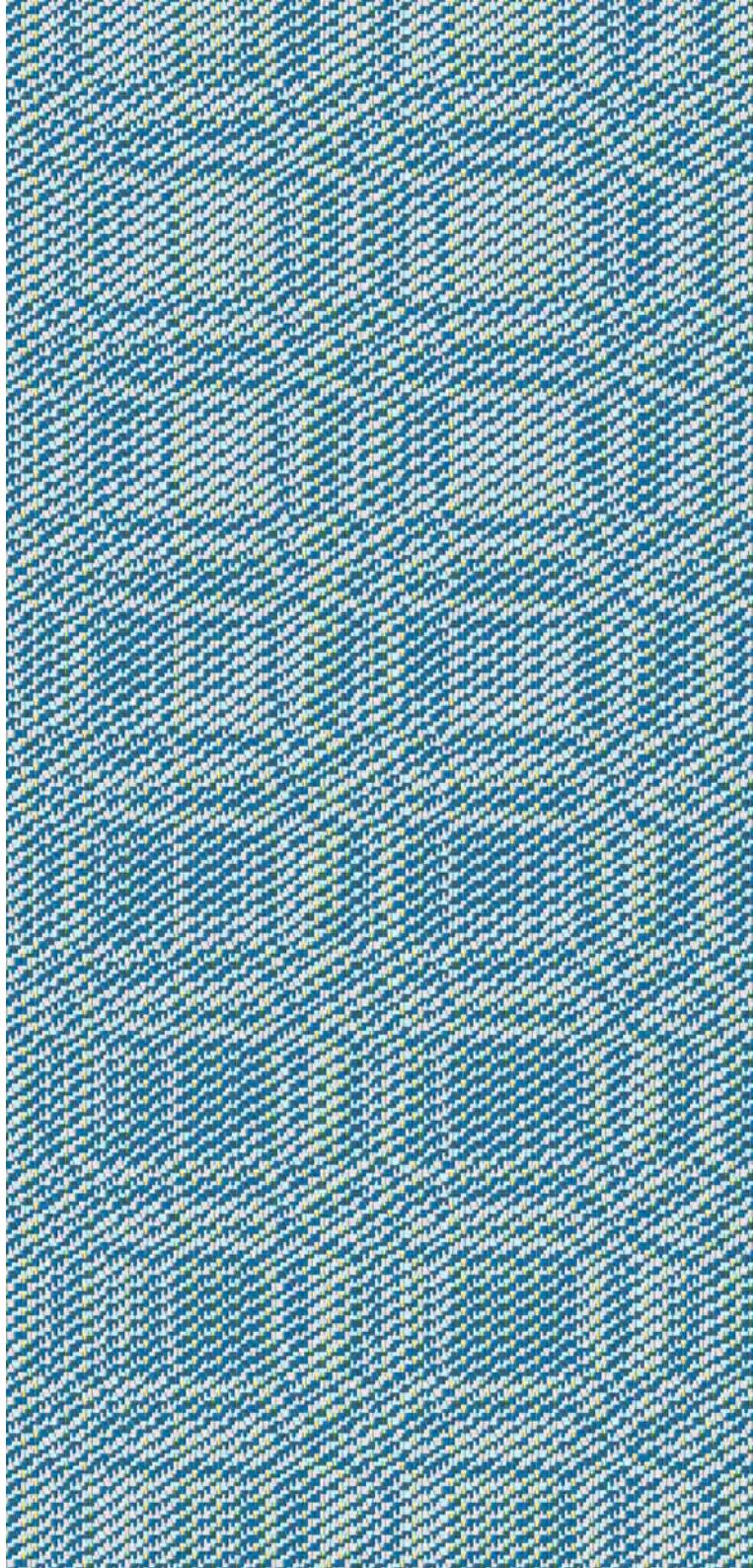
Warp: Azure and Silver, 25 epi

Weft: Marzipan, 16 ppi

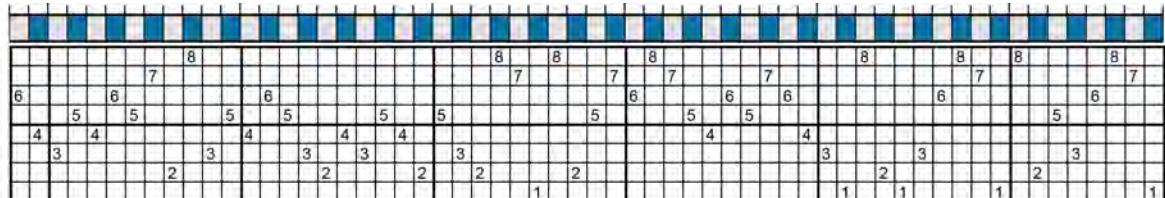
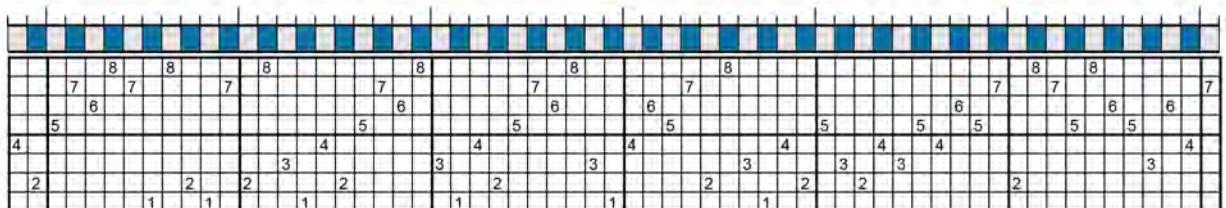
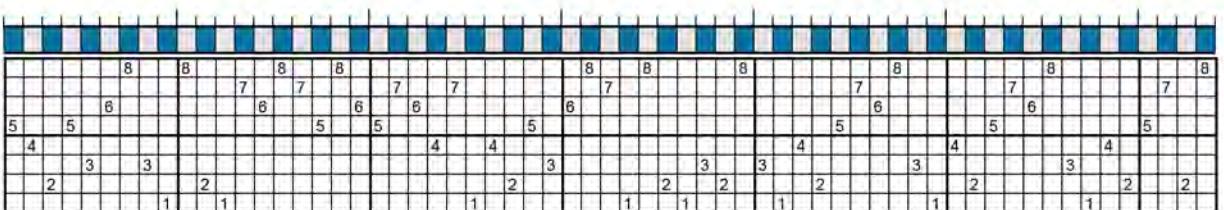
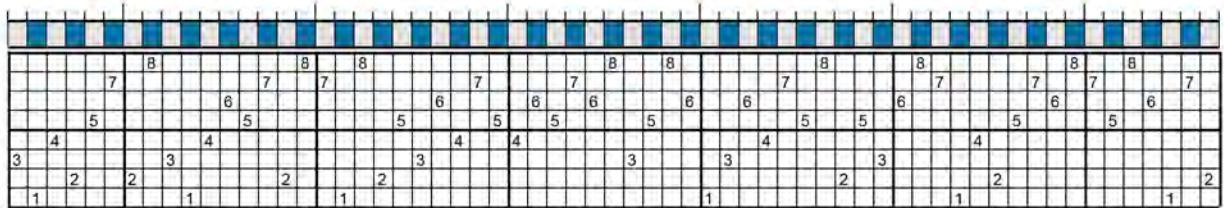
## Finishing

This yarn responds well to vigorous fulling, so allow for 10-20% shrinkage.

« Sound of the Sea, 16-shaft  
version. Handwoven using  
wool/silk blend yarn.



← Begin here



8	8	8	8
7	7	7	7
6	6	6	6
5	5	5	5
4	4	4	4
3	3	3	3
2	2	2	2
1	1	1	1

		6	
		7	
1		8	
2			
3			
1			
2			
1			

		7	
		8	
1			
2			
1			
2			
1			

		8	
1			
2			
1			
2			
1			

		9	
		8	
1			
2			
1			
2			
1			

		10	
		9	
1			
2			
1			
2			
1			

		11	
		10	
1			
2			
1			
2			
1			

		12	
		11	
1			
2			
1			
2			
1			

		13	
		12	
1			
2			
1			
2			
1			

		14	
		13	
1			
2			
1			
2			
1			

		15	
		14	
1			
2			
1			
2			
1			

		16	
		15	
1			
2			
1			
2			
1			

		17	
		16	
1			
2			
1			
2			
1			

		18	
		17	
1			
2			
1			
2			
1			

		19	
		18	
1			
2			
1			
2			
1			

		20	
		19	
1			
2			
1			
2			
1			

		21	
		20	
1			
2			
1			
2			
1			

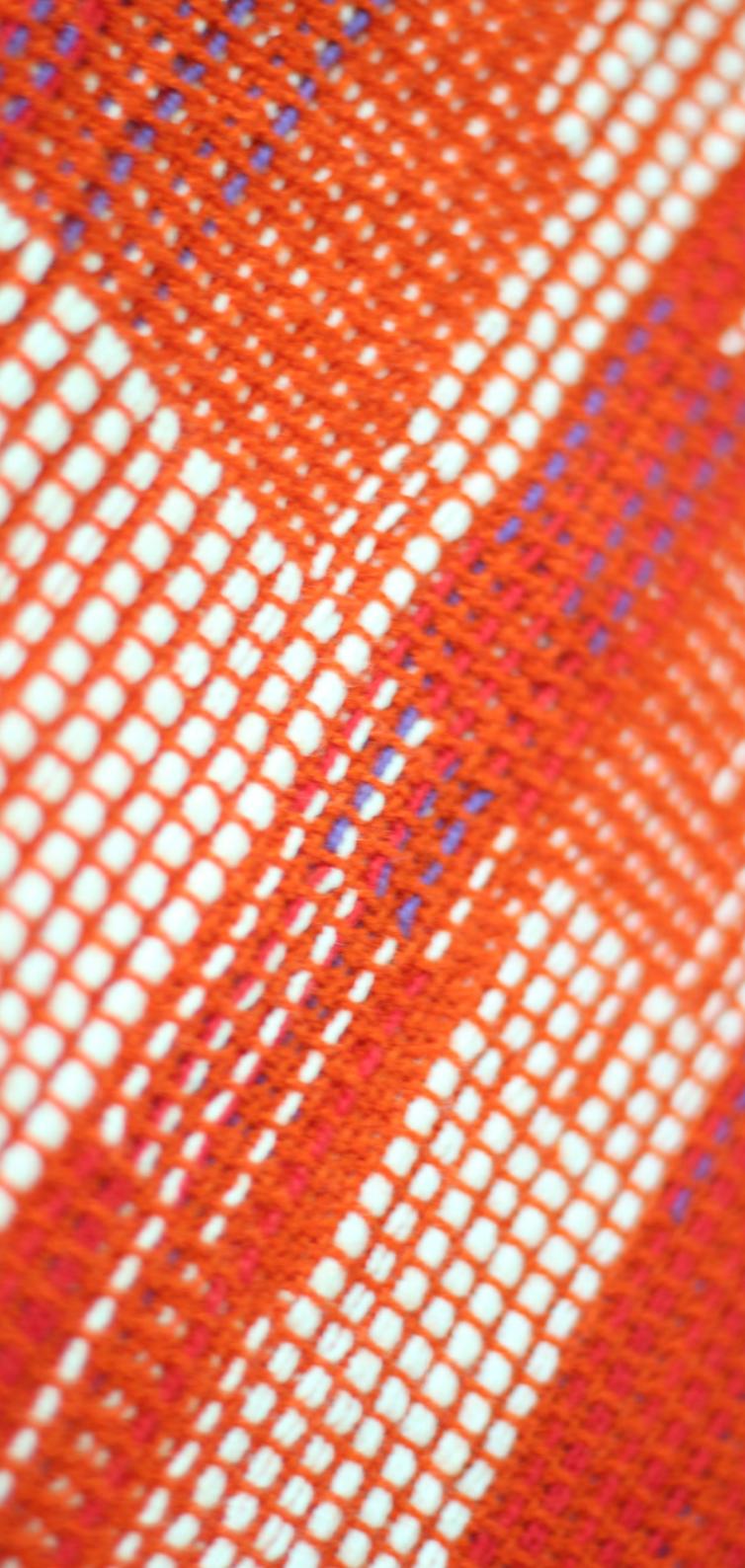
  

		22	
		21	
1			
2			
1			
2			
1			

		23	
		22	
1			
2			
1			
2			
1			

On left the threading pattern read each row right to left, top to bottom. On right, the treadling sequence, read each column top to bottom, left to right.



« Detail of horse clop weave showing the differing sizes of linen white yarn amongst the deep orange.

## Single Horse Clop

A seven-shaft threading pattern is shown for a polychrome summer and winter block design based on a single "clop" from the horses clopping spectrogram. The sample was created using a table loom to enable improvisation on the loom, and the basic liftpattern is given. Each unit consists of six picks: two plain weave picks using the same colour yarn as the warp, and at least four pattern picks in assorted colours to show the variety in the spectrogram. On the pattern picks, shaft 1 is always lifted and the shafts marked with an X are lifted whenever the pattern weft is to be hidden in that block on the face of the cloth.

The pattern shuttles can contain different colours of yarn or the same colour. The full potential of the polychrome design is only obtained using two separate shuttles (rather than two colours in a single shuttle), since this allows pattern threads to be shown/ hidden in different blocks within each pair of pattern picks.

The sample shown was woven using 14/2 Nm (8/2 Ne) GOTS-certified organic cotton for both warp and weft, with warp sett at 20 epi.

## Yarn specifications

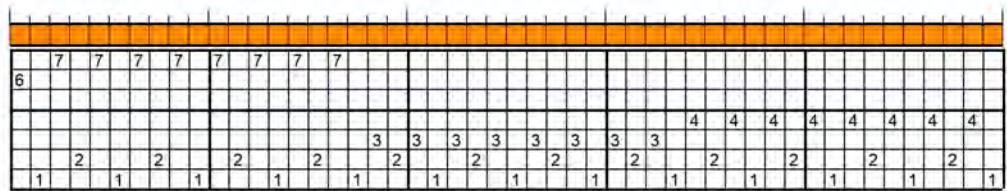
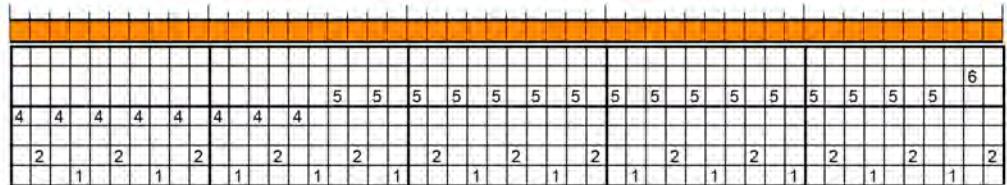
Warp and weft: 14/2 Nm (8/2 Ne) GOTS certified organic cotton (Venne Colcoton)

Warp: Tile 5-2009, 20 epi

Weft: Tile 5-2009, Flaming Red 5-3003, Medium purple 5-4023, Linen White 5-7007

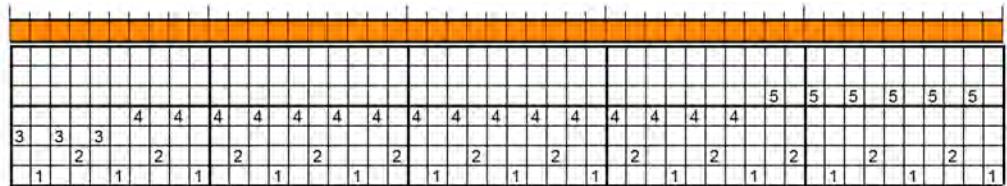
← Brain here

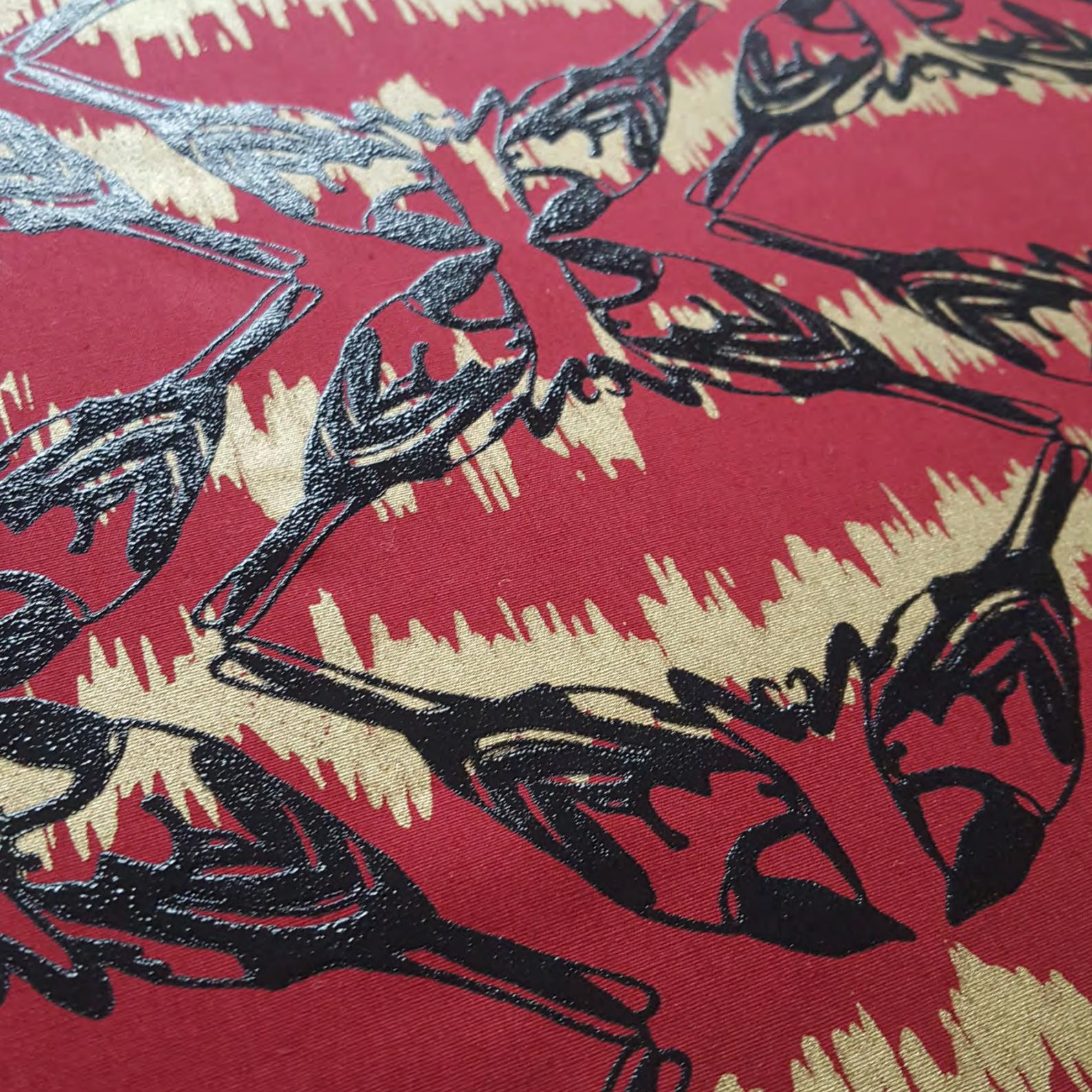
Threading pattern. Pattern can be read each row left to right, working from bottom to top or right to left from top to bottom.



Lift Plan

1	X	X	X	X	X	X	X		
1	X	X	X	X	X	X	X		
1	2								
1	X	X	X	X	X	X	X		
1	X	X	X	X	X	X	X		
	3	4	5	6	7				





« Detail of horse clop weave showing the differing sizes of linen white yarn amongst the deep orange.

Proceeding pages: Screen print images of bird and bird song audio form for reproduction.

# Great Tit Pattern

## Layer 1 - Waveform

Created waveform from sound file in Audacity. Took a screen shot and placed into Illustrator. Performed image trace using black and white mode, threshold 128. Expanded image. Created a repeat using the pattern maker - brick by row, offset 1/2. Drew A4 art board and rectangle same size, filled with repeat pattern.

## Layer 2 - Great Tit

Drew great tit on tracing paper from source material found on internet using pencil then fine liner and posca pens. Scanned to Mac resolution 300 dpi, high contrast. Placed in Illustrator, performed image trace using black and white mode, high threshold. Expanded image. Created a repeat using pattern maker - hex by row - using the artwork duplicated four times and rotated. Drew A4 art board and rectangle same size, filled with repeat pattern.

## Screen Printing Process

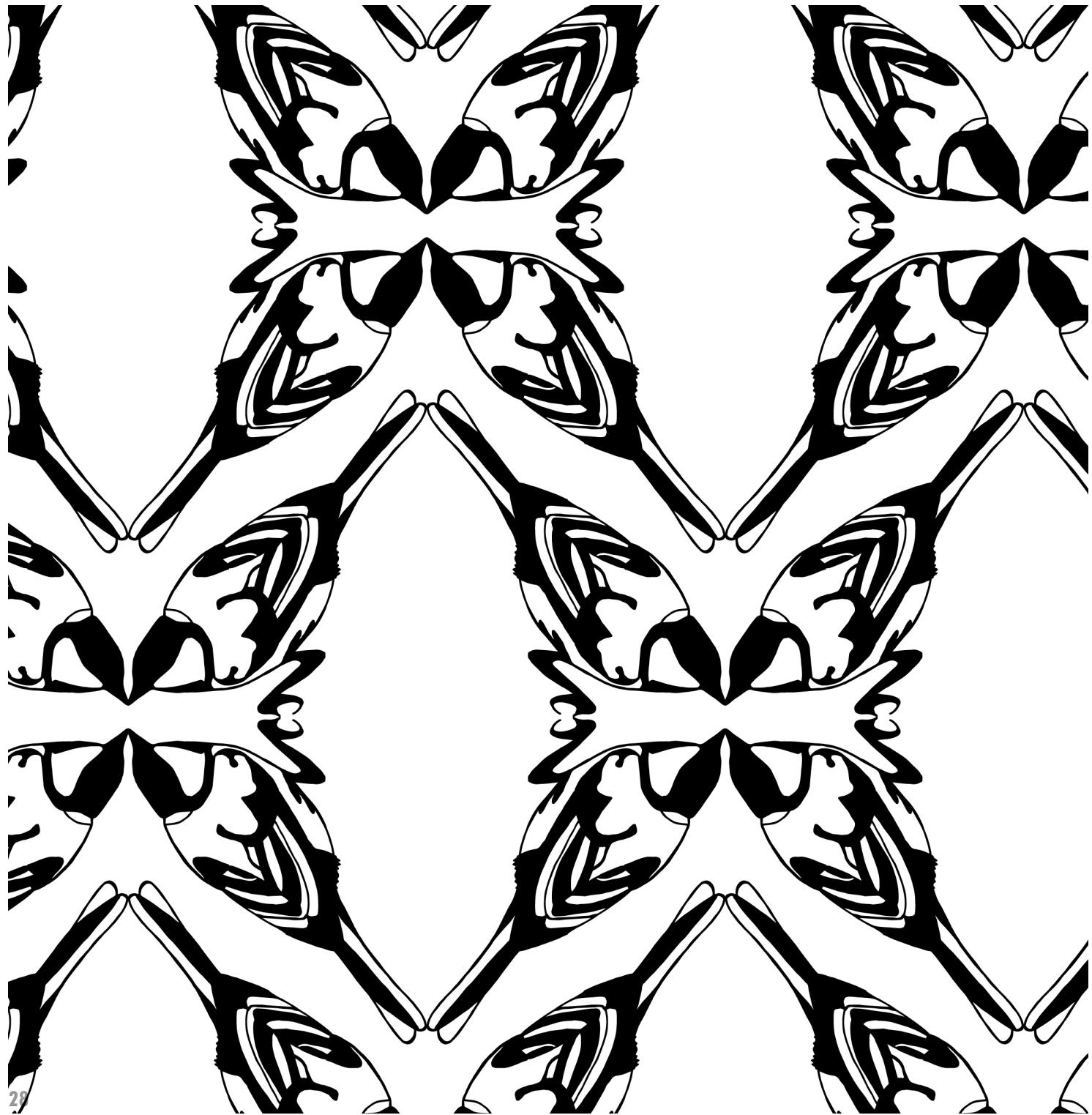
Artwork repeat created A2 size and spread over 2 x A3 art boards in Illustrator. Printed onto A3 tracing paper, then joined with tape. Screen coated with light sensitive emulsion. Artwork taped to

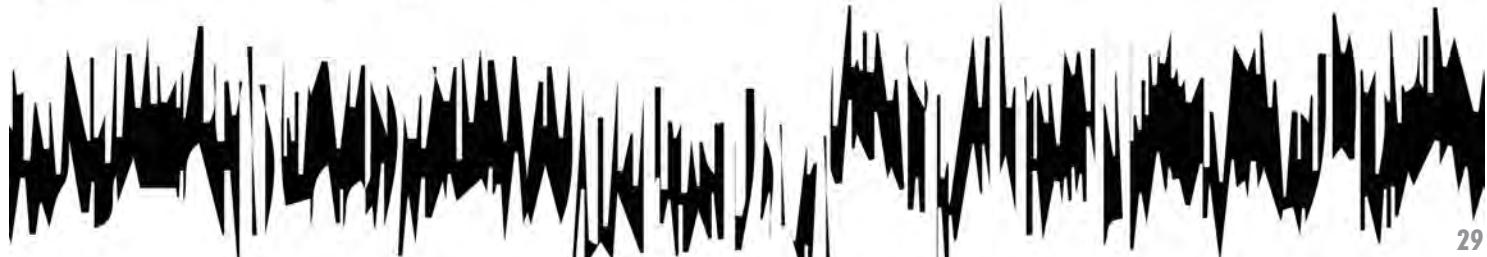
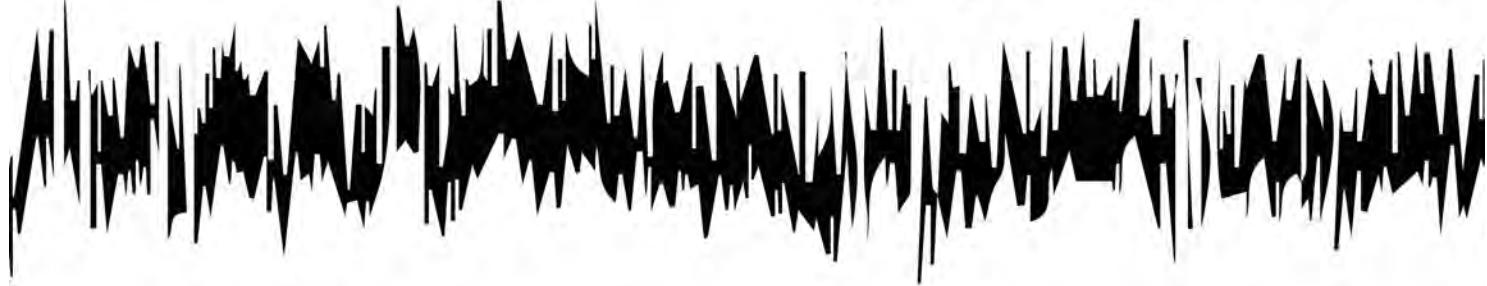
underside of screen, set on glass and screen exposed in exposure unit for 6.5 mins. Screen washed out to reveal resulting stencil.

Screen taped to ensure no leakage from gaps, tippex used to touch up any holes in stencil. Inks mixed using textile printing (FF) binder and pigments/powders. Fabric stretched and pinned to printing table, then ironed. Set square used to ensure fabric is straight, masking tape measured and laid out to map out screen positions (three per width). Tracing paper stencil used to check repeat will meet up. Right then left position printed, dried using hairdryer, then middle screen position printed. Repeat six times. Waveform pattern printed in gold first using 4 pulls per print. Great tit pattern printed over the top in black using 2 pulls per print.

## Finishing - Final Piece

Excess fabric cut off, binding stitched to either side of the fabric, folded and hand stitched on the reverse. Loops stitched into the top and bottom of the length to allow space for a pole to hang the fabric and weights to be placed in the bottom.







x Black and white print for  
reproduction.

# Wave on Rock

The approach to screen print is very loose and mark making based. Because of this, the prints are derived from drawings that respond to the spectrograms. The initial drawing stage is made using black drawing materials to focus on line over colour – in this instance ink and charcoal. The marks are then scanned into Photoshop and edited in scale, precision and composition to form the final designs. Designs are printed onto tracing paper A3 size in black and white, and exposed onto the screen using screen-coating emulsion in an exposure unit. Once exposed, the screen is rinsed to remove excess emulsion and reveal the design.

After drying the screen now ready for printing, and colours are thoroughly mixed together to combine the pigment and binder. Fabric is ironed and pinned flat to the print bed. Screen is placed where you would like the design to be, and weighed down with a weight to avoid the screen slipping. Pigment is applied at one end of the screen, and pulled through the mesh of the screen with a squeegee back and forward. Excess pigment is removed from either end of the screen and washed and dried to ready the screen for the next position for printing.

Following the same process as mentioned previously, this print was formed looking at the overall texture of the spectrogram. To capture the bold speckles of the background, you can draw using ink and a roller. Translated into Photoshop, the mark was repeated and printed out A3. Print the screen on ready dyed yellow base fabric, and created a 2-colour print by first printing a pink layer.

Once dry, place the cleaned screen slightly left and down, and print in a dark pink pigment. These printed colours were selected from the Audacity spectrogram tones.

Overall printed pattern using »  
red ink.





« Detail of overlaid prints using multiple ink types and colours.

## Footsteps in the Snow

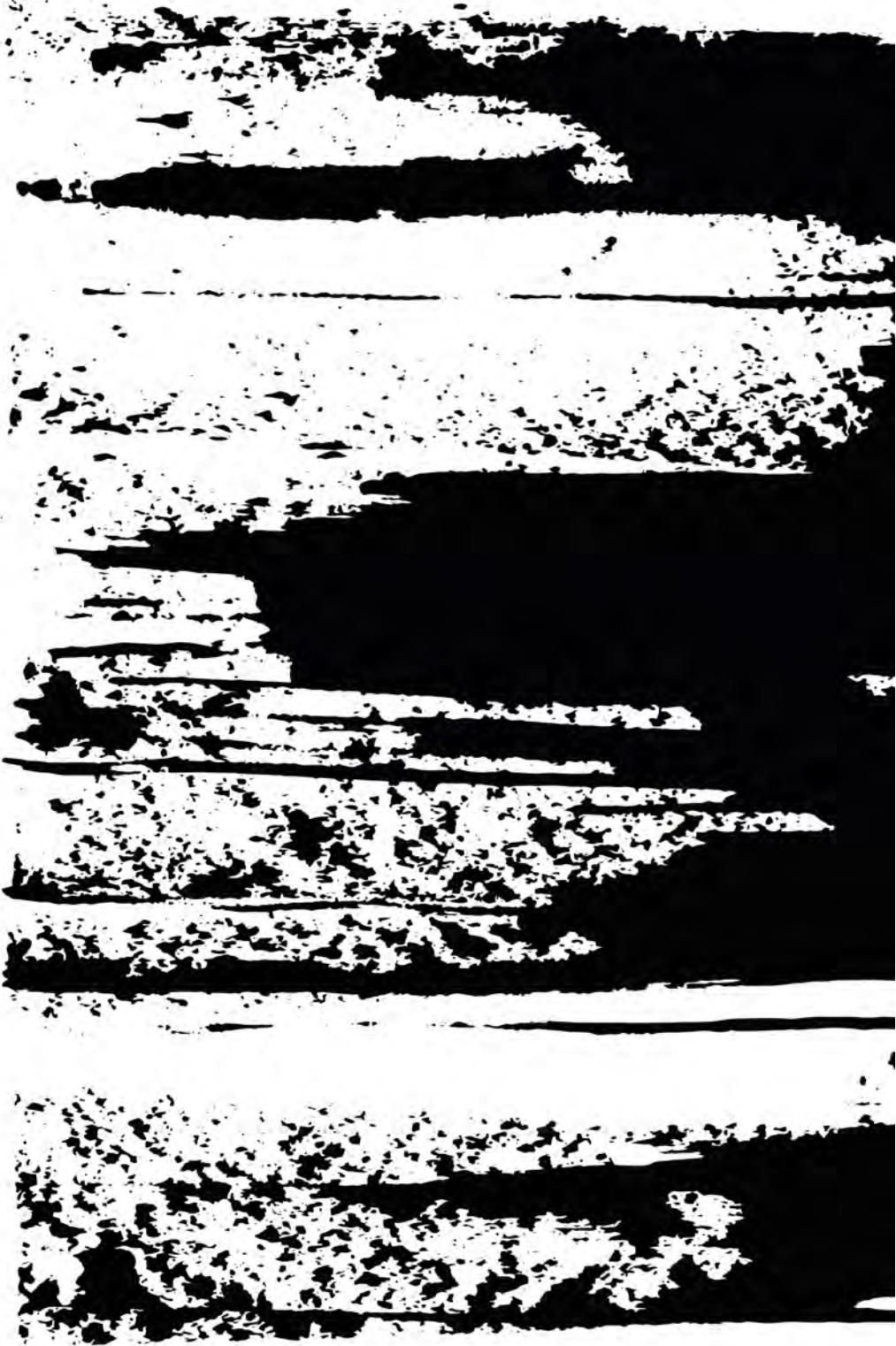
Series of drawings created with charcoal referring to spectrogram. Scanned to Mac resolution 300 dpi, high contrast. Placed in Illustrator, performed image trace using black and white, high threshold. Expanded images. Chose favourite to print.

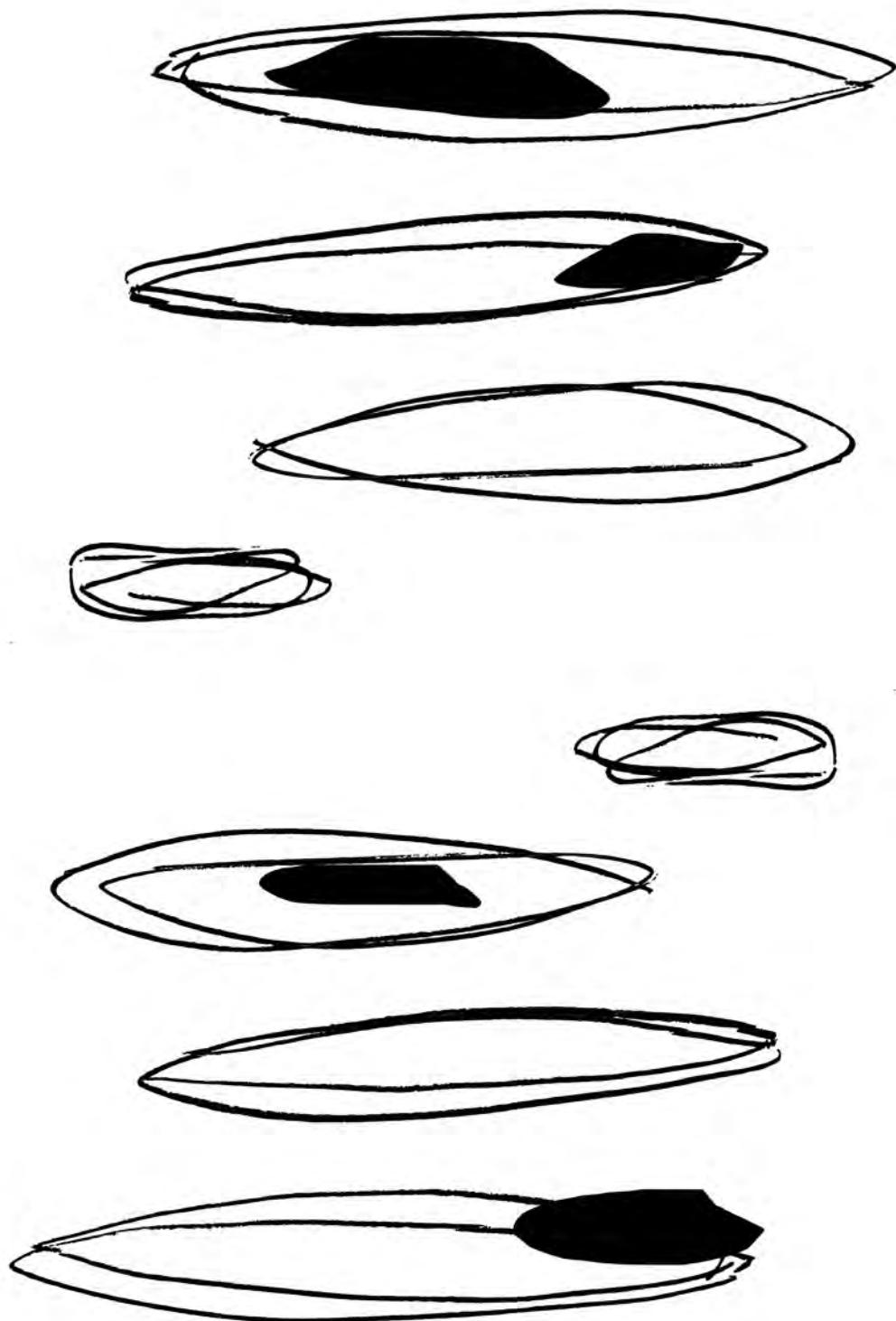
### Screen Printing Process

Artwork enlarged to A3 size and printed onto tracing paper. Screen coated with light sensitive emulsion. Artwork laid face up on front side of screen, glass on top to keep flat. Exposure lamp used to expose the screen for 9 minutes. Screen washed out to reveal resulting stencil.

Screen taped to ensure no leakage from gaps, tippex used to touch up any holes in stencil. Inks selected, fabric pinned to printing table. Footsteps in the snow sample printed using placement method, with the screen being placed randomly by eye using 5 different colours of ink overlaid and printed onto white sheeting. The resulting print is abstract and the sample has been selected from a larger printed area.

Black and white image for » reproduction.





« Black and white image for reproduction. Note the circular and free flowing line using sound as the inspiration

Striated pattern detail with »  
yellow and grey yarn knitted  
throughout.

# Shaking a Branch

Screen-printing as a process is very free, and can be used in many ways. I enjoy using screens for placement prints, positioning on the fabric to personal taste of composition. Overlaying print designs slightly offset from one another in varying colours can be successful too. This provides depth, added tone or texture. The number of pulls of pigment through the screen with a squeegee is dependant on the weight of fabric, binder consistency and desired effect: The less pulls, the lighter / more uneven the print. The more pulls, the darker the print. Be careful not to use too many pulls, as the print can bleed on the fabric.

Base fabrics can make a big difference to the impact your print has. Ready dyed bases are a good option for even tone flat colour surfaces to work on. Dyeing your own bases may allow for more colour options or textural colour depending on technique. Even printing your design on top of other screen-prints or ready patterned fabrics can work.

## Making the pattern

Zooming in to the texture of the spectrogram revealed oval shaped negative white space. It was these shapes that I used to create this print. Once refined in Photoshop and transferred to screen, the print was printed onto dyed grey linen. The first print has been made using 4 pulls of the squeegee, to create a lighter blue speckled effect print. Once dry, a second layer was added in the same dark blue pigment by rotating the screen around and printing on top, this time using 7 pulls to create a dark flat tone layer. With the lighter blue rotated print lying underneath, a shadow effect has been created using offset and tone.





« Detail of footsteps in the snow  
linear pattern.

# Footsteps in the Snow

Striped pattern knitted on a vintage domestic machine

Knitted with two different yarns - one plain A, one variegated B,  
replicating the 'grainy' effect of the background in the spectrogram.

**Yarn A** plain knit

**Yarn B** engage TUCK buttons and standard 1D punchcard pattern  
(alternate stitches forward)

## Stripe pattern

14R A, 4R B, 2R A, 2R B, 2R A, 4R B, 2R A, 8R B, 2R A, 4R B, 16R A, 14R  
B, 2R A, 2R B, 2R A, 4R B, 6R A, 2R B, 2R A, 2R B, 2R A, 2R B, 2R A, 2R B,  
2R A, 2R B

Scale of pattern can be reduced or enlarged to suit specific projects  
or different weights of yarn. This pattern can also be knitted in plain  
stripes.

# Horse in the Cover

This pattern is for a hand knitted cabled bolero cardigan in one size. The Horse sound has been translated in a cable design on the back panel. A variety of cables representing the different intensity of sound, radiate from the centre column. The centre column or purl stitches represents a quiet moment between sounds, and is a welcome pause in the otherwise complex knitted row. As time passes and the sound disperses the cables also fade into regular knit and purl stitches.

The back and fronts of the cardigan are knitted in one piece but could be split into 3 separate knitted pieces if you prefer. The cables radiating around the back panel fade before reaching the front and neatly finish under the arms and at the shoulders. The two front edges are curved to represent the gentle meandering of the two rivers meeting in the Cover.

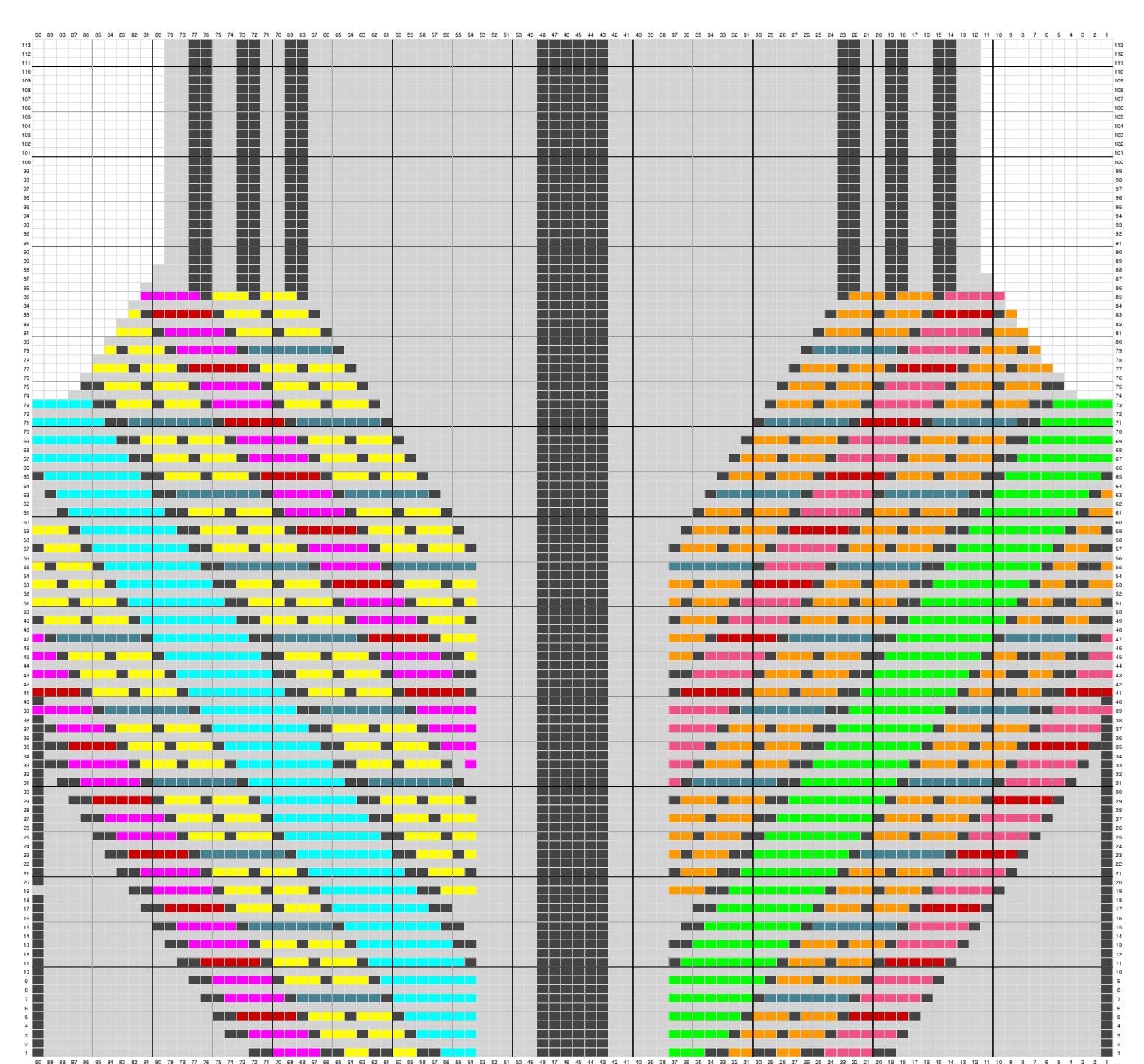
The sleeves are plainly knitted in stocking stitch to keep the focus on the back panel of the cardigan. They are easily shaped to be set in at the finish. Once sewn together the whole piece is finished with an easy I-cord border giving a neat edge without detracting from those

beautiful cables. There is no doubt that the back panel is a complex design and knit. Cables are traditional set in vertical columns crossing at a set number of rows. In this design the cables travel both vertically and horizontally. This was a new concept for me and a design challenge both to my skills and my traditional knitting brain.

Cable charts traditionally use stitch symbols; however, the complexity of this chart in symbols became unreadable. Instead a coloured chart more familiar to stranded knitting designs has been used, which is easier to follow when knitting, and also shows how the pattern could be knitted as a stranded knit. The final garment is shown here knitted in naturally dyed sustainably produced merino yarn, in a paler colour to show the cables at their best.

The sound of horse clopping, »  
detail of cable stitching  
travelling vertically and  
horizontally. Hand-knitted with  
wool yarn,





## Knitting plan legend

	Knit on right side purl on wrong side
	Slip these 5 stitches to cable needle. 1 stitch behind, moving remaining 4 stitches over to the RIGHT. K4, P1
	Slip these 3 stitches to cable needle. Move 2 stitches forward to the RIGHT. P1, K2
	Slip these 8 stitches to cable needle. Move 4 forward to RIGHT cross every 9th row. K8
	Stitch removed by armhole decreases
	Slip 5 stitches to cable needle. Move 4 forward and to the LEFT. P1, K4.
	Slip these 8 stitches to cable needle. Move 4 forward to LEFT cross every 9th row. K8
	Slip 3 stitches to cable needle. Move 2 forward and to the LEFT. P1, K2.
	Rearrange stitches as for normal Cable 1 RIGHT/LEFT. Instead of knitting 4 add an additional 2/2 cross to the RIGHT/LEFT then K4.
	In addition to rearranging the stitches to travel RIGHT/LEFT. Slip 4 to cable needle to cross to RIGHT/LEFT. K2, P2, K2
	Purl on right side knit on wrong side

## Materials for pattern

5 x 100g DK weight yarn

4mm circular needles 60cm cable

3 stitch markers

Gauge 30 rows x 20 stitches = 10cm<sup>2</sup> after blocking

## Knitting pattern

### Body

Cast on 19 stitches for front piece place marker, 90 stitches for back place marker, 19 stitches for front piece.

Working back and forth on the needles.

**For all wrong side rows in the pattern knit the stitches as they face you ie knit the knit and purl the purls.**

Purl one row

Begin chart - **AT THE SAME TIME work increases at each of the front edges.**

**2nd row Cast on 3 stiches at each end.**

**4<sup>th</sup> row cast on 2 stiches at each end.**

**Then increase 1 st at each end EVERY row 5 times.**

**Then increase 1 st at each end EVERY OTHER row 5 times.**

**Then increase 1 st at each end EVERY 4<sup>th</sup> row 4 times.**

**Then increase 1 st at each end EVERY 6<sup>th</sup> row 2 times.**

Continue knitting chart without shaping until 74 rows completed.

### Armholes

Knit until 3 stitches before the first marker. Cast off **6 stiches** to form the under arm. Continue with the chart until 3 stitches before the second marker. Cast off **6 stiches** to form the second under arm. Cut yarn and rejoin to work on the back piece with the right side facing.

### Back

Continue to follow chart. **AT THE SAME TIME** decrease one stitch at each end of this and the following **RIGHT** side rows **until** 70 stitches remain.

Work 37 more rows of chart without shaping.

**Shape back neck and shoulders.**

Work 23 stitches, K2tog, cast off centre 21, work to end of row.

Purl one row.

Decrease one stitch at the neck edge on this and all **RIGHT** side rows until 20 stitches remain.

Work 2 rows.

Cast off 7 stiches at the start of this and the next **RIGHT** side row.

Work 1 row.

Cast off remaining 6 stiches.

Repeat for other shoulder.

### Front

Working each front separately back and forth. Rejoin yarn to begin on a **RIGHT** side row.

Knitting in stocking stitch.

Decrease 1 stitch at the front edge on the first and every 8 rows for a total of 7 times.

**AT THE SAME TIME** - decrease 1 stitch at the armhole edge at the start of **WRONG** side rows for a total of 6 times.

When all decrease are complete begin shoulder shaping.

## **Shoulder**

Cast off 7 stitches at the start of the next row and the following alternate row.

Work 1 row.

Cast off remaining 6 stitches.

**Repeat with reverse shaping for second front piece.**

## **Sleeves - make 2**

Working back and forth in stocking stitch.

Cast on 48 stitches.

Work 4 rows.

Next row - K2, make 1, knit to last 2 stitches make 1, K2.

Continue to work in stocking stitch, increasing every **6 rows** until you have a total of 52 stitches.

Then increase every **8 rows**, until you have a total of 76 stitches.

Continue knitting without shaping until the sleeve measures 40cm from the beginning. End with a purl row.

Cast off 3 stitches at the start of the next 2 rows.

Decrease 1 stitch at each edge on the next and following **RIGHT** side rows until 44 stitches remain.

Then decrease 1 stitch at each edge every row until 14 stitches remain.

Cast off 14 stitches.

## **Finishing.**

Wet block body and sleeves.

Sew in sleeves.

Add i-cord edging starting at left side join and working in one continuous knit until complete.

## **I-cord edging**

Using double pointed 4mm needled.

Cast on 3 stitches.

Pick up one stitch from the **RIGHT** side of body of knitting - 4 stitches on needles.

K2, K2 tog - 3 stitches on needles.

**DO NOT TURN. INSTEAD SLIDE BACK TO THE START OF THE NEEDLE AND REPEAT.**

The yarn will pull across from left to right creating the cord effect. You do not need to pull the cord tightly yourself.

Pick up at a ratio of 1:1 for the stitches and rows on the body.

When you have worked all the way round cast off and sew together.

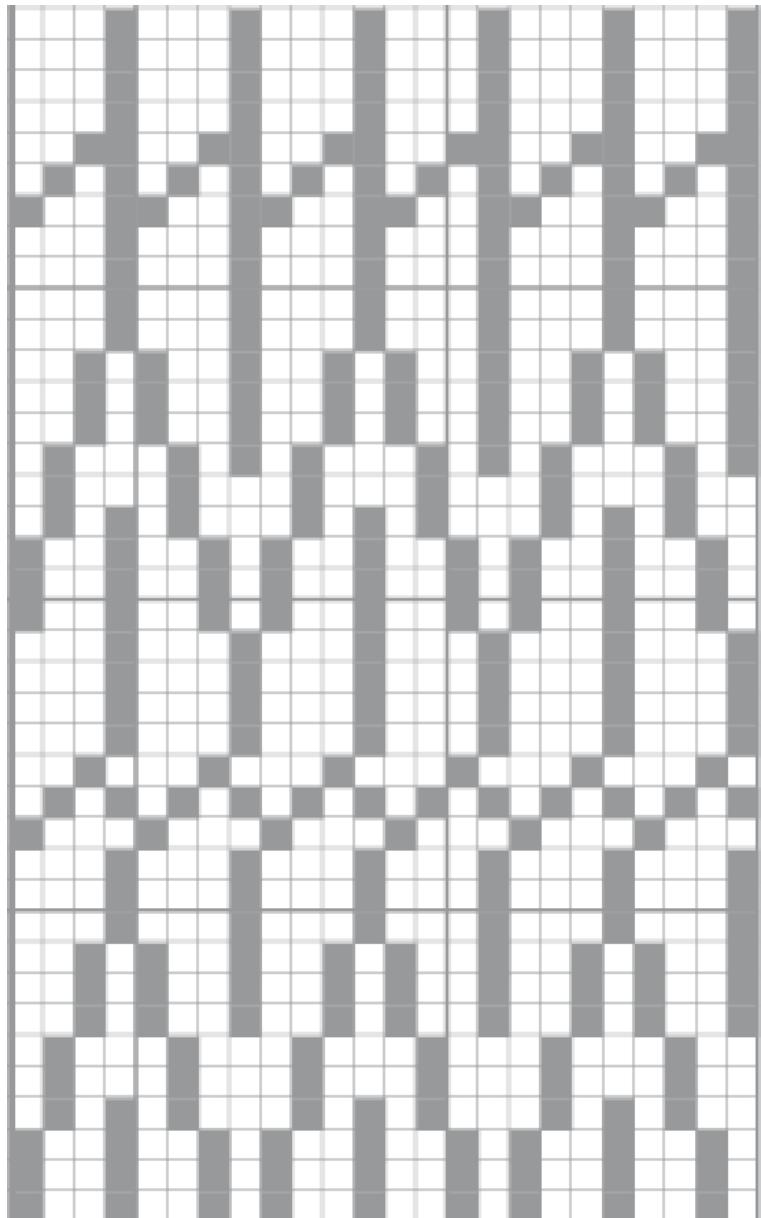
Detail of knitting. »





« Detail of knitting pattern showing the y-shaped chevrons of the wren birdsong.

Punchcard pattern »



# Wren birdsong

Fair isle pattern inspired by three different elements of wren birdsong spectrogram, knitted on a vintage domestic machine.

Final piece knitted in different colours to create a dip dye effect to replicate the sound levels from faint to strong. The piece has also been knitted in Olive's signature reversed colour proportions to show how this changes how the pattern looks.

Punchcard created with 24 stitch repeat and 39 row repeat. This pattern can also be knitted by hand by following the chart shown.



« Branches shaking pattern  
knitted as a cushion cover.

# Branches shaking

The woods have been an important part of my life for as long as I can remember. Every difficult conversation, break up and crossroads has been considered in a long walk under the leaves. No matter the weather or the season. I find the woods both relaxing and refreshing, so Orla's eerie recording drew me in.

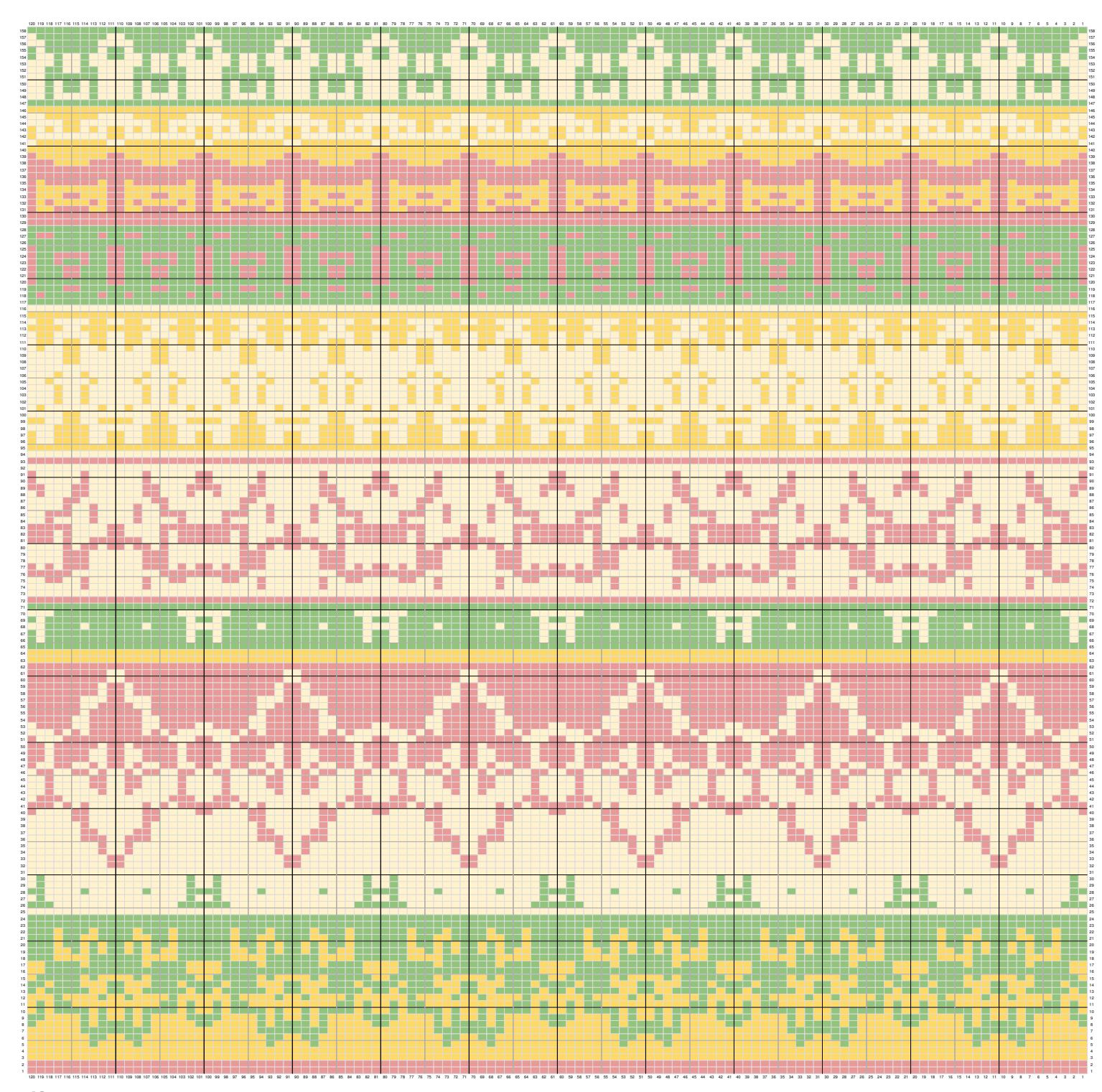
Due to the wind noises the recording was very busy with *shhhh* sounds. I used the Audacity software to do some noise reduction and improve the clarity of the branches. I also reduced the frequency shown in the Spectrogram to only include the range that is within my hearing.

When I took the Spectrogram through to the chart software the patterns were subtle. To help them standout I increased the contrast and reduced the number of colours used. A variety of interesting shapes began to emerge. I zoomed in on the chart and picked out shapes to rotate and repeat across knitted rows.

The cushion cover created acts like a traditional sampler pattern. With no shaping to worry about this is one of the easiest ways for handknitters try out different colour and pattern combinations. Most knitters make a small swatch to do this but others, like myself make

larger unshaped test items like cushions covers, scarves, hats or sleeves. This allows us to view the stitch and colour combinations over a larger area of knitted fabric, which is helpful when measuring the gauge and planning for size.

The next step for this pattern would be a traditional yoke style sweater or cardigan. The bands of pattern lend themselves well to this, the smaller bands being at the top of the chart would work well with the increasing required without interrupting the flow of the pattern and the larger band would sit well further down the knitting where no shaping is required.



[« Knitting plan](#)

## Materials for pattern

4 colours of 4 ply weight yarn, 50g of each colour.  
3mm circular needles 60cm cable  
1 stitch marker to mark start of round  
Gauge rows x stitches = 10cm<sup>2</sup> after blocking

## Knitting pattern

Cast on 240 stitches and join to work in the round. Use a stitch marker to indicate the start of the round.

There is an option to use a provisional cast on method here which will allow you to use a neat Kitchener stitch at the end of the pattern when closing the cushion cover.

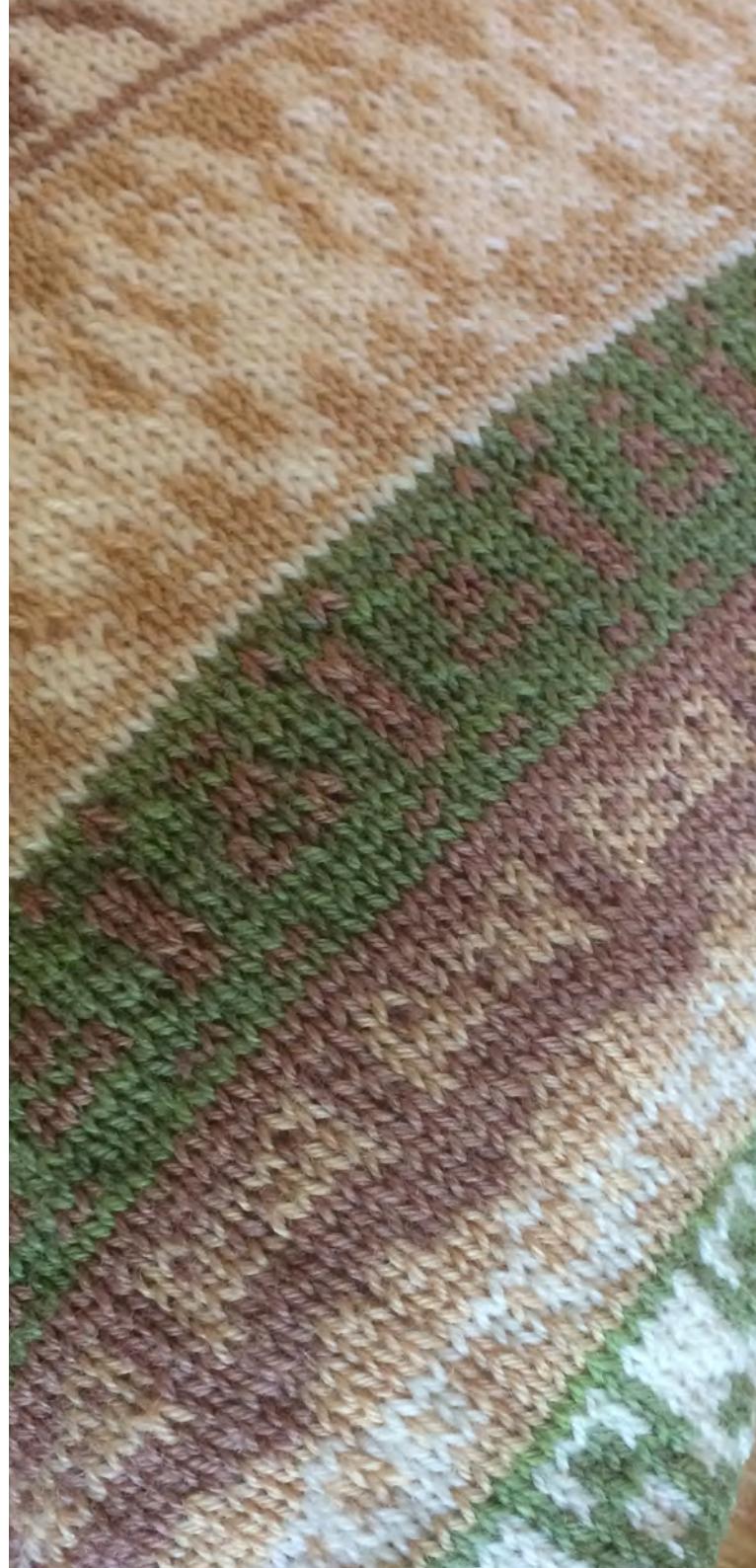
Alternatively, just use your preferred cast on and close with mattress stitch or insert a zip in order to be able to remove the cushion pad for cleaning.

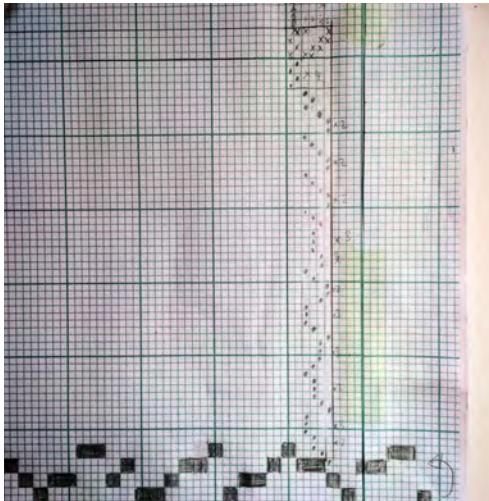
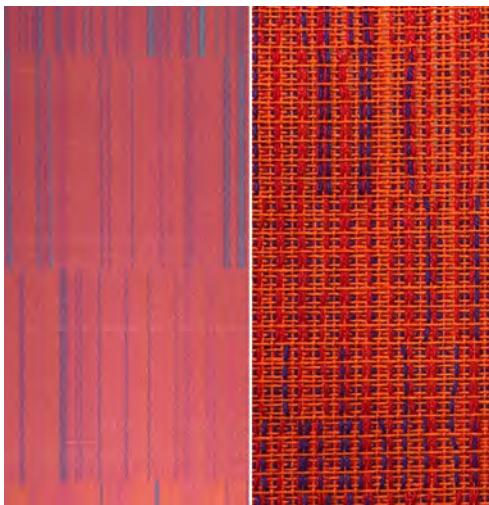
Work to complete the chart.

When the chart is complete turn the tube of knitting inside out and complete a three needle cast off.

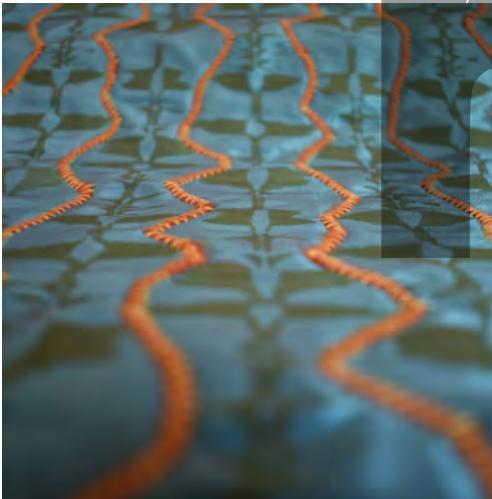
Then return to the start of your knitting, insert a cushion pad, unravel the provisional cast on and sew closed.

[Knitting pattern »](#)





# reflect



Overall, this study promoted innovative multi-sensory approaches to traditional pattern creations; and opened dialogues across the traditional textile disciplines, disrupting the textile manufacturing paradigm. The potential impact for novel pattern creation and contribution to the evolving field of textile design in contemporary Scottish manufacturing can not only innovate the process of pattern design but, in the long term, promote more open-distributed approaches towards textile production.

We thank you for taking the time to read and use our patterns and we hope that they provide a useful reflection on your own experience in the landscape. If you create anything with these patterns, we would love to see them! Please email [auraltextiles@gmail.com](mailto:auraltextiles@gmail.com) or else tag @auraltextiles or #auraltextiles on Instagram or Twitter.

« Images from the Instagram Aural Textiles page showing the variety of patterns and processes involved.

# References

Mennie, L. & Jaramillo, G., 2018, Aural Textiles: Beyond Visual Pattern Making, *Journal of Textile Design Research and Practice*. (in press)  
DOI 10.1080/20511787.2018.1522077

Schafer, R.M. (1994). *The Soundscape: our sonic environment and the tuning of the world*. Rochester, VT: Destiny Books.

West, M.L. (1994). The Babylonian musical notation and the Hurrian melodic texts. *Music & Letters*, 75(2), 161-179.

## Further reading

Andrew, S., & Diamond, K. (2018). Dichotomies in textile making. In S. Luckman & N. Thomas (Eds.), *Craft Economies*, London: Bloomsbury Publishing, 70-82.

Cantwell, J. & Weir, C. 2011. "Birdsong" Website, 29 September 2017. Retrieved from <https://vimeo.com/33143287>

De Oliveira, A. G. et. al. (2015). Bird acoustic activity detection based on morphological filtering of the spectrogram. *Applied Acoustics*, 98, 34-42.

Prahлад, C. K., & Ramaswamy, V. (2004). Co-creation experiences: The next practice in value creation. *Journal of Interactive Marketing*, 18(3), 5-14.

# Acknowledgements

We would like to thank the following who have supported this project:

Finn Fullarton-Pegg, Design Researcher

Daniele Sambo, Photographer

Sean Fegan, Videographer/Photographer

Christiane Friauf, Event Support

Anne Owen & staff of the Falconer Museum for their assistance in curating and hosting the exhibition.

Carrie Custodio & staff of the Red Lion Restaurant, Forres.

Lynne's Loom, Aberdeen

We would also like to thank the following locations for their hospitality during our workshops:

The Plockton Bunkhouse

Plockton Village Hall

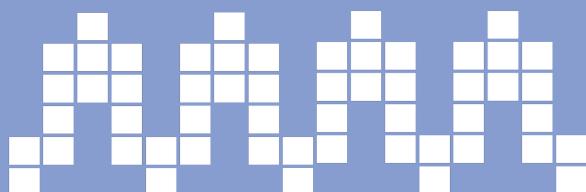
Plockton Inn Restaurant

Balavil Hotel, Newtonmore

Newtonmore Village Hall

Toshacs Tuck Shop, Newtonmore





*patterning sounds* is a pattern book of participant work of the Aural Textiles project. It explores Scottish landscape sound-inspired textile design in a collaborative and distributed manner. A research project funded by the Royal Society of Edinburgh and The Glasgow School of Art's Innovation School.

RSE

INNOVATION  
SCHOOL  
THE GLASGOW  
SCHOOL OF ART