

Wo(rk)manship: Transforming reduction into tessellating multi-block relief prints

Victoria Browne, Oslo National Academy of the Arts

ABSTRACT

This article documents practice-led research from the artist's position as print 'maker' within contemporary craft. The methodology embodies David Pye's first-hand account of the workmanship of risk. The project integrates Computer Numerical Control (CNC) milling to overcome process limitations; to realise scalable complex multi-block relief prints and to allow further exploration in colour printing.

The report reflects on the process of transforming reduction relief prints into tessellating multi-block relief prints, as well as commenting on the situation and timescale in which the research took place. The outcome delivers new insights into the author's artistic practice.

INTRODUCTION

Diversity imports into our man-made environment something which is akin to the natural environment we have abandoned.

The Nature and Art of Workmanship, David Pye, 1968

David Pye (1968) published 'The Nature and Art of Workmanship', to advocate for diversity in the material nature of the craft process. 'In the workmanship of certainty the result of every operation during production has been predetermined and is outside the control of the operative once production starts. In the workmanship of risk the result of every operation during production is determined by the workman as he works, and its outcome depends wholly or largely on his care, judgment and dexterity' (Pye 1968, p52).

Unlike his contemporaries, Pye was writing from his everyday experience in the workshop as a practicing craftsman and an artistic researcher avant le lettre. 'He systematically dismantled the ideas of John Ruskin's Art and Craft movement

which he found to be insupportably idealistic' (Adamson 2010, p341). Pye argued, for example, that 'Ruskin did not realise there could be great pleasure in doing highly regulated workmanship, as perhaps he never had to work for a living and that a fair proportion of patient tedious work is necessary if one is to take pleasure in any kind of livelihood' (Pye 1968, p118). Pye became 'perhaps the most widely read twentieth-century craft theorist' (Adamson 2010, p341) and is still quoted by educators, historians, and anthropologists; Glenn Adamson, Christopher Frayling, Ezra Shales,



Figure 1

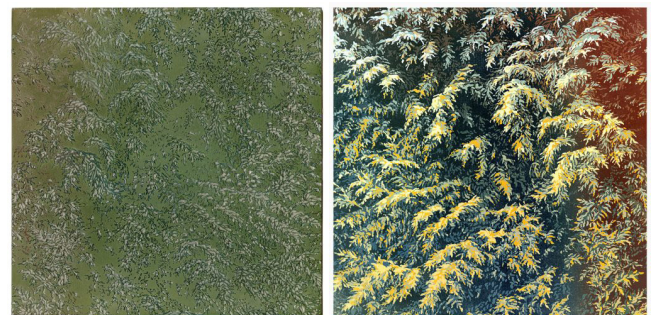


Figure 2

Figure 1: Photo-montage and Hand Carving. Photo by Victoria Browne

Figure 2: Reduction Relief Matrix and Reduction Linocut. Photo by Victoria Browne

Tim Ingold, Daniel Miller and John Thackara.

Although Pye recognised the privilege of opportunity when ‘the use of talent can only be learnt very slowly by practice’ (Pye 1968, p137), he did not attempt to contextualise the craft process further by advocating for diversity of gender, class, or race of the workmen. In 1968, hands-on work remained divided between men in the workshop and women in the home; influential art theorists were principally white European men; and post-colonial discourse for public engagement had yet to evolve. Fifty years later, what practice-led methods embody the wo(rk)man in her artistic research? How can the wo(rk)man remain ‘open to risk that makes interpretation possible’ (Siukonen 2015, p68) when unforeseen constraints take hold? By positioning myself as a printmaker in the twenty-first century, this project invites further reflections on Pye’s workmanship of certainty versus workmanship of risk.

METHODOLOGY

My artistic practice takes inspiration from post-industrial craft heritage and is situated in the intersection of tacit knowledge, machine tools and digital technology. As an exploration into mankind’s pursuit to manipulate and control the natural environment, my polychromatic gesturally carved relief prints depict vernacular topiary as a common trait of urban sprawl.

In seeking to reveal embedded knowledge, my research methodology purposefully aimed to include the following five stages: to identify, by gathering visual data from observation, accessing primary source material and reading relevant publications in the field; to select, by translating collated data into drawing, carving and printing a reduction relief matrix by hand in the studio; to process, by digitally tracing, tessellating and mimicking with CNC-routing in the workshop; to analyse, by remixing multiple relief matrices in the print studio; and to reflect on the art production in a written report.

IDENTIFY

In 2017, I began recording visual information of ornamental foliage in Nordstrand, a district of Oslo located on the southside of the fjord, in which property boundaries are commonly delineated by manicured hedges and picket fences. Thuja ‘green giant’ conifer is a hybrid cross between two Japanese and North American species and as a non-native evergreen; it is extensively cultivated for urban development throughout Norway.

I worked en plein air by drawing with charcoal on paper mounted to an easel. The sketches were relatively quick, spontaneous and although often self-conscious, were valued for their binary data. Gestural marks captured a rhythm in the repetition, a direction of movement and a sense of scale relative to my body. The foliage was also photographed with a smartphone camera, which proved less conspicuous and

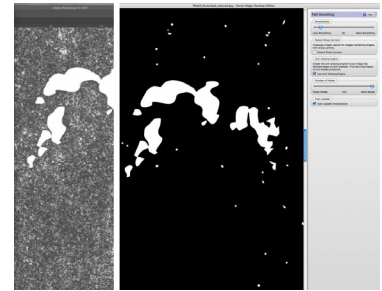


Figure 3

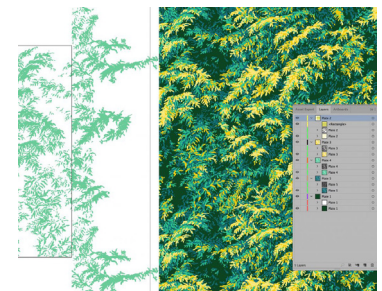


Figure 4

completed in less time, and added to the accumulation of visual data.

I also visited the Munchsalen at Nasjonalmuseet to reference from primary source material. Edvard Munch (1863-1944) was a titan of an artist during his lifetime, his presence still dominates the cultural landscape of Norway, and the impact of his legacy attracts visitors worldwide to the museum's collection. My research became a unique opportunity to explore Nordic light and colour through Munch's paintings.

I selected *Death in a Sickroom* (Munch 1893) initially for its graphical square format and distinct contours of colour. But subconsciously I was also drawn to the figures' isolation in the painting. After relocating the previous year from London, I was reeling from the fallout over Brexit and haunted by the sickly green skin pallor of Munch's figures. I frequently encountered this eerie colour in winter, during the early morning when the sunlight reflected off Nordstrand's white wooden villas. I photographed the painting with a smartphone camera (Miranda 2013) and colour matched by eye with a Pantone swatch book. This secondary source material contributed to the visual data and served as an accurate colour palette to reference on my return to the print studio.

SELECT

I began by re-interpreting the binary and visual data, drawing with graphite transferred onto a linoleum matrix in preparation for carving. At this point, I was aware that Pye's workmanship of risk could be applied to two different stages: firstly preparatory, when hand carving the matrix, and secondly productive, when colour mixing ink by eye during the printing process.

Historically, Japanese ukiyo-e artists rarely carved or printed their own multiblock woodcuts; production was traditionally divided between carvers and printers, all masters with specialist knowledge of material, tools, and techniques (Chiappa 2018). In comparison, reduction relief printing demands the full attention of the artist to engage with every stage of production, including carving the block and printing the edition. The irrevocability of [this] printmaking process means that at any moment whether through inattention, or inexperience, or accident, the artist is liable to ruin the job (Kelsey 1995).

To reduce the risk, craftsmanship follows the mantra of practice makes perfect [uses *promptos facit*]. The wo(rk)man is compelled to dedicate hours refining her skills through repetitive acts of hand-eye co-ordination, so that the muscle memory becomes embodied as tacit knowledge. This is echoed in Richard Sennett's *The Craftsman* (2008) and a central tenet in the Art and Craft department at Oslo National Academy of the Arts (KHiO); observing that 'ten thousand hours is a common touchstone for how long it takes to become an expert' (Sennett 2008, p172). Our workshops are open eighteen hours a day, seven days a week for students to become specialists of their art

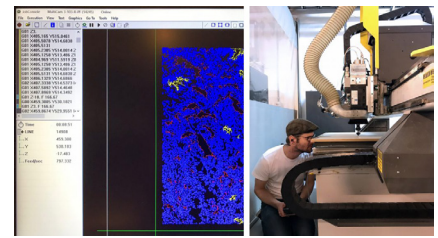


Figure 5

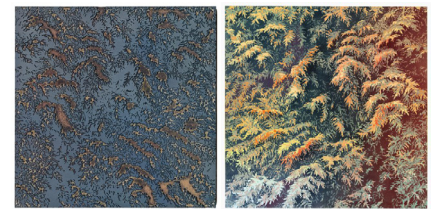


Figure 6

production.

My own contractual time at KHiO is divided between teaching, administration and artistic research. I am rarely able to commit to a daily exercise of hand carving and colour mixing in the workshop. So initially, I was critical of my own results, when compared to Pye's 'art of workmanship' (Pye 1968, p63). My prints lacked diversity in scale, gesture, or colour, and in my mind's eye, they were either too flat in regularity, too conventional in form or too contrived in intention. I was compelled to re-evaluate the gathered visual data. I began to explore photomontage by removing the camera lens perspective (Joyce 1988) to convey movement through space. The result was a digital composite produced in Adobe Photoshop. The image was gray-scaled, gridded and reversed, and displayed on a mini tablet as visual notation during the hand carving stage.

Reduction relief printing is a process applied to a single matrix. By progressively alternating between printing and carving the matrix, the ink is rolled onto the raised surface and printed in registration over the previous printed layer to achieve a multi-colour image. Carving the block by hand stimulates a haptic sensation, and the ensuing marks range from a gestural and spontaneous indentation to a more controlled and deliberate sculptural formation. When applied to reduction relief printing, the process supports polychromatic combinations varying in tone, hue and luminosity. The printmaker's creative development is activated from within the production, like a painter applying paint to canvas (Browne 2017).

The reduction relief matrix was 45cm x 45cm: a scale for my body to comfortably enfold, gesturally rotate and hand carve at 360°. A strategy of trial-and-error developed my confidence and reacquainted my hands with tacit knowledge. I proceeded to alternate between carving and printing, enabling a readjustment back into the familiar rhythm of working by hand-eye coordination. Contrary to the accustomed rules of dedicated practice, third time lucky was a more fitting methodology; producing a multi-colour reduction relief print that reflected Pye's art of workmanship.

Then it stopped.

In July 2018 I gave birth. My body was tangibly committed to keeping a human being alive, my mind was reoriented towards new priorities and my time was overloaded by a round-the-clock routine, never knowing when I could return to the print studio. My hands were delegated to new tasks, performing repetitive acts of childcare and domestic chores. Only my eyes could remain focused; randomly capturing visual data in my locale, occasionally visiting exhibitions, and sporadically absorbing reading material. Confidence in my artistic practice began to wane and the eighteen-month hiatus became an endurance exercise in self-determination.

Then it [returned to the point at which it had] stopped.



Figure 7



Figure 8



Figure 9

Figure 7. Printing and Colour Mixing. Photo by Victoria Browne.

Figure 8. Backdrop (2020) by Victoria Browne. Multi-block relief print. Photo by Victoria Browne

Figure 9. Backdrop (2020) by Victoria Browne. Installation at KHiO. Multi-block relief print. Photo by Victoria Browne

PROCESS

To compensate for the timeout and the growing self-doubt of my wo(rk)manship, I initially focused on processes with predetermined outcomes. At this point, I was aware that Pye's workmanship of certainty could be applied to two different stages: firstly preparatory, in the post-production of digital files and secondly productive, in the CNC-routing of multiple relief blocks.

Historically, craft-based industries have often relied on hybrid forms of production in which some of the operations have predetermined results whilst others depend on the care, judgement, and dexterity of the workman (Pye 1968). The production is commonly divided between a team of operators with specialist knowledge of materials, tools and technology. In comparison, a hybrid art practice demands full attention of the artist when integrating new technology into traditional craft processes. The digital embodiment of a printmaking process means that comprehensive knowledge and experience is demanded of the artist to complete the job.

For example, due to the size constraint of an A3 Epson scanner, each print layer of the reduction process was digitally translated in parts as bitmap files. Post-production in Adobe Photoshop involved transforming (to re-align the bitmap files back into one layer), posterizing (to reduce the number of tones to vectorise) and overlaying (to check the digital re-alignment of the bitmap layers).

In addition, due to the RAM limitations of my computer hardware to auto-trace in Vector Magic, each layer of the bitmap file (.psd) was translated in parts as vector files. Post-production in Adobe Illustrator involved transforming (to re-align the vector files back into one layer), erasing (to reduce the number of stray nodes) and overlaying (to check the digital re-alignment of the vector layers).

Vector Magic's tracing software is a programming structure that performs a series of actions as sequences, selections and iterations in a specific order. Similarly, Artlandia SymmetryWorks is a software component that automates the tessellation process in Adobe Illustrator and in theory saves 'hours of work and painstaking effort' (Artlandia 2001). I dedicated time to learning this plug-in during the post-production stage. But after ample testing, I concluded that the multi-layered vector file (.ai) was too complex for the programming structure to calculate.

Without the software to automate a series of actions, I had to become embedded in the programming structure. I committed 'hours of work and painstaking effort' of human-computer interaction to perform multiple sequences, selections, and iterations by hand-eye coordination. By overlapping two sides of the composition in Adobe Illustrator, to erase or extrude the vector paths in pattern editing mode; a strategy of trial-and-error produced a multi-layered isogonal

tessellation with a half-drop repeat.

The CNC-router is a machine tool located at the convergence of processes that can be understood to be at once manual, mechanical and digital' (Grimshaw 2017, S3736). In the workshop at KHiO, an operative oversees the Computer Aided Design (CAD) modelling with McNeal Rhino 3D and the machine milling on a MultiCAM CNC-router 3000 series. With precision of the workmanship of certainty, the operative imports the vector paths (.ai) into RhinoCAM, a CNC plugin that programmes the tooling and conversion into tool paths (.3dm). The post-processor software component then generates the G-code instructions (.cnc) including the xyz coordinates, which are exported to a MultiCAM job console for the CNC-router to follow. Once production begins, it is outside of the control of the operative (Pye 1968).

The reduction relief matrix was initially hand-carved at a 30° horizontal direction with Japanese Komasuki gouges shaped in a 'U'. However, the CNC-router was programmed to mimic the surface of the matrix by high-speed milling at a 90° vertical direction with a tool bit shaped in a 'V'. By virtue of the exacting work and as a precaution to the material limitations of the matrix, it was necessary to laminate the linoleum onto MDF for the following reasons: to prevent slippage on the CNC-router vacuum bed, to avoid weakening the scaffolding when milling and to limit warping due to the contraction of the lamination glue. The outcome of this highly regulated and predetermined production was a series of 52x52cm tessellating relief blocks, each delineating different layers in the reduction process.

Then it stopped.

In March 2020 Norway went into lockdown. The arrival of Covid-19 temporarily closed all institutions, schools and businesses. My hands were once again delegated to performing repetitive acts of childcare and domestic chores, in addition to fulfilling my teaching responsibilities at KHiO remotely. My belief in completing the research project again began to falter and the uncertainty of returning to the print studio became an all too familiar state of mind.

Then it [almost returned to the point at which it had] stopped.

ANALYSE

The workmanship of certainty was embodied by the digital knowledge that I used for post-production in the computer suite and for CNC-routing in the workshop. Once Norway partially reopened, I also began to assimilate pre-determined production into my strategy of trial-and-error back in the print studio. I continued to make decisions based on judgement, dexterity, and care from within the printmaking process; I remained open to the level of risk that makes interpretation possible. But simultaneously I referenced the colour swatches appropriated from Munch's Death in a Sickroom to remix multiple relief blocks. It became essential to record my progressive colour mixing as handwritten

recipes, instructions, charts, and observations in a sketch book. A strategy of third time lucky produced a polychromatic 'key print' that referenced twenty colour swatches achieved by printing ten layers with five multiple relief blocks.

OUTCOME

At the start of this research project, I had assumed that the number of colours would be limited by the same number of multiple relief blocks, to achieve a continuous tessellation within the pre-planned timescale. But once I began referencing recorded data in my sketch book, to pre-determine the colour mixing, gradient rolls and sequence of block printing, this led to unexplored terrain in my art practice.

By mapping out and scaling up the key print, the methodology revealed a new approach to colour printing, that amplified the perception of flux and diversity across a large-scale tessellated backdrop. My artistic research incorporated knowledge gained from fieldwork exploring historical European hand-printed wallcoverings, including Zuber's visual aesthetic, William Morris' half-drop repeat and Josef Frank's multi-block rotation (Browne 2020). The outcome of the art production was exhibited in October 2020 at Kunsthøgskolen in Oslo; in 2021 at International Print Triennial MTG 2021 in Krakow; as a video iteration at IMPACT 11 in Hong Kong; and a billboard iteration at OnBoards Biennial in Antwerp.

The outcome of this artistic research demonstrates how highly regulated and pre-determined art production compensated for the loss of self-confidence, due to unforeseen time constraints on my artistic practice. The digital embodiment of tacit knowledge in the human-computer interactions programmed the machine tools to mimic the hand-carved matrix. 'The body itself is only human by virtue of technology: "the human hand is human because of what it makes, not of what it is" (Colomina and Wigley 2016, p52).

Craftsmanship can be learnt very slowly by practice, through daily repetitive hand-eye exercise and dedicated time to develop tacit knowledge. It is not uncommon for artists to stop, to lose momentum or confidence in their artistic practice. Everyday factors like mental or physical health, financial insecurity, work and family commitments, and even global pandemics can impact on time for art production.

However, art production determined by the care, judgment and dexterity of the artist's hand and machine tools, remains distinct from contemporary digital tools. Perhaps this is due to craft masking a somewhat romantic attitude to Pye's own historical moment (Adamson 2007). For myself, as an artistic researcher, the outcome of integrating digital technology into the printmaking process released my methodology from the embodied limitations of time, scale and capacity. In addition, by assimilating pre-recorded colour mixing with tacit knowledge in colour printing, a strategy of third time lucky generated a level of complexity in my polychromatic printing that

demands further exploration in the future.

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AUTHOR

Victoria Browne: Associate Professor of Printmaking and Publishing
Kunst og Handverk / Art and Craft
Kunsthøgskolen i Oslo / Oslo National Academy of the Arts
victoria.browne(at)khio.no
www.grafikk.khio.no
www.khio.no

Victoria Browne was born in London and educated in France, Norway and the U.K. She returned to London for ten years to begin her professional career before relocating to Oslo where she now lives and works. Her prints and publications are held in international collections including the V&A, Tate and MoMA.

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IMAGE GALLERY

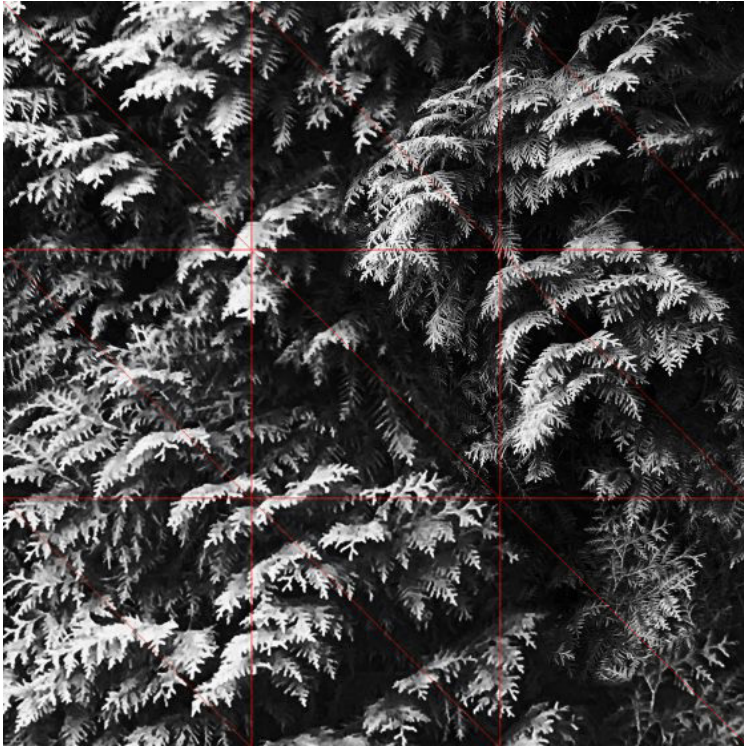


Figure 1: Photo-montage and Hand Carving. Photo by Victoria Browne

Figure 2: Reduction Relief Matrix and Reduction Linocut. Photo by Victoria Browne

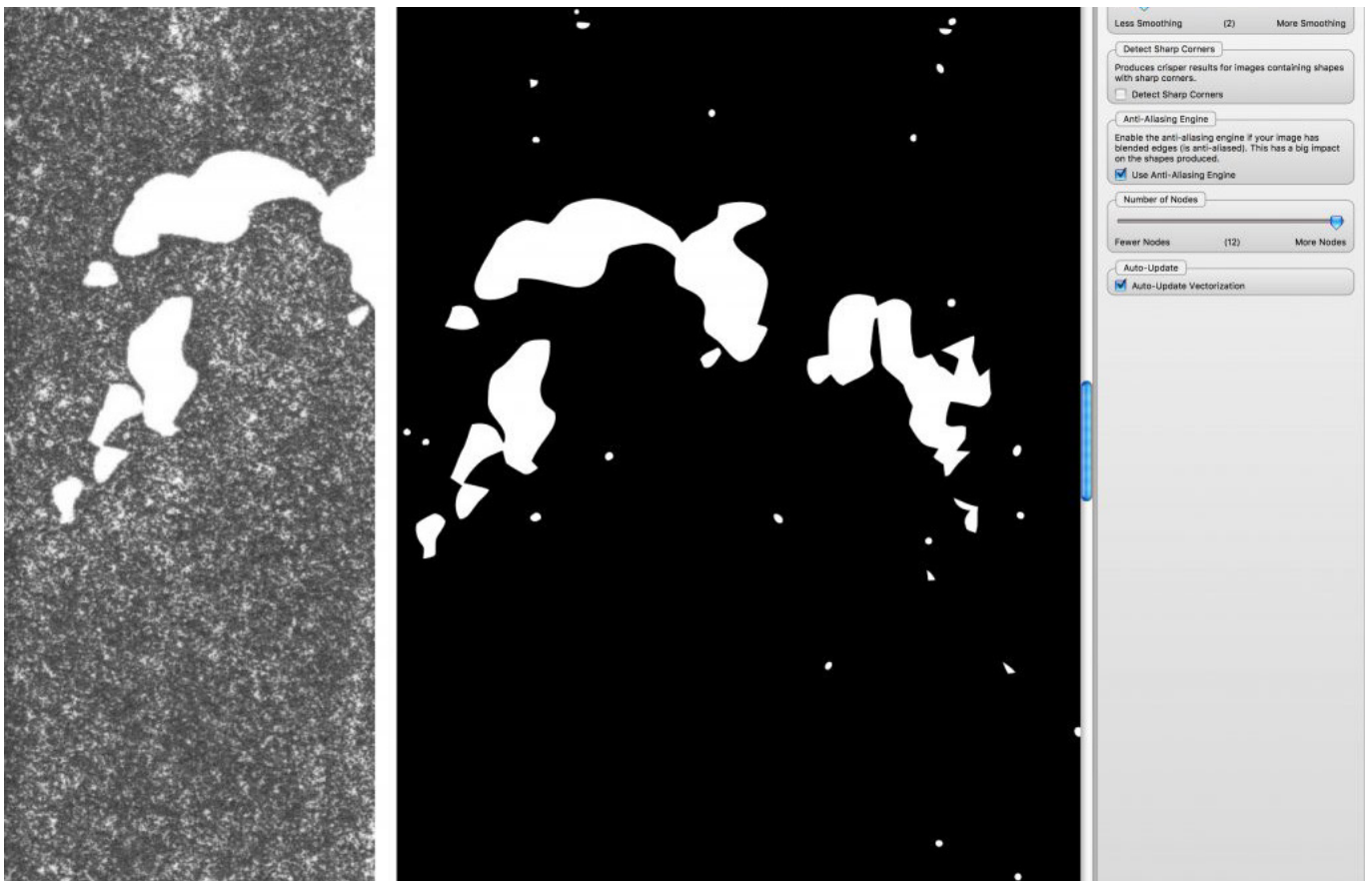


Figure 3. Vector Magic Trace. Photo by Victoria Browne

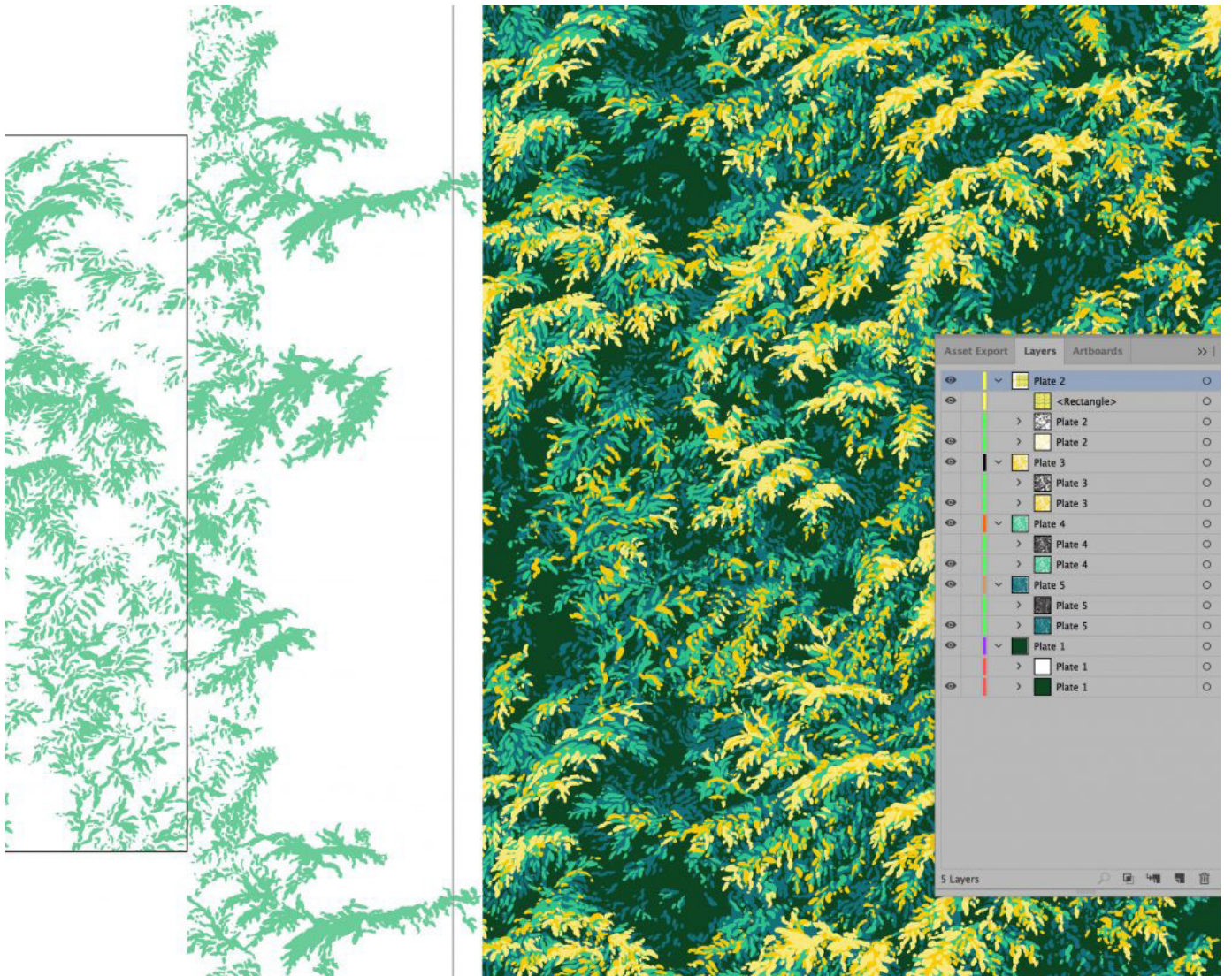


Figure 4. Illustrator Tessellation. Photo by Victoria Browne

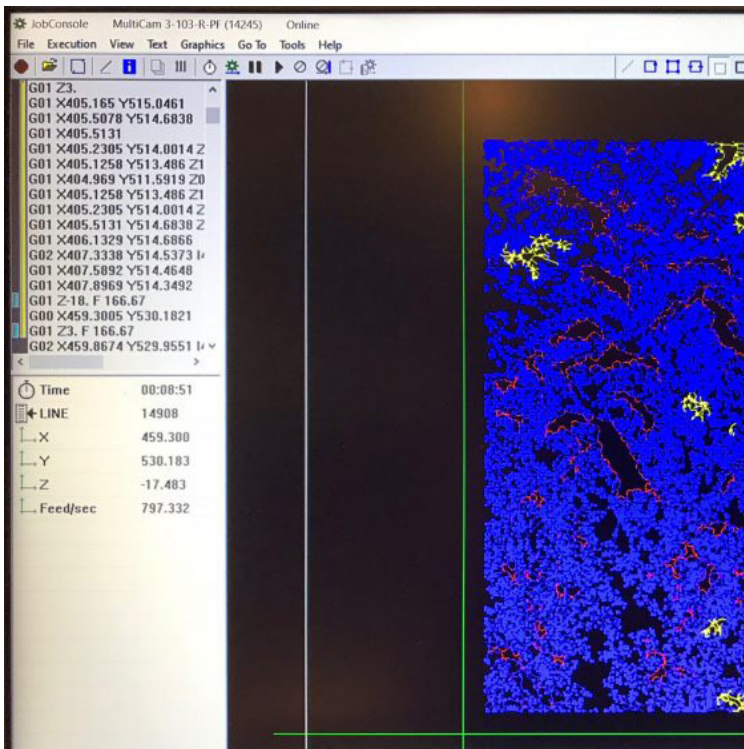


Figure 5. G-Code and Operative Aligning the CNC Router. Photo by Victoria Brown



Figure 6. Fig. 6. CNC-Routed Matrix and Keyblock print. Photo by Victoria Browne



Figure 7. Printing and Colour Mixing. Photo by Victoria Browne



Figure 8. Backdrop (2020) by Victoria Browne. Multi-block relief print. Photo by Victoria Browne



Figure 9. Backdrop (2020) by Victoria Browne. Installation at KHiO. Multi-block relief print. Photo by Victoria Browne