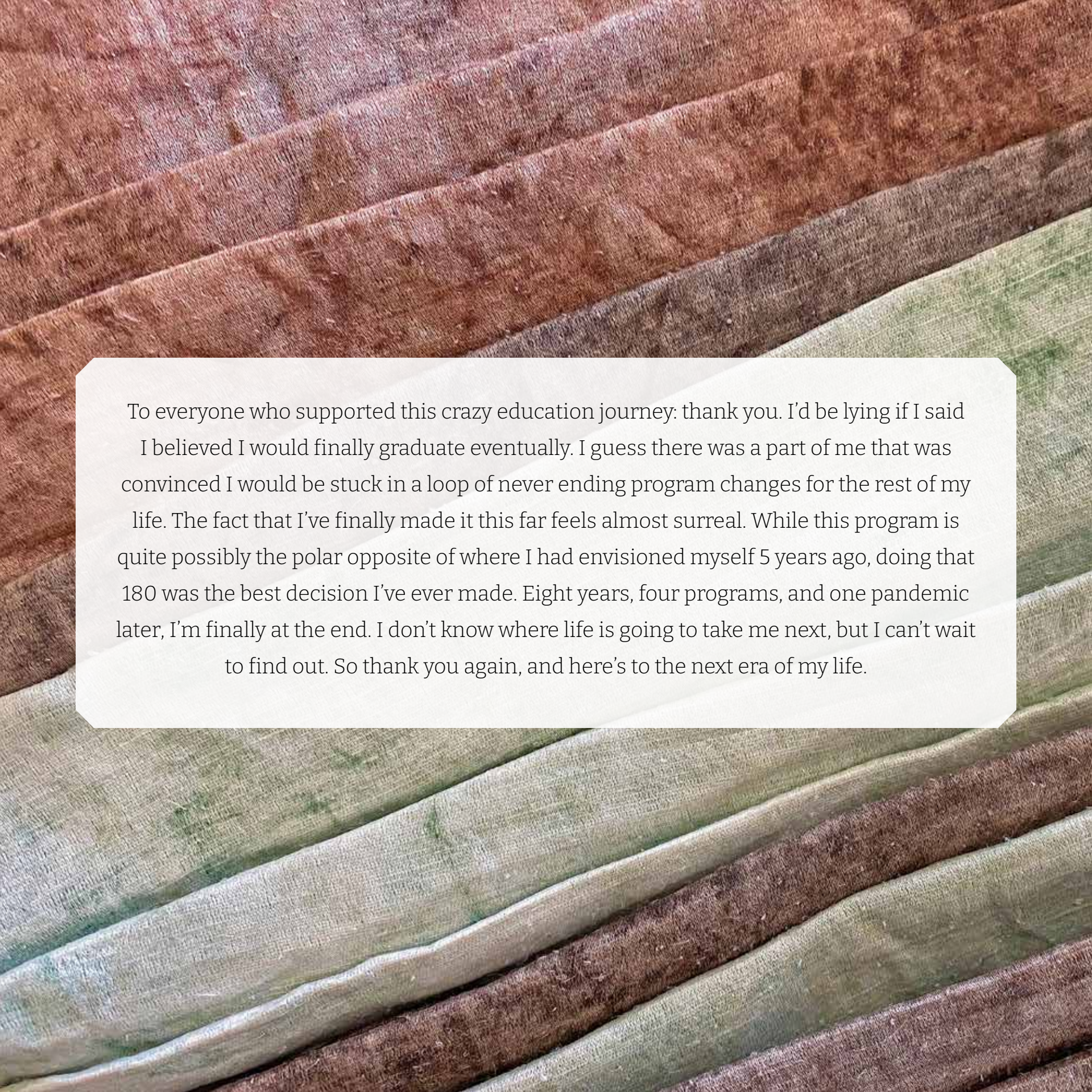
Fingerprint of the Earth

Kayleigh Marshall

Capstone Project 2022-2023



To everyone who supported this crazy education journey: thank you. I'd be lying if I said I believed I would finally graduate eventually. I guess there was a part of me that was convinced I would be stuck in a loop of never ending program changes for the rest of my life. The fact that I've finally made it this far feels almost surreal. While this program is quite possibly the polar opposite of where I had envisioned myself 5 years ago, doing that 180 was the best decision I've ever made. Eight years, four programs, and one pandemic later, I'm finally at the end. I don't know where life is going to take me next, but I can't wait to find out. So thank you again, and here's to the next era of my life.

Sheridan College

Faculty of Animation, Art and Design

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It all started at the beginning of time itself. One spark, that's all it took. Suddenly everything was blasted into existence from what was once an empty void and only a speck of matter. Atoms joined together and created objects the size of which is beyond imagination. Planets, stars, galaxies, black holes, they all came from this one explosion. Planets started to cool down from the white hot liquid they were made of, and worlds were born. As this cooling continued, atmospheres were formed and the once liquid planets now had a hard skin. Beneath this hard skin a dance of liquid fire was occurring and causing the skin to crack and split. The same dance then pushed the segments of the rocky skin into one another and something amazing occurred: the skin that looked so solid began to twist and fold in ways that should not be possible. Mountains jutted out of the ground and the fingerprint of this baby world was formed. Twisting and swirling patterns made out of something that should have been solid gave our little planet a life of its own.

Geologists have a saying – rocks remember

-Neil Armstrong

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Biography

Kayleigh is a textile artist and cosplayer born in Ontario, Canada. How her interest in textiles developed was a bit of a roller coaster ride. When she finished high school she initially went into engineering because she had an interest in science and making things. Over the course of four years she switched between different engineering streams trying to find a topic she enjoyed. In late 2018 she was diagnosed with lupus. It was this that forced her to slow her life down and take a look at things in a different way. During this time she realized engineering was not something that was going to make her happy in the long run, so she started looking at programs way outside of what she knew. This combined with her newly discovered love of costuming led her to the Textile program at Sheridan College. She immediately fell in love with the program. This project is the culmination of her journey to find her place in our world.

Project Statement

Fingerprint of the Earth is a textile piece exploring the similarities between rock and fabric. In our world there is a process happening right beneath our feet known as geologic folding. Tectonic plates floating on magma crash into each other with a huge amount of force. This force is enough to bend even rocks. The result of this process are rocks containing beautiful patterns and layers. This folding in the rocks can be mimicked using folding of fabric. Geologic folding is a process that most people are unaware of. The purpose of this project is to bring attention to this force of nature that is changing our planet every day. By making a wearable inspired by this hidden beauty we can bring attention to a process that would otherwise go unnoticed. Clothing is something we all use every day, and by using it as a medium, we can create something that will not be ignored. These two things that seem so different at a glance, may not actually be that different at all.

Figure 1: Geologic folds in a chevron pattern. Here the rock has folded at a sharp angle with the resulting shape looking similar to a triangle.

Figure 2: Geologic folding in a wave pattern. Compared to the previous example, the folds here are much more gradual. The resulting pattern is smooth with less sharp points.

Figure 3: Geologic folding that has been subject to erosion. When geologic folding occurs in areas with layers of different rock, erosion can affect these different rocks at different rates. Some rocks will remain while others will be eaten away. This erosion process can make the folding much more visible .

A Brief History of Earth Pigments

When we look at how we dye textiles today, there are a whole bunch of different methods to choose from. You can use synthetic dyes, natural dyes, or some combination of both. The science of dyeing has come a long way over the years. Initially, early humans did not have the wide variety of options that we have today. One of the earliest methods of colouring fabric was through the use of Earth pigments.

The earliest examples of Earth Pigments we have found dates back to over 70 000 years ago. Most of these examples are of paintings on the inside of caves. We can see in the picture to the right how they were used to paint an outline of a hand. This is an example from a cave in Avignon, France. It was used by early humans as a way to mark where they have been.

The colour palette available during this time was very limited. Most colours were either red, yellow or orange. The compound responsible for creating these pigments is ferrous oxide, or rust. When ground up, it creates yellow. This yellow can then be heated, which causes the pigment to turn to a more red tone. Controlling the heat allows the maker of the pigment to create a range of oranges and reds.

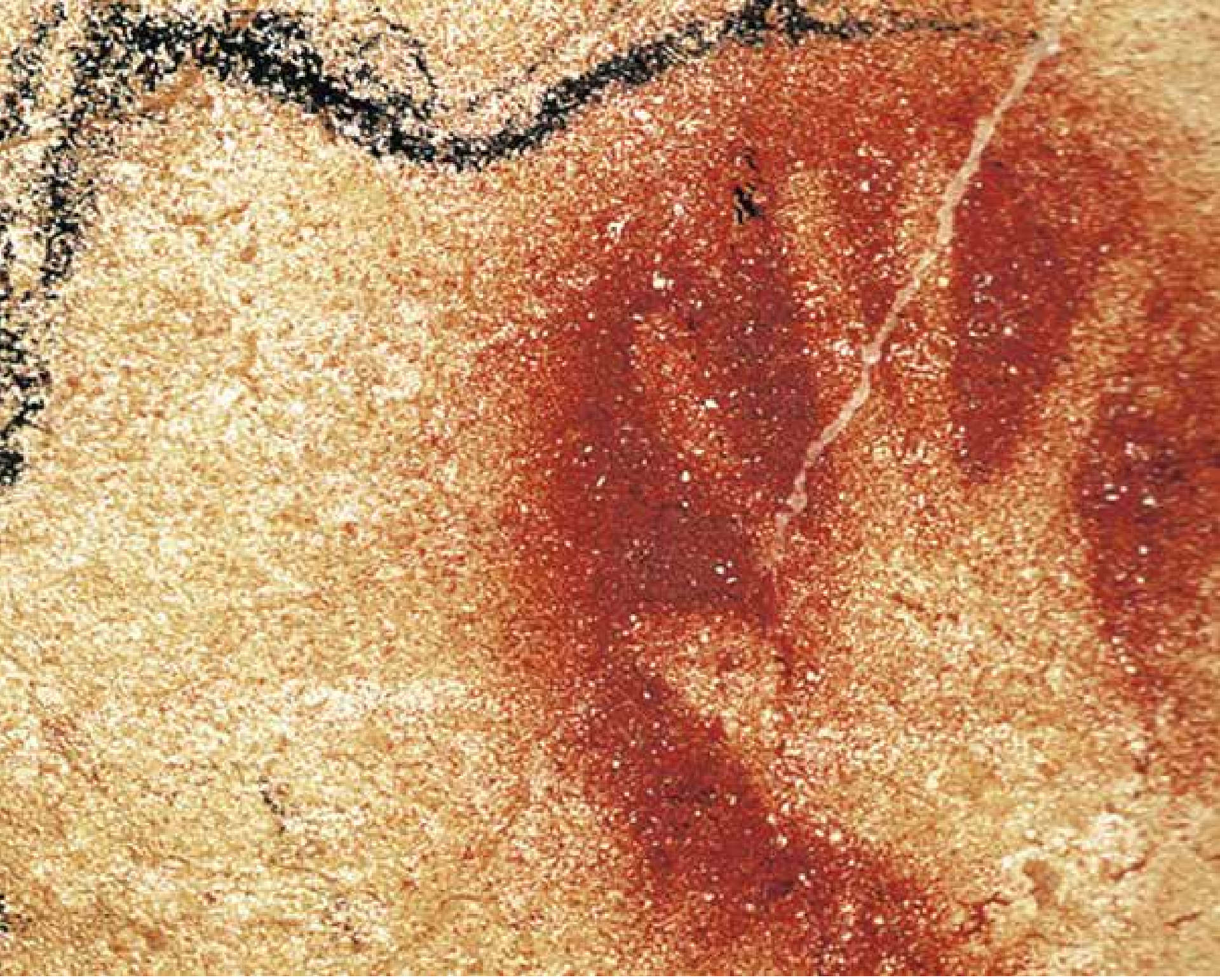


Figure 4: A hand painted on the inside of a cave in Avignon, France

Figure 5: A sarcophagus decorated with green from malachite

A bit later, around 4000 BCE, the Egyptians were starting to figure out how to create colours that were not just warm tones. Malachite was ground up to create green, and lapis lazuli was ground up to create blues. These blues were later replaced by the indigo plant due to the rarity of lapis lazuli.

Figure 6: Old hieroglyphs painted blue using lapis lazuli

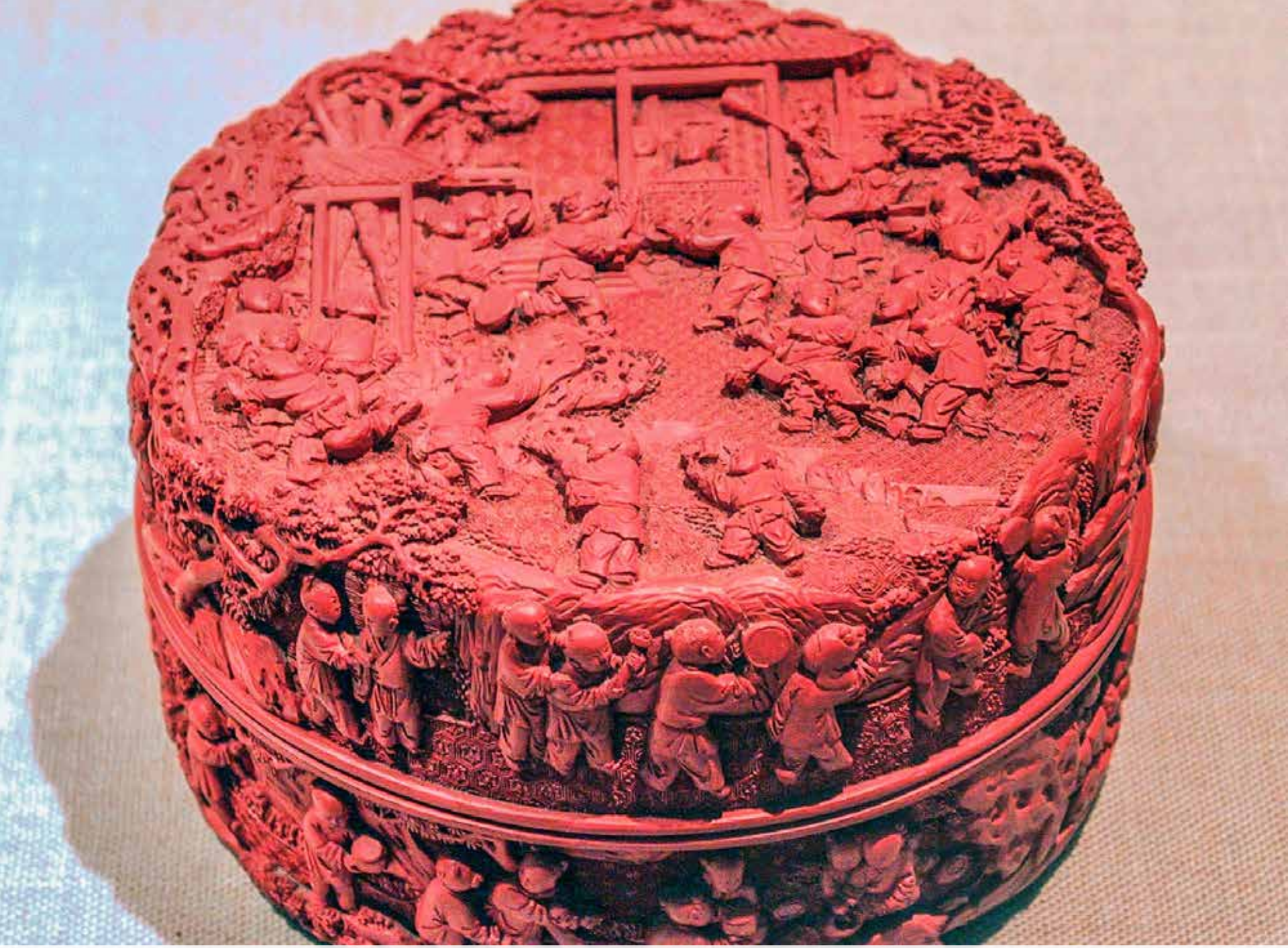


Figure 7: A pot from ancient China decorated with vermillion pigment

Another important pigment in history was vermillion. This is a bright red colour produced when cinnabar is ground up. The pigment is then washed and heated to brighten the colour. The Chinese were manufacturing vermillion long before it made its way to civilizations in the west. The compound could also be made by combining mercury and sulfur while heat is applied.

Earth pigments are not widely used in textiles anymore, however, the industry would not be where it is today without them. There are some artists who still make use of this ancient art. The colours created from Earth pigments have a very natural feel to them that is hard to replicate with synthetic dyes. It is this feeling that will keep this art from dying, and allow it to continue on into the future.

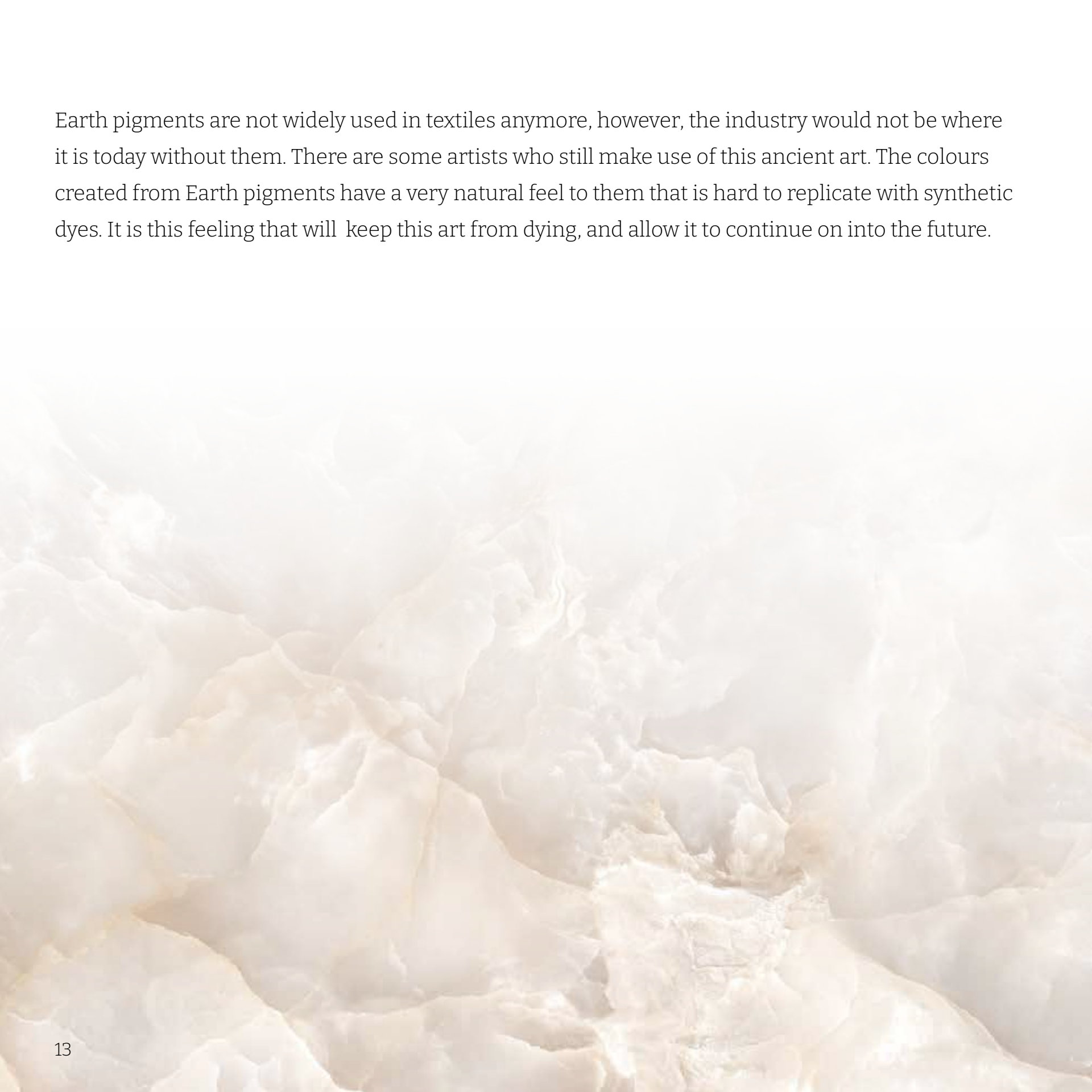


Figure 8: Earth pigments displayed in their original forms, their ground up forms, and how they were used on historical artifacts

Inspiration Artists: Meghan Price

The first artist that Kayleigh chose to take a look at is Meghan Prince. She has one piece in particular that is important in developing her theme. That piece is called Hutton's Unconformity.

This piece is a weaving that was based on an illustration in the 1795 book "Theory of the Earth" by James Hutton. This illustration is pictured below. The book discusses how different geological processes work together to fold and bend the earth. These are the same ideas Kayleigh wants to explore in her own project.

Figure 9: Hutton's Unconformity designed and made by Meghan Price

Inspiration Artists: Firefly Path

The next group Kayleigh chose to take a look at is Firefly Path. This is a company that sells gowns with a strong theme of fantasy throughout their work. While this is a company, the people that work on the gowns design and make everything by hand. Kayleigh has an interest in costuming and fantasy, so these dresses capture the same feel Kayleigh hopes to capture in her final piece.

Figure 10: A fairy gown inspired by Japanese cherry blossoms, designed and made by Firefly Path

Mantle

Colour Testing with Earth Pigments

Before starting the final process, it was necessary to test out various pigments to see what colour each would be on different types of fabric. The fabrics chosen had a range of colours and textures. These tests were also useful in determining what colours looked good together to ensure the final piece would look cohesive.

Materials Used

- Hemp Silk Satin
- Silk Dupioni
- Ania Linen - Natural
- Santa Fe Linen - White
- Unbleached Cotton Muslin

Figure 11: The 5 types of fabric used in the colour tests

Mordanting the Fabric

Mordanting is a process that is done to help natural dyes adhere to the fabric. It helps prevent the dyes from washing out and fading. The process is different depending on the type of fabric being used. The mordanting process for Earth pigments also changes a bit from the original process used when dyeing with plant dyes. Below is how the fabrics were treated prior to the application of the Earth pigments.

Calculations

Total WOF (weight of fibre): 370g

Amount of gallnut used: 15% WOF

730g x 0.15 = 55g of gallnut

Process

1. Water was brought up to a simmer
2. Gallnut was weighed and added to the pot
3. Fabric was soaked in water for 30 mins
4. Fabric was added to bath and simmered for 1 hour
5. Bath was stirred every 5 mins
6. Fabric was removed from bath and soaked in soy milk prior to dyeing

Figure 12: The fabric in the gallnut bath

Making Soy Milk

In order for Earth pigments to properly adhere to the fabric they are applied to, the pigments need to be suspended in a binder. This binder can be a variety of different things, but in this case soy milk was used. This was to keep the theme of using substances obtained from the Earth. Due to preservatives used in store bought soy milk, it does not allow the pigments to bind in a way that prevents the dye from washing out. Because of this, the soy milk needed to be made from scratch. Below is the process that was used to create the milk.

Process

1. Dry soy beans were added to water to soak overnight, about 2 cups of water was used for every 1 cup of soy beans
2. Beans were removed from the water and placed in a blender
3. Water was added to the blender, about 3 cups of water was added for every 1 cup of soy beans
4. The mixture was blended on medium for about 4 mins
5. The pulp was poured on a piece of muslin fabric to filter out the liquid
6. The strained liquid was put aside for future use
7. More water was added to the pulp (using the same ratio as before) and the mixture was blended again
8. This process was repeated a few more times until enough soy milk was made to dye all of the fabric

Figure 13: Soy milk being strained through a piece of muslin fabric

Setting up the Jars

The process of immersion dyeing is a bit longer than traditional natural dyes. It is because of this that they have to be set up a bit differently. An advantage of Earth pigments is that they do not need heat to take to the fabric like most dyes need. They can also be set up and left alone for a while. This fact makes the slow dyeing process a lot easier. This advantage, however, comes with some downsides. Because they have to be left for so long, it is easy to forget to move the fabrics around in their jars. Not mixing enough makes the dye job uneven, therefore, you need to set reminders up if you want everything to turn out evenly. Shown here is the process that was used on these colour samples.

Process

1. Glass jars were cleaned to ensure there would be no impurities
2. 20g of pigment was added to each jar
3. Jars were filled with soy milk and left until the colour had fully mixed with the milk
4. Pre-soaked fabric was added to each jar
5. Jars were placed in a fridge and left to sit overnight, shaking every few hours
6. Fabric bundles were removed from the jars and left to dry without washing
7. Dry fabric was left for 1 month to allow the colour to fully bind
8. After 1 month the fabric was washed and mounted to cards

Figure 14: The fabric in a jar with the Earth pigments, each jar is labeled with the colour it contains

Final Colours

Figure 15: The results of the Earth pigment tests

These are all the colour samples from the Earth pigment tests. There are 20 colours in total that were tested on 5 different fabrics. They were mounted on pieces of cardstock containing the name of the colour to keep track of everything.

Fabric Manipulation

A main concept of this project is to mimic the folds of the Earth by folding fabric. There are many different types of folds, and they each give their own look and feel. This look can also change depending on the scale of the folds. This next series of samples explores both the type of folding and the scale of the folds.

Figure 16: The fabrics used in the manipulation tests

Materials Used

- Hemp Silk Satin
- Silk Dupioni
- Ania Linen: Natural
- Santa Fe Linen: White

Gathering Samples

Process

1. Fabric was cut into pieces and the initial measurements were recorded
2. Lines were drawn on the fabric to guide the stitching
3. Using a sewing machine, basting stitches were sewn where the lines were drawn
4. The ends of these stitches were pulled to gather the fabric and create ruffling
5. The ends of the threads were tied to prevent the gathers from coming undone
6. This process was repeated using different spacing between the basting stitches

Figure 17: The gathering samples with 0.25" between rows of basting stitches

Pleating Samples

Process

1. Lines were drawn on the fabric to mark out where the pleats would go
2. The fabric was ironed along the lines to create the pleats
3. The edges were sewn down to prevent the pleats from losing their shape

For Samples with a Twist

4. After the first edge was sewn the opposite edge was ironed down in the opposite direction of the first edge
5. This edge was then sewn down, creating a twist in the middle of the pleats

Figure 18: The pleating and twisted pleating samples on Ania Linen with 2" spacing

Figure 19: A work in progress shot of one of the manipulation samples

Size Changes

Initial Lengths

Silk Dupioni: 13.5” Hemp Silk Satin: 13.5” Ania Linen: 13” Santa Fe Linen: 13”

Gathering (1”)

Silk Dupioni: 2.5” Hemp Silk Satin: 3” Ania Linen: 3.5” Santa Fe Linen: 3.25”

Fabric shrinks by about 77%

Gathering (0.5”)

Silk Dupioni: 3” Hemp Silk Satin: 3.25” Ania Linen: 4” Santa Fe Linen: 3.25”

Fabric shrinks by about 75%

Gathering (0.25”)

Silk Dupioni: 2.25” Hemp Silk Satin: 2.75” Ania Linen: 3” Santa Fe Linen: 2.75”

Fabric shrinks by about 80%

Figure 20: An example of the size changes in the gathering samples

Pleating (1")

Silk Dupioni: 4.25" Hemp Silk Satin: 4.5" Ania Linen: 5" Santa Fe Linen: 6"

Fabric shrinks by about 62%

Pleating (2")

Silk Dupioni: 4.75" Hemp Silk Satin: 4.5" Ania Linen: 5.5" Santa Fe Linen: 5.5"

Fabric shrinks by about 62%

Pleating with Twist (1")

Silk Dupioni: 5.5" Hemp Silk Satin: 5" Ania Linen: 5" Santa Fe Linen: 4.5"

Fabric shrinks by about 62%

Pleating with Twist (2")

Silk Dupioni: 5.25" Hemp Silk Satin: 4.75" Ania Linen: 5.5" Santa Fe Linen: 4.5"

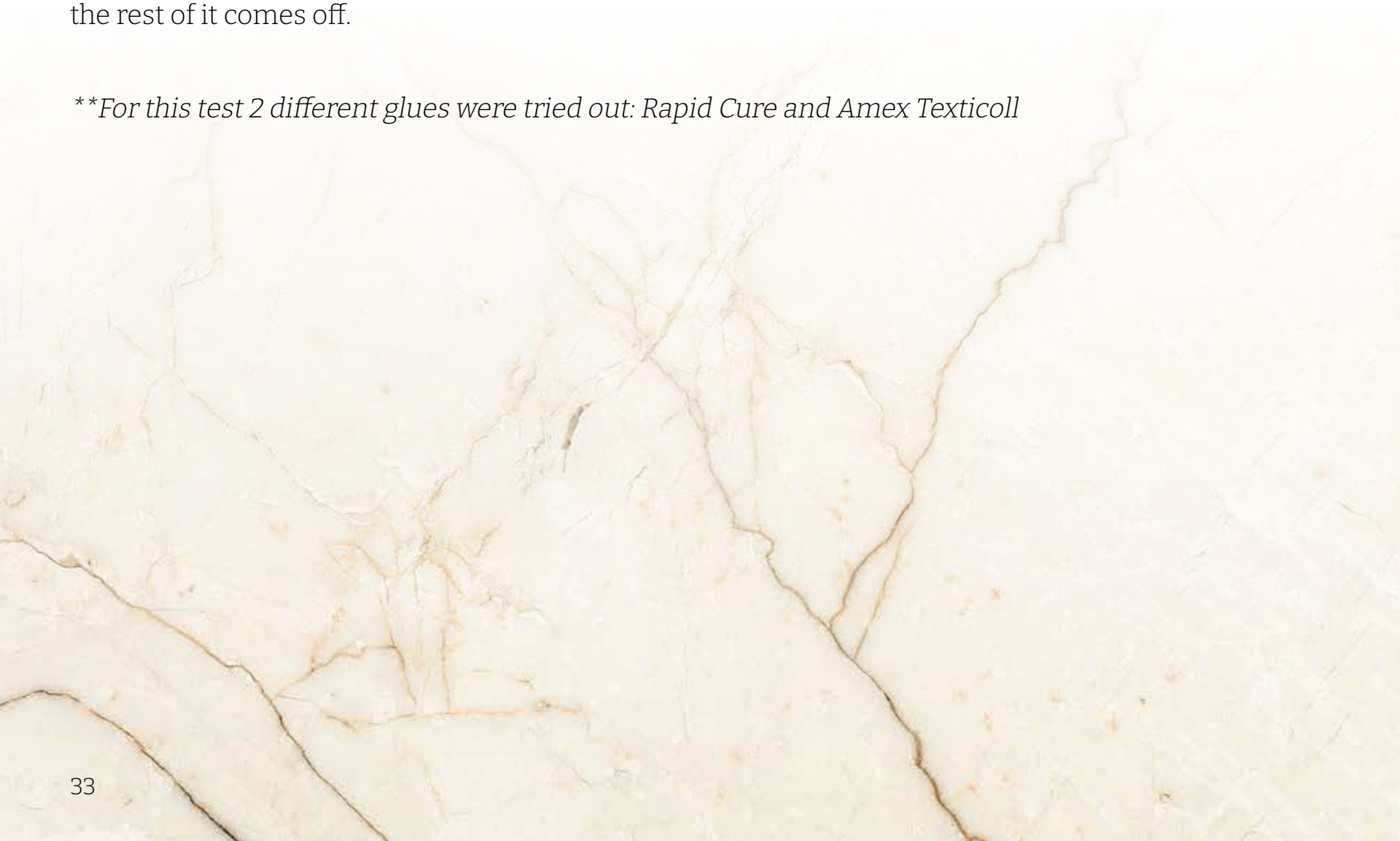
Fabric shrinks by about 62%

Figure 21: An example of the size changes in the pleating samples

Foiling Tests

When you look at rocks in nature there are sometimes small little details that you do not notice unless you look closely. One of these details is the veining that can form. These parts look like small cracks but they have been filled with other minerals causing crystals to grow. These small shiny parts add a level of beauty to what would normally be plain rocks. One of the techniques that can be used to capture this beauty in fabric is foiling. This process uses a glue that is applied to the surface of the fabric to stick to a sheet of shiny material. When the glue is activated by heat it adheres to the foil sheet in the places it has been applied. When the foil is peeled off, the parts on the glue will stick while the rest of it comes off.

***For this test 2 different glues were tried out: Rapid Cure and Amex Texticoll*



Process

1. Glue was applied to fabric; depending on the thickness of the glue, this can be done with either a brush (for less viscous glues), or a wooden stick (for more viscous glues)
2. Glue was left to dry for 24h
3. Heat press was turned on and set to 400°F
4. Foil was placed on the fabric and put into the heat press
5. Heat press was closed for 30s
6. Fabric was removed from heat press and excess foil was peeled off

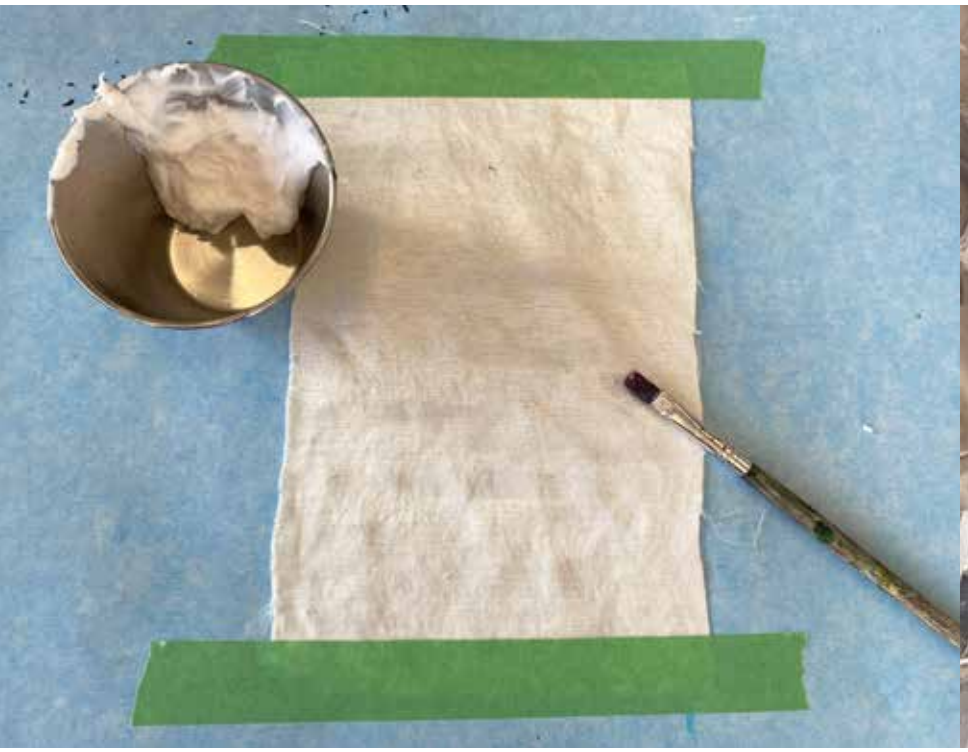


Figure 22: Foiling glue being applied to a piece of fabric

Figure 23: Foiling samples after being pressed in the heat press

Foiling Results: Rapid Cure

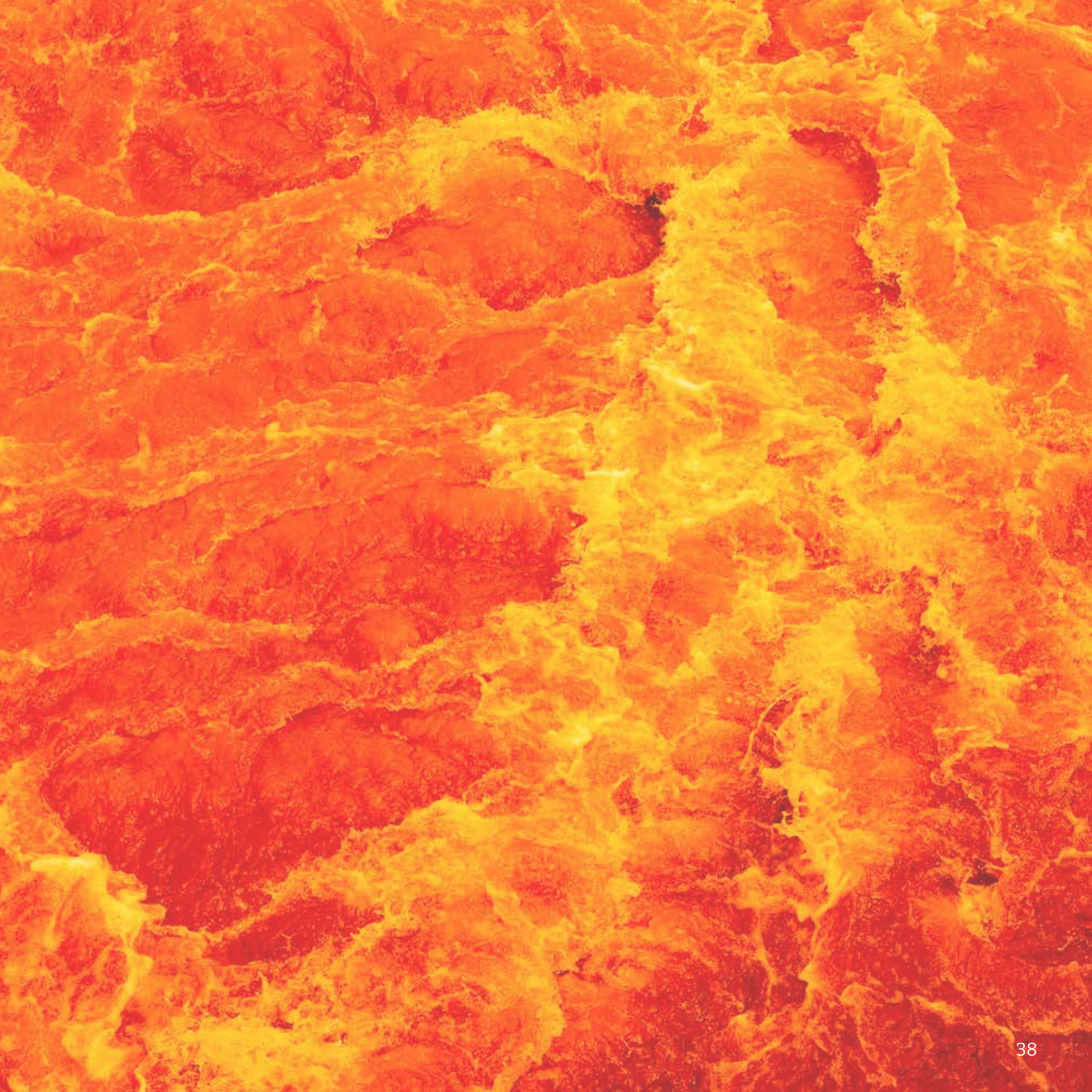
Overall, much better adhesion was achieved with the Rapid Cure glue.

Figure 24 : Foiling samples that used the Rapid Cure glue

Foiling Results: Amex Texticoll

Figure 25: Foiling samples that used the Amex Texticoll glue

Outer Core



Designing the Dress: Colour Selection

Figure 26 : The sample colours selected for the final piece on hemp silk satin fabric

The colours to be used in the final piece were selected based on the results of the pigment testing. The chosen colours are: Cyprus umber warm, Cyprus umber dark, and Cyprus green. The fabric that was chosen for the final piece is the hemp silk satin.

Designing the Dress: Sketch

Figure 27 : The process of sketching out the design for the final piece

Pattern Drafting: Corset

Corsets can often be a challenge to pattern due to the fact that they are so form fitting. Because of this, Kayleigh decided to use a pattern drafting method that works very well for garments that need to fit snugly. This method uses both tape and cling wrap to make a pattern that fits the exact shape of the body.

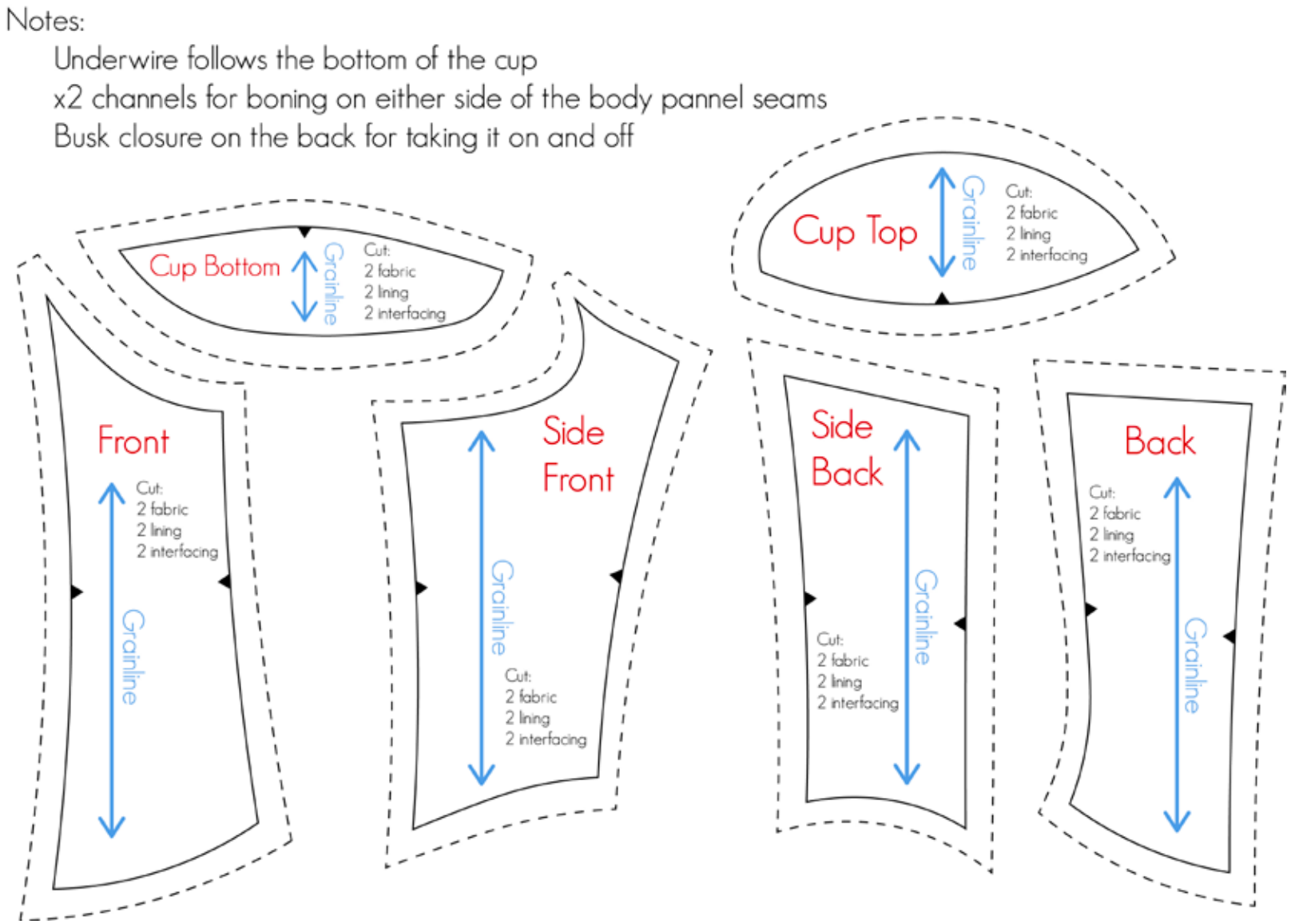


Figure 28 : The final corset pattern after being traced in Adobe Illustrator

Process

1. Cling wrap was wrapped around a dress form to create a base for the tape to attach to
2. A layer of masking tape was applied to the cling wrap
3. Lines were drawn at the top and bottom of the corset to mark out the general shape
4. Measurements were taken at the top, middle and bottom sections of the corset
5. These measurements were then divided into 4 to make sure each panel was roughly the same size
6. Seams were drawn on the tape based on the measurements
7. Panels were labeled to keep track of where each piece goes
8. The pattern was removed from the dress form and cut into pieces
9. A picture of the pieces was taken so the pattern could be traced using Adobe Illustrator
10. After tracing the image, a 5/8" seam allowance was added around each piece of the corset pattern
11. Notches were added to the pattern to make sure the panels would line up with each other
12. The pattern was printed out and taped together to be used for sewing

Figure 29 : The tape pattern before being cut out

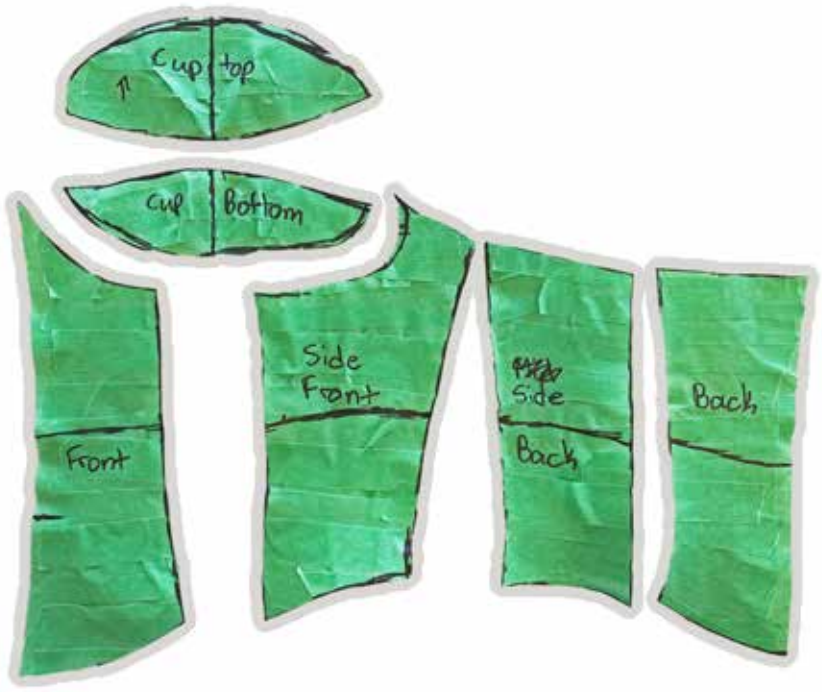


Figure 30 : The tape pattern after being cut out

Pattern Drafting: Hoop Skirt

When looking at the rendering of the dress we can see that the skirt part of the dress is quite large. Making a skirt entirely out of fabric would be extremely difficult for something of this size. In order to create the same silhouette as the drawing, a hoop skirt was made. This not only created some structure for the dress, but was also able to create the desired shape while keeping the weight to a minimum. Below is how the pattern was created for the hoop skirt.

Process

1. A rough shape of half of a cross section of the skirt was drawn on construction paper
2. The drawing was divided into sections based on where the hoops would be placed
3. The edge of each section was measured to figure out what the radius of each hoop would be
4. Using this measurement, the circumference of each hoop was calculated

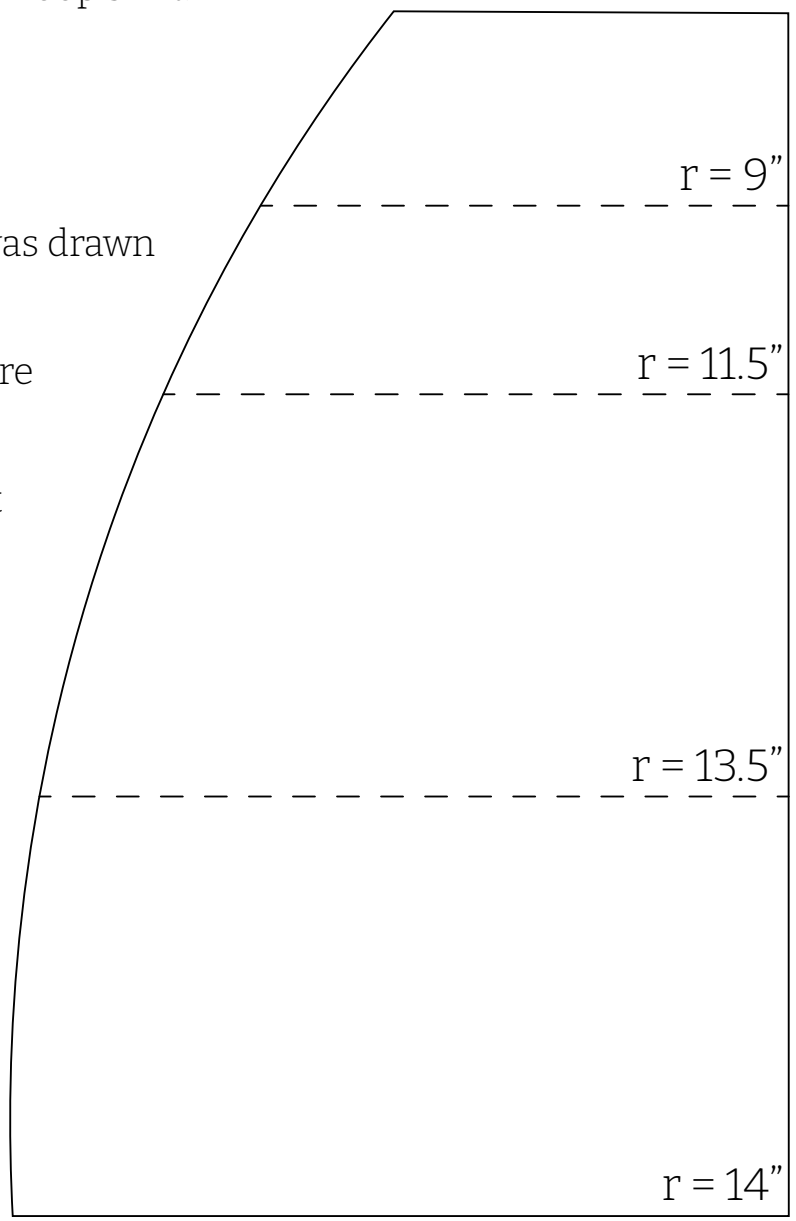


Figure 31: The cross section of the hoop skirt

Hoop Skirt Calculations

Top Ring

$C = 2\pi r$

$C = 2\pi(9")$

$C \approx 56.5"$

Middle Top Ring

$C = 2\pi r$

$C = 2\pi(11.5")$

$C \approx 72.25"$

Middle Bottom Ring

$C = 2\pi r$

$C = 2\pi(13.5")$

$C \approx 84.8"$

Bottom Ring

$C = 2\pi r$

$C = 2\pi(14")$

$C \approx 88"$

Assembling the Hoop Skirt

Due to the way the fabric part of the skirt needed to be patterned, the hoop skirt needed to be constructed prior to the skirt pattern. This ended up working well in the end because the hoop skirt created at this stage could also be used in the final piece.

Process

1. Steel hoop boning was cut based on the calculations made during the patterning stage
2. Hoop boning casing was cut to be slightly longer than the hoop boning
3. The hoop boning was inserted into the casing
4. Plastic tubing was cut and attached to the ends of the hoop boning to hold the hoops in a circle
5. Several pieces of twill tape were cut based on the sketch done previously
6. The ends of the hoop boning casing were sewn shut by hand
7. The hoops were sewn onto the twill tape pieces at equal intervals to ensure the hoops would sit level
8. A waistband made of twill tape was attached to the top of the hoop skirt
9. Loops were sewn onto the waistband to allow a belt to be threaded through
10. Snaps were sewn to the waistband to keep it closed

Figure 32: The hoop skirt being sewn

Figure 33: The finished hoop skirt on a dress form

Pattern Drafting: Draping the Skirt

Because of the overall size of the skirt, it was decided that the best way to create a pattern for this part would be to do it by draping and pinning some cotton muslin fabric over the hoop skirt. While the pattern could have been created using the same tape method used in the patterning of the corset, the size of the skirt would have made this extremely challenging.

Process

1. Two Large pieces of cotton muslin fabric were cut
2. These two pieces of fabric were pinned to a dress form which had the hoop skirt on it
3. The sides of the fabric were pinned together
4. The position of the pins were adjusted until the skirt fit over top of the hoop skirt nicely
5. Darts were pinned at the front and back of the skirt to make it fit a little better
6. The fabric was not wide enough along the bottom hem, so two smaller pieces of fabric were cut in a triangle shape
7. These triangular pieces of fabric were pinned and sewn to the gaps in the bottom of the skirt to add some volume
8. A strip of fabric and a strip of interfacing were cut to create a waistband
9. The top of the skirt and the strip of interfacing were inserted into the waist band and sewn shut
10. A slit was cut in the back of the skirt for a zipper
11. An invisible zipper was sewn in the slit to allow the skirt to be removed easily
12. All of the inside seams were run through a serger to prevent fraying
13. The bottom of the skirt was hemmed to finish everything up nicely

Figure 34: The final skirt on a dress form inside out

Figure 35: The triangle of fabric (godet) added to the skirt to increase the volume

Figure 36: The invisible zipper after being inserted

Figure 37: The layers of the waistband before being sewn

Corset Mock Up

Before making the final dress, the corset pattern needed to be tested to make sure it fits. A mock up was created out of cotton muslin and plastic boning to do this. Interfacing was also used to make sure the mock up would be structured in a similar way to the final piece.

Process

1. The corset pattern was lined up with the grain of the fabric. Weights were placed on the pattern to ensure it would not move while being cut out.
2. The fabric and interfacing panels were cut out
3. The panels were sewn together and the cups were attached to the body
4. Two pieces of boning were sewn in along each vertical seam
5. Underwire casing was sewn in along the bottom of the cups
6. Boning and underwire were inserted into the casing sections
7. Lining pieces were sewn together
8. The lining was sewn to the outer layer of the corset leaving a section open to turn everything inside out
9. A modesty panel was sewn in along one of the back seams
10. The gap left in step 8 was closed up
11. Holes were marked and cut out along the back edges spaced one inch apart
12. Grommets were pressed into the holes

Figure 38: The corset panels sewn together

Figure 39: The inside of the corset after adding boning and underwire

Figure 40: Grommets being inserted into the corset to allow lacing to pass through

Figure 41: The final corset mock up

Putting it all Together

Overall, the final assembly of the mock up worked well. There were a few technical things that needed fixing before moving on to the final piece. First, the cups did not fit exactly right. A dart needed to be added in the top half to make it follow the curves of the body better. Second, the transition between the waistband of the hoop skirt and the first hoop was very jagged. In order to smooth this out an additional hoop was added along with a circular pillow to support the fabric from behind. Lastly, attaching the boning to the front of the corset would make sewing anything on top extremely difficult. A decision was made to sew the boning to the lining instead to make the assembly of the final piece a little easier.

Figure 42: The final mock up of the dress

Dyeing the Final Fabric

After all the sampling had been completed, the final dyeing of the fabric could begin. It was calculated that 3m of fabric would be needed of each colour. This amount was calculated using the amount the fabric shrunk when creating the pleating samples *(see pages 31 and 32 for the math)*. When creating the samples, a 1:1 ratio of pigment to fabric was used. In order to effectively dye 3m of fabric, it was determined that 9 pots of each colour of Earth pigment would be needed.

The amount of soy milk made was less specific. There needed to be enough to allow the fabric to move around freely in the bucket but not enough that the dye job would be completely even. The fabric was placed in the bucket crumpled up so that the final colour would take on a texture similar to that of rocks in nature.

Figure 43: The powdered Earth pigments before being mixed with the soy milk

Figure 44: The Earth pigments after being mixed with the soy milk

The first step in dyeing the fabric was to get the buckets set up. One of the advantages of using Earth pigments is that they do not need heat in order to bond with the fabric. The same process used to make the soy milk for the samples was used to make the milk for the final baths (see page 22). Once each bucket had been filled with the milk, the pigments were mixed in. The fabric was added after the milk had fully taken on the colour added to it.

The milk needed to be refrigerated during the entire dyeing process to make sure it did not go bad. Luckily, the dyeing was done during the winter, so the buckets were left outside to keep them cold. The buckets were left for a total of 24 hours. They were occasionally mixed to ensure that the entirety of the fabric took on some color, but not enough that the dye job was perfectly even. This was done to add a simulated texture to the fabric.

Figure 45: The Cyprus Umber Warm dye bath with the fabric added, being stirred with a piece of wood

Figure 46: The Cyprus Umber Warm and Cyprus Green fabrics hung up to dry

At the end of the 24 hour time period, the fabrics were removed from the soy milk and hung to dry. The sediment remained on the dry fabric for another month before the fabrics were washed. This was to ensure the colour would adhere to the fabric properly.

Figure 47: The Cyprus Umber Warm fabric being submerged in water

After sitting for one month, the fabric was washed. It went through two washes. The first one was done by hand in the sink with a small amount of triscour soap. After that it was run through a washing machine with no soap to get the last of the sediment out.

Final Assembly

The Bodice

In order to make the dress easier to sew, and easier to wear, the bodice and skirt were made as separate pieces. Using the same pattern as was used in the mock up, a thick, white cotton was cut into the pieces needed to construct the corset. To ensure the corset had as much stability as possible, the pattern was lined up with the grain of the fabric. Pattern weights were used to make sure the paper did not move while the panels were being cut out. Pieces of interfacing were also cut to add extra stability to the piece.

The next step was to iron the pieces so each part of the panel could be lined up as accurately as possible. The parts were then clipped together to make sure all edges were lined up before being sewn. The interfacing was also clipped to the inside of the bodice so it could be sewn at the same time as the cotton layer.

Finally, the pieces were all sewn together. The seams were ironed so everything would sit as flat as possible. This ironing also removed any creases that may have appeared as a result of the sewing process. The inside of the seams were then run through a serger to protect against fraying.

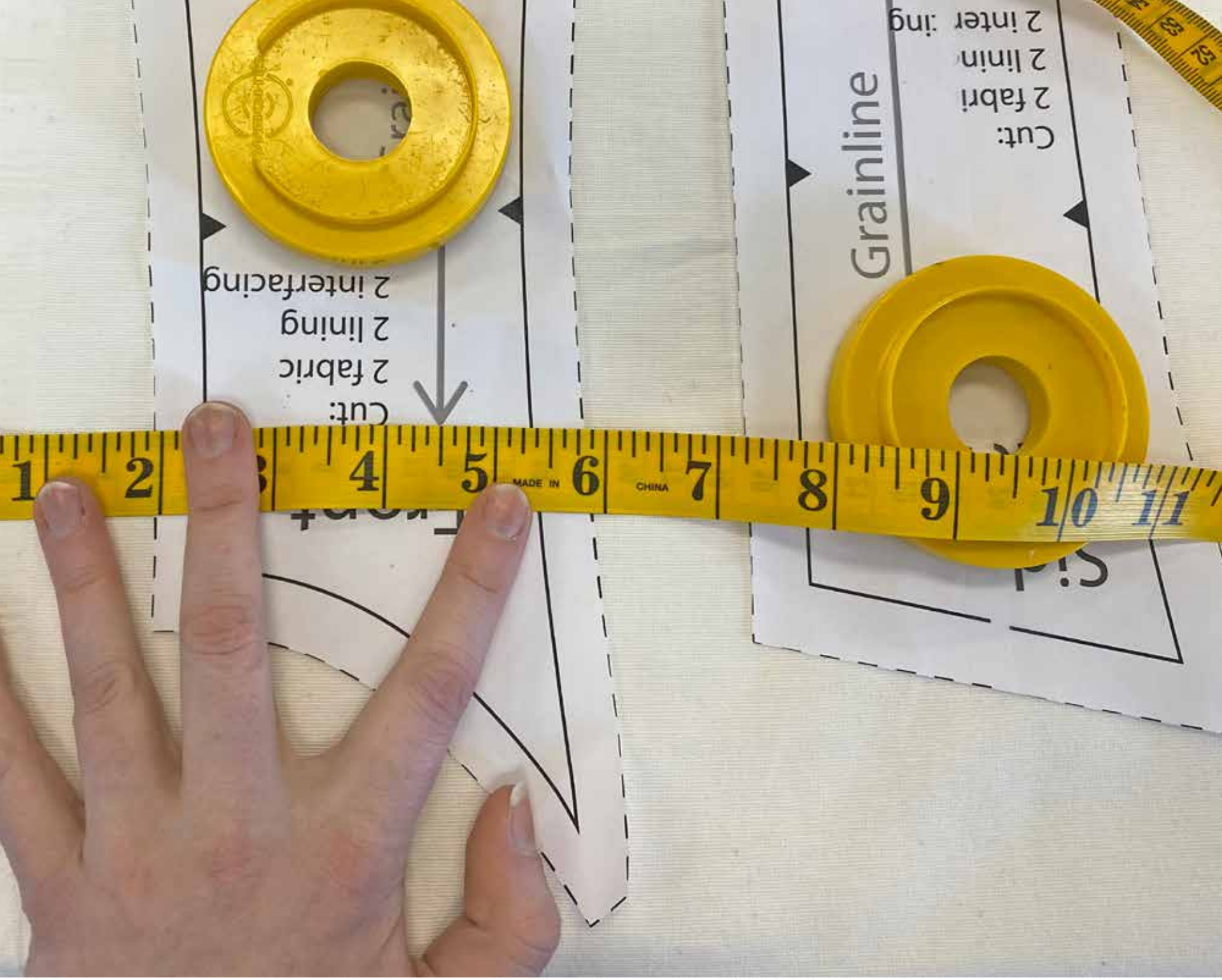


Figure 48: Lining the corset pattern up with the grain of the fabric

Figure 49: Ironing the panels flat before sewing everything together

Figure 50: Serging the raw edges of the fabric to make sure nothing starts to fray

The next step in the assembly of the bodice was to add the pleats. These pleats represent the folded layers of rock, which was the inspiration for this project. In order to make this pattern similar to the patterns in nature, the pleats were made without measuring the size. In our world, layers of rock are not exactly the same size, so making the pleats in an organic manner makes it look similar to nature.

Strips of fabric were cut in different thicknesses. These strips were then folded and ironed to create the pleats. These pleats were then pinned to the white cotton base from the previous step. A line of stitching was run along the bottom of each pleat to make sure everything stayed in place.

This process was repeated until the entire bodice was covered.

Figure 51: The bodice with 50% of the pleats sewn on

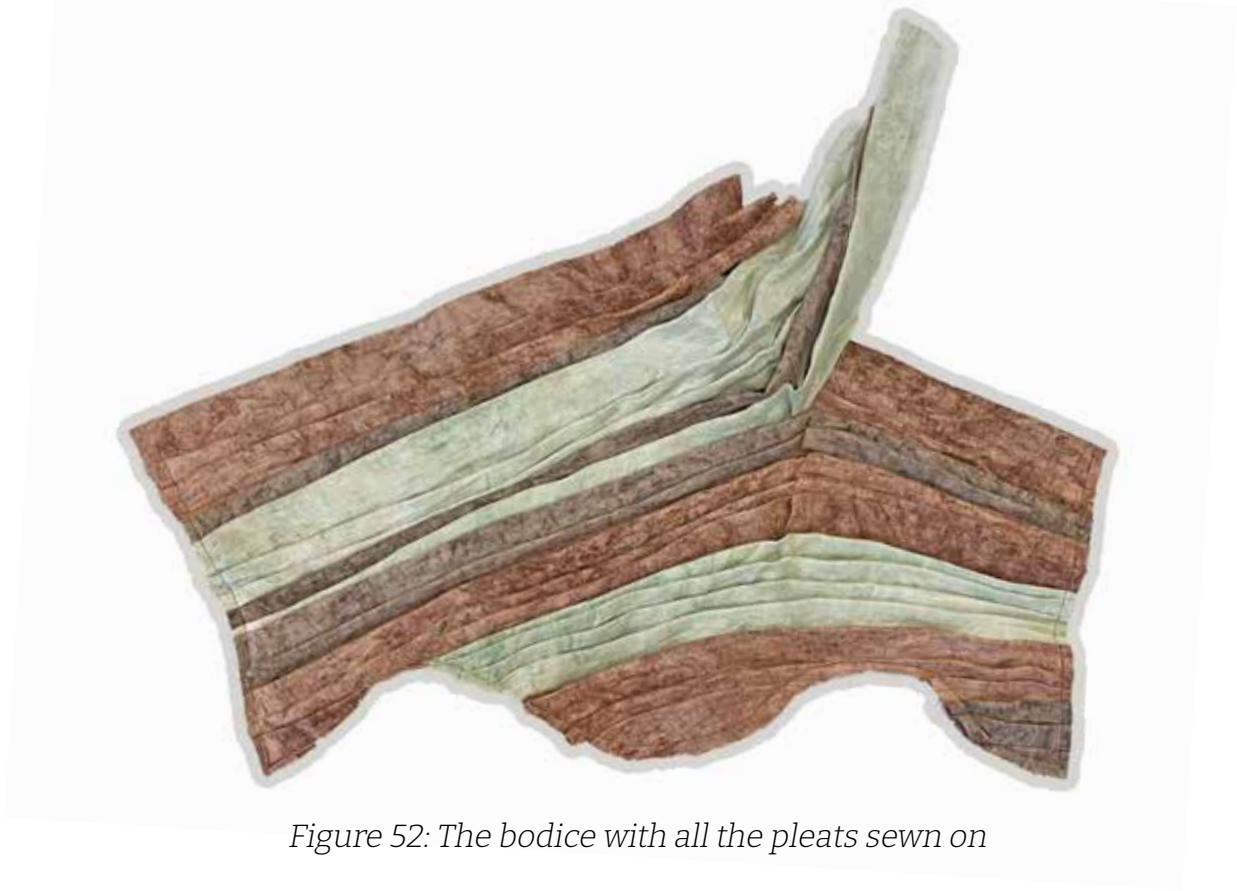


Figure 52: The bodice with all the pleats sewn on

The Lining

In order to protect the stitching on the inside of the bodice, it was decided to add a lining. This lining also gives the bodice a layer that the boning can be attached to.

The lining was made using the same pattern as the outside of the bodice. It was also assembled in the same way, just without the interfacing layer. The bodice needed to support a lot of weight, so boning was added to give the piece some structure. Spiral steel boning was chosen because it is durable, while still allowing some flexibility. These spiral steel bones were attached by inserting them into strips of cotton casing.

To make sure the casing would be sewn in right along the centre of the seams on the corset, several dashes were drawn at a specific distance from the seam. This distance was determined by measuring the width of the casing and dividing it by two. Doing this means the seams on both sides of the casing will be an equal distance from the centre seam where the panels are connected.

Once all the channels were inserted, the lining was attached to the bodice.

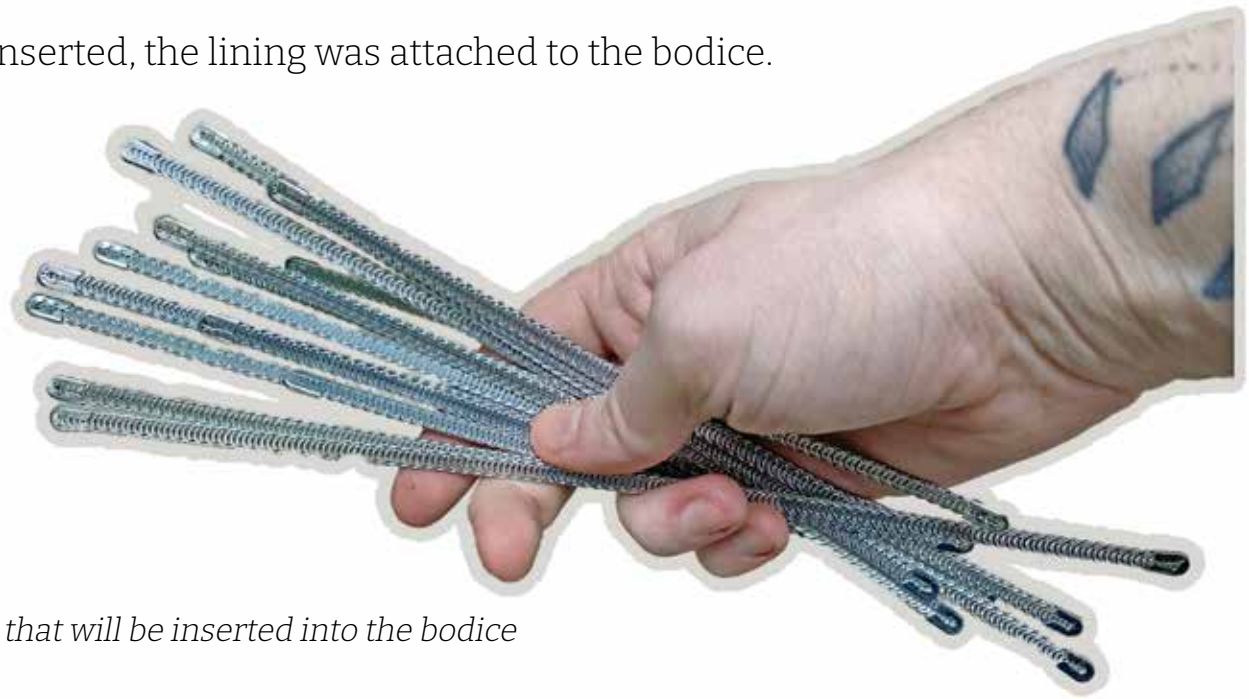


Figure 53: The spiral steel boning that will be inserted into the bodice

Figure 54: The boning and casing lined up along the dashed lines on the inside of the corset lining

Reinforcing the Shoulder

An important part of this project was to make the dress look like it is defying gravity. There is a part of the bodice that is jutting up from the main part to try and create this feeling. Making sure the fabric can hold itself up like that created a bit of a challenge. On it's own, fabric is a very bendable material. It tends to fall under the weight of gravity. Some structure needed to be inserted to make sure the fabric would stay in the shape it needed to.

The first layer that was attached to the back of the shoulder piece was some iron on patch backing. Two layers of this was used to add a lot of rigidity to the piece. Next, a layer of interfacing was ironed on to the patch packing. The interfacing reinforced everything as the patch backing on it's own has a tendency to crack and break. While these layers helped, it was not quite enough to keep the shoulder from falling over. The last thing that was added were some channels . These allowed some armature wire be threaded into the assembly. This wire not only held the piece up, but also allowed it to be bent and shaped to the form to the body it will be on.

Figure 54: The interfacing and channels used to hold the shoulder up

Figure 55: The armature wire inside of the cotton channels

Figure 56: The line drawn to ensure the two sections of pleating would meet up at the same distance from the waist every time

The Skirt

Throughout the design process, the exact design of the skirt was up in the air. Before sewing any of the dyed fabric on, a pencil was used to sketch out lines to see what different patterns would look like. Some images of rocks were put up while this was being done to make sure the skirt pattern would be similar to that of the patterns in nature.

The design that was decided on in the end had a change in direction about one third of the way down the skirt. The direction change needed to remain in the same spot around the entire circumference of the skirt, so a line was drawn to make sure this happened.

Like the bodice, the size of the pleats were made without measuring anything to keep the size of them organic.

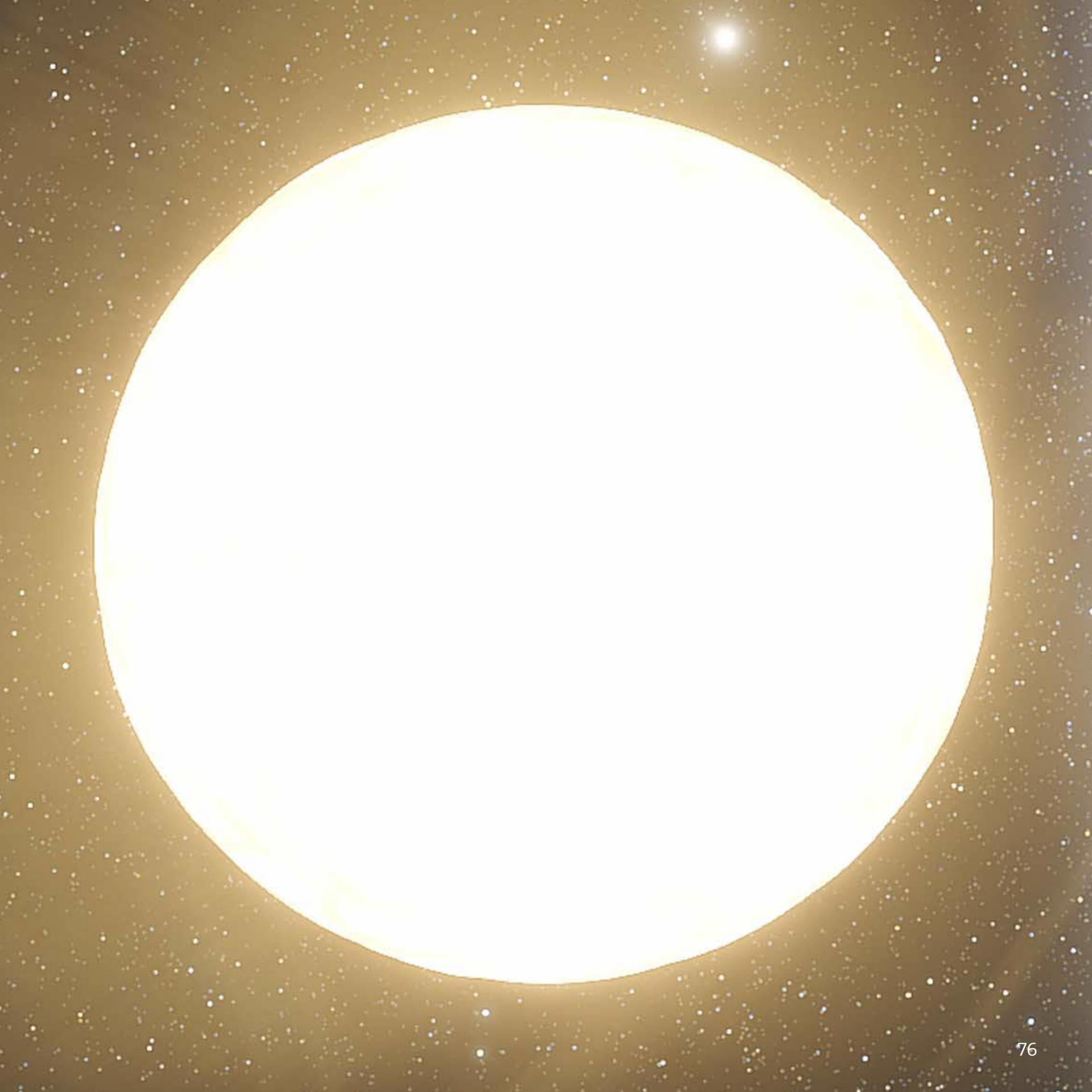
The first pleats to be sewn on were done right at the edge of the skirt. The picture to the left shows the first two that were attached. After this, subsequent pleats were lined up against the inside (to the right) of the previous one. This process continued until the entire skirt was covered in the coloured fabric.

Towards the end of the construction of the skirt, an issue occurred. When the math was done to determine the amount of fabric that would be needed to fully assemble the dress, the final numbers were exactly what was required. This means that there was no room for error as there would be no fabric left over in case of mistakes. Luckily there ended up being just enough fabric and the project was successfully completed. Because of how close it was, there was a lot of stress about whether or not there would be enough dyed fabric. In the future, extra fabric, in addition to what is needed to complete the project, will be made to try and avoid this exact situation.

Figure 57: The skirt partially covered in sections of pleating

Figure 58: Pleats being pinned in place to ensure they would not move during the sewing process

Inner Core



Lessons Learned

Throughout the course of this capstone project there have been many things that have been learned. These things have been both practical skills, as well as theoretical concepts. Listening to how other people have interpreted this work throughout the year has brought certain things to the surface that would not have been realized otherwise.

The first, and largest, learning experience was to do with the use of Earth pigments. This is a technique that the artist had never used before, so making it such a significant part of the project was definitely a risk. Luckily, there was a good amount of time to figure everything out. Because the artist had experience with immersion dyeing fabrics with both natural and synthetic dyes, some of the basic concepts weren't too hard to pick up on. Like natural dyes, Earth pigments need to use some sort of binder or mordant to help them adhere to the fabric. In this case, that binder was soy milk. The soy milk had to be made from scratch as the extra substances added to store bought soy milk make it ineffective. The amount needed when doing the samples was manageable. Because of this, it was assumed that doing it for the final fabrics would not be too difficult. However, once the calculations were done, it was realized that a lot more milk than initially thought would be needed. Three 5 gallon buckets needed to be filled with milk in order to dye the fabric properly. Making this much milk was extremely time consuming. Looking back on this part of the project, this technique was not ideal for the amount of fabric needed. The artist is very happy with how the colours turned out in the end, but the process itself is not really practical for large amounts of fabric.

The second major learning experience that happened during this project was more on the theoretical side of things. During the tutor exchange in the first semester a meeting with Liz Aston took place. While talking with her about Earth pigments, she brought up a good point to do with the Native American population and what it means to be using the land as a white settler. This was not something that had considered at the time, but the more it was thought about, the more it was realized that it was something extremely important that needed to be kept in mind. This is their land, and the nature of Earth pigments means we are using that land as a part of the process. While this is not something that affected the concept of the project directly, it's important to acknowledge that connection.

The last major learning experience had to do with managing the artist's own tendency to burn out. She is used to working on pretty big projects like this one because of her background in cosplay, so it was assumed that her levels of motivation would be similar to how it changes when she works on her costumes. Close to the end of every project Kayleigh works on, usually around the 75%-80% completion point, she starts to find it difficult to get herself to work on things. While the motivation may not be there, usually the pressure of getting it done by a certain date will be enough to get her working again. There was one major difference between this project and the other cosplay projects however: the cosplays are almost always completed within the span of 2-3 months, and this project was one that lasted a whole year. Once a cosplay is finished, the excitement of starting something new is more than enough to find motivation again. It's almost like the switching of gears refreshes the artist's view on things. This project hasn't had that switch in it. Kayleigh has never worked on one single project for this long before. By the end of this project, she had been finding it extremely difficult to stay motivated and she had felt more burnt out than she has in the past. She now knows this is how she will react on projects of this length. Keeping this in mind, a different way of planning out tasks can be used to keep motivation up, even if the project takes a whole year to complete.

Every project is a learning experience. Looking back on the experiences throughout the year, can be extremely useful for future projects. The artist has learned some things about technical processes, how to consider ideas outside of the strict definitions of the project, as well as some valuable information about herself. All of this would not have been possible without this project, and Kayleigh hopes to use these experiences in her future endeavors.

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Colour and Art: A Brief History of Pigments is an article that was published in the Optics and Laser Technology journal. It discusses the history of Earth pigments from the first known uses of them, to their use in the current era. Earth pigments were the first paints that humans made, with the original ones being found in prehistoric caves. Over time people realised that when certain minerals were ground up, they could make different colours. One example of this is the use of malachite to decorate sarcophagi in ancient Egypt. A major part of my capstone project is the use of Earth pigments to make a piece that mimics rocks in nature. I have always had an interest in learning the history of the materials I am working with, so this article has really deepened my appreciation for the process. Rocks are full of history, so I hope reading about the history of these pigments will allow me to capture some of that history in my project.

Haeckel, E., Breidbach, O., Hartmann, R., & Eibl-Eibesfeldt, I. (1998). Artforms in Nature. Prestel. (Original work published 1899).

Artforms in Nature is a book that contains a collection of images from all aspects of nature. There are snapshots of everything from geology to plant life. There are some stunning microscopic images of plankton showing geometry that could never be seen with the naked eye. Geometry is everywhere in nature. All around us there are fractals that create beautiful patterns. These patterns were made without any human involvement. Geometry in nature is one of the main themes of my capstone project. I am exploring the way rock folds, and

how that can be mimicked using fabric. There are some images in this book that show some patterns in geology. While the pictures may not be exactly what I am representing, it is a good jumping off point in terms of designing the surface of my fabric. These images will serve as good reference material going forward.

Mukherjee, S. (2021). Atlas of Structural Geology (Second). Elsevir Publications. https://books.google.ca/books?hl=en&lr=&id=k-T7DwAAQBAJ&oi=fnd&pg=PP1&dq=structural+geology&ots=zAjONHvpdr&sig=0IIG5rfFeFSw524USPoYmhaE7MY&redir_esc=y#v=onepage&q=structural%20geology&f=false

This book goes over different formations in structural geology. The part that was of most interest to me was the section on folding. It goes over how different folds form and the different shapes they can take. The mechanisms behind the folding were particularly interesting. By understanding how different folds form, you start to understand the shapes you see. My capstone project is centred around these geologic folds. If I want to effectively replicate them in my project, I need to understand how they form in the first place. Maybe there is a way I can replicate these folding mechanisms using fabric. If I can fold the fabric in the exact same way the rocks are folded in real life, then my re-creation will be closer to the real thing. The first step to a successful re-creation is understanding the theory behind the mechanisms.

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During the midterm critique, one of the points that was brought up was possibly adding some sort of surface texture to my fabric. The colours I achieved were fairly even, but rocks in real life are not one solid colour. One idea I thought of was using shibori as a way to add some variation to the colour. Memory on Cloth is a book that goes over many different shibori

techniques. There are sections for bound, clamped, and sewn resists. There are also parts talking about the history of shibori. As of right now, I am undecided if shibori is a technique I want to explore, but if I decide to use it this book will be a good guide on how to achieve certain patterns. Combining shibori with foiling may give me that natural texture I am looking for.

Wolff, C. (1996). The Art of Manipulating Fabric (R. Cooke & R. Fanning, Eds.) Krause Publications.

The first technique I knew I wanted to explore in my capstone were the different ways of manipulating fabric to create shapes and patterns. In order to narrow down what techniques to try, I looked through the Art of Manipulating Fabric book. This book covers almost every fabric manipulation technique you could think of. It gives detailed instructions along with pictures to make it easy to understand. Because there is so much information in this book, I had to go through and narrow down which techniques I wanted to try out. I started by putting sticky notes on pages that were of interest. I then went back and chose techniques based on my reference pictures. The selected techniques were what influenced my sample creations. I am happy with the results I have achieved so far, but if there are any other techniques I want to try out in the coming weeks, this book will be the first one I go to.

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