

**RESEARSH DOCUMENT:  
GABY VAN DEUTEKOM (0846134)**

## GENERAL INTRODUCTION

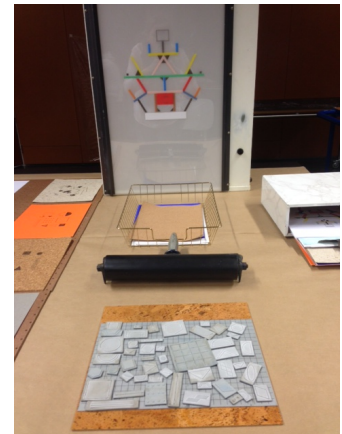
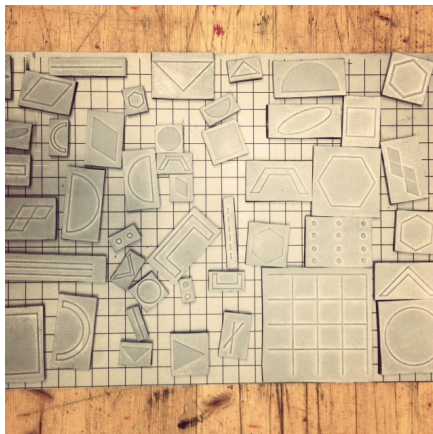
As a designer who is working in the field of digital craft my focus is on the reintroduction and the translation of existing traditions, printing techniques, shapes and patterns. My signature is especially visible in the use of crafts and printing techniques in combination with traditions and art history. The combination of traditions and art history is very inspiring, because it gives my work an extra dimension and an identity. Identity is an important aspect within my discipline “Lifestyle and Design” and often forms the base for my designs and concepts.

## MEMPHIS DESIGN “ TOOLS AND TECHS”

For my project for the “Tools and Techs” assignment I’ve spend time on the building process of imagery and rotation. I’ve gained inspiration from the art form “Memphis Group”. As an artist I could relate with the “Memphis Group” as an art form, because it is both playful as clear guideline. An other aspect of my design that I would like to point out, is the social aspect of my “Memphis” design. The idea behind the design is that an existing form can be changed in something better by working as a team. The forms I’ve used in my design are forms that originate from different disciplines and usually are the base of a design. Examples of the forms I’ve used are: squares, circles and triangles.

## REASON BEHIND “MEMPHIS DESIGN”

The basic forms serve as the base for my design. The underlying thought is that the design is a dynamic brainstorm activity. In my opinion the best ideas arise when people are discussing and when people get out of their comfort zone. Only then people are able to see things differently and in another context. This allows me to react to the digitization of the present day. Nowadays many designers are more comfortable using a computer and distancing themselves from analogous methods. My design can function as a stimulant to unite both the digital and analogous methods.



### **TARTAN DESIGN “ TOOLS OF THE TRADE”**

For the “Tools of the Trade” assignment I’ve further explored my interest for identity and tradition. Thereby I asked myself the questions: “What means identity to me?” and “How do I translate that in a design?” To me identity is individuality which characterizes a designer. Identity is also an influential factor on the image of a person in the social and cultural field. A culture and background brings history and tradition along and that’s what I’ve tried to express in my design. I’ve researched the patterns of the Tartan which is part of Scotland’s history. Tartan is a pattern consisting of criss-crossed horizontal and vertical bands in multiple colors. Tartans originated in woven wool, but now they are made in many other materials. Tartan is particularly associated with Scotland. Scottish kilts almost always have tartan patterns. Originally each tartan pattern belongs to a particular region, and was associated with a weaver or weaver family who lived there. Later every tartan pattern tells which family or clan you came from.

### **REASON BEHIND “TARTAN DESIGN”**

Tartan is part of a person’s identity and is a way of expressing that person’s identity. It shows which family or clan a person’s from and is associated with a weaver from the same region. With the Tartan as a design I’ve started experimenting with electricity and chemistry. The yarns, the material which are used to weave Tartans, don’t have colors and therefore raw materials are needed to give it color. The weavers had secret recipes which they used to color the yarn. Each weaver had it’s own distinctive recipe that they used for their own family or clan. The fact that every weaver had it’s own distinctive recipe is something that’s matching with my personal motivation. Weavers are specialists who are known for their craft and that’s something I’m trying to achieve in my own field of work. As a designer I’m always looking for ways something that makes me stand out of the crowd and expresses my uniqueness. The secret recipes of the weavers are part of the inspiration that I’ve used to come up with an own processing technique. On the other hand is the story behind the technique a major part of the base of my concept. In my concept I’ve changed the traditional guidelines into a more present technique by using electrolysis.



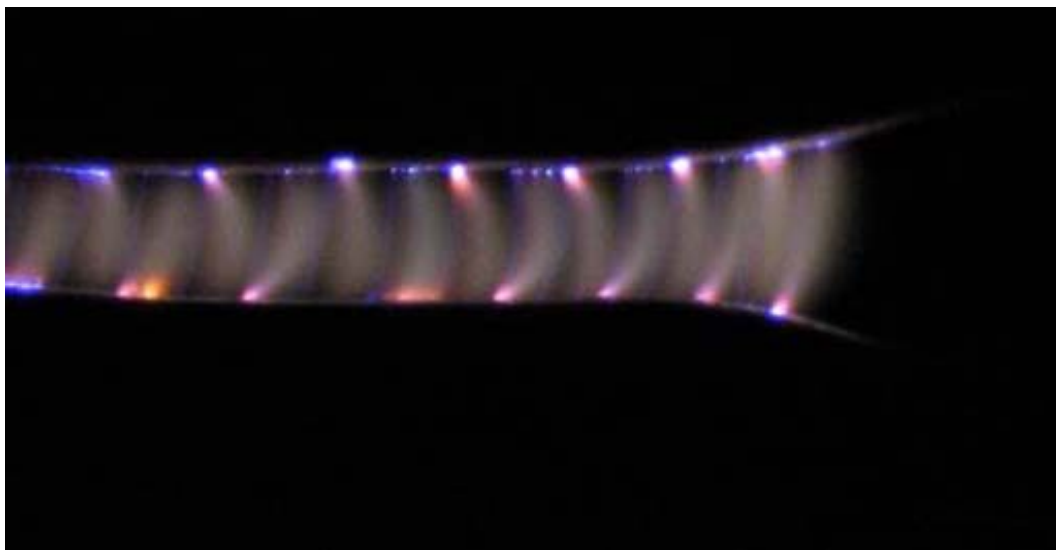
My fascination for this was sparked by technique electrolysis. I've connected this technique with my passion for patterns and textile (and the history of textile). I like the fact that materials, in this case textile, get an extra meaning because of traditions. The traditions express an identity. This connection between identity, tradition and textile came together in Tartans, an Scottish weaving tradition.

The Scottish is made from Tartan and the patterns of the Tartan goes way back. People are using these patterns to express their identity, because it showed from which region, clan or family they're from. Tartan was banned for 35 years when England and Scotland were united. After the ban was over most of the original Tartan patterns were destroyed and a lot of the knowledge of Tartans were gone as well. Writers like Ossian started to write down stories and poems, in the art movement Romanticism, to breathe new life into the Tartan tradition. Later research revealed that most of these stories were made up.

For me as a designer traditions are a very important inspiration and I like to place old traditions in the present day. Thereby I believe that traditions are able to tell a story. But I am also aware of the fact that traditions change in the course of time. Traditions are passed from generation to generation and the interpretation of the story change through time. Traditions should be respected but it's inevitable that these stories change through time. The fact that traditions change is the starting point for my concept. I find it special to renew traditions and interpretate traditions in a different way.

My expertise is creating patterns with old printing techniques. Therefore I came up with the idea to use electricity as a possible printing technique. I asked myself the question: "Usually we're using electricity to make objects function, but what if I use electricity and make it visual?" For example "Jakob's ladder", that a bridge made of sparkes. The electrical tension based on two conductive electrons which create an space that's filled by gas or air. For the technique I've chosen I'm not using gas but red cabbage juice. The juice will function as a conductor for the path in my pattern.

The inventor of the electricity net is Nikola Tesla. He did several experiments which lead to safe use of electricity and inventions like alternating current (AC) generator. The AC generator is a machine whereby mechanical energy is transferred to electrical alternating energy by a spinning axis. These inventions are part of the electrolysis technique the technique I use in my project.



## A TRIBUTE TO

The story starts by scientist Michael Faraday. He was dealing with magnetism and electricity and mainly the combination of these two. More importantly was his work with electrochemistry and his experiments with electrolysis. In 1833 he wrote his findings down and created what is known as the Electrolysis-laws. In addition, Faraday was convinced that magnetism creates electricity. In 1831 he unrivalled the phenomenon electromagnetic induction. (just one example)

$$m = \left(\frac{Q}{F}\right) \left(\frac{M}{z}\right)$$

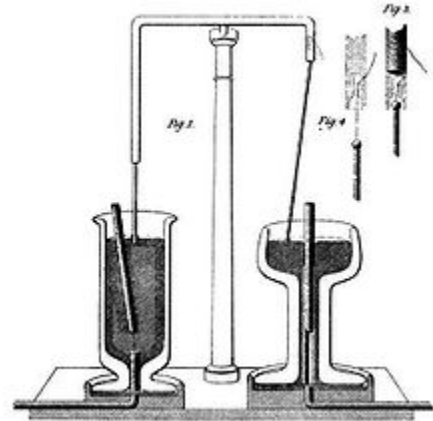
where:

m is the mass of the substance liberated at an electrode in grams

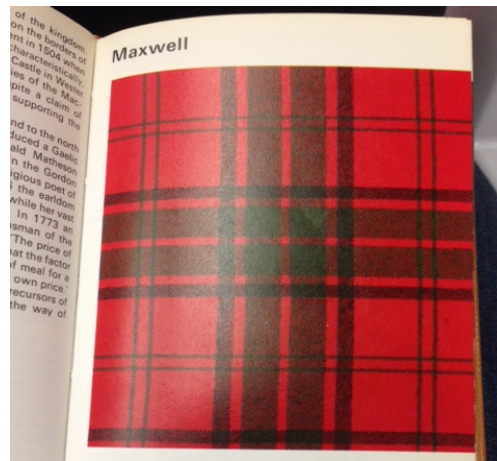
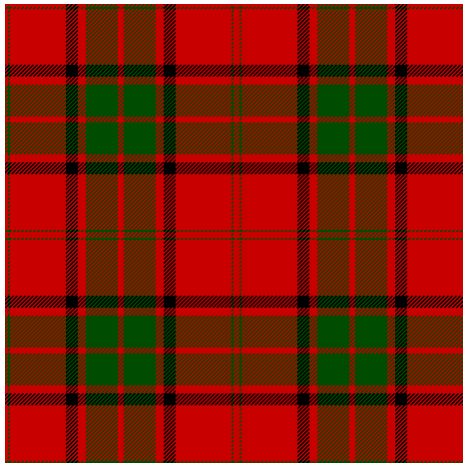
Q is the total electric charge passed through the substance  $F = 96485 \text{ C mol}^{-1}$  is the Faraday constant

M is the molar mass of the substance

z is the valency number of ions of the substance (electrons transferred per ion).



An other important scientist is James Clerk Maxwell (1831) is the only child of John Clerk Maxwell and Frances Cay, both born in Edinburgh. His father John was part of the Clerk family of Pencuik who was part of the Scottish aristocracy. His father used to be called John Clerk, but discovered to be an heir of ground in the region of Meddlebie near by Dumfries. There was a term to inherit this ground and this was to affiliate the name Maxwell and that he was family of Lord Maxwell. That is why his name changed in John Clerk Maxwell. James Clerk Maxwell spend a lot of his childhood on the "Middlebie" Estate.



In 1861 James Clerk Maxwell gave a demonstration at the Royal Institution in London involving the first color picture. Maxwell took three black and white pictures of ribbon of cloth of a Tartan. Every picture was taken with a different color filter in front of the lens. After these photographs were taken he layered the pictures on top of each other which created the first color picture in the world. He let the world see the original colors of tartan through his first color photo. This is the first color photograph:



With this story I want to pay a homage to these scientists and their discoveries. By combining these techniques and the story I'm able to create a new design of the Tartan. I'm also using the old practice of dyeing fabric and the natural raw material I'll be using is red cabbage. Another important element of my design is copper. I will be using copper, I weave it into a tartan pattern with silk or cotton yarn.



### DYES

Previously, Tartans like "the Falkirk" were produced with the natural colors of wool. The introduction of colored dyes made it possible to create different cloth. These dyes were produced from moss, bark, roots of plants and leaves. The washed wool was soaked in the dye and in most cases wood-dye was added (iron or copper for example) to make the dye last permanently. Considering the complexity of some recipes it is very remarkable that they've been discovered. In many cases it's a matter of experimenting and coincidence. Because the weavers were limited to the colors they could produce locally most regional patterns and colors are alike. Unfortunately wasn't it possible to produce these colored dyes on commercial scale. The increase of the trade in the 18th century led to an increase of imported dyes like Lichen and Indigo. This offered the weavers extra options for colorings their designs and patterns.

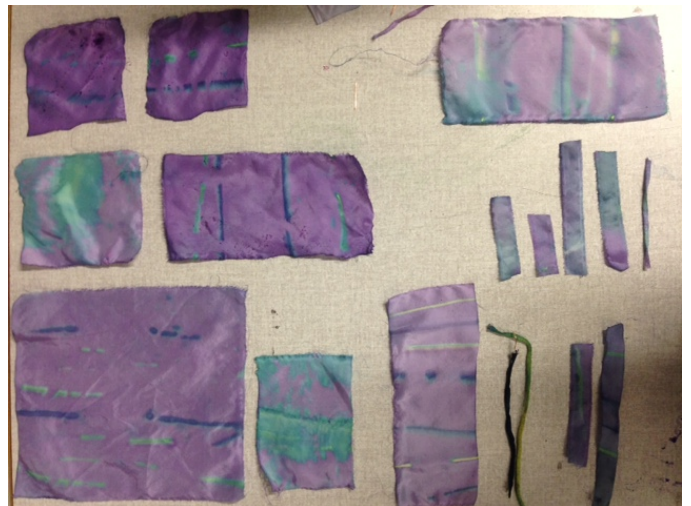
First I experimenting with Electrolysis as a tool to flow electricity, but later I found out that copper was also a part of the dyeing process of the weavers. During these experiments with copper I discovered that the old recipes also copper was added. As a means to fix or to influence the color. That was an extra reason to developed the Electrolysis in a way that fits with the history behind the tartan's.

## TOOLS FOR YOUR TRADE

In "Tools of the Trade" I've designed tools for my project "Secret Tartan Recipe", but these tools can be used in other disciplines like design, illustration, textile and fashion. I designed the follow tools: a recipe, two kinds of looms and a electric pen. These tools need to be combined, but the liquid is most important element to get the right result. The recipe of the liquid is responsible for the change of color and the pattern. My expertise is creating patterns with old printing techniques. Therefore I came up with the idea to use electricity as a possible printing technique. The idea behind this choice is to interpret the traditional Tartan in a new and modern way. But also keeping an eye on the origin of the tradition of weaving and dyeing of the Tartan.



The tartan is in this project for me a way to tell the world that a pattern is not only a pattern. The Tartan patterns are identity's with a lot of history. Besides it is not only the identity is of the person who wears it, but also the identity of the maker. It is an reflection of this practice that he made him with a lot of care. The recipes are not a step by step plan, it is much bigger than that. It gives opportunities.





## RECIPE

The original production methods and recipes for dyeing fabric and yarn involved natural raw materials like berries and plants. These raw materials were soaked in metals to change the colors or to fixate the colors. Considering the complexness of some recipes it is very remarkable that they've been discovered. In many cases it's a matter of experimenting and coincidence. I was inspired by the traditional way of dyeing fabric and I wanted to use a raw material as well. I have chosen red cabbage as raw material. Using electrolysis I've used red cabbage as a PH indicator, because red cabbage has the ability of changing its color based on the degree of acidity.



## PROCESS ELECTROLYSIS

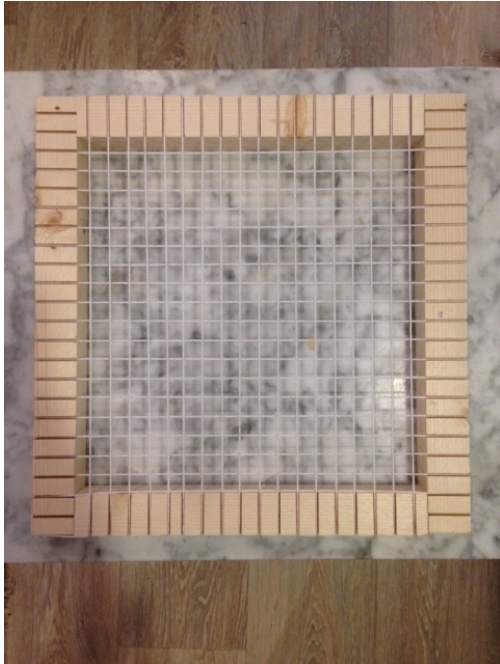
Electrolysis is a chemical process using electrical power through two electrodes, the Anode and the Cathode, whereby composed fabrics can be separated to single fabrics or to other composed fabrics. Electrodes are electrified atoms. The Anode and the Cathode or responsible for the way that the electricity was directed. The Anode is the opposite pole. The Cathode is negative when the object functions as a power consumer and positive when the object function as a power force. The Anode are able to adopt the electricity that is released making the color in the fabric increase or decrease. This process in combination with the degree of acidity of the fabric is responsible for the color in the fabric. The amount of energy that's necessary for separating the red cabbage juice depends on the concentration of the fluid which increases when the concentration is higher. By using electrolysis, the recipe and ingredients I was able to create multiple colors.



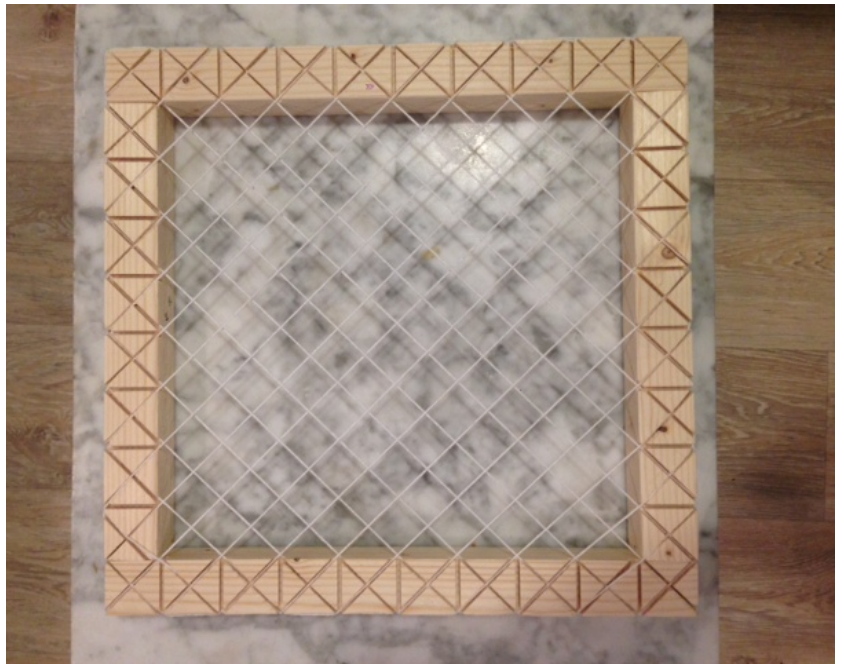
## LOOM

- Loom 1. horizontal crossed vertically lines.
- Loom 2. diagonal crossed lines

Loom 1



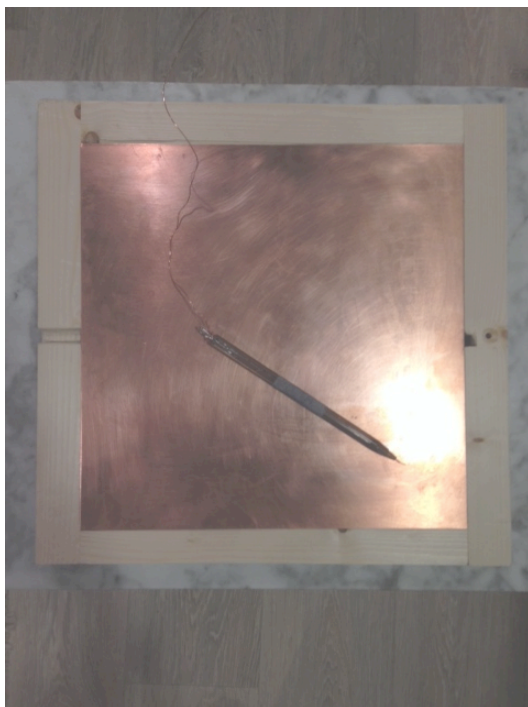
Loom 2



I've designed a loom which allows me to create as many different Tartans as possible. It can weave horizontal, vertical and diagonal lines, which can be used at the same time but solo as well. Besides weaving it is also possible to use the copper wiring as a surface where the fabric can lay on top of so the fabric can be colored using the recipe (see the recipe).

## ELECTROLYSIS PEN

By using the electrical pen it is possible to create patterns by drawing the patterns directly on the fabric. This is mainly designed as an extra possibility and can be used in multiple disciplines.



## RECIPE

Recipe:

Step 1:

Put the red cabbage to the boil

Pour the juice and put the juice in a bowl so that only the cabbage leaves. This can boil again with salt if it succeeds.

Step 2:

Add salt in the boiling red cabbage with a ratio of 50:1.

Step 3:

There are two options now: dyeing the fabric or weaving the fabric.

Option 1: Weave a pattern and go step 4.

Option 2: Do you want to dye the whole fabric without using copper threads? Then you need a piece of silk, cotton or any other piece of natural fabric. Cut it in any size you like and proceed to step 4 option 2.

Step 4:

Option 1: Let your fabric soak for at least half a day to day in red cabbage juice.

Option 2: Let your fabric soak for at least half a day to day in red cabbage juice.

It is important to keep the fabric moist, so don't let it dry out!

Step 5: The two different types of looms allow you to wind up the copper threads. Important is which pattern, colour and repeat you choose.

Positive ion/Cathode: Black = yellow/green

Negative ion/Anode: Red = blue/purple

Option 1: After weaving the fabric and winding up the copper it is crucial that a small piece of the copper remains. This is necessary so the connection with power is possible. Be careful with placing the threads and connecting them. And let it soak as described in step 4.

Option 2: There are two options for weaving the threads. You can weave them in two paths or by separate paths which you have to connect separately.

Step 6:

Option 1: Connect the weaves for the best result. Connect the cables with the same colours. Connect the red cable with the other red cable (same goes for the black cables) and put the black cable in the blue contact.

When everything is connected switch to 40,5 max volts slowly. Now let the electrolysis work its magic!

Remember: don't switch on both paths at the same time.

Option 2: Connect the copper threads in the pattern you've selected. Now put the fabric on top of it. Switch to max 40.5 volts or lower and now let the electrolysis work its magic!

## IMPLICATIONS

I researched the meaning and backgrounds of expressing one's identity through a Tartan. People always used clothing and patterns to distinguish themselves from other. The family recipe and production methods of weavers gave people a way to do that. The strive for distinguishing oneself isn't changed in current time. Because of the tools and the recipe patterns still create tradition and identity nowadays.

After researching I found out that identity not just lies in the people who wore the Tartans but also in the people who creates the patterns. I've created a production method with the combination of the recipe, the tools and electrolysis. I believe that the original way of 3d knitting and weaving, and dyeing textiles can be changed with this product. The focus lies on creating a pattern and carefully placing the copper wiring in stead of color combinations that are already in the fabric. With this new production method it's more about the generation of colors using electrolysis.

Another interesting aspect of this new production method is the biological generation of colors and ink using natural raw materials. This can mean a change in textile industry. The original Tartan patterns were dyed and weaved according to family recipes. By keeping the recipes secret and within the family the weavers had the chance to distinguish themselves. This is both an important cultural as personal aspect.

I made a recipe with a natural and organic product in my own way. Which can ensure that everyone can develop his own recipe if only held to certain conditions. The conditions to use the method of production lie in the use of materials. As one hundred percent natural materials such as yarn, textiles, raw materials ( like copper, salt and organic products: for example red cabbage ). If each interpret these terms in his own way and adheres to these conditions. That means that everybody is able to develop its own unique and exclusive tartan by means of an original recipe. The recipe gives a personal character that represents the identity of the creator.

