

Reflections on the Evolution of Life Expressed in Clothing

Fengying Zhuo

Putian University Fujian Putian 351100

Abstract: My concept explores the idea of 'life' and 'human existence'. We as a species have evolved so much, will we still continue to evolve? At what point does evolution stop? I explored the idea of the human species evolving to become various species of mammals, and being completely stripped back to bones, organisms, and cells. Looking back to the very beginning of life, I chose denim and knitting to explore and think about the process of human evolution, trying to simulate the texture development of cells and blood vessels in the process of human evolution through knitting technology and to present the human body shape with the silhouette of the denim.

Keywords: Evolution; Cell; Bone; Knitting; Denim

1. Introduction

1.1 Background of Study

Life and human existence have always been secrets for scientists to reveal. So far, there is no definite answer. Darwin's "Natural selection" is probably the best conclusion so far. Driven by the epidemic, we have to think about the meaning of life. What will the world of the future look like? Will people change their breathing methods after wearing a mask for a long time? Now that medical methods can help people change their faces, what about change chromosomes, genes, and DNA? Or whether human evolution will mutate into other species again because of the environment? In this continuously consumed and developed environment, will we eventually return to the origin or evolve into a more advanced species? I express these thoughts in the colors, silhouettes, and fabrics of clothing, hoping to make people have a deeper understanding and thinking about life through clothing.

1.2 Aim and objectives

In a modern society where low-carbon life and sustainable development concepts are highly respected, more attention will be paid to the sustainability of clothing design. Therefore, it is necessary to develop environmentally friendly fabrics and to reduce pollution and waste in the production process. I want to use knitted fabrics to realize this environmental protection concept, creating knitted fabrics with recycled yarn, so as to achieve the sustainable development of clothing. Meanwhile, I also hope that through this graduation design, the clothing can be more ready-made and market-oriented. During my graduation design process, I can more determine my own consumer group, and be able to find out the positioning of the brand more accurately.

1.3 Scope of Study

Explore the secrets of the human body. Separate the bones and flesh to get a clearer body structure. Study the bone shape of different parts from the body structure. Collect the shape elements of the bones and combine them with the silhouette of the clothing. At the same time, explore the daily movement and growth of the cells, organisms, and blood vessels inside the human body, record and simulate the evolution process with knitting technology. Through the study of the human evolution process, I can summarize colors, fabric textures, and clothing silhouette, which can provide directions for developing design thinking.

1.4 Methodology

(1) Literature exploration

Literature Study on the Process of Human Evolution

① Bone Structure

② Cell Structure

(2) Experimental exploration

①Knitting experiment: first collect the elements of human cells, organisms, and blood vessels to understand the growth status of cells, organisms, and blood vessels. Secondly, conduct knitting experiments with different algorithm formulas, and use knitting machines to create new types of knitted fabrics. Simulate the real state of human cells, organisms, and blood vessels in a process of repeated experiments, and further present it in the form of knitted fabrics.

②Draping experiment: collect and analyze elements from the external silhouette of the human body to the silhouette of bones inside the human body, and then explore the changes of the silhouette through draping. The key of this experiment is how to express the shape of the body through draping.

(3) Summary

Refer to the research and views of scholars and experts on the human development process, so as to further refine the experience and apply it to the process of practice.

2. Review of Literature

2.1 Origin of life

The mystery of human evolution has always been a field that scientists continue to explore and study. From single-celled organisms to multi-celled organisms, from the original ocean to an oxygen-filled environment suitable for life, from nitrogen-fixing plants to today's photosynthesis. The first aquatic organism, the origin of all species—trilobites were born in the ocean. Later, as the composition of the air on the earth changed, aquatic organisms continued to come to the land, evolving amphibians, and reptiles.

With the passage of time, the number of plant species on land has gradually grown up. The limitation of the aquatic environment and the diversity of food on land has also increased, which caused many aquatic organisms to gradually migrate to land, undergoing complex evolution on land, and finally evolving into the ancestors of human beings—primates.

2.2 The relationship between cells and blood vessels

Consisting of surrounded flat cells, the blood vessel's basic unit is cells. Angiogenesis refers to the development of new blood vessels from existing capillaries or post-capillary veins, which mainly includes: degradation of vascular basement membrane in the activation phase; activation, proliferation, and migration of vascular endothelial cells; reconstruction to form new blood vessels and vascular network is a complex process involving many kinds of molecules of different cells.

Blood vessels belong to connective tissue, which is composed of a large number of cells and intercellular substances. The intercellular substance of connective tissue includes matrix, fibers, and constantly renewing tissue fluid, which has significant functions.

2.3 The generation of life

The natural essence of life is not protein but nucleic acid—Deoxyribonucleic Acid (DNA) and Ribonucleic Acid (RNA). The traits of organisms are mainly controlled by DNA molecules. If life evolved, there should be the accidental synthesis of the first DNA molecules. In addition to material properties, life is also self-organizing. Taking the most basic life form, cell as an example, a living cell has cell membranes, energy factories, protein manufacturing factories, information replication centers, and many other departments. All of these must work in an orderly manner in a certain way so that this most basic life can be maintained.

3. Methodology

3.1 Data collection

(1) Collection of theme elements

①Collect elements of the external silhouette of the body. The body will assume different postures due to fatness and thinness. The sharp contrast formed by these silhouettes will bring many references to the outer silhouette of the clothing. At the same time, when the body is in motion, the curve of the body will also move, which brings new changes.

②Extract the skeleton silhouette of the body. After understanding the bones of each part of the body, split them, and then further simplify the shapes of these bones.

(2) Draping data collection

Combine theme elements with clothing silhouettes through sketches, and then explore in the draping experiment. Sleeves are a good display part of the body silhouette, which can well show the fluidity of the clothing silhouette. Therefore, the focus

of clothing silhouette is on the change of sleeves.Repeated experiments on the sleeve to obtain a large amount of data and information.

Different curves can be extracted through the change of sleeves,and the curves can be applied to other structures of the body,such as the details of pants.The trousers can form a stronger sense of space through the curve division,making the trousers more three-dimensional in terms of visual effects.

(3) Knitting data collection

① Data collection of yarn material and production process

Understanding the composition and production process of different yarns is an essential part of making knitted fabrics. Knowing the composition of the yarn can better know how this yarn performs.In this knitting experiment,I mainly collected information on the composition and production process of cotton yarn(lace texture),metallic yarn,chenille,mohair yarn,and fancy yarn(feather texture).

The composition of the cotton yarn is 100%cotton,which is a strongly twisted thread of 100%pure cotton.Different from ordinary cotton thread,cotton yarn is not elastic.But the cotton yarn has a good gloss and a softer texture.

Metallic yarn is a mixed material of polyester and metallic yarn twisted,which is strong and uninterrupted.At the same time,the metallic yarn is soft and has good weaving performance.

Chenille is made by twisting fibers or filaments of different fineness and strength,which is soft and light.Meanwhile,it also has the advantages of good drape and good water absorption.

Mohair yarn is Angora,which has high strength,good abrasion resistance,elasticity,strong luster,is not easy to be felted,and easy to wash.The mohair yarn is light and fluffy.Due to the limitation of production,mohair yarn is noble and luxurious.

Fancy yarn is a synthetic fiber,just like viscose,polyester,acrylic,and so on as we know it.The thread in the middle of the fancy yarn and the surrounding decorative thread should use the same shrinkage material to prevent the yarn from being different in length,uneven,and knotted after washing.The sum of the counts of core yarn and the decorative yarn is equal to the count of the finished product,which will also be affected by the number of crochet needles.The inspection method for core yarn and the decorative yarn is that the decorative yarn should be 1-3 times thicker than the core yarn.

② Data collection of yarn density value

Collect the density data of different types of yarns through the knitting machine. Understanding the numerical change from the maximum value to the minimum value of the yarn density facilitates the mathematical calculation of the yarn texture in the later stage.

3.2 Data analysis

(1) Data analysis of draping

After expanding the modified version of the sleeve part of the vertical cut into a flat version,it is found that the difference of the curve on the sleeve will greatly affect the fluidity and three-dimensional degree of the sleeve bending.Therefore,it is necessary to modify the value of the curve part on the sleeve plate to get an accurate value.

The curve segmentation of trousers has also been adjusted in different details.Not just dividing lines,curves can also create hollow parts by crossing,which makes the curve more vivid.Not only that,the curve can also be expressed in the details of the trousers,such as the pockets of the trousers and the silhouette of York at the back of the trousers.

(2) Data analysis of fabrics

① Innovative knitted fabric that uses the texture of the yarn to express the growth state of blood vessels

The fabric is a combination of fancy yarn and chenille.The soft texture of the chenille is like the skin inside the body carrying the growth of blood vessels.The fancy yarn is like the blood vessels in the body constantly growing,bursting with its own vitality.When the fancy yarn is brushed out of the secondary yarn on the wool thread with a brush,it will grow wantonly like a blood vessel,bursting out new connection points.

The state of the whole fabric is very vivid.This kind of texture effect can bring strong vitality to people visually.

② Innovative knitted fabric that simulates the texture of cells through calculation formulas

The fabric is a combination of cotton yarn,metallic yarn,fancy yarn,and mohair yarn.Cotton yarn and metallic yarn can form a sharp contrast of thickness,just like the inner wall tissue of the body.Under the microscope,the cells of the body show different states,and they swim around the body.By observing the growth state of the cells,two different textures of mohair yarn and fancy yarn are selected to simulate the appearance of the cells in the algorithm formula.Then combine this three-dimensional cell with the cotton

yarn that simulates the inner wall tissue of the body and the metallic yarn. The purpose of this texture effect is to more accurately simulate the effect of cells in the body so that people can more concretely understand the shape of body cells and have a better understanding of life.

4. Findings and analysis

In the course of the experiment, I learned that it is necessary to combine three-dimensional cutting and plane cutting to better express the three-dimensional space of the clothing silhouette, making the silhouette structure of the clothing more three-dimensional. Therefore, when I am exploring the pattern of clothing, I need to convert the value of the vertical cut into a flat cut to make it easier to modify and discover new patterns. Secondly, in the exploration of knitting experiments, knitting will change its tightness due to changes in density and thus change the tightness and thickness of the fabric. Therefore, in the production process, pay special attention to the density gap between different yarns and whether they can be combined. The thickness of the yarn also largely determines whether the yarns can be mixed and matched. Yarns with a large difference in thickness cannot be knitted. Except for the most basic flat needles, it will be difficult to combine with each other in the process of making patterns.

5. Conclusion

5.1 Conclusions about the research issue

In this design, I focus on the research on the silhouette and fabric of clothing. The experiment process can be divided into two aspects. The first one is to find the silhouette of the clothing through draping. Because I want people to become stronger and more energetic when wearing them, in the study of silhouette, I would like to increase the sense of space. The difficulty lies in how to make the curve change on the sleeve achieve a perfect loop state, and how to make the sleeve and the shoulder part connecting the front and back pieces become three-dimensional. In the repeated draping experiment, the sleeves are circulated more reasonably by collecting the channels and dividing the sleeves. Then use shoulder pads to increase the contour and three-dimensional sense of the shoulders. In the woven fabrics, denim fabrics have been chosen to present the clothing effect. Denim fabrics are divided into elastic denim fabrics and non-stretch denim fabrics, whose organization is also divided into the plain weave and twill weave. So 35 different types of denim fabrics are collected. Compared with other fabrics, denim fabrics are stiffer and more delicate in texture, which can express the silhouette of the design more clearly. Another aspect is the research on knitted fabrics, which is the focus of this graduation design research. In the early stage, I searched for 20 kinds of yarns related to this theme and made them into the most basic knitted fabrics. After understanding the fabric texture presented by these yarns, I chose five of them to make pattern changes. The difficulty of knitting pattern calculation is that its algorithm is complicated and some yarns are prone to drop needles on the knitting machine because of the decorative yarn. Therefore, the production of a patterned fabric will take about 7-8 hours. Approximately 70 pieces of fabrics were produced in the course of this final experiment. It is difficult to process and takes a long time. However, it is this complicated process that enables the presentation of the more refined and innovative knitted fabric. Compared with woven fabrics, knitted fabrics are more creative, and their texture changes are more diverse. It can not only make the fabric have a sense of space but also better fit the theme to design theme-related fabrics, just like simulating the growth state of the body's blood vessels and cells.

5.2 Implications for future research

This graduation design allowed me a clearer goal for my future research direction. I hope to focus on the research of knitted garments, but not limited to the exploration of knitted texture and knitted patterns, but to develop new knitted fabrics on the basis of research and creation of yarns, so as to extend the life and persistence of knitted clothing. Under the environmental pressure of frequent natural disasters and global warming, sustainable clothing must be the future development trend of the textile industry. How to reduce the waste of resources and the recyclability of resources is an important part that designers should bring into design thinking and strive to balance. Clothing not only makes people beautiful but also makes the whole earth environment beautiful. Therefore, the entire process of studying sustainable and environmentally friendly yarns to extending the use time of clothing is the direction of future research. Secondly, I also hope that knitting can gradually occupy the clothing market in summer clothing items, and develop breathable, cool, and light knitted clothing so as to change people's basic cognition of thick and warm clothing. Knitwear is no longer limited to the seasons and can become a clothing category that can be purchased throughout the year.

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About the author:

Fengying Zhuo , 1995.09.05, Female, China Putian, Teaching assistant, Master's degree Fashion And Text.