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## **Abstract patterns and representation: the re-cognition of geometric ornament**

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## 5. Making representational patterns: Gottfried Semper's material approach

### *5.1. Introduction*

The practice of making patterns is not only limited to those of drawing and painting. In this chapter it will become clear that in the course of time humans have used numerical and geometrical cognition to make geometric patterns in a variety of practices with different media and techniques. Each practice is an example in its own way of how humans exploit their cognitive competences by means of using their body to manipulate materials with specific techniques to make artefacts and patterns. In each practice, the making of patterns serves a specific function, for instance, drawing attention to an object or marking a border between one space and another. As I already showed in Chapter 3, and as will be further emphasized in this chapter, the patterns produced are inherently representational. From certain formal properties like symmetry and regularity, humans can infer that an agent must have made the pattern intentionally, and because an agent realizes these properties while making the pattern, its representational potential is implicitly related to the practice of manufacturing. I therefore think an approach is needed which makes it possible to understand the making of geometric decorative patterns not just from the context of underlying cognitive competences but also as something humans do.<sup>1</sup>

Gottfried Semper (1803–1879), an architect as well as an historian of art and architecture, and of what now would be called material culture, introduced such a perspective into the history of art. Semper presented a radically new view on architecture as emerging from elementary crafts and developed this into a theory of style that emphasized the process of making and the role of technique, tracing back the origin of architecture and the decorative arts to the earliest forms of structures around which other cultural practices emerged. Semper for instance shows that the practice of weaving branches made possible the creation of simple surfaces, which functioned as

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<sup>1</sup> Hvattum 2004, pp. 43-44; Klemm 1843, p. 214.

fences to encircle a determinative space. With this example, Semper argued that the craft of weaving was elementary for the architectural element of the encircling to emerge. He also shows how the principle of making patterns came naturally with weaving; a process that involves connecting branches or threads made of natural fibres into a cloth: a cloth that can function as a surface.<sup>2</sup>

In order to make this argument clear, however, I will have to make a detour. Semper's theory is often hard to understand and far from straightforward. I will therefore start with a discussion on the historical, cultural and scientific background against which Semper formulated his theory. Even though Semper's view is radically new it cannot be separated from this broader context. Like many of his contemporaries, Semper considered the development of forms of cultural artefacts and the arts as a process comparable to the process of evolution in nature. The assumed analogy between cultural and natural evolution encouraged the formulation of questions on how the development of the arts related to the cognitive, cultural and bodily evolution of the human species.

Furthermore, I consider it necessary to pay extra attention to how Semper defined 'element', 'motif' and 'configuration', some of the key concepts he used in his theory.

My intention is not to subject Semper's theory to a full exegesis. I consider some of his insights with regard to the craft of weaving as crucial for an understanding of the recognition and making of patterns. They challenge to rethink numerical and geometrical cognition as related to the human body, to materiality and technology, and thereby perhaps even as (partially) shaped by these factors. I will therefore relate Semper's insights within a new context as building blocks for my argument that geometric patterns in a decorative context are representational.

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<sup>2</sup> This aspect of Semper's work is discussed in recent studies by Hvattum 1995, pp. 68–75; Hvattum 2004, pp. 29–46, 64–83; Laudel 1991, pp. 58–116; Mallgrave & Hermann 1989, pp. 1–44; Mallgrave 1996, pp. 177–200, 267–301. Mallgrave & Robinson, 2004, pp. 1–68.

## 5.2. *Semper's theory in historical context*

During the nineteenth century, early cultural practices were a subject of interest for art historians, anthropologists and psychologists to an increasing extent. This interest to understand the broader historical context in which the arts and their motifs had developed must be conceived against the background of at least two important scientific and sociocultural developments. The industrial revolution had brought a radical change in the relationship between the designer, the process of manufacturing, and the consumer of products of arts and crafts. These changes brought about a renewed attention amongst designers, architects, and historians for the history of manufacturing processes. It encouraged the development of new theories on the relationship between the maker, material, physical labour and the final product of design.<sup>3</sup>

The scientific developments of the nineteenth century would have a profound influence on the thinking about the arts in another way. Discoveries in biology resulted in revolutionary new ideas about the origins of life and the morphology of species. Evidence found on expeditions such as that of Darwin indicated species had developed according to constant adaptation to their environment. Nature appeared to be far from static and this insight formed the core of later evolutionary theory. It would influence the thinking about the history of the arts in the sense it made possible a shift towards a conception of that history as an evolution of forms, motifs and styles. To an increasing extent designers and theorists emphasized that nature should not be copied but that art should follow its own laws analogous to those of nature.<sup>4</sup> I think this development also made possible a different view on representation. Views on the nature of representation have never been unambiguous but the conception of representation as making present bodies, objects and phenomena by means of pictures in which formal resemblances between the picture and the depicted enables the viewer to recognize the picture as a representation of, were challenged more and more since the mid-nineteenth century. The abstract shapes and motifs that would have evolved from the logic of art's own

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<sup>3</sup> Davis 1999, pp. 193–194; Pevsner 1960, pp. 20–26.

<sup>4</sup> Hvattum 1995, pp. 68–69; Keyser 1998, pp. 139–140.

evolution were now also, or perhaps again, recognized in their power to make present significant content.<sup>5</sup>

I want to make clear that both industrialization as well as the idea of art as analogous to nature each in their own way influenced Semper when he developed his theory of style. Mari Hvattum makes clear that Semper's theory is unique amongst others in the sense that Semper was not looking for the origin of art or architecture in a single primordial type or motif. Nor did Semper want to formulate an aesthetic as a set of regulative design principles. Semper argued that the making of artefacts, the adornment of one's surroundings, in other words, those activities that make the world a typical human world, found their origin in cultural rituals.<sup>6</sup>

### 5.2.1. Industrialization

The Great Exhibition of 1851 in London was a crucial experience for Semper. At this event, artefacts and decorative styles from all over the world were displayed next to each other for a broad audience. This confrontation with decorative styles from other cultures encouraged theorists and designers to systematically compare those different styles in search of shared underlying principles. At the same time, industrial production provided another important catalyst. Mass production triggered a debate that questioned the quality of mass-produced products. Many scholars and designers in England were dissatisfied with the aesthetic quality of industrially-manufactured products of design. Industrial production ignored traditional principles that were believed to be crucial for the creative process; a process in which the artisan himself shaped material so that the form naturally served the function of the actual object designed. The practice of the past was presented as one of an idealized harmony between the maker, material, form, function and user. Although this view rested on an idealization of the past, such idealizations only encouraged its defence. Many theorists believed designers should return to those principles, which had proved their usefulness for centuries and which could eventually improve nineteenth-century design. But the debate was also about how this could be achieved, by means of a literal return to

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<sup>5</sup> Braembussche 2009, pp. 61–86.

<sup>6</sup> Hvattum 2004, p. 20.

traditional craftsmanship or by establishing a new practice of design in which universal design principles were somehow combined or adjusted to modern industrial production.<sup>7</sup>

Semper acknowledged the crisis of the mid-nineteenth century and stated that nothing good had come from industrialization yet.<sup>8</sup> He argued that all along the history of art, motifs from earlier periods had always been appropriated in new forms, but always in varieties that served the needs of the present. The failure of such an appropriation was the problem of the nineteenth century. The crisis therefore was not about the appropriation of earlier motifs *per se*, nor about the ‘misplaced’ reuse of such motifs; the problem was that these motifs had not been analyzed in their component parts thoroughly enough so that something new could be built from these constituent parts. In other words, the existing art forms and motifs had to be completely deconstructed for something new and better to arise.<sup>9</sup>

Semper formulated the problem as a combination of two factors: on the one hand, industry provided designers with an ‘abundance of means’; but on the other, designers had not yet found an appropriate way to design objects in the spirit of the new industrial age. Therefore they had failed to develop a style that would do justice to both the tradition to which existing styles belong, as well as to contemporary demands.<sup>10</sup>

Semper thus realized that industrialization had turned everything upside down.<sup>11</sup> But he also acknowledged the merit of industrialization and the new possibilities it had

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<sup>7</sup> To get an idea of the different views about the directions in which nineteenth-century design should develop see for comparison for instance Wornum 1856, pp. 5–25 & Ruskin 1907, pp. 168–169.

<sup>8</sup> Hvattum 1995, p. 68. See for instance Semper 1852, pp. 11–12.

<sup>9</sup> Semper 1852, pp. 30–31. See also Hvattum 2004, pp. 158–159 & Mallgrave 1996, p. 206.

<sup>10</sup> Semper 1852, pp. 11–15. See also the English translation in Mallgrave & Herrmann 1989, pp. 134–136. Many other theorists argued that ornament should somehow express the spirit of the age in which it is created. See for instance also Christopher Dresser who refers to St. James’ Hall by Owen Jones as an example in which ornamental styles from the past are included but nevertheless in such a way that it ‘(...) expressed in a new form the refinement of our age, (...)’. See Dresser 1862, p. 16 for quotation and pp. 10–14 on the topic in general. See also Chestnova 2014, p. 4.

<sup>11</sup> Semper 1852, pp. 11–12. See also for instance Woud 2001, p. 84. The architectural historian Auke van der Woud refers to another important consequence of industrialization: the fact that it disarranged all existing tenets about the relationship between form and materiality. Harsh materials like porphyry and granite could now be cut and polished with ease by machines. Ornaments that were once executed in wood, stucco or marble could now easily be moulded in vulcanized rubber or iron. These qualities of materials had always had symbolical significance as well. A porphyry statue gained in significance because the sculptor had to overcome the hardness of the material. These material qualities also

brought with it. His 1852 response to the Great Exhibition, *Wissenschaft, Industrie und Kunst*, could therefore be regarded as an attempt to create order within the chaos by means of establishing a new aesthetics which Semper argued could be based on objective scientific foundations.<sup>12</sup>

I think objective and scientific should in this context be understood in the sense that by empirical means certain principles can be detected that underlie the arts and crafts whether it concerns textiles, ceramics, wall decoration and architecture. This approach differs from other designers who were formulating theories on design, such as the aforementioned Owen Jones. Although Jones' analysis is based on a thorough comparison of ornamental motifs and patterns from different historical periods and cultures, it appears to culminate in a regulative set of rules on how to design. This is further underlined by the 37 propositions Jones formulated. Semper's analysis on the other hand, goes further than the decomposition of motifs into formal properties, and further than formulating design rules. Even the geometrical transformations that can be applied to motifs and patterns Semper links to principles that rather seem to connect to the physical and psychological aspects of a culturally-embedded practice of pattern making, which he deduced from the evolution of motifs.<sup>13</sup> From that perspective Semper emphasized how, and with which means and material, an idea becomes materialized: not the materiality itself but the process of materialization, e.g. the process of making appears to have been his main interest.

### 5.2.2. Art's analogy with nature

The Great Exhibition in London allowed Semper to formulate the historical part of what would become his theory of style. His assumption that many products from non-European cultures represented earlier stages of artistic development carried with it the notion that by comparing European and non-European artefacts, an exact tipping point

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determined its appropriate use, a reason why porphyry was mainly dedicated to the monuments of emperors and kings. The machine in fact, had ridiculed this all.

<sup>12</sup> Semper 1852, pp. 12–15. Woud 2001, p. 84. For the complete text see Semper 1852. A reprint has been published in 1966. See Semper 1966, pp. 27–71. For the English translation see Semper in Mallgrave & Herrmann 1989, pp. 130–167.

<sup>13</sup> Papapetros 2010, p. 320. See further Mallgrave 1996, p. 278.



could be determined when modern design had lost its affinity to the tradition from which it had been cut off by industrialization.<sup>14</sup> This method also allowed Semper to consider the products of the technical arts as arising from a development comparable to the development observable in nature. Many nineteenth-century scholars believed that the forms that appear in nature are based on a set of primordial forms. As in nature, the practice of design allows for primordial forms to be infinitely repeated in different materials and under different cultural and historical circumstances. Still, they are traceable in other cultural traditions. Although Semper did not seek for a single primordial motif or type he did argue that every product of design should somehow express the traces of the motifs to which it owed its legacy and this idea became one of the central assumptions underlying his theory.<sup>15</sup>

At the end of the nineteenth century, Semper's theory of style could in retrospect indeed be regarded as the equivalent of evolutionary theory for architecture.<sup>16</sup> A century prior to Darwin, Linnaeus' tenth edition of the *Systema Naturae* was as a categorization of species still mainly based on external morphology as well as on the bodily structural properties of species.<sup>17</sup> Although Linnaeus' taxonomy was broadly accepted, Darwin's theory of evolution would later prove species were not static. Mere taxonomies of animals and plants had therefore little to offer about the animal and plant world in terms of their evolutionary development. Darwin's theory implied the development of living creatures on earth was subject to change and

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<sup>14</sup> See for instance Semper 1852, pp. 11–12, 31–35. Woud 2001, pp. 84–86. Many others later shared Semper's analysis. Van der Woud phrases Dutch architect and sculptor Jacobus Roeland de Kruyff (1844–1923) who agreed with Semper that the degradation of the applied arts had originated in later 18<sup>th</sup> century France where it had cut itself off from architecture when mangled forms were constructed on the basis of random compositions that had lost its significance to architectural form. De Kruyff further argued that the neglecting of teaching a sense of beauty, which soon followed further contributed to what he defined as a desire for novelty: the new, the latest, started to prevail the sense for beauty. He designated naturalism as the second cause for the deterioration of the applied arts. His aversion to naturalist scenes, which had no formal relation to the object they decorated, he shared of course with the circle around Henry Cole, which had already rejected naturalism fiercely in the fifties.

<sup>15</sup> Semper 1860, pp. vi, xxxvii. Mari Hvattum describes how as a result of increasing contacts with other cultures, enlightenment scholars such as Montesquieu started to regard 'nature' and 'natural principles' as particularizing in the sense that these principles apply universally but are subject to external factors and therefore produce different outcomes under different circumstances, hence the worldwide differences between cultures. See Hvattum 2004, p. 38.

<sup>16</sup> Semper 1880, p. 4. Mallgrave 1996, p. 376.

<sup>17</sup> Linnè 1806, pp. 4–5.

therefore had a *history*.<sup>18</sup> This realization of the history of evolution raised the ancient question about the origins of life: a question that had always been explained from a theological perspective. Apart from biology, the question of origin had also already re-emerged in the enlightenment climate of the eighteenth century, where it pervaded many scholarly disciplines.<sup>19</sup>

To some extent, the scholarly tradition in the decorative arts shows an analogy with the development in biology. Even though taxonomies of ornament continued to be published well into the twentieth century, during the course of the nineteenth century the emphasis shifted to the study of the underlying principles of ornament. In other words, a descriptive categorization in terms of stylistic similarities and differences waned in favour of a theoretical approach in which the historical relationship and development of the underlying principles of motifs and styles were recognized and studied. Again, this development paralleled those in other scholarly and scientific disciplines. The idea of unity in variety, which was an important concept for nineteenth-century designers, was already reflected for instance in the descriptions by early nineteenth-century natural scientists such as Georges Cuvier, who emphasized the mutual relationship of the various parts of the organism functionally defining each other.<sup>20</sup> It is in this context that the genesis of Semper's theoretical publications should be situated.

Semper regarded motifs as the basic ordering principles of art. These motifs would be subject to change under the pressure of changing cultural and historical circumstances. Art revolved not around the copying of nature, but it was analogous to nature; art, and in particular the non-mimetic art forms such as architecture, produced its own stock of forms which were subject to their own ordering principles and laws. Just as species in evolution could gradually change their form, the development of art

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<sup>18</sup> This of course depends on how one defines history. British philosopher Roger Scruton defines it as a process by means of which humans are able to understand the becoming of human thought, events and manmade objects. In that sense evolution is not a history but an evolution precisely. Even though it can be understood as a process in the sense of one in which the one life form evolves into another, as a process it unfolds regardless of the acts of conscious beings. On Scruton's notion of history see Scruton 1995, p. 140.

<sup>19</sup> Hvattum 2004, pp. 30–31.

<sup>20</sup> Mallgrave 1996, p. 157. Nerdinger & Oechslin 2003, pp. 9–10.

was a development of these motifs, changing form or material appearance, or becoming new forms.<sup>21</sup> Semper expresses this clearly:

“Just as in the terrestrial story of creation simple and massive organisms preceded complex and finer beings, and just as thereafter the contradictions of old and outdated principles of life were resolved at a higher conceptual level, so the history of architecture leads us gradually from the colossal primordial formations and their fossil remains to the more complex and finer representations of secondary and tertiary social organisms.”<sup>22</sup>

But the natural sciences would influence Semper’s thought in two other ways. Biology also provided Semper the analogy of the skeleton, which makes clear the principle of structural support of organs and muscles that are covered and protected by the skin, a principle observably across the species. Ethnography gave Semper the insight that the tent was the oldest form of shelter, rather than the hut, as Vitruvius had argued. The notion of the tent would form the basis of his argument that textiles was probably the oldest craft from which the others would eventually emerge. Biology and ethnography thus gave Semper the idea that enabled him to distinguish between structure and *Bekleidung*. In essence, all outer appearances of both buildings and objects could be regarded as a form of *Bekleidung*.<sup>23</sup>

### 5.3. *The relevant concepts derived from Semper’s theory*

Before going into the importance of textiles from the context of *Bekleidung*, I think it is necessary to discuss the key concepts *Elemente*, *Motif* and *Gestaltungsmomente* in the following sections for which I will mainly quote from Semper’s *Die Vier Elemente der Baukunst* and *Der Stil*. The meaning of these concepts is not always easy to interpret, but an understanding of those concepts is needed to understand why Semper considered

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<sup>21</sup> Hvattum 2004, pp. 10–11, 47.

<sup>22</sup> Semper in Herrmann 1984, p. 225.

<sup>23</sup> Semper 1860, pp. 227–231. See also Mallgrave & Herrmann 1989, pp. 29–40, Woud 2001, pp. 51–52. About the hut as primordial building type see Vitruvius, *De Architectura*, Book II, §1. According to Riegl, Semper would never have wanted to reduce artistic spirit to a mere mechanical materialism as was sometimes later advocated by some of Semper’s followers who, according to Riegl, overlooked the important point of Semper’s theory. See Mallgrave 1996, p. 375.

the textile arts to be so fundamental. Besides, a proper notion of these concepts is also crucial for being able to judge the significance of Semper's theory with regard to the assumed cognitive competences underlying the recognition and making of geometrical decorative patterns.

### 5.3.1. The enclosure as one of the four elements of architecture

In his essay about the four fundamental elements of architecture, Semper returned to the earliest days of civilization. He proposed that the fire was the main spot where men gathered after coming back from hunting or fighting battles. The fire formed the basis of the first human settlements. After all, the fire provided heat, was a place where food could be cooked, and it protected against wild animals. Therefore, Semper called the central fireplace of the hearth the first and most important 'moral' element of architecture. It was around this element that the three other elements, the roof, the enclosure and the mound, were grouped. From these elements, specific human technical skills developed: ceramics – and later metalwork – emerged from the context of the hearth, water and masonry work emerged from the context of the mound; carpentry emerged from the context of the roof, and textiles emerged from the enclosure.<sup>24</sup>

With respect to the decorative arts in general, the enclosure could be viewed as the main element. The element of the enclosure is related to the technical skills concerning the weaving of mats and carpets by means of braiding branches, pieces of bark and plant fibres, which preceded the use of textiles. When hung, these early carpets formed the first forms of the creation of a space that allowed early humans to protect themselves from the heat and the cold and that also enabled them to create spaces that separated their belongings and their households from others. According to Semper, this type of space division preceded the brick wall by far. The latter arose from the technique of masonry, which is related to the element of the mound; from the

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<sup>24</sup> Semper 1851, p. 55–56. For further explanation of the relation between the elements and their derivative techniques see Hvattum 2004, p. 15. Mallgrave argued that Semper's notion of the elements should not so much be considered in a literal sense but rather as the processes from which a formal development arose and which are concentrated around the function of a hearth, roof, enclosure, and mound. See Mallgrave 1996, p. 185.

principle of this element, the idea arose to stack pieces of stone on top of each other to use this stack as a foundation. From the idea of a stack of stones, the idea arose to use this as a wall. Semper explains how the masonry wall could be applied as the inner core of more lightly woven mats: in this way, a practice from the element of the mound joins a practice from the element of the enclosure. However, the function of the mat remained the same: the creation of a space. Semper argues that the origin of a braiding as a space divider remained traceable even when carpets and mats would later take the form of panel work and painted plaster applied on the constructional inner wall of brick or mud.<sup>25</sup> Semper argues:

“Es blieb der Teppich die Wand, die sichtbare Raumbegrenzung. Die dahinter befindlichen, oft sehr starken Mauern wurden wegen anderer, das Räumliche nicht betreffender Zwecke notwendig, als zur Sicherheit zum Tragen, zur grösseren Dauer und dergleichen. (Hanging carpets remained the true walls [Wand], the visible boundaries of space. The often solid walls [Mauern] behind them were necessary for reasons that had nothing to do with the creation of space; they were needed for security, for supporting a load, for their permanence, and so on.”)<sup>26</sup>

Semper further argues that in many places where masonry walls had not become a means to an end, carpets remained the only space dividers. But even where the masonry wall had become a necessity, it took the form of an invisible scaffolding hidden behind what Semper calls the true and legitimate representation of the wall (*Wand*): the embellished carpet. At this point of his essay Semper refers to the carpet for the first time as a representation. I believe this means the carpet should now be viewed as a representation of a space divider, because in its function of the covering of the wall (*Mauer*), the carpet no longer creates space in a literal sense while to the beholder it still appears as the visible space divider. As already noted above, the wall (*Wand*) retained this sense of a space divider when other materials, such as plaster,

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<sup>25</sup> Semper 1851, p. 57. Mallgrave & Herrmann 1989, p. 104.

<sup>26</sup> I would like to emphasize the difference in meaning between his use of the German words *Mauer* and *Wand*, which in English both translate as wall. The wall as *Mauer* should be understood as the stack of stones forming the inner core while the wall in the sense of a *Wand* considers the dressing, hence the ‘Bekleidung’. Semper 1851, p. 58. The English translation is quoted from Mallgrave & Herrmann 1989, p. 104.

metal plates, glazed terracotta or stone slabs, gradually replaced the carpets. For a long time, the embroidery and the associated patterns of the original carpets were imitated in these new materials, but artists would gradually exploit the possibilities of the new material and add new qualities to their creations.<sup>27</sup>

Semper sees the above principle expressed most articulately in Assyrian art. For Semper, the sharp contour lines, the emphatically carved muscles of the figures, the orderly alignment of the heads of the figures as well as the ornamental lattices applied to their cloths and shields on the sculpted bas-reliefs applied to Assyrian temples betrayed their origin in the patterns of former carpets (Fig. 64 and 65). Although Assyrian sculpture remained partly faithful to the boundaries set by the medium of weaving, it could at the same time extend these boundaries. This extension should also be taken literally since the new medium of the stone panel and the technique of sculpting allowed sculptors to lift the figures from the background in relief (Fig. 66).<sup>28</sup>

Another example of this principle concerns the use of geometric patterns derived from woven baskets in the capitals of columns. Even when transposed to a new material, the geometric patterns still express the strength and upward direction of basketry.<sup>29</sup> The pattern represents as it were the tension of the textile fibres under the pressure of the capital's weight (Fig. 67).<sup>30</sup> The new technique and material thus adds possibilities to the execution of the motif while the motif also remains faithful to its original function.

In ancient Greece, this principle would have been recognizable in how subsequently wood, stucco, and later marble panelling were used in temple architecture. Temples were prepared in order for panels to be placed in all locations where painted sculpture would be harnessed. Semper could use the nineteenth-century discovery that the statues, as well as the inner and outer walls of Greek temples were originally painted in bright colours, to underscore his argument that wall decoration originated in the

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<sup>27</sup> Semper 1851, pp. 57–59.

<sup>28</sup> Semper 1851, pp. 59–60. Semper in Mallgrave & Herrmann 1989, pp. 104–106.

<sup>29</sup> Mallgrave 1996, pp. 285, 376. Alois Riegl disagreed with Semper about the textile arts as the main source of the motifs in the decorative arts. In his objections against the idea that geometrical patterns emerged from the technique of weaving, Riegl would argue that Semper would have considered concepts such as the cover and the band in an abstract way indeed and not so much in a literal physical and material sense as it would have been understood by Semper's followers.

<sup>30</sup> Mallgrave 2010, p. 69.

ancient primacy of the wall fitter's technique over that of the mason: i.e. from the moment walls were constructed of bricks, clay, or natural stone, the need for dressing (*Bekleidung*) remained, and as a result the constructive parts of walls were panelled with wood or stucco in order to be painted.<sup>31</sup>

### 5.3.2. The motif

Semper conceived the development of patterns as one of material metamorphosis, which he referred to as *Stoffwechsel*. It is a process of transformation from one material (fibres) and technique (weaving) to others, for instance from natural fibres to stone panels. From that perspective, Semper emphasized how certain motifs remained recognizable as references to earlier techniques, materials and significances and I think this is an important insight with regard to representation. In Chapter 1, I have defined the motif as the recursive theme of a pattern; in the case of geometric decorative patterns, the motif is the geometric shape or the constellation of geometric shapes recognizable as the recursive theme. Semper's use of the term motif is not always easy to understand in the context of his wider theory and he uses the term in a variety of meanings and contexts.<sup>32</sup> Therefore, I will focus on the context in which Semper uses the concept of the motif in a sense I think is most related to my earlier definition.

In Semper's first lecture as Director of the Dresden Bauakademie, in which he argues that art including architecture is an ordering activity, Semper regarded motifs as the basic and recognizable configurations of buildings, ornaments and artefacts by

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<sup>31</sup> Semper 1851, p. 66. See also Semper in Mallgrave & Herrmann 1989, p. 109 & Hvattum 2004, p. 11. Hvattum underscores the importance of the discovery of polychromy for Semper's thinking as it challenged him to regard the history of art as the history of material metamorphosis (*Stoffwechsel*). See further Mallgrave 1996, pp. 25–38. Semper 1851, pp. 99–101. Semper in Mallgrave & Herrmann 1989, pp. 126–127. From the perspective of a design practice, Semper states that the dressing of the wall should somehow revert to the carpet as the original form of enclosure. This is a means to ensure that the function of the wall as spatial enclosure does not become obscured.

<sup>32</sup> At least five different and frequent uses of the concept can be distinguished in Semper's body of work: (1) the motif as the principal driving force of the development of forms in the arts, (2) the constellation of the elements within a building type, (3) the functional constellation of a part of a building type (such as the entrance, the fence, but also supportive elements such as the pole, the column etc.), (4) a recurrent woven, painted, carved, or sculpted theme, shape, pattern or subject used in a decorative and ornamental context, (5) the pattern emerging from a technical operation (such as the seam or the weave itself). See Semper 1851, pp. 87, 95–96 & Semper 1860, pp. 39, 43, 67–68, 85–87, 181, 186, 228, 230, 245, 263, 348, 371, 380, 417.

means of which this ordering is able to become manifest.<sup>33</sup> The notion of the motif as an instance of ordering is also found in *Die Vier Elemente*, where Semper makes a comparison between Greek mythology and the visual arts. In Greek mythology, the aggregate of earlier and often no longer understandable ancient natural philosophical ideas, of traditions and events, beliefs and verses, are now presented in an orderly fashion within the heroic poetry of Homer and Hesiod. Like the epic poetry of the Greeks, the visual arts too are an ordering of earlier indigenous motifs that have become detached from their original roots.<sup>34</sup> In the course of time, these motifs change under specific historical and cultural circumstances, but nevertheless remain the repertoire of forms available to the arts. This insight again underscores the idea that art in the creation of forms should not copy nature; neither should it depend on the whims of the artist. Art is governed by its own set of laws, which should be conceived as analogous to the laws of nature.<sup>35</sup> From this perspective, the stylizations of flowers and plants in Ancient Egyptian art can be understood, not as literal copies, but as artistic motifs indeed (Fig. 68).<sup>36</sup>

Semper saw the idea of forms based on earlier motifs most clearly expressed in the Assyrian bas-reliefs he saw at the British Museum. For Semper, the practice of placing plates of natural stone against the structure of their temples, as well as the practice of painting and relief-sculpture, originated in the looms and colour mixing bowls of the Assyrians and their predecessors. The splendid colours and the fantastic refined artistic representations would have made ancient Assyrian carpets so praiseworthy. Semper argued that the way in which the animal figures once were expressed on these carpets was fully compatible with what the spectator was still able to observe on the stonewalls that survived from Nineve (Fig. 69). Therefore, the Assyrians could be regarded as the most faithful preservers of these motifs.<sup>37</sup>

I interpret Semper's conception of the motif within the context of artefacts such as the Assyrian wall panels, as the one in which Semper most clearly develops a notion

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<sup>33</sup> Hvattum 2004, p. 10. For the reference to Semper's original text see Semper 1834, Ms. 19. See the integral version in Laudel 1991, pp. 230–231.

<sup>34</sup> Semper 1851, p. 52.

<sup>35</sup> Hvattum 2004, p. 10; Laudel 1991, pp. 331–332; Semper 1834, Ms. 19 § 3.

<sup>36</sup> Semper 1851, p. 76.

<sup>37</sup> Semper 1851, pp. 59–60.



of the motif as a visual motif, a theme in the arts, or a constellation of lines and colours that can be subject to formal and material transformations and through that can acquire new meanings. It is a notion of the motif as the specific and recognizable element and principle of ordering of an artefact or adornment. From a perspective on motifs inspired by Semper I think that in the case of geometrical patterns the motif could be regarded as the distinguishable and recognizable central visual element of a pattern subject to or deriving from the ordering principle of repetition. Both the final form of the motif, as well as its recursive nature are deducible from the manufacturing process of the pattern.

### 5.3.3. Moments of configuration

I think that Semper's meaning of the motif thus not only concerns the motif's formal properties; it does not just denote motifs in the concrete form of triangles, rosettes or lotus flowers, but something of its becoming always resonates in it. This becomes clear in his explanation on the moments of configuration of ornament. Semper saw the artistic motif already expressed in the earliest adornments of the human body. They would have been exemplified in hanging elements such as earrings, or encircling objects such as rings and wreaths, but also in adornments emphasizing direction, such as feathers on helmets. Semper conceived the earring as an adornment that represents the vertical force of gravity while indicating a local symmetry that emphasizes the symmetry of the entire human body, and therefore also the relationship of part to whole. The hanging earring highlights the body, as a totality, while the ring being an adornment that encircles, would emphasize the body's proportionality. Semper is not very clear in how the ring accomplishes that in concrete relation to the body but I think Semper's main point with regard to the ring is that as an encircling it refers to the principle of radial distribution and proportional relationships of the parts to the whole such as evident from the radial arrangement of crystals. Adornments, such as certain garlands,

express the movement and direction of the body in space and thereby emphasize direction (Fig. 70).<sup>38</sup>

Semper defines three moments of configuration (*Gestaltungsmomente*), which correspond to the three dimensions in space: height, width and depth. In order for the multiplicity of form to become united within a whole, the form's configuration must meet three corresponding conditions: symmetry, proportion, and direction. Semper sees this clearly exemplified in the growth of crystals, which start from the centre and develop symmetrically and radially in all directions, with all the parts proportionally related to the whole such as can be observed for instance in the snow crystal (Fig. 71).<sup>39</sup> These moments of configuration apply to ornaments in general but in relation to the ornamented some type of ornaments express one of these moments more explicitly than others to such an extent that they can be regarded as the embodiment of it.<sup>40</sup> The earring for instance could be seen as an example of how the notion of configuration works within the individual ornament as a whole. The principle of symmetry is configured in the hanging of the earring by means of which a straight vertical axis can be distinguish that divides the earring into two mirror images of the form (that is: when assumed each earring is indeed composed of a symmetrical form), while the principle of proportionality configures the relation of the earring to the totality of the body. The principle of direction is again related to the hanging but now in particular emphasizes the upright position of its wearer.<sup>41</sup>

To arrive at a better understanding of Semper's notion of moments of configuration and to make such a notion more concrete with regard to the recognition and making of geometric patterns, I want to connect to Semper's source of inspiration: crystallography. In Chapter 1 of this thesis I showed how the anthropologists Washburn and Crowe adopted a classification system, which in crystallography was

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<sup>38</sup> Semper 1884, pp. 310–325. This attention for the relationship between the parts and the whole that is exemplified in the individual ornament as well as in the relationship between the ornament and the ornamented is inspired by Semper's interest in contemporary crystallography and the scientific knowledge about the ordering of atoms. See also Hvattum 2004, pp. 89–90 & Mallgrave 1996, pp. 270–271. See Vitruvius, *De architectura*, Book III, 1, 2. One can also think of the depictions of the human body in the Renaissance, known as the Vitruvius man, in which around a man with both arms and legs spread a perfect circle could be drawn.

<sup>39</sup> Semper 1860, pp. xxiv–xxvi.

<sup>40</sup> Hvattum 2004, pp. 91–92; Semper in Herrmann 1984, pp. 228–232.

<sup>41</sup> Semper 1884, pp. 310–311.

used to describe the repetitive structures of crystals. Washburn and Crowe used that to identify the number of possible one-dimensional and two-dimensional flat-surface patterns. They showed that the number of possible patterns depends on a combination of geometrical transformations that can be applied to a pattern.<sup>42</sup>

Semper also connected the three moments of configuration directly to the dimensions in space, i.e. width makes possible direction, while in order to arrive at a condition of symmetry an ornament needs both a horizontal and a vertical axis and thus both width and height. Finally, I think Semper meant that in order for an ornament to become conceivable as a total body whose parts proportionally relate to one another, it requires the dimension of depth. This may make sense with regard to ornaments as individual things but with regard to patterns I think the moments of configuration relate to geometrical transformations in a slightly different way.

As I already emphasized earlier, the definitive transformation, which makes something a pattern in the first place is repetition. Once there is repetition, for instance, in the form of a series of points that make a line, or a series of motifs which make a one-dimensional pattern, this repetition develops in a certain direction. If it develops only in width or height it develops in one dimension but if it develops in width and height at the same time, it develops as a two-dimensional pattern and finally as a three-dimensional pattern when it also develops in depth, i.e. the configuration moment of direction is obviously connected to repetition.

Washburn and Crowe showed that the geometrical transformation of rotation is at the basis of symmetry. After all, seeing an ornament as symmetrical requires a mental rotation that allows one to comprehend two-halves of an ornament as each other's mirror image.<sup>43</sup> Finally, proportion which Semper regarded as how the parts of the ornament relate to the whole but also as how the ornament relates to the ornamented, expresses itself in geometric patterns in the regularity of the ordering in the sense of the measure of the distances between the repetitive elements; measure is also what distinguishes a pattern from a series.

I think the moments of configuration Semper defines should thus be seen as the specific transformations by means of which ornaments and patterns come into being.

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<sup>42</sup> Washburn & Crowe 1988, pp. 44–51.

<sup>43</sup> Washburn & Crowe 1988, pp. 44–45.

They are the concrete ordering principles, which Semper within the context of his broader theory of style also connects to his more philosophical conception of ordering as being the central activity by means of which humans relate to the world.

#### *5.4. The role of textiles in making representational patterns*

As in Chapter 4, I have identified the building blocks and the main geometric operations with which to make patterns, only this time from the perspective of Semper, which is a perspective that departs from the craft of weaving. I argue that the notion of a motif in the meaning of the distinctive visual element of a pattern is the main building block to be used with regard to geometric decorative patterns. Semper has shown that visual motifs are related to and emerged from certain techniques and materials. The practice of weaving comes down to connecting (technique) different natural fibres (material) into a piece of cloth (result) which can be used as a surface (function) to separate one space from another. Semper implicitly also makes clear that in the craft of weaving the thread is the material embodiment of the abstract concept of line. Semper's insights emphasize that the emergence of different art practices – e.g. different forms of making representations – is not only related to this abstract concept of line but also to the cognitive competences underlying the mental and physical process of connecting lines as to make patterns. Numerical and geometrical cognition allow humans to connect a number of lines in a determinative direction and thereby humans are able to make one-dimensional patterns, in which the direction can be either horizontal and vertical, and two-dimensional patterns in which humans connect lines in both directions as to create a surface, whether that is by means of drawing a web of lines on a flat surface, such as Alberti exemplified, or whether that is by means of connecting threads into a cloth that can be hung as a surface in order to function as a space divider. Both are a means to make patterns. An abstract concept of line appears to be the foundation for making visual shapes and patterns, regardless in what medium and with what technique. I will discuss this abstract concept of line from the context of the practice of weaving with the purpose of showing that Semper made clear how the

woven patterns of the cloths and carpets that functioned as space dividers became representations.

#### 5.4.1. From contour, to a line, to the thread, to the knot.

The essential formal element with which to create visual geometric motifs and ultimately patterns is the line. It is hard to determine when and where the concept of line would have been expressed in a materialized form for the first time. All that can be said is that archaeological evidence indicates that the use of line for making patterns is at least very old.<sup>44</sup> The neuroscientist Stanislas Dehaene proposes that human cognition may have abstracted lines and junctions of lines from the contours appearing when objects in nature occlude each other.<sup>45</sup> But line, in the sense of a thin elongated extension in space, is also a concrete distinguishable feature in nature in the formal quality that is characteristic of grasses, twigs and reeds, which are also strong and flexible enough to be arranged into the motifs of woven materials. The line could be regarded as the mental raw material that preconditions the use of actual line-like raw material such as natural fibres. But perhaps it is also plausible that the emergence of the mental concept of line is the result of a reciprocal process in which humans indeed abstract away from the perceived contours of objects while the practices of weaving grasses and reeds into coverings, of scratching in hard materials, or the application of pigments on the human body, at the same time consolidated the concept of the line in the human mind.<sup>46</sup>

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<sup>44</sup> Incisions with geometrical patterns in the form of cross-hatchings have been found on a piece of ochre in South Africa, which approximately dates from 77.000 BC. See Henshilwood et al. 2002. See further Anikovich et al. 2007 & Straffon 2014, p. 60. A research group from Leiden University found what appears to be a regular geometric pattern on a shell from Java which could have been scratched onto the shell and which the researchers were able to date to about 430.000 years BC., a time when the species *Homo Erectus* inhabited Java. This finding, however, is so particular that nothing can be said for certain whether this is truly an intentional scratching. See Joordens et al. 2015, pp. 228–231.

<sup>45</sup> Dehaene 2009, p. 137.

<sup>46</sup> The argument anthropologist Clifford Geertz already formulated in the 1960s emphasizes my point. Geertz argued the expansion of our nervous system was not just a precondition for cultural development but developed during and under the influence of it. In other words: human nature is shaped by culture and vice versa. Geertz argues there is no zero point of departure for the emergence of culture. He regards the idea that by means of scratching off the layers of culture, natural man would appear in essence as an Enlightenment idea no longer applicable within the context of twentieth-

At the end of the nineteenth century art historian Aloïs Riegl would underscore the importance of contour for the making of representations. He argued that if an artist wanted to sculpt a form after nature, the artist ‘just’ had to copy the form. In order to represent those forms on a flat surface someone had to infer from the contours the outline of those forms, which according to Riegl, as such does not exist in nature, and with which those forms could be represented on the flat surface. I would not argue that sculpting is a matter of ‘just’ copying forms. Perhaps this practice too requires a mental concept of line or other mental concepts. What nevertheless matters is Riegl’s emphasis on the mental concept of line as a precondition for representation.<sup>47</sup>

A mental concept of line as a medium-independent abstraction might be the foundation of perhaps nearly all the visual artistic practice. From the formal properties of the artefacts that result from those practices, it is at least possible to determine whether or not they could have been realized without such a concept. In the discussion of Alberti, it already became clear how the concept of line is a necessary precondition for drawing and thus for constructing patterns of lines with which to draw forms that are able to represent three-dimensional objects and bodies. I think it is plausible to argue that drawing as it is known today, is indebted to earlier line-dependent practices such as, for instance, scratching although I think it is not possible to trace the origin of the use of the concept of line to a single specific practice. Line could have been an abstraction that expressed itself in different practices more or less at the same time.<sup>48</sup> What matters is that the mental concept of line is fundamental for making shapes and patterns and therefore also for making representations.

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century anthropological knowledge. I think Geertz’ opinion is compatible with current conceptions of the brain as a highly plastic organ. See Geertz 1968, pp. 25–26, 28.

<sup>47</sup> Riegl 1893, p. 2, 24. See also Riegl trans. by Kain, Castriota & Zerner 1992, pp. 14, 33.

<sup>48</sup> With regard to the origin and the essence of the line, both Semper and Aloïs Riegl (1858–1905) at least connected it to the adornment of the body. Riegl 1893, pp. viii–ix. See also Riegl trans. by Kain, Castriota & Zerner 1992, p. 5. Noticeable in all these forms of early ornaments was the use of geometrical patterns. Riegl considered the possibility of a spontaneous emergence of geometrical patterns in different parts of the world as a serious option, but he did not exclude the possibility of a development in which some cultures were leading the way for others that in turn copied and adopted the geometric style. Riegl 1893, p. x, 4. See also Riegl trans. by Kain, Castriota & Zerner 1992, pp. 7, 16. From the context of the proposed universality of geometrical patterns see also Alina Payne’s suggestion that Riegl’s attempt to formulate universal styles and a origin of art might have been established against the background of the multinational Habsburg Empire that suffered from nationalist movements from people within the Empire such as the Slavs and Hungarians and which was supposed to be suppressed by emphasizing internationalism. Payne 2012, p. 134.

Semper shows how line in the practice of weaving is materialized in the form of the thread. With regard to line Semper discusses in *Der Stil* the role of body art and he does that from the context of its importance for textiles. He argues that the first natural kind of protection for humans is the human skin. Therefore, he regarded the practice of painting the skin as highly important for the study of style.<sup>49</sup> This last comment is perfectly understandable in view of his concept of *Bekleidung*. Since in many of these adornments the location and direction of the painted lines on the body appear to correspond to the body's underlying muscles, these lines testify to a relatively advanced knowledge of the body's structure. The painting of the body therefore underscores Semper's notion of the distinction between structure and the dressing. Semper doubted whether the painted lines on human bodies should be seen as representations of primitive forms of textiles, but he argues that it could have been the case that the adornment of the body was a reminiscence of a once more advanced cultural practice. The fact that many painted or tattooed lines appear as mingled threads resembling strings and bands from weaving, reminded Semper of the thread as the main linear element of textiles.<sup>50</sup>

Semper identified two main functions, which were realized by the craft of weaving: binding and protection. Weaving made possible the protection in the form of the encircling, which after all was constructed by means of braiding different branches or pieces of bark and in the form of the tent, which was constructed by means of hanging woven carpets. The elementary principle behind the technique of weaving is that of binding. The precondition for making a surface in the form of a cloth that can

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<sup>49</sup> Semper considered the practice of adorning as a way of imposing a natural order onto the decorated, whether it was the body or an object. This adornment would invest the decorated with agency. He noted for instance a resemblance between the practice of decorating the body and the use of masks. Masks were used as a means to terrify enemies, a practice common amongst North American Indians, but also common in the history of Assyrian and Greek art in the form of Gorgon masks. Semper 1856, pp. 2–3. See also Mallgrave 1996, p. 270.

<sup>50</sup> Semper 1860, pp. 97–104. Semper trans. by Mallgrave & Robinson 2004, pp. 171–175. On page 102 (2004, p. 175.) Semper also refers to the use of bark as dressing material in which the original function of bark is also that of protection, i.e. that of the tree. Once peeled off and used as dressing material it thus remains related to its original function. See also Hale 2006, p. 59. With regard to the knowledge of the muscular and bone construction of the human body Alberti proposed that 'come la vestire l'uomo' (as in dressing) artists should understand the nude first in terms of the proportions of the muscles and the bones, which the artist should subsequently cover with flesh and skin. In this, one could read an analogy with building in the sense that like a building the human body consists of an underlying structure dressed with flesh and skin through which the principles of the structure are still expressed. See Alberti, *De pictura*, § 36.

function as a space divider when hung is the competence to bind together a number of different fibres into a thread, and to bind these different threads together into that cloth.

Semper would identify the knot as the oldest technical symbol of binding. The use of the knot (Fig. 72) to bind different threads may speak for itself, but considered as the central element of the creation of woven patterns, Semper also regarded the knot as the elementary cosmological unit; cosmological in the context of appealing to a sense of order. The principle of knotting was still detectable in other art forms. Semper saw knots for instance represented in the decorations on vases.<sup>51</sup> In this instance, the knot had become a decorative and representational motif still referring to its earlier fabric and manufacturing, as well as to the principle of binding; a function that such patterns expressed in a symbolic way because they often run around the entire vase with which they appear to suggest holding the object together.

According to Semper, the principle of binding would have been fundamental for the development of the arts in general and was already detectable in one of the earliest artistic products: the string. A string relates different elements to a whole within a certain direction and in relation to a central point of reference, for instance, pearls or beads that are arranged within the larger whole of a chain. Semper therefore regarded the string as the oldest expression of the idea of unity by means of multiplicity. Strings as band patterns are omnipresent in ornament. There are numerous examples of strings as sequences of ornamental motifs executed in stone in architecture, for example, recognizable in the form of egg and dart patterns, which function as ornamental frames. Semper regarded the wreath of leaves as perhaps the oldest concrete example of a string (Fig. 73). In the wreath of leaves at least two different branches are bound as such that all the individual leaves and berries are united within a larger circular unity that could be used as a kind of symbolic crown. In the string, the expression of the manufacturing process comes to the fore as well; its motif is constituted by the actual externalization of the ritually-embodied action in space and time. Bands differ from strings in the sense that bands are able to connect elements that are not part of the

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<sup>51</sup> Hale 2006, pp. 59–60; Mallgrave 1996, p. 293; Semper 1860, pp. 180–182. With respect to the knot's appeal on the sense of order one can think for example about how Alfred Gell would later recognize this in the apotropaic patterns used to warn of evil spirits.



band itself. The distinction that Semper makes between strings and bands might be hard to grasp but I think that Semper essentially distinguishes between arrangement and connection. In a string, elements are arranged within a large whole but in a band those elements are literally connected, bound together. I think the difference becomes clear from the pictorial examples Semper shows in *Der Stil*; the ornamental bands represented exemplify in a formal sense the principle of weaving together branches, threads and fibres. Semper argues: 'Jedes Band gibt sich als textiles Product, als ein Product kund, bei welchem ein Rohstoff in Anwendung kommt, (...), das heisst dessen Resistenz gegen das Zerreißen in Anspruch genommen werden soll. (Every band presents itself as a textile product, as a product that uses raw material characterized by (...) resistance to tearing.)'<sup>52</sup>

If one would regard the difference between strings and bands to decorative patterns I think that a number of rosettes arranged, according to a grid pattern, is indeed different from a mosaic pattern of a floor which all the motifs are literally attached to one another by means of lines and therefore adhere to the principle of binding. It may not, therefore, come as a surprise that Semper refers to the simplest band as that of a line or a thread indeed.

Band patterns express the principle of connecting individual elements into a new single coherent whole (Fig. 74). That is essentially what one does when weaving a pattern from individual fibres into a single cloth; but also when drawing with individual lines a single form.<sup>53</sup> Here, we could consider again Alberti's analogy between a web of intersecting straight lines (such as that of a checkerboard patterns) and the threads of a cloth (Fig. 75 and 36).

#### 5.4.2. Dimensioning (direction and scale) and counting (individuating threads)

Within the context of weaving the thread is the connective element comparable to the drawn line in perspectival drawings. Weaving comes down to the manufacturing of a surface by means of binding different threads in two-dimensions. In order to perform

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<sup>52</sup> Semper 1860, pp. 13–19. Translation in Mallgrave & Robinson 2004, pp. 113–117.

<sup>53</sup> Semper 1860, pp. 19–21. See also Mallgrave & Robinson 2004, pp. 117–118.

this, a maker at least needs the ability to count on a basic level, as well as some basic understanding of geometry.

Even though Semper does not explicitly mention counting and dimensioning, their importance is evident from his considerations with regard to symmetry, proportion, and direction. Furthermore, the principle of unity by means of multiplicity implies the ability to make a distinction between counting and dimensioning, as well as the ability to consider a set of similar entities as a new entity in itself, i.e. the ability to understand sets as subsets. I explained how strings and bands are constituted of successive elements and how bands are made up of one or more individual threads. Semper emphasizes the function of connecting and binding strings and bands, where the various elements are viewed as individual entities in relation to a larger whole. There are a number of technical proceedings underlying each kind of stitch, which eventually forms the basic elements of larger pieces of embroidery.

Pattern making, whether in drawing or textiles is a matter of imposing order. Semper related the human creative urge to the Greek concept of cosmos, which refers to both order and adornment. He argues that the rhythmical and ritual act of creating works of ornament allows subjects to relive this cosmic order, which is subsequently represented in the eventual ornaments themselves.<sup>54</sup>

According to Semper, order emanates from the physical rhythm of labour as well. I therefore believe Semper's emphasis on the rhythmical can be related to numerical cognition, i.e. the competence to individuate objects and connect them to a number, and to that of geometry, i.e. the competence enabling the recognition of the shapes of objects, their spatial proportions and the positions of those objects in space. Together, these capacities allow for the ordering of individual objects in a rhythmical sequence in a specific spatio-temporal direction by means of a repetitive activity. Ordering also allows the individual elements to be contemplated as being part of a set, forming a subset pertaining to a larger whole. It allows the viewer to see the proportions between all the objects and events from the smallest to the largest.

Furthermore, Semper's emphasis on walls as space dividers anticipates a very early practice of surveying which I showed in Chapter 4 that this is a practice that

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<sup>54</sup> Semper 1860, p. xxi. See also Hvattum 2004, p. 66 & Semper in Herrmann 1984, p. 219.

requires an understanding of direction and distance. Semper argued that the original encircling of the first primitive tents was made of branches, which were braided into wickerwork. As discussed, its function is protection by means of creating a type of fence, which simultaneously delineates and defines a space around the central motif of the hearth.<sup>55</sup>

#### 5.4.3. How (woven) patterns become representations

Now that I have also outlined the building blocks, their properties, and the transformations for the textile arts with which to create patterns, I want to return to the main issues of Semper's theory and briefly summarize his broader argument in order to arrive at an understanding of how and under what conditions those patterns become representations. I will give special attention to the 60th paragraph in *Der Stil*, which could be considered as the paragraph in which Semper develops his argument in its most condensed form.<sup>56</sup> Earlier, I discussed how Semper traced the true origin of architecture and the decorative arts back to the use of hanging mats as space dividers. According to Semper, the use of mats to enclose space and separate the inside from the outside is even older than the dressing of the naked body. The earliest space divider is that of an enclosure made of poles and twigs. Making such an enclosure requires a technique that according to Semper came naturally to humans. Braiding twigs naturally developed into braiding pieces of bark. This resulted in a lighter form of enclosure and subsequently in the invention of weaving. Initially, humans used natural fibres such as grasses, but soon they would have started to work plant and animal material into woven fibres. The variety of natural colours of stalks and fibres allowed their use in alternate order in woven mats. According to Semper this alternate use of different coloured fibres would have been the origin of pattern.<sup>57</sup>

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<sup>55</sup> Hvattum 2004, p. 70. See again Semper 1851, pp. 56–59 & Semper 1860, pp. 227–228. About numerical cognition and materiality see Overmann 2016, pp. 42–51.

<sup>56</sup> Eck 2017, p. 24.

<sup>57</sup> Semper 1860, pp. 227–228. See also Mallgrave & Robinson 2004, p. 248. From the context of geometric decorative patterns Semper's observation about colour is significant in the sense that colour appears to add certain quality to patterns. A simple pattern of similar star shapes executed in an alternation of red and blue, still allows humans to recognize this as a set of similar stars but at the same time, the two different colours will encourage the viewer also to consider the set of stars as divided in

Eventually, the use of natural coloured fibres was replaced by the artificial manipulation of fabrics with dye. The loom initiated the mechanical production of carpets, mats, and screens but their function as an actual space divider remained. At some point, the technique of masonry, which according to Semper came forth from the mould as one of the four elements of architecture entered the domain of the wall fitter. Walls made out of brick, clay or natural stone were now applied as the inner core of the true wall, *Die Wand*. Semper again emphasizes that these inner walls (*Mauern*) were not related to the creation of space but invented for reasons concerning safety, structural support and durability. The hanging carpets are the true visible space dividers even when they were later replaced by panel work and painted plaster to such an extent that the motifs and patterns of the woven carpets and mats were initially also imitated in these new materials. These patterns thus not only migrated from one medium to another, but they also became representational with respect to their technical origin; they started to function as an index of that former technique. Semper regards this transformation of woven patterns to painted patterns as the start of the development towards ever more complex decorations and representations such as the ones that would have eventually been applied on the walls of Greek temples and that the colour residue found in the nineteenth century would still testify to.<sup>58</sup>

Semper's central argument boils down to the thesis that all architecture is a matter of dressing (*Bekleidung*), which originates from the practice of creating space by means of the enclosure of hanging carpets, mats, and screens. According to Semper, the essential principle of architecture is the masking of the constructive parts and the monumental execution of the dressing. Semper states that masking and dressing is as old as humanity and the joy with which humans perform those activities is what makes humans painters, poets, and architects. In this context, Semper mentions the necessary destruction of reality – by which he refers to the concealing of the material – as a

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two subsets, blue stars and red stars. But what is maybe even more important, the alternate use of colour (red star, blue star, red star, blue star and so on) adds extra qualities to the pattern: not just that of colour but also that of rhythm. I think Semper's remark emphasizes this rhythmical application of coloured fibres. Colour tends to highlight the serial nature of the pattern. Within a decorative context, this certainly strengthens the pattern's power to capture the viewer's attention. Therefore I think that the use of alternating colours makes the pattern more interesting and that colour and rhythm are part of the qualities that makes a geometrical pattern decorative.

<sup>58</sup> Semper 1851 pp. 57–59; Semper 1860, pp. 228–229. See also Mallgrave 1996, pp. 294, 377.

precondition for the form to express itself as an independent, significant, and symbolically-loaded human creation. We have to forget about the means with which (“Vergessen machen sollen wir die Mittel, (...)).<sup>59</sup> Semper considered colour as the immaterial property of the building’s dressing to obscure the reality of the building’s materiality.<sup>60</sup> The dressing therefore allows considering the form of the dressed, for what it is and not for what it is made of. This notion also has consequences for the representational potential of the dressing. When the weaves of carpets are expressed in a material other than textiles, for instance on stone panels, being separated from their material root, the emphasis of the weave as a motif can now shift to the form of the motif as an individual quality. As indices, these motifs still refer to the material and technique from which they originated but as individual forms they now also have the potential to refer to something else, or make present something else; the weave as a motif has acquired the potential to become a symbol. This also means that the whole of decorations and patterns that once emerged from the weaves of carpets and mats, applied in the form of panel work or painted plaster, now function as a representation, both as an index to its former material and technique but also in a symbolic way, at least as the visible space divider, a function, which the dressing in the form of panel work or painted plaster literally lost. This merging of index and symbolic reference to material and technique also applies to the dressing in the form of decorative patterns arranged as a succession of planes separated by bands and seams as applied to objects such as vases. Semper argues: ‘Ihre Symbolik knüpft an die einfachsten Prozesse des Reihens, Schnürens, Spinnens, Drehens, Flechtens, Webens, Nähens und Säumens, (...) [Their symbolism is linked with the simplest processes of making rows, lacing, pinning, twisting, braiding, weaving, sewing, and hemming – (...)]’ (Fig. 76).<sup>61</sup>

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<sup>59</sup> Semper 1860, pp. 229–231. Semper supports his argument by referring to a number of ground motifs of building types to which all later monumental architecture would be tributary. In *Der Stil* he identifies the festive scaffolding hung with carpets, twigs, flowers, and trophies, as the motif for later permanent memorials; the improvised pilgrimage markets of poles and screens as the motif for Egyptian temples; the wooden funeral pyres for monumental funerary tombs; the tabernacle as the motif for temples; the decorated wooden tribune as the motif for the theatre.

<sup>60</sup> Mallgrave 1996, p. 298. See also p. 36 where Mallgrave argues that according to Jacques Ignace Hittorff colour was the variable, which in addition to the relatively stable use of the classical orders could underscore the importance of the building by means of decorative programs.

<sup>61</sup> Semper 1879, p. 83. English translation by Mallgrave & Robinson 2004, pp. 530–531.

With this argument I think Semper also touches on the core of what makes geometrical decorative patterns stand out as representational in comparison to (non-decorative) patterns. His thinking provides an important argument with respect to cognitive research on the perception and cognition of images and patterns showing that the recognition and making of decorative patterns is not simply a matter of pattern recognition. The latter of course is a precondition for the recognition of decorative patterns and I have also shown that patterns in general already tend to appear to humans as intentional. However, the decorative (e.g. in the form of a geometric pattern) enables the decorated, like the mask enables the person wearing it, to stand in the place of something or someone else. In both the practices of masking and dressing lies the essence of representation in the broad sense, of standing for and acting as, or on behalf of, something or someone else, of veiling the true nature of something or someone else, in order to present something or someone else in a symbolic way. As a result of their order, patterns in general evoke the suspicion of intention and therefore an agent almost by nature. Decorative patterns exploit that suspicion while being deliberately used to make something present within specific cultural contexts.

### *5.5. Conclusion*

Alberti underscored the fundamental importance of line as the building block of representation in the fifteenth century. According to Semper, the line in the form of the thread was the basic material of the practice of the textile arts. The weaver could weave different individual threads into patterns, which constituted the pieces of cloth. But as successions of elements or motifs Semper also recognized in the string, the band, as well as the seam, the concept of line. In the textile arts, the band for instance concerned the repetition of certain motifs in a certain one-dimensional direction. When one takes Alberti's abstract conception of line as a sequence of points without intervals, together with the notion as discussed in the previous chapter that the smallest possible element of a pattern is a point, one is able to infer that all two-dimensional patterns are ordered along lines. This again also means line (as a geometrical construct) presupposes multiplicity, i.e. quantity.

This conception of the line has a material as well as a physical and cognitive aspect. Semper's theory shows how these aspects are fundamental for representation. The concept of the line is transferred by means of the rhythmical labour of the body onto the material where it becomes its manifestation. There it already starts to function as an index of its maker, of the functioning of the maker's body and mind being unified in the manufacturing process; a process embedded within a specific cultural context. When woven patterns were imitated in other materials, such as stone, they literally become representations of the earlier techniques and practices. Regarded from that perspective, patterns always index previous patterns or patterns derived from other techniques. This process can be understood as a reciprocal one. In *Der Stil*, Semper compared the different elements that are part of embroidery, such as the stitches, to the elements with which mosaics are made in the sense that according to Semper, embroidery is a kind of making mosaics with threads, and just as in the art of mosaic, it enables the artist to create flat surfaces as well as figurative images. Semper wanted to show that both practices are founded on similar independent principles.<sup>62</sup> But this case also emphasizes that motifs in mosaic would be an index of motifs from other and earlier practices.

With respect to the assumed cognitive competence to represent, Semper's notion of the thread can now be connected to the conception of the line such as Alberti conceived it. Alberti already compared the construction of surfaces in perspective on the picture plane, to the weaving of a web, albeit in a metaphorical sense.

Both Alberti and Semper appear to depart from a conception of line as an underlying abstraction but I consider Alberti's conception of a line to a large extent as one in the sense of a formal precondition, which by means of its application in a practical geometry transforms into the concrete line as the raw material with which to construct the representation of space, and the bodies and objects contained in it. With his emphasis on manufacturing processes Semper adds to that concept a physical and material aspect in the sense that the physical labour by means of which threads are woven into patterns is itself a sequence of events in space and time that becomes

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<sup>62</sup> Semper 1860, p. 193. See also Mallgrave & Robinson 2004, p. 228.

materialized in the pattern and recognizable as an index of its maker and its manufacturing.

It is this consideration, which in fact forms the missing link between cognitive competence and physical condition that was hardly discussed in the fifteenth century. This makes clear – at least with regard to the practices of making in the visual arts – how the integration of numerical cognition and cognition of geometry is probably achieved as a result of the manipulation of materials through physical labour by means of technology. I think this is also an important addition to the more functional description of the cognitive competences underlying the recognition and making of visual patterns because Semper shows that the integration of cognitive competences cannot be seen as separate from certain biological and cultural needs, such as, for instance, the need for protection, which would have led to the use of woven mats as hangings, the ensuing creation of space, and eventually the emergence of architecture. Semper showed how the emergence of decorative patterns would relate to the practice by means of which the earliest woven structures were made. His argument therefore also allows the recognition and making of geometrical patterns in decorative contexts, to be considered as emerging from the combination of physical, technical, material, and cognitive skills. The question, whether the cognitive concepts and competences involved in those manufacturing processes had to be present in the mind a-priori to some extent, or whether these competences developed simultaneously and under the influence of those processes is, for many reasons, hard to answer. Semper had no definitive opinion about this matter and nor was it his main concern although he *was* convinced that the inclination for order and adornment was a natural characteristic of humankind.