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# Architecture and the Body, Science and Culture

Edited by Kim Sexton

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## 9 The eye of modernity

Form, proportion and rhythm in  
German architectural history of the  
nineteenth and early twentieth  
centuries

*Tobias Teutenberg*

### The playground of the modern eye

'The ultimate essence of modernity is psychologism, the experience and interpretation of the world according to the reactions of our interior being – essentially as an interior world – the dissolution of solid content into the liquid element of the soul, out of which all substance is derived, and whose shapes are merely forms of movement' (Simmel, 1909, p. 183).<sup>1</sup> Georg Simmel's (1858–1918) concise definition of modernity was also a description of the leading style of perception at the turn of the twentieth century. The well-known sociologist and cultural philosopher understood this to consist of the programmatic psychologizing of phenomena and the systematic giving of dynamism to reality. When published in 1909 in his essay on Auguste Rodin, Simmel's words reflected the characteristics of the visual culture surrounding him, while at the same time recognizing this culture's formal signature in the heavily movement-emphasizing postures and surfaces of Rodin's sculptures. Simmel's view of Rodin's work was naturally deeply influenced by the culture in which he found himself, just as it had also been for previous Rodin interpreters who read the very same artworks as manifestations of late Romanticism, anti-modernity or even postmodernity (Brabant, 2017). Disagreements over the meaning of Rodin's formal language make very clear how differently the same object can be viewed and critiqued in the course of history. This leads to the theory that historical descriptions of pictures, sculptures, architecture and other phenomena of the everyday world give insights into the dominant styles of perception of their era, which are shaped by factors both within and without the broad disciplinary borders of art history, such as the optical and circulatory sciences.

This essay about visual culture in Germany during the nineteenth and early twentieth centuries is primarily interested in descriptions which, like Simmel's text, originate in contemporary German art and architectural history. However, in comparison to Simmel their main focus is not on modern



sculpture but on objects, pictures and buildings from all classical epochs in art history. Yet, all of the descriptions are related to a common observational technique, which indicates the presence of a collective visual style in German art history around 1900. This common mode of seeing has its origins in contemporary scientific theories of perception which, in turn, change and evolve according to new understandings of physiology and psychology. As a result, researchers continually and inevitably subject works of art and architecture of varying epochs to a 'visual modernization', viewing them through new filters. At the turn of the twentieth century, a key filter was dynamism, specifically recognizable through the prominence of the notion of rhythm (Blümle, 2014; Schneider, 1992). By emphasizing the rhythm of objects and built form, art historians were responding to current ideas on the bodily experience of aesthetic sensation. Medical research and the emerging 'science' of Gestalt psychology located the motus for these deep in the 'primal' cardiovascular system and in the physiology of the mind.

This chapter traces the new-fashioned, rhythm-based visual style farther back in history to the analytic observation of geometric shapes and mathematical proportions common in early nineteenth-century teaching methods (e.g., *Anschaunungsunterricht* or observation instruction) and drawing education, where the systemization and rationalizing of the act of seeing was actively cultivated.<sup>2</sup> The influence of this visual regime was such that the educated human eye could join forces with advances in other scientific disciplines, such as botany, to produce unexpected new knowledge in historical architecture. With the appearance of rhythm in German art history around 1900 those long-established visual styles became slowly outdated, but that is not to say that rhythm simply and entirely wiped out the former conventions of detached, ocular-centric observation, but rather grew alongside and incorporated them, before eventually overruling them.

### Visual education and visual culture in nineteenth-century Germany

In the nineteenth century, diverse disciplinary fields came to prefer certain styles and methods of observation. Many of them were based on the strict conditioning of the human body and greatly influenced the processes of learning and understanding in their specific areas and beyond. To name only one example, Lorraine Daston and Peter Gallison have even described what they term a disciplinary eye within the realms of botany and anatomy during this era (Daston and Galison, 2007, p. 48). By revealing the epistemological origins and methodological details of dominant visual practices, they demonstrated how the calibrated eye, once taught what and how to see, influenced the creation of images for scientific atlases (Daston and Galison, 2007, p. 44). Nevertheless, one highly influential area within Germany's visual culture of the nineteenth century has largely been ignored: drawing education (Heilmann *et al.*, 2014 and 2015; Ashwin, 1981).

Zurich social and educational reformer Johann Heinrich Pestalozzi (1746–1827) was one of the field's great innovators in that his ideas and methods gave unfettered precedence to the rationalization of the eye. His general approach was on the one hand influenced by traditional observational techniques of the natural sciences dealing with the systematic fragmentation of objects to their basic elements. Those long-established epistemological methods have been summarized a few decades earlier by the Swiss botanist Jean Senebier in his publication *Die Kunst zu beobachten* (The Art of Observing) from 1776. On the other hand, it is obvious that late eighteenth-century drawing books with their focus on the contour and geometry of the human body offered inspiration to him.

The core of Pestalozzi's doctrine centered around a variety of exercises in observation and drawing with the primary goal of adjusting the students' visual perception of the world around them in such a way that they were capable of reducing the objects being observed down to their basic geometric shapes and mathematical relationships, as a contemporary graphic illustrates (Figure 9.1a). The teacher sits in a classroom of roughly 80 students, gestulating with his right hand in order to initiate the act of measurement in relation to the body of a student standing to his left. To complete their assignment, the children should imagine a square – in Pestalozzi's theory the archetype of all mathematical forms – positioned between themselves and their comrade, thereby enabling them to define the basic shapes and proportions, which make up the body of the boy. The ultimate aim of this process was to convert the previously unrefined observational faculties of his students into a skilled talent of perception undergirded by well-defined rules referred to by Pestalozzi as *Anschaunungskunst*, that is, the art of observation (Teutenberg, 2016, pp. 150–3). The reduction of the body to geometric shapes is tantalizing similar to the figures on Archaic Greek vases (Figure 1.3), but, as Chang explains in Chapter 1, in Antiquity geometrization was supposed to reveal the joints and articulation of the human body, or its undoing, whereas in the nineteenth-century geometry and proportion signified the (assumedly) reasonable order of nature and the human capacity to comprehend it.

Pestalozzi's teaching method became widespread and influential in Prussia (Oelkers and Ostenwalder, 1995), as Wilhelm von Humboldt (1767–1835) set up his own institutes in Pestalozzi's mould in order to teach the desired method to the offspring of the social elite as well as new generations of teachers. From these beginnings, a dense, robust network of Pestalozzi-followers flourished in Germany, inspiring theorists like Friedrich Herbart (1776–1841) and Friedrich Fröbel (1782–1852) who advocated similar observational methods but with alternate geometries (e.g., the triangle or circle) and mathematical techniques. However, by far and away the most effective disseminator of Pestalozzi's teaching methods in Germany was the drawing lesson (Ashwin, 1981, pp. 51–77). Even Pestalozzi developed special drawing exercises for visual education. During the nineteenth century, however,



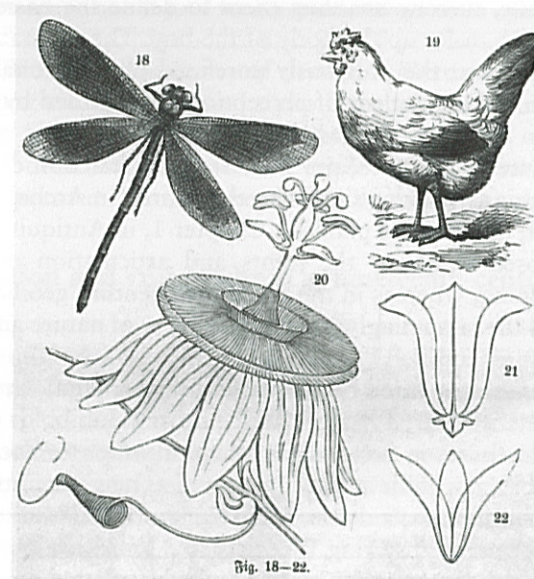


Figure 9.1 (a) (above) Pestalozzi in observation lesson (1803); (b) (below) triangular plants and animals

Photos: (a) Brosterman, 1997, p. 21, with permission; (b) Flinzer, 1896, p. 120

drawing classes became ever less focused on that which had been its primary aim since the early modern period – namely, the realistic representation of objects, in particular of the human body – instead concentrating almost entirely on the development of the students' skill of observation. By the beginning of the 1870s, drawing education had become an obligatory subject at all German schools, with the implementation remaining almost entirely true to Pestalozzi's original concept of 'eye-geometrization' (Figure 9.1b). It was only in the Art-Education Movement (*Kunsterziehungsbeewegung*) around 1900 that the rigid formalistic approach of drawing education along with much of the instrumental reasoning of nineteenth-century education triggered heavy criticism. Ophthalmologists blamed the method for damaging for the eye (Gräber, 1880), and developmental psychologists (Sully, 1895) found it psychologically unsuitable for children. As a result, the geometrized practices fell slowly into disuse in the twentieth century and the strong visual regime established by drawing education of that time have now been all but forgotten.

### The grammar of architecture

The visual habits of people in the nineteenth century – especially artists and architects, art and architectural historians – were inevitably formed by the strong effect of the Pestalozzi-inspired drawing education practices, not least because of the very strict and manipulative teaching methods (Rutschky, 1977) used in schools at a time when nobody was able to escape from the influence of pedagogy anymore. Clear traces of this visual conditioning can be found particularly in German art and architectural historiography for a couple of reasons. First, practically all nineteenth-century researchers in art history were forced to acquire drawing skills in order to be able to religiously fill sketchbooks while travelling.<sup>3</sup> And second, the discipline of art history had emerged from a long tradition of *Sturm und Drang* and Romanticism (Bisky, 2000), in which individual subjectivity, personal associations and extremes of emotion were to be given free expression in reactions to art and architecture. By the 1830s, art historians had begun to embrace empiricism and consequently the need to observe the form of artworks and architecture carefully. Much of the written production in art history in this period evidences the impact of the visual techniques taught in observation and drawing lessons since the early nineteenth century.

Among the publications to fulfill the new empiricist objectives was the first text on the theory of (neo-) Gothic architecture by landscape architect Johann Christian Metzger (1789–1852): his essay *Gesetze der Pflanzen- und Mineralienbildung angewendet auf den altdeutschen Baustyl* (Principles of the Formation of Plants and Minerals Applied on the Old German Building Style) from 1835. Metzger was a well-known expert on landscape design as well as the author of popular books on the cultivation of wine, fruit and vegetables, all of which show the pedagogic influence of Pestalozzi as well



as the advances made by naturalists such as Karl Rudolphi (1771–1832) (Scheidle, 2008, p. 72). Metzger was not only highly familiar with the educational debates of the time but, – as an architect, – he enjoyed a thorough drawing education. Not surprisingly, the basic concepts in his essay bear the stamp of the observational method and the visual techniques of pedagogy of the time.

The self-professed aim of his essay was nothing less than ‘to establish a law, which appears to have been observed by our elders in the form of plants and minerals, and which they may subsequently have applied within their designs for buildings, in particular with so-called Gothic structures’ (Metzger, 1835, III; trans. by author). According to Metzger, this supposedly universal principle was first discovered by medieval *Bauhütten* (masons’ lodges) – an institution romanticized and ‘modernized’ in the nineteenth century to the point where it was believed that lodges were interdisciplinary groups of skilled workers among whom were builders, natural scientists and mathematicians. These networks were said to have shared their own highly evolved ideas on the development of architecture exclusively by word-of-mouth, but this secret knowledge had been lost as a result of the *Bauhütten*’s demise in the early modern period. However, as a result of analytic observation, Metzger had ‘noticed characteristics of old buildings which appear to shed new light on the topic’ (Metzger, 1835, VI). These characteristics centered around the so-called technique of circle graduation, whereby circles could be deconstructed into geometrically accurate, equally proportioned segments.

Metzger had first observed this principle in the world of botany, more specifically, in the flowering of trees as well as in the organization of their seedpods, stems and leaves (Figure 9.2a). According to him, it is clear from nature how the geometric shape of the circle is formed and how it can be divided by two to six lines in halves, thirds, fourths, fifths and sixths of  $180^\circ$ ,  $120^\circ$ ,  $90^\circ$ ,  $72^\circ$ , and  $60^\circ$ , respectively. Assuming that geometry was fundamental to architecture, Metzger proposed that many buildings of the Middle Ages had been built on this general law of nature. He found evidence for this in his hometown, more specifically in a small sculpture over the entrance to the Ruprecht building of Heidelberg Castle (Figure 9.2b). The shield shows two angels holding a wreath of leaves in their hands ‘in which there are five equidistant five-petalled roses’. Furthermore, one of the angels is holding a large compass with his right hand ‘which is seated in the wreath’ (Metzger, 1835, p. 13). Metzger saw in this a five-way division of the circle and thus declared the work as evidence that the design of the whole structure is based on the natural law of circle division. And, indeed, the suggestion was not as far-fetched as it may seem: According to Metzger, the axes of the pointed-arch portal at the front of the building lie at angles of  $72^\circ$  to each other and thus were also proportioned by the five-way division of the circle. Encouraged by this result, the architect started to analyze several more mediaeval structures in Heidelberg, among them the Gothic *Heiliggeistkirche*. And then

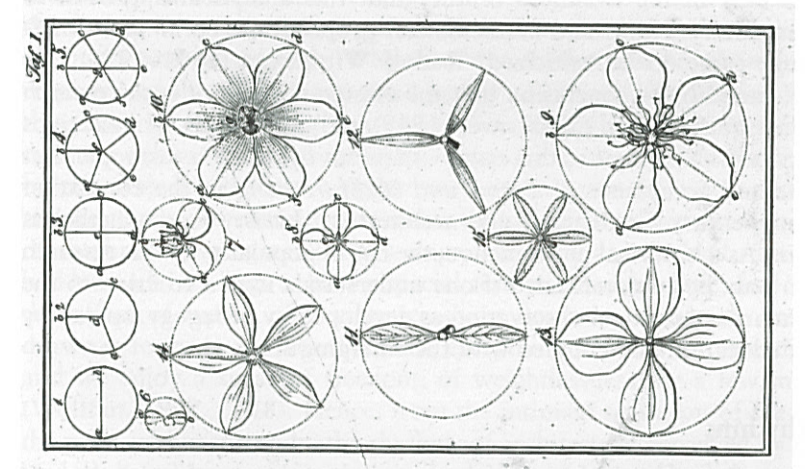
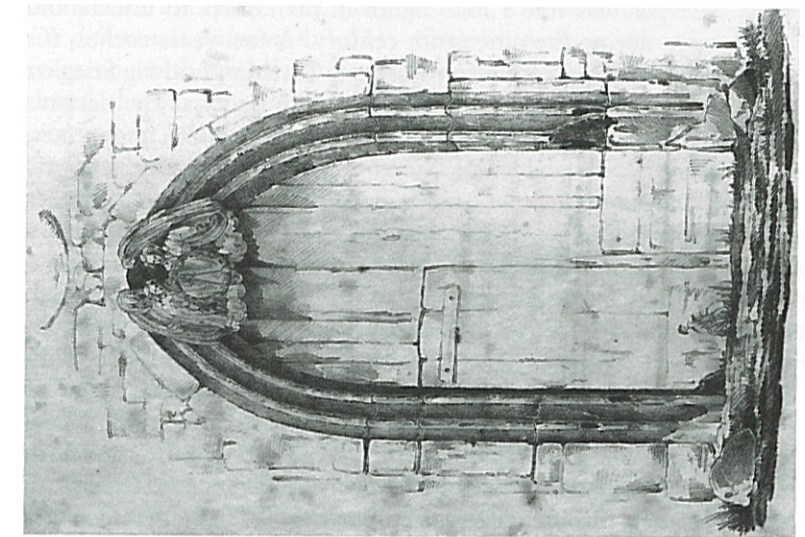


Figure 9.2 (a) (left) the law of circle graduation in nature; (b) (right) the portal of Heidelberg Castle  
Photos: from Metzger, 1835, plate 1



yet more conformity with circle division became apparent to him: the tracery, spiral staircases, towers, pillars, roofs and even the monograms of the stone crafters apparently relied on the same principle. In Metzger's eyes, they all confirmed his general thesis that the grammar of Gothic architectural form could be seen to be derived from the geometric qualities of the circle.

Of course, Metzger was not a lone figure in his efforts to understand Gothic architecture during the nineteenth century. A few years earlier, for instance, the architectural historian from Leipzig Christian Ludwig Stieglitz (1756–1836) was already of the opinion that the square was the decisive shape within the Gothic style and not the circle (Stieglitz, 1829) and in fact, a whole host of closely related publications shows how his form-analytic visual style was a common pursuit, as seen, for example, in Carl Alexander von Heideloff's four-part *Der kleine Altdeutsche (Gothe) oder Grundzüge des altdeutschen Baustyles* (The Little Old German (Goth) or the Foundations of the Old German Building Style) of 1849–1852 and in Friedrich Hoffstadt's seven-part *Gothisches A.B.C.-Buch* (The Gothic A.B.C. Book) of 1840–1863. Not surprisingly, the first objects of speculation with regards to basic-forms and proportions were those of the Middle Ages,<sup>4</sup> as there was hope that analyses would lead to insights into the supposed lost-secrets of the *Bauhütten*. This topic therefore provided art-historians with a lot of room for speculation and almost encouraged them to attempt to rediscover these secrets through analytical observation. The body, however, did not enter into their explorations unless it was that of the artisan and even then, the interest was on the craftsman's mind rather than his hand.

It was only in the twentieth century that this analytical approach to the observation of form and mathematical proportions (*Form- und Maßforschung*) came to be criticized. Rudolf Wittkower (1901–1971), for instance, came to the conclusion that the epistemic value of such research was in fact quite limited (Wittkower, 1949) and many later art historians – among them the author of this essay – share his opinion on this topic. But the value and acceptance of *Form- und Maßforschung* in the context of nineteenth-century German art and architectural history was nonetheless enormous. As a historical phenomenon, the rise in popularity of this research style can only be comprehended if one understands it as a reaction to the new standards of rational observation as developed by pedagogy, spread by drawing education and coupled with the emerging sciences.

### Body rhythms

A more encompassing inclusion of anatomy, physiology and psychology in the discourse of architectural history in Germany had to wait until the later nineteenth century, when scholars in several interrelated fields recognized the body as an instrument not only of visuality but of aurality and sensation. Evidence for this development is the consideration of rhythm in German art history in the late 1800s, as it was a direct response to the rise of a new

scientific awareness of the human body as a rhythmically organized system (Wellmann, 2010, pp. 169–97). On the one hand thanks to inventions such as the blood pressure reader by the ingenious French physiologist Étienne-Jules Marey (1830–1904) (Braun 1992, Chapter 2), whose diagrams made the rhythmic nature of blood circulation – principally known and understood since antiquity ((Pseudo-) Aristotle, *Problemata physica*, 882B; Galen, *De differentia pulsum*, 4.9–11) – obvious. And, on the other hand, current research in the fields of psychoacoustics and Gestalt psychology introduced rhythm as an important organizing principle of the mind as well. German art history around 1900 recognized those now scientific paradigms attentively and modified its observational style according to them.

The earliest evocation of architectural rhythm in German art history can be found in Heinrich Wölfflin's (1864–1945) dissertation *Prolegomena zu einer Psychologie der Architektur* of 1886, in which the Swiss art historian likens rhythm in architecture to the pulse of the human heart.<sup>5</sup> Inspired by Robert Vischer's (1847–1933) doctoral thesis in which the aesthetic effect of optical rhythms is explained in terms of empathy or *Einfühlungstheorie* (Vischer, 1873, p. 8), Wölfflin's text very carefully attempts to apply the principles of rhythm as found in the temporal arts like music and poetry to the realm of spatial arts like architecture. He did, however, stop short of declaring rhythm to be one of his four laws of form (*Formgesetze*) – namely, regularity, symmetry, proportion and harmony. And yet Wölfflin undeniably identified an architectural basis for rhythm, for instance, in his focus on the alternation of supports in the St. Michael's Church at Hildesheim (1010–1031). In the steady change from columns to pillars in the nave of the church he observed 'a sequence of distinct parts, and therefore a sense of pulse', and he queried, 'Why should a rhythm not be created through emphasis of the second and third parts?' (1999, pp. 31–2). For Wölfflin, this was reason enough to think about the relevance of rhythm for his discussions around architectural phenomena. He came to several conclusions on the subject. The first was that various examples from historical architecture clearly demonstrate that architects had relied on the stimulating effect of rhythm in ever greater ways since late antiquity. Second, this in turn had led such buildings to have a special aesthetic characteristic, as if 'through the effect of waves of rhythm crashing down upon us, we are taken, drawn in to the beautiful movement, everything which is formless dissolves, and we enjoy a sense of freedom, of weightlessness for a few moments' (Wölfflin, 1999, p. 18). Hence, from the intimate sensation of the 'feel' of the pulse within the body, the rhythms of architecture perceived by the eyes lead the beholder to a unique, disembodied experience of built form. Finally, in order to establish the observer's ability to recognize rhythmic forms in architecture and to appreciate their aesthetic character, Wölfflin sets out a third and final thesis relating to organic functions of the human body such as breathing and pulse. The wavy lines of the pulse diagrams created by Marey's blood pressure reader gave Wölfflin every reason to believe that



each human was, by default, familiar with the functions of their own body and thus, with the principle of rhythm. Therefore, much like he had done with his other design principles, Wölfflin traced rhythm back to the biological makeup of mankind and thus incorporated this principle in his anthropocentric architectural theory.

Subsequent research has firmly established Wölfflin as someone highly influenced by contemporary theories of the organization of the human body (Maskarinec, 2014). Yet, his *Prolegomena* accomplished another important step in terms of architectural research: it established the choreographic interpretation of structures, which from this point on became an evermore consequential concept. The influence of this approach was nurtured, but transformed, in no small part by August Schmarsow (1853–1936), a professor of art history in Leipzig, and, before him, by Alois Riegl (1858–1905).<sup>6</sup> Schmarsow's first involvement with the principle of rhythm appeared in a talk he gave in 1896, in which he famously defined architecture as a *Raumgestalterin*, a space-maker or literally a 'creatress of space' (Schmarsow, 1896, p. 44). This space-giver establishes her own creations on the basis of the human physiology, whereas Wölfflin had focused on architecture's solid bodily *form*. But, like Wölfflin, Schmarsow found rhythm to be a basic ingredient in his own spatio-anthropomorphic understanding of architecture. In his formulation, the body informed three core principles: 'in the first dimension, proportionality prevails; in the second, symmetry; and in the third, the element [...] of rhythm' (Schmarsow, 1896, p. 59). The three terms allude to an older architectural theory, that of Gottfried Semper (1803–1879), and its main terms – eurhythmy, proportionality and symmetry – not least because both researchers defined their three aesthetic laws in terms of the physical makeup of man.<sup>7</sup> Unlike Semper, however, Schmarsow emphasized the superiority of rhythm over the other two. For him, it was the ultimate principle of design in architecture since its playground was exclusively the third dimension, namely depth, in which he saw the 'lifeline of every spatial formation' (Schmarsow, 1896, p. 58). Unlike proportionality and symmetry, however, rhythm was not evoked by static mathematical ratios and geometric shapes; instead, in Schmarsow's opinion, rhythm was a purely psychological principle in that it effected a viewer's perception of space. As a person walks forward in a rhythmic sequence of steps, he or she thereby builds up a rhythmic series of perceptual impressions which create – in a subtle way – an awareness of a space's totality.

Current research into the motor function of the human body has justified Schmarsow's stance that beholders on the move are developing rhythmic impressions of architectural forms and spaces automatically. For instance, researchers from the anatomy department at Leipzig University, such as Christian Wilhelm Braune (1831–1892) and Otto Fischer (1861–1916), had already started work on what was later to become the six-volume publication *Der Gang des Menschen* (The Human Gait) (1895–1904), which established the rhythmic nature of human walking with the help of

chronophotography (Figure 9.3a). But Schmarsow took inspiration from psychological studies as well (Mainberger, 2010, pp. 91–110; Golston, 2008, pp. 12–29). Pioneered in the second half of the nineteenth century by researchers such as Ernst Mach (1838–1916) and Ernst Meumann (1862–1915), psychoacoustics established the theory that humans by their very nature tend to subjectively hear rhythmic patterns among similar sequences of sounds. Furthermore, the nascent field of Gestalt psychology held that the human mind tended to perceive whole systems rather than focus on small parts even when evidence for the whole was not manifest. Father of the discipline Christian von Ehrenfels (1859–1932) had already identified rhythm as one of these systems by 1890, observing that, regardless of whether the elements of a rhythmic sequence 'are marked by changes in volume, obvious movement, pressure or otherwise', they are always leading to the same rhythmic form in the consciousness of the human beholders (Ehrenfels, 1890, p. 278).

For his part, Schmarsow concluded that rhythm forms an essential principle of organization in the human brain, helping people to process and arrange sequences of sensory data. Against this epistemic background, the early nineteenth-century predilection for observing an object's geometric building blocks and proportions played a largely inconsequential role. Proportionality and symmetry were only important to Schmarsow in assisting walking beholders to perceive the rhythmic component of the built environment. They were mere partitioning elements within the fluid medium of time, uprooted by the overwhelming flow of rhythm like tree trunks on an untamed mountain river (Schmarsow, 1998, p. 91).

### Architectural rhythms

With Wölfflin and Schmarsow, the viewing habits of the nineteenth century clearly began to shift, albeit slowly, to be in line with their new perspectives on the human body. The focus on formal factors such as basic shapes and proportions is still present in both, yet a cinematographic reading of architecture is also present with its focus on rhythmic movements. A number of application-oriented studies on architectural rhythm soon followed, notably those of medievalist Wilhelm Pinder (Bushart, 2007, pp. 169–72). A student of Schmarsow, Pinder attempted to understand the development of rhythmic 'grouping principles' (*Gruppierungsgrundsätze*) in Norman Romanesque architecture (Pinder, 1904, p. 1). He accepted his mentor's premise that viewers inevitably observe architectural forms as temporal rhythmic organizations on account of their own psychophysical constitutions. However, even more important for Pinder was the fact that the bodies of artists and builders themselves are rhythmically organized. The principle of rhythm was therefore subconsciously built in by an edifice's designer and ultimate creator. So, whereas in the first half of the nineteenth century, Metzger looked for the inscription of the craftsman's rationality on building fabrics, by the turn



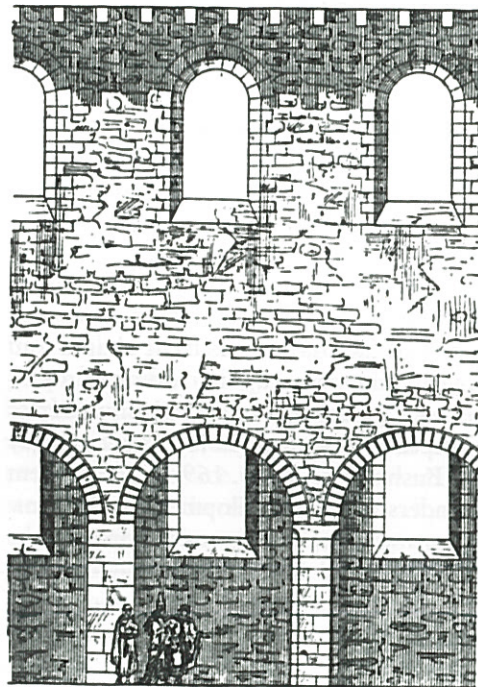
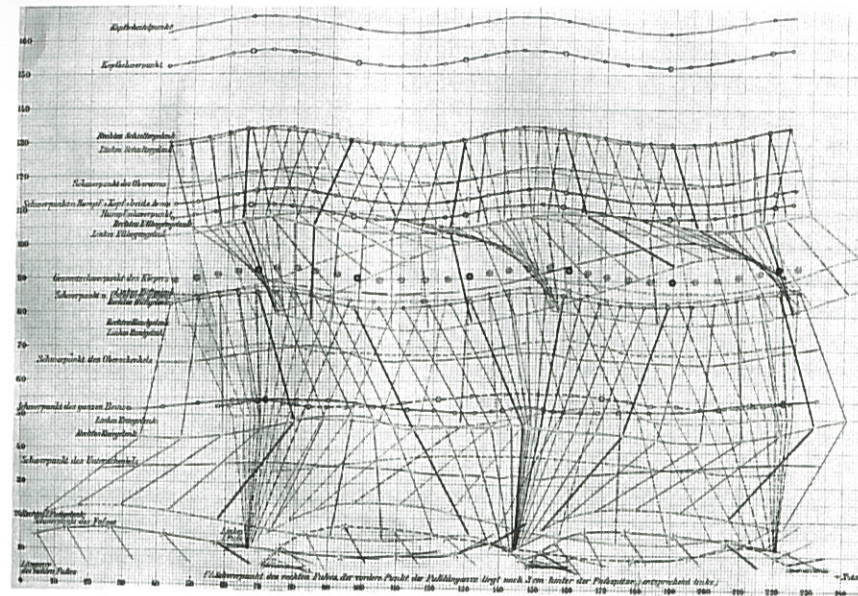


Figure 9.3 (a) (above) the rhythm of human walking; (b) (below) nave elevation of the late Carolingian basilica (the 'Basse Oeuvre') at Beauvais, France  
Photos: (a) from Braune and Fischer (1899); (b) Pinder, 1904, Figure 1

of the twentieth century, it was the master's pulse that gave medieval churches a dynamic they transmitted to those who entered.

In the practical portion of the study, Pinder examined how the different rooms of a basilica might engender and guide the formation of a rhythm within the eye and body of its beholder. The oldest building considered was the late Carolingian cathedral of Beauvais, the so-called *Basse Oeuvre* located at the foot of the present-day Gothic choir (Figure 9.3b). In the book, he painstakingly details all the forms and proportions of the church in over 17 pages of text. Pinder then tries to understand 'what information is to be found within the building [...] to be received by the viewer's senses' (Pinder, 1904, p. 21). To this end, he places an imaginary viewer on the central axis of the nave and allows him to walk towards the choir and thereby emphasizes the importance of the pillars to the rhythmic impression of Beauvais' space: 'The man walks along and there is a regular alternation of feeling in him: from that of being close to a body to that of having a heavy weight lifted [...]. This switching of emotions in an alternating sequence is a simple form of rhythm' (Pinder, 1904, p. 22; trans. by author). He finds that this impression is supported by other factors, such as the momentum of the nave arches or the regular pattern of the windows in the clerestory. Absent in the *Basse Oeuvre*, however, are strong vertical accents which, in many Romanesque and most Gothic churches, were provided by slim responds and huge pillars. Hence, the rhythmic energy of Beauvais' late Carolingian basilica stays comparatively low but, as a starting point for Pinder's extensive studies on the history of rhythm in medieval Norman architecture, the church plays nonetheless an essential role nonetheless.

In addition to Pinder, many more German architectural historians at the turn of the twentieth century dealt extensively with the principle of rhythm and their work is by no means limited to medieval architecture. Leopold Ziegler (1881–1958) examined the rhythm of early modern buildings in his *Florentinischen Introduction zu einer Theorie der Architektur und der bildenden Künste* (1912), while Albert Erich Brinckmann (1881–1958) focused on the rhythm of historic urban spaces in *Deutsche Stadtbaukunst* (1911). Furthermore, as a guiding concept rhythm was also popular among art historians around this time, and the range is quite substantial: from Friedrich Rintelen's (1836–1907) book on *Giotto und die Giotto-Apokryphen* (1912), which emphasizes rhythm in the compositions of the Florentine artist, to ethnologist Ernst Grosse's (1862–1927) work on Paleolithic art, *Die Anfänge der Kunst* (1894), which deals with the rhythm of the ornament of hunter-gatherers. And finally in the visual arts of modernity, diverse theoretical and practical examinations of rhythm as an aesthetic principle can be found not only in the work of the Bauhaus masters Paul Klee (1879–1940) and Wassily Kandinsky (1866–1944) but also in Hans Richter's (1888–1976) 'absolute film' *Rhythmus 21* (1921) in which paper rectangles and squares form the basis for a visual rhythm of hypnotic pulsing.



Quite naturally, the architecture of the early twentieth century was not unaffected by the enthusiasm for the body's affinity for rhythm, as the planning and design of the interiors of the Festspielhaus theatre (1911–1912) in the garden city of Hellerau, near Dresden, makes clear. The architect of this multipurpose building, which included an institution for rhythmic education, was the hitherto largely unknown reform-architect Heinrich Tessenow (1876–1950). However, it was the Geneva music educator Émile Jaques-Dalcroze (1865–1950) and the Berne stage reformer Adolphe Appia (1862–1928) who were responsible for the design at a conceptual level (Beacham 2006, pp. 108–30; Sonntag, 2015, pp. 332–413; Vicovanu, 2013). Both men brought decades of experience to the project. Jaques-Dalcroze had developed a method of rhythmic education in the 1890s while teaching at the Geneva Conservatory, and he began to try his theories out in practice in 1902. His aim was to instrumentalize the bodies of his students so that they became sound-boards for the communication of musical rhythms, thereby improving their hearing and motor skills. Later, as he expanded the sphere of his method, he came to recognize in his theory a universal cure for the 'general arrhythmia of human life' in the industrial age (Michelis, 1991, p. 19). The evolutionary connection between body and mind, which Jaques-Dalcroze perceived as being disturbed in the modern workplace due to the discipline forced on people by technology, was to be strengthened by rhythm under the guise of bodily movement and gymnastic exercise. In 1905, Jaques-Dalcroze took part in the 6th Swiss Musicians' Congress, announcing his first results in a lecture entitled *Über musikalischen Schulunterricht* (On Musical School Lessons). Demonstrations of his method followed throughout Germany, resulting in 1909 in the commission to design a new institute in Hellerau.

Adolphe Appia came to people's attention at roughly the same time, primarily as a result of his stance against the use of historical and/or natural staging in contemporary theatre, as outlined in his critical text *Die Musik und die Inszenierung* (Music and Staging) of 1899 as well as in his essay *Comment réformer notre mise en scène* (How to Reform Our Mise-en-Scène) of 1902. In his opinion, the image-rich, two-dimensional painted backdrops, which relied on heavy external lighting, denied spectators an authentic experience of space and prevented a full, three-dimensional movement of actors' bodies upon the stage. To his mind, the reliance on such backgrounds was a relic of an antiquated theatre tradition in which word and music were of more value than visual elements. To overcome this restriction, Appia designed his own stage sets; however, he was only able to put his ideas to the test after 1906, the year in which he stumbled across Jaques-Dalcroze and his rhythmic methodology while visiting Geneva. A lively correspondence and close friendship between the two men ensued. Appia increased his knowledge of Jaques-Dalcroze's theories through active participation in courses in rhythmic gymnastics. The Genevan teacher was in turn not only impressed with Appia's wide-ranging understanding of his approach but with

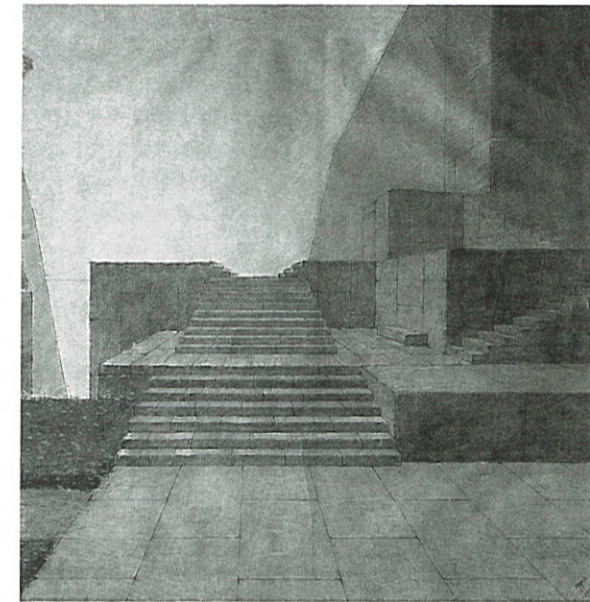


Figure 9.4 (a) (above) Adolphe Appia, *Espace rythmique* (1909); (b) (below) Rhythmic gymnastics exercise in Hellerau, photo 1912

Photos: (a) from Beacham, 2006, p. 89, with kind permission; (b) from Lambelet, 1979, Figure 21, with kind permission



Appia's critique of contemporary staging, and thus involved him in the planning for the Hellerau institute.

The multifunctional hall of the Festspielhaus gives the most direct evidence of their fruitful collaboration. The hall is an undecorated, rectangular theatre and gymnastics room, in which the division between the audience and the stage was deliberately emphasized. Appia sketched it roughly 20 times between 1909 and 1910 in his series of drawings called *Espaces rythmiques* (Figure 9.4a). With the use of heavy shadow, they all show tonal, geometric, three-dimensional staging arrangements consisting of subtly illuminated podiums, stairways and ramps in otherwise completely empty spaces, free even from the bodies of performers. The same strong geometric aesthetic forms the basis of the theatre in Hellerau, which makes use of moveable modules. Historical photos of performances of rhythmic gymnastics (Figure 9.4b) show, on the one hand, how close Appia came to fully realizing his vision (Beacham, 2006, pp. 131–59). On the other hand, they also give an impression of how optical rhythms were evoked through the interplay of architecture and body, as uniformly dressed groups of people form geometric elementary forms and perform wave-like movements, which set out rhythms of circles and triangles. Appia's stage design enabled them to ascend and descend in swaying movements to carry the rhythmic interplay of body and architecture into a three-dimensional space. Hence, in the theatre hall of Hellerau, the systematic rhythmization of the architectural space – contemporaneously evoked within the observations and descriptions of Wölfflin, Schmarsow and Pinder – finally became reality.

The first part of this chapter introduced Swiss educational reformer Johan Heinrich Pestalozzi and his influential educational approach to establish the importance placed on the rationalization of perception in the early nineteenth century as students learned to sharpen their eyes to perceive the rationality of nature, i.e. its arithmetic and geometric principles. Subsequently, echoes of this visual education resounded in the writings of Johann Christian Metzger on medieval architecture, whose form-analytic approach led him to the theory that the Gothic style in general derived from the geometric qualities of the circle. The work of Metzger and his many successors in the field of *Form- und Maßforschung* demonstrates that nineteenth-century visual education strongly affected the observational techniques of contemporary art- and architectural-historiography in Germany. However, around 1900 the slow demise of the pedagogic observational-style within the discipline is recognizable, as seen in the appearance of a new fashionable term within art history – rhythm. The sudden shift in visual style owed its appeal to the research of anatomists, physiologists and psychologists, who gave rise to a new understanding of the human body as a rhythmically organized system. Art historians like Heinrich Wölfflin, August Schmarsow and Wilhelm Pinder adjusted their gaze according to the new scientific insights by programmatically evoking rhythmic movements of per se lifeless structures and artists like Adolphe Appia invented architectural

surroundings, which systematically support the evolvment of architectural rhythms.

The sweeping rhythm-obsession of turn-of-the-century German art and art history was not destined to endure. The philosopher Richard Höningwald (1875–1947), for instance, expressed his concern about the 'transferability of rhythm' as early as 1926 and mused upon what is now admitted to be a fragile relationship between rhythm and its founding elements (Höningwald, 1926, p. 11). Regarded as an aesthetic principle of almost unrestricted applicability in the early twentieth century, the concept soon began to lose its entire relevance and significance. At least part of the decline of rhythm in German art history is attributable to its association with the racial sciences propagated throughout both world wars (Golston, 2008). For architectural history, the first instance of this development was in Kurt Gerstenberg's (1886–1968) dissertation *Deutsche Sondergotik* (1913), in which the author gives rhythm a nationalistic connotation by comparing French Gothic cathedrals with Late Gothic churches in Germany. Gerstenberg surmised that the main disparity between the two modes of design lay in fundamentally different realizations of spatial rhythms, which he took to be indicators for the completely different *Kunstwollen* (artistic volition) of French and German people. National Socialists such as art historian Alfred Stange (1894–1968) took this tendency further by stipulating that a 'rhythmic, strongly energized movement' was a natural principle of German architecture throughout history and it could endure 'because it runs in the nation's blood' (Stange, 1935, p. 234). A renaissance of the rhythmic concept in art history during the post-war period was hardly feasible under these circumstances. In fact, academics such as the Viennese philosopher Friedrich Kainz (1897–1977) argued against the re-use of the principle in the fields of visual arts and architecture and for returning it to its proper and conventional realms in music and poetry (Kainz, 1948, pp. 490–526). And so it is of perhaps little surprise that contemporary historians of art and architecture see this short-lived era of rhythmic observation as strange and unfamiliar – indeed, not unlike the strong visual focus on shapes and proportions in the first half of the nineteenth century. For historians of body concepts and visual styles, however, this episode within the history of experiencing architecture is of great importance as it forms a bridge between Germany's visual culture of the nineteenth and that of the early twentieth centuries.

## Notes

- 1 Unless otherwise noted, translations and paraphrases are the author's.
- 2 For an in-depth exploration of nineteenth-century visual and drawing education in German-speaking countries, see Teutenberg (2016) and my soon-to-be published dissertation.
- 3 Most of the research on this topic focusses on the sketchbooks of individual artists, for instance, Kemp (2007); Boerlin-Brodbeck (1994).
- 4 For other examples from this period based on similar visual techniques, see Graf (1958).



- 5 I have here omitted earlier passages on rhythm from Karl Schnaase and Franz Kugler (cf. Russack 1910), as rhythm for these authors functions as a metaphor for life and the liveliness of architectures, which had little influence on the use of the term 'rhythm' in subsequent generations.
- 6 For further information on Riegl's concept of rhythm, see Vasold (2012); for Schmarsow's treatment, Pinotti (2012); Schneider (1992).
- 7 Schmarsow acknowledges his source as Gottfried Semper's 'Prolegomena' from the first volume of *Stil* (1860). Semper's 1856 lecture 'Über die formelle Gesetzmässigkeit des Schmuckes und dessen Bedeutung als Kunstsymbol' (On the Formal Principle of Ornament and its Significance as an Artistic Symbol) would likewise appear to be an important for Schmarsow's terminology as well as his anthropological-centric theory of architectural space (cf. p. 19).

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## 10 Body and space, Gothic and Cubism

### A Czech avant-garde between empathy, aesthetics and science

Frank Bauer

Cubism was one of the foundational movements of twentieth-century modernism, but it is one that historians of the visual arts frequently view as concerned primarily with painting and centered in Paris. Yet, when the francophile German art critic Victor Wallerstein (1878–1944) wrote one of the first retrospectives on an avant-garde movement taking off in Prague around 1909, he refused consciously to 'suffix the new movement with some -ism' (1912, p. 229)<sup>1</sup> and named it *cubist*, the name recently given to the contemporary Parisian endeavors.<sup>2</sup> Arguably, Czech Cubists can be said not only to have fueled modern explorations in architecture and the applied arts completely unknown to Parisian Cubism, but also to have been originally motivated in their quests by advances in both arts and science – hence avoiding identification with the French artists, they simply referred to themselves as 'new direction' (Moravánszky, 2006, p. 25). Following the title of art historian Ákos Moravánszky's (1998) analysis of Central-European modernisms based upon their 'competing visions', that is, their versatile and conflicting sources of inspiration (pp. 1–23), this chapter aims to unearth some of the original background of Czech Cubism. Specifically, it demonstrates how two distinct approaches towards the cognition of architectural space were embedded in Cubist design, and that they were informed by nineteenth-century discourses of psychology, spatial understanding and empathy. In so doing, it reveals overlooked linkages between the body and Cubist architectural space as well as debts owed to the seemingly uncoporeal style of Late Bohemian Gothic.

At the origin of these developments was the advent of modern psychology. German scientists such as Gustav Theodor Fechner (1801–1887), Wilhelm Wundt (1832–1920) and Hermann von Helmholtz (1821–1894) were spearheading the emergence of experimental psychology in late nineteenth century, often building upon diverse backgrounds in medicine, philosophy, physics and *Völkerpsychologie* (proto-psychological studies on the conditioning of national characters in language and culture). Through pioneering work bridging fields today divided into arts and science, they studied