

in: *Goethe's Ghosts: The Persistence of Literature*. Ed. Simon Richter and Richard Block (Rochester: Camden House, 2013) 17-36.

## 1: Egologies: Goethe, Entoptics, and the Instruments of Writing Life

*Andrew Piper*

ON 13 APRIL 1813, GOETHE RECEIVED a small booklet in the mail titled “Einige neue Versuche und Beobachtungen über Spiegelung und Brechung des Lichtes” (A few new experiments and observations on the reflection and refraction of light). It was an offprint of an article that had appeared in the *Journal für Chemie und Physik* written by Goethe’s friend Thomas Seebeck, who was now residing in Nuremberg. It concerned the question of the polarity of light, which was observable through the combined effects of double refraction and multiple reflection and which had been treated two years earlier in a prize-winning article by the French researcher Etienne Louis Malus, “Théorie de la double réfraction” (1811).<sup>1</sup>

Malus’s work would go on to become the single most important influence for optical research for the next two decades until the wider acceptance of Augustin Fresnel’s wave theory of light over the course of the 1820s.<sup>2</sup> It had begun as an inquiry into the well-known phenomenon of double refraction, the way crystals such as Iceland spar could split a ray of light into two separate rays, initially observed by Erasmus Bartholin in 1669. What interested Malus was the way the two rays behaved differently when subsequently reflected off *another* transparent surface. As light passed through the doubly refractive prism, one ray could be reflected on a second surface while the other ray was absorbed or refracted depending on the angle of incidence, a process that could be reversed so that the reflecting ray was switched with the refracting ray and vice versa. In order to account for these opposing phenomena, Malus argued that light must consist of properties independent of its directionality with respect to the reflecting surface. This Malus ultimately chose to call the polarity of light.<sup>3</sup>

In taking up Malus’s work, Seebeck’s primary aim was to argue against the French theory of the internal polar structure of light and argue instead for the Goethean theory of the unity of light. “Das Licht ist einfach,” writes Seebeck in a passage underlined by Goethe in his copy of the article, “und nur durch das was in und an den Körpern, welche

mit demselben in Wechselwirkung treten, Nichtlicht ist, kommt eine Polarität am Lichte hervor" (Light is simple and only through an interaction with that which is not-light in and on the bodies will a polarity of light appear).<sup>4</sup> Polarity was not an inherent feature of light, but a function of the *interaction* between light and not-light in and on material bodies. Polarity was an appearance, for Seebeck, as for Goethe, something that was brought forth through an exchange in the world.

Over the course of his experiments, Seebeck would discover, by expanding the distance between his light source and his reflective bodies, the symmetrical chromatic shapes that he would discuss in the second half of the article and later term, in consultation with Hegel, entoptic colors. The significance of the shapes for Seebeck was the way they drew attention to the necessary interaction between reflective and refractive bodies for the production of such polarized chromatic forms. Following on François Arago's discovery that polar effects could be produced with simply refractive bodies (such as mica) and not only doubly refractive ones (like Iceland spar),<sup>5</sup> Seebeck experimented with a variety of transparent bodies (mica, quartz, stacks of glass plates) as well as shapes (cubes, cylinders, cones, prisms, hemispheres). In so doing, he was able to conclude that the production of the chromatic forms he was observing did not depend (exclusively) on the qualities of the bodies themselves, but on their relational position within the reflective apparatus.<sup>6</sup> As he would write, referring to his illustration of Malus's apparatus (fig. 1), "Diese Versuche beweisen zugleich, so wie alle vorhergehenden, daß die 3 Glieder des Apparates, die beiden Spiegel GG und HH und der Würfel oder Cylinder usw. an der Bildung der Figuren gleichen Antheil haben" (These experiments show, as with all preceding ones, that the three members of the apparatus, the two mirrors GG and HH and the cube or cylinder etc. participate equally in the formation of the figures).<sup>7</sup> On 26 December 1815, the Paris Academy awarded Seebeck half prize for his entoptic discovery (the British researcher David Brewster would receive the other half).

## I.

Seebeck's studies on entoptic phenomena coincided with what is now considered the beginning of the great age of research on the physiology of perception, for which Goethe's *Farbenlehre* had served as a landmark contribution. The eye, and the cosmos of subjective spectral appearances that corresponded to it, emerged as a central object of such nineteenth-century scientific inquiry. As Johann Wilhelm Ritter would write with his usual aphoristic poignancy: "So ist die ganze Welt sich Auge" (The whole world is now an eye).<sup>8</sup> If we are going to speak of Goethe's "ghosts," then, it is important to recall the extent to which his work, arguably more

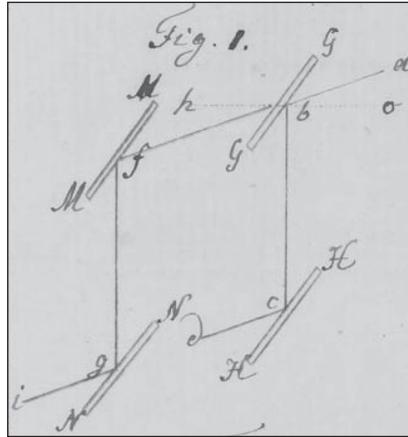


Fig. 1.1. Detail of the refractive apparatus used by Thomas Seebeck in “*Einige neue Versuche und Beobachtungen über Spiegelung und Brechung des Lichts*” (1813). Courtesy of the Klassik Stiftung Weimar, GSA 26/L 4a, S. 4.

so than any other figure of the period, initiated the scientific validity of such visual specters.

And yet no matter how significant the physiological basis of optical research would become in the opening decades of the nineteenth century, and no matter how much Goethe played a key role in its generation (Johannes Müller, for example, would say that Ottilie’s diary in the *Wahlverwandtschaften* was the starting point for his study on “fantastic visions”<sup>9</sup>), what mattered within the field of *entoptics* for Seebeck and Goethe was the way it asked after the *objective* appearance of color within material bodies.<sup>10</sup> With the recent scholarly attention to the question of the physiology of vision, we have in the process largely overlooked this supplemental, and crucially technologically mediated, stage to Goethe’s optical research.<sup>11</sup> If physiological vision was concerned with the objectivity of subjective seeing—the properties of the eye that generated visual experience within our minds—entoptics was concerned with what we might term a relational objectivity between subjects and objects mediated by an apparatus.<sup>12</sup> Entoptics was the study of the way objects in relation to each other and in relation to the perceiving subject via some form of interference worked in concert to generate visual phenomena, to generate “appearances” in the world, that which we could know. Entoptics shifted the basis of experimental knowledge from the more commonly addressed dyadic structure of subject and object—valorized in Goethe’s own writing in his much-cited essay, “Der Versuch als Vermittler zwischen Subjekt und Objekt”—to a triadic and fundamentally social and technical assemblage between a subject and multiple dynamic objects.<sup>13</sup> The relational

mobility of objects, and ultimately of the colors themselves, is what made entoptics such a significant new field in Goethe's life and work.

Goethe likened the discovery of entoptic phenomena to the geographer's encounter with "a newly discovered island."<sup>14</sup> In my essay, I want to return to Goethe's entoptical research, this so-called "island," by situating it within the larger field (or sea) of his work during this period, and in particular his autobiographical work that was so definitive for his postclassical output of the 1810s.<sup>15</sup> My argument is that the entoptic paradigm emerges in Goethe's work as a pivotal conceptual space to work through the increasingly unsettled relationship between the fields of observation, subjectivity, and self-representation that transpired in the opening decades of the nineteenth century. Research on vision not only drew heavily on autobiographical material for its subject matter (the real equivalents of Otilie's diary). It also played a key role in defining the nature of both the individual and the organism that was the ostensible object of the autobiographical project.

This essay thus grows out of a larger line of inquiry that is interested in understanding the interchange between the fields of scientific investigation—and the broad range of areas that gradually came to be known as the life sciences—and that of literary representation, in particular the increasingly popular genre of literary autobiography.<sup>16</sup> For late eighteenth- and early nineteenth-century writers, I want to argue, understanding the category of life, whether as a vital process or the sum of lived experiences, depended as much upon the controlled practices of scientific experiment as it did upon the more open-ended media work of literary experiments in self-disclosure.<sup>17</sup> My question is not simply a Foucauldian one of how life emerged as a distinct field of knowledge around 1800, but more specifically how life came to be written, how it came to be understood as a *writable* object of knowledge. What were the connections between the graphical and the observational instruments that were used in writing life—whether understood as bibliographic or natural scientific apparatuses—and the way life came to be *envisioned* around 1800? In other words, how did the autobiographical, the bibliographical, and the optical all influence one another?

The years between when Goethe first received Seebeck's booklet and then turned with renewed intensity to the study of entoptic colors coincided with his turn away from completing the fourth volume of the first section of his autobiographical work, *Dichtung und Wahrheit*, and toward a series of supplemental parts that would include not only the *Italienische Reise*, but as we will see, the lesser-known periodical *Ueber Kunst und Alterthum*, which Goethe would refer to as belonging to his autobiographical corpus although it was never subsumed within the larger edifice of *Aus meinem Leben*.<sup>18</sup> The entoptic turn coincided, in other words, with the breakdown of a particular representational paradigm informing

his earlier project of writing life, one that we might characterize as “aspirational,” where life was understood as a totality of successive, upwardly striving stages of change. Life, according to this model, was essentially a plant. Or better: a stone that wanted to become a plant, much like the all-important icon of the gothic spire that had played such a critical role in Goethe’s own development in the figure of the Strasbourg Cathedral.<sup>19</sup> As Goethe wrote in the epigraph to the third volume of *Dichtung und Wahrheit*, slightly modifying a saying from Luther, “Es ist dafür gesorgt, daß die Bäume nicht in den Himmel wachsen” (That’s why it has been arranged that trees do not grow to heaven). In arguing for the aspirational limits of the arboreal, in reminding us that trees do not grow or go to heaven, we can see how the botanical had reached its metaphorical limits within Goethe’s autobiographical undertaking.

In place of completing and publishing the fourth volume of *Dichtung und Wahrheit*, which would not appear until after his death (an act itself most often understood in autobiographical terms), Goethe would embark on a seventeen-year project of autobio- and autobiographical supplementarity. He enacted at the level of the medium of the book the principle articulated by the translator in *Dichtung und Wahrheit*, who, with the fate of Goethe’s father hanging in the balance because of his insult to his French occupiers, cries out, “Nur Aufschub Herr Graf! Nur einen kurzen Aufschub!” (FA 14:114; A deferral my count! Just a short deferral!). Deferral, and the related idea of convertibility—both core elements of the idea of translation and thus spoken by the translator—would provide Goethe with a new program of writerly self-representation, one that was gradually worked out in the natural scientific field of entoptics and the geo-bibliographic spaces of Italy and the Rhine and Main regions. The entoptic apparatus, the classical ruin, and the serialized book of mediated self-reflections would serve Goethe as the material conditions of a renewed sense of self defined through the principle of an intermedial, specular multiplicity. It is here, in such spatio-bibliographic fractures or *Brechungen*, where we see Goethe shifting from a stadal to a radial theory of life. Life is no longer understood as a vertically oriented trajectory propelled by an invisible force within us (*Bildung*, *Lebenskraft*, or *conatus*). Instead, life emerges as the summation of external reflections of oneself (what Goethe would recursively refer to as the “Aug’ in Auge” in his poem “Entoptische Farben”).<sup>20</sup> This might be the second, and indeed more important, way that the notion of Goethe’s “ghosts” has left its mark on the period’s epistemological horizon: the way self-knowledge in Goethe was no longer predicated as an act of seeing yourself as an other, but instead as an act of seeing yourself *through* others. “Self-reflection” emerges in Goethe’s late work as the aggregate of medial refractions of one’s self in the world—as an egology.<sup>21</sup>

## II.

When Goethe first received Seebeck's booklet on his discovery of the entoptic shapes, what began as a swift, initial engagement quickly turned to failure. As Goethe wrote in his diary a day after receiving Seebeck's work, "Aufsatz wegen der Seebeckischen Entdeckung, der nicht abging" (WA 3.5:32; Essay in response to Seebeck's discovery that went nowhere). Goethe's engagement with the entoptic would go dormant for the next year as he worked on and off completing the third part of *Dichtung und Wahrheit* (the galleys were revised on 2 February 1814) and beginning the *Italienische Reise* (the first notation is 6 December 1813). But by January of 1815, Goethe would begin an intensive engagement with the phenomena of entoptic colors, and we can see from his diary the way entoptics and the *Italienische Reise* emerge in a kind of alternating current within his working practices, visualized here in this corresponding chart (fig. 2). The symmetry is striking, one that achieves a moment of remarkable clarity in that two-week period marked in bold in April 1816. While working on the *Italienische Reise* for ten days between 12 and 29 April, the single day spent on entoptic experiments on the 17th marks out the exact midpoint of his work during this short span. There is a deeply programmatic relationship in Goethe's daily working practices between the intermedial translation of his Italian notebooks into print and his investigation into the translation of light into chromatic form through the apparatus of multiple reflection.

But there is also a polarized one. The *Italienische Reise* and the entoptic apparatus are complementary to the extent that the latter reconciles the perceptual instabilities that Italy comes to represent. As I have written elsewhere, not only was Italy where Goethe went to orient himself toward objects, a tradition of interpretation that has been strongly shaped by Jane Brown.<sup>22</sup> It was also where he went to experience a new form of vertiginous or torsional seeing. Italy served as a key space to reflect on what it meant to posit a fundamental turn at the basis of life, either through the age-old notion of conversion (in Goethe's naturalized term as "rebirth") or through the material artifact of the sheep's skull discovered in Venice that allowed Goethe to theorize the skeletal crown composed of a multiplicity of vertebrae or *Wirbelbein*, bones that turn. Looking "back" (*Rücksicht*)—understood in terms of both retrospection and vertebral encounter—emerged as the new condition of a post-Italian model of "insight," one that was itself understood as a form of rotation (*vertex*), a looking in that was premised on a looking away, an "ableiten" in Goethe's terms.<sup>23</sup> The vertigo of Italian life (and things) necessitated a new sense of both medial and ocular disorientation. As a space and a set of things, Italy serves as a rotatory supplement to the aspirational figures of *Dichtung und Wahrheit*.

1815		1816	
Jan / Feb	Ent	March 13-14	IR sent to Frommann
March	0	March 15-30	Ent
April-June	IR	April 9-10	Ent
July	0	<b>April 12-29</b>	<b>IR / Ent</b>
Aug / Sep	Ent	April 30	Ent
12,13,14,15,16,17,22, 24,25,26,29 17 = Ent		May 18-19	Ent
		June 3,7,8,10	Ent
Italienische Reise (IR) Entoptische Farben (Ent)		June 11, 28, 30	IR
		July 1, 11	IR
		July 12	IR / Ent
		July 13, 14, 15	IR
		July 16	IR sent to Frommann
		July 21, 22	Ent
		Oct 9-17	IR
		Oct 30	Ent
		Nov 2	Ent
		Nov 4,5,8,13,19,20	Ent
		Dec 8	IR

Fig. 1.2. Chart showing the dates drawn from Goethe's diaries of when he was working on the *Italienische Reise* and entoptic color research.

The *Italienische Reise* was the work in which Goethe would ultimately argue for the supplementarity of man (FA 15.1:372). And yet it was not only a figural and bibliographic supplement to *Dichtung und Wahrheit*, but also the creative counterpart, or pole, to the scientific experiments undertaken during these same years with the entoptic colors.<sup>24</sup> The results of these experiments would subsequently appear in a long essay, "Entoptische Farben" (Entoptic colors), which was published in 1820 in the journal *Zur Naturwissenschaft überhaupt* (FA 25:682–728). The reflection, or pole, of that scientific essay would then appear as a novel practice of life-writing that would emerge in the same year in Goethe's literary-critical journal, *Ueber Kunst und Alterthum*. To understand the larger project of writing life in Goethe is to be attentive to these reflective and supplementary structures within his working practices. It is to understand the autobiographical and the scientific as processes in time.

Turning first to the essay on entoptics, we can see that one of the fundamental reasons for Goethe's interest in entoptics was the way it amplified his anti-Newtonian conviction that color was not derived from the division of light but instead was a product of *Triebung* or a darkening medium.<sup>25</sup> For Goethe the central component of the entoptic apparatus was the way it worked most distinctly with darkened or tempered pieces of glass. In this it drew together a visual phenomenon with that other increasingly interesting

object of early nineteenth-century science: heat. It would be Seebeck's interest in heat, after all, that was the basis of his subsequent discovery of thermoelectricity just one year later (which at the time he called thermomagnetism), a complement to Hans Christian Oersted's earlier discovery of electromagnetism in 1820, the year of Goethe's entoptic essay.<sup>26</sup>

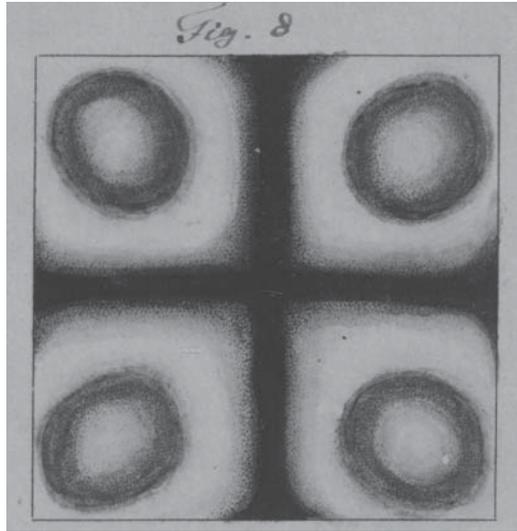
At a deeper level, entoptic figures were signs of a new, and particularly vexing, type of natural knowledge: the law of compound forms. In their derivation from compounding visual effects, and in their relation to other natural phenomena such as temperature, entoptic figures raised important questions about aggregative forms of knowledge. How did the parts relate to one another? Was there a hierarchy of forces under which lower forces were to be arrayed? Was there one single unifying force in nature? Or was there a complementarity to how these individual forces interacted and if so, what were the patterns of such complementarity? What was the law behind such compound nouns—if there was one law—and how was one to create a nomenclature for such combinatory phenomena? As Goethe had surmised already in 1806, well before the French breakthrough into the polarization of color:

Die Farbe zeigt eine Polarität, sie oxydirt und desoxydirt, und wird es: beides Erscheinungen wie bei Magnet und Electricität. Sollte die Farbe nicht eine nur für den Sinn des Auges erfolgende Erscheinungsweise eines und desselben Entis sein, das sich bald als Magnetismus, bald als Electricität, bald als Chemismus zeigt?<sup>27</sup>

[Color shows a polarity, it oxidizes and deoxidizes, and becomes both appearances as with magnets and electricity. Should color not be a mode of appearance that emerges only as a consequence of the sense of the eye as one and the same thing, one that reveals itself at times as magnetism, at times as electricity and at times as chemistry?]

Understanding this fundamentally aggregative quality of nature required new modes of perception and new means of inscription to record and represent it.<sup>28</sup>

Goethe's attention to the aggregative was also integral to his second major insight about the significance of entoptic colors: the condition of their translatability. Essential to the process of aggregation was the phenomenon of transformation, or metamorphosis in Goethe's terms, a fundamental change of state that bore a relational aspect to a prior or adjacent state. In experiment #23 in which Goethe used a sheet of mica—the medium we should remember that had been decisive for Arago's work on the discovery of the chromatic aspect of polarization—Goethe makes the argument that the cross at the heart of the entoptic figure produced by the use of mica is actually two arrows or hooks, *Haken*, that are striving toward one another (fig. 3). The static cross is here translated into



*Fig. 1.3. Detail of the illustration of entoptic colors taken from Thomas Seebeck, “Einige neue Versuche und Beobachtungen über Spiegelung und Brechung des Lichts” (1813). Courtesy of the Klassik Stiftung Weimar, GSA 26/L 4a, S. 5.*

two dynamic arrows, or seen the other way around, the arrows combine to produce the figure of the cross.

The *Pfeil* and *Haken* are of course two of the most vital figures in Goethe’s late work, whether understood as rhetorical barbs or magnetic needles.<sup>29</sup> In notes taken during Goethe’s first Italian stay, we can see how the arrow is similarly part of a larger notational universe used to understand the natural objects before him. In this particular sheet (fig. 4), in which Goethe is arguing for the principle of “Hervorbringung ihres Gleichen” (WA 2.7:9; the generation of the similar) within the botanical world, we can see how Goethe uses crosses (+) as a way of making emendations to his dictations that are then combined to form grids or number signs (#) in order to add subsequent notations. The cross and the grid are thus signs of manuscriptural addition, but they are also mirrors of the gridlike structures of the very botanical forms Goethe is describing (GSA 26/LV,2, Bl. 87Rs). The growth of writing—and the transformation of ideas that it presupposes—are derived from the figural shape of the growth of plants. The notational sign, the mark of more language, reflects the visual sign, the image of a developmental object in the world. Seen in this way, the cross is a sign not only of an addition to writing, but also of a translation across media—it marks out a common space of movement from writing to drawing as well as from nature to graphesis more generally. As we move from the arrow (>) to the cross (+) to the grid (#), the

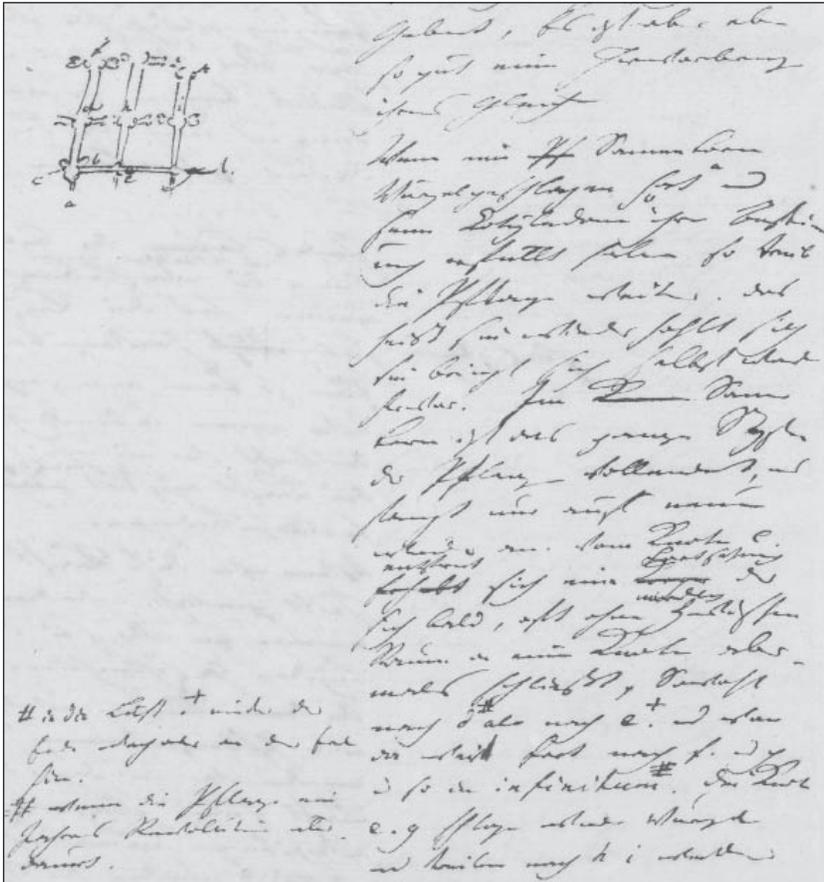


Fig. 1.4. Portion of a leaf from Goethe's notes taken during his first Italian journey on the theme of "The Generation of the Similar." The schematic drawing of the plant in the upper left corner mirrors the notational system of emendation in the lower left corner. Courtesy of the Klassik Stiftung Weimar, GSA 26/LV, 2, Bl. 87Rs.

*Haken* becomes a fundamental sign of translation itself, a technique for visualizing natural and cultural assemblages, for visualizing phenomena understood *as* assemblages.<sup>30</sup>

It is telling that at the very moment that Goethe argues for the dynamic and aggregative identity of the entoptic figures (again experiment #23), he will also make reference to Ernst Chladni's well-known sound-shapes, a comparison that had already been made in Seebeck's initial article.<sup>31</sup> Referring to the oscillation of the figures produced by the sheet of mica, Goethe writes:

Dieses ist sehr unterrichtend, indem wir nun daraus lernen daß die bekannten Kreuze nicht etwa aus zwei, sich durchschneidenden Linien entstehen, sondern aus zwei Haken, welche sich, aus den Ecken hervor, gegen einander bewegen, wie es bei den chladnischen Tonfiguren der Fall ist, wo solche Haken gleichfalls von der Seite hereinstreben, um das Kreuz im Sande auszubilden. (FA 25:700)

[This is very informative in so far as we learn from it that the observed crosses are not constituted from two criss-crossing lines, but rather from two arrows. These originate in the corners and move towards each other, much like the case of Chladni's sound shapes, where such arrows similarly strive towards the center from the sides in order to form the cross in the sand.]

Indeed, for Goethe's early research on entoptic figures, the visualization of sound had played a key role right from the beginning. In a diary entry from 3 February 1815, we see Goethe discussing a sound-table he had created based on Chladni's textbook (GSA 26/LII, 20, Bl. 5–6). One day later, he will move to experiments with entoptic colors, a pattern that will repeat itself a few weeks later when, on 19 February, Goethe will work on his so-called "Tonlehre" and then a week later return to the entoptic colors. The intermedial visualization of sound provides the theoretical foundation for the intermedial visualization of color, which is itself premised on a translational principle of multiply turning light in order to produce dynamically conjoining figures that form a larger whole. The translational identity of the graphical figure as trope (as that which turns) underwrites an intermedial practice of the representation of nature, as we move from sound-image to thermal-image and ultimately to the compound images of the thermal, electrical, and magnetic.<sup>32</sup>

Understanding the combinatorial and translational identity of entoptic colors, what Goethe referred to as "das Grundphänomen von allen übrigen" (WA 2.5.2:359; the foundational phenomenon of all others), would depend in crucial ways on the specific apparatus upon which its observation was indebted. In this, the entoptic apparatus, which Malus had named a polarimeter, was an integral part of the history of technologically assisted viewing, although it has seldom if ever been read this way.<sup>33</sup> Unlike other, more canonical instruments like the microscope or telescope that emerged out of an early-modern milieu of natural inquiry aimed at allowing the human viewer to see more *deeply* into nature, the entoptic apparatus had a crucially generative function.<sup>34</sup> Where the microscope allowed researchers during the contentious eighteenth-century debates on epigenesis to observe generation (most notably in the figure of the hen's egg), the entoptic apparatus was itself generative, a generativity that depended upon a torsional aspect of turning and returning light. In this,

it was remarkably similar to another early nineteenth-century instrument, the kaleidoscope, invented by David Brewster, the individual we recall who had received the other half of Seebeck's prize. As Brewster described his invention, "The fundamental principle of the Kaleidoscope is, that it produces symmetrical and beautiful pictures, by converting simple into compound or beautiful forms, and arranging them, by successive reflections, into one perfect whole."<sup>35</sup> Like the kaleidoscope, the entoptic apparatus did not reveal something hidden in nature, but brought it forth through a compound process of successive turns. Only in conjunction with one another in a serial process of revolutions would such transparent bodies reveal the relational chromatic forms that resided within them. Only through such turning and returning could we see within, what Goethe notably called the "lines of restraint" or "Hemmungslinien" that resided within tempered pieces of glass (FA 25:709). Or as Goethe wrote in his earlier essay on the doubly refractive crystal that was a prelude to his entoptic studies, "Nur da wo beide Bilder sich decken, zeigt sich das volle Bild, zeigt sich das wahre, dem Auge undurchdringliche Objekt" (FA 25:671; Only there where both images cover each other does the full image show itself, the true object impenetrable to the eye). The entoptic image was the summation of rotational aggregation.

### III.

If entoptic colors were the experimental pole to the autobiographical work of the *Italienische Reise*, it would be Goethe's periodical, *Ueber Kunst und Alterthum*, begun in the same year as the publication of the first volume of the *Italienische Reise*, that would serve as the bibliographic realization of the entoptic program of multiple reflection. As a whole, *Ueber Kunst und Alterthum* was a work deeply invested in exploring emerging practices of reproducibility within the arts, especially the new art of lithography.<sup>36</sup> Its significance as an autobiographical space lay in the way it redefined the bibliographic supplementarity of the *Italienische Reise* into a program of recursive, intermedial self-reflexivity. It did not just extend the corpus of life-writing as a potentially illimitable serial practice. Rather, it defined the intelligibility of that corpus as dependent upon an assemblage of both epitextual and intermedial refractions of one's own self-representations.<sup>37</sup>

The crucial starting point of this autointermediality occurred when Goethe included a short notice by Johann Heinrich Meyer, written at Goethe's request, in the second part of the second volume of 1820, the same year that saw the publication of Goethe's essay on entoptic colors. The notice consists of a bare 129 words describing a publication by the brothers Henschel in Berlin that consisted of seven lithographed illustrations of Goethe's childhood and that were based on scenes described

in *Dichtung und Wahrheit*. However simple, or perhaps because of its simplicity, this untitled, ghostwritten contribution initiates a new practice in Goethe's life-writing. It becomes the first of more than two dozen notices or *Anzeigen* that will appear in Goethe's journal over the next decade in which Goethe, or one of his mouthpieces, will discuss a publication that derives in some adaptive way from his own writing. In the next issue of *Ueber Kunst und Alterthum*, for example, Meyer discusses a life-sized bust of Goethe made by the sculptor Christian Daniel Rauch, an engraving of which will adorn a later issue of the same journal (5, no. 2). Goethe will review interpretations of his poetry ("Ueber Goethes Harzreise im Winter"; 3, no. 2); translations of his interpretations of painting ("Observations on Leonardo da Vinci's Celebrated Picture of the Last Supper. By Goethe"; 3, no. 3); engravings based on his own sketches ("Radirte Blätter, nach Handzeichnungen [Skizzen] von Goethe"; 3, no. 3), for which he will write accompanying poems; musical settings of his poetry ("Neue Liedersammlung von Carl Friedr. Zelter"; 3, no. 3); French translations of his dramatic works ("Oeuvres dramatiques de Goethe"; 5, no. 3); and finally books of testimonies by others about himself, the review of which was written by Eckermann ("Goethe in den Zeugnissen der Mitlebenden"; 4, no. 3). In lieu of the confessional mode—autobiography in a Rousseauvian vein—here we have representations of other people's representations of one's self-representation.

By way of conclusion, I want to turn to one example in particular that should give an indication of the extent to which the entoptic visual apparatus was translated into a mediological program in Goethe's autobiographical work. Two notices after Meyer's account of the Henschels' lithographs, we find a notice concerning that archsymbol of the early nineteenth-century self, the gothic cathedral (FA 20:404). This time the façade of subjectivity is the unfinished Cologne cathedral. The notice, jointly authored by Goethe and Meyer, concerns a recent publication in which the newly discovered blueprints for the cathedral's missing towers were reprinted by Georg Moller.<sup>38</sup> The notice was significant for two main reasons. First, it drew attention to the very first entry of the opening issue of *Ueber Kunst und Alterthum* from 1816 in which Goethe mentioned the discovery of the cathedral's plans by his friend Sulpiz Boisserée and initiated a call for their publication for the purpose of their visual development, to move from the graphical space of the blueprint (*Grundriß*) to that of the perspectival drawing (FA 20:24). The new notice of 1820 was thus a sign of the way the *Anzeige* as a genre was capable of bringing forth work in the world. Like the entoptic or kaleidoscopic apparatus, the literary advertisement, that which pointed "at" (*anzeigen*), was not simply reflective. It did not just reflect and thus amplify something that was already there. Rather, it contained a generative potential. Through the practice of multiple reflection, it brought forth something in the world.

Giving further valence to the figures of the *Pfeil* and *Haken*, pointing was understood as a form of making.

The advertisement was significant for another reason, however, one that depended on the way it aligned manuscriptural discovery with print technology as part of a larger program of visualization. In the second half of the notice Goethe and Meyer refer to a project by the chief architectural engineer in Weimar, Clemens Coudray. Coudray had created a thirteen-foot perspectival representation of the cathedral based on the printed plans and sketches (Coudray's drawing is now lost). One of the key technological means of doing so, expressly mentioned in the notice, was the printing of *Gegendrucke*, or mirror prints, in Moller's edition, which allowed for the proper perspectivalization of the structure's columns.

Such mirror prints were produced by printing the normal plates of an image onto a piece of paper and then, while the ink was still wet, placing a second page on top of the print, absorbing the ink in what would now be considered a form of off-printing (fig. 5). The significance of the *Gegendruck* for Goethe was the way print was endowed with its own mirroring function. It was capable of multiply reflecting its manuscriptural source as a means of visual completion. The off-print served as the technical equivalent of the morphological principle of *ab-leiten*. The notice tellingly concluded with a call to further visualization, as Moller is requested to print Coudray's drawing so that other experts could then participate in an even fuller representation of the original sketches, including bookbinders, upholsterers, decorators, and architects. Print's reflective qualities—its capacity to multiply a work in the world—were called upon to bring together a diverse array of artisanal experts to generate a more complete visual product. Print was understood as an entoptic technology that could bring forth visual assemblages through the process of intermedial translation.

The short notice (notice #20) was thus significant for the way it articulated a theory of technological reproducibility. But it was also significant because of the way it reconceived the gothic spire as one of the most epochally significant metaphors of human life at the turn of the nineteenth century. Instead of a sign of the aspirational principle of self-exceeding that had belonged to the Strasbourg Cathedral and its memorialization in *Dichtung und Wahrheit*—the gothic spire as the most imposing figure of the incessantly upward striving self—notice #20 shifted the column's meaning toward that of a radial model of social and technical assembly. The missing spire was filled in by a literary-technological practice of fulfillment: from the printed sketch or *Entwurf*, to the suprahumanly-sized drawing that towered over the viewer, to the multiply printed mirror images or off-prints that, taken together, were meant to coalesce into something even "fuller."

The emerging ecological theory of the self on display here—that self-realization, the realization of the singular column of our individuality,

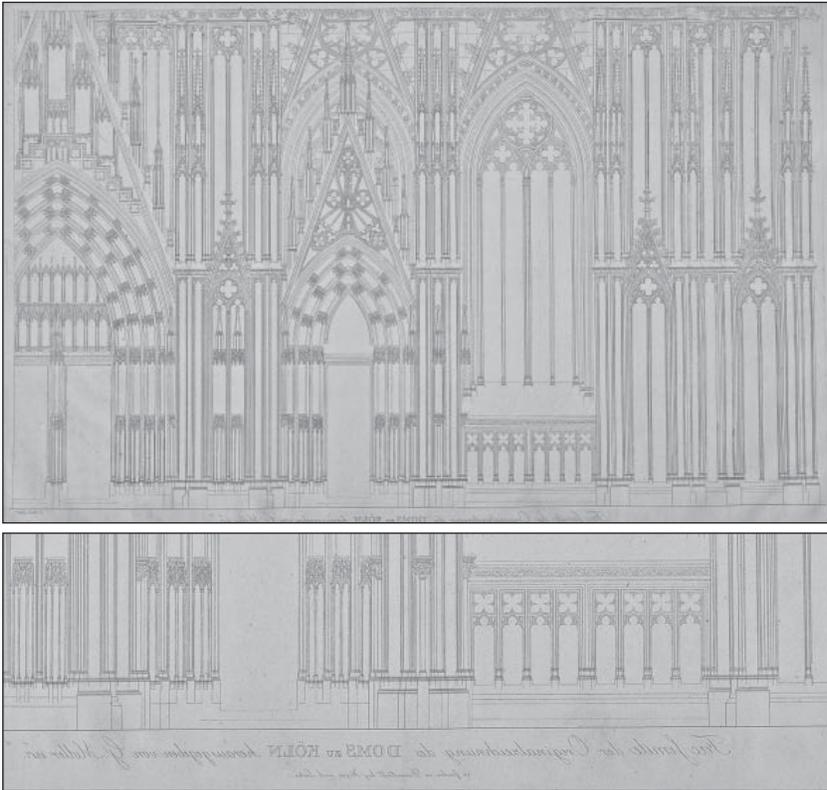


Fig. 1.5. One can see that the caption in the lower portion of the print is written in reverse, indicating it is a mirror print. Georg Moller, *Bemerkungen über die aufgefunden Originalzeichnung des Domes zu Koeln* (Darmstadt 1818), plate 2. Courtesy of the *Klassik Stiftung Weimar, Goethe Nationalmuseum, Ruppert 2356*.

only occurs through the understanding of others' understanding of ourselves—is paired with what we might call a protocological theory of writing, the way we can establish the codes through which our work will be taken up in the future without, however, any predictive or deterministic success. According to *Ueber Kunst und Alterthum* and the larger autobiographical project to which it belonged, writing life was understood in Hans-Jörg Rheinberger's sense as an experiment, as a machine for making the future.<sup>39</sup> As the object of such writing, the individual life was no longer conceived as the summation of moments of striving to be oneself, what Goethe would call, in a more pessimistic vein, "error."<sup>40</sup> Instead, life was to be understood as the mediated assemblage of multiple refractions, *Brechungen*, of that life in the future by others. As Goethe would write in his own translation, or refraction, of Byron's *Manfred*, which

appeared as the closing entry to this issue of *Ueber Kunst und Alterthum* that I have been discussing: “Im Leben ist nichts Gegenwart” (In life there is no present).

## Notes

<sup>1</sup> Etienne Louis Malus, “Théorie de la double réfraction de la lumière,” *Mémoires des savants étrangers* 2 (1811): 305–508. For a discussion of Seebeck’s work, see Keld Nielsen, “Another Kind of Light: The Work of T. J. Seebeck and His Collaboration with Goethe. Part 1,” *Historical Studies in the Physical and Biological Sciences* 20 (1989): 107–78 and vol. 21 (1991): 317–97. For a discussion of Malus, see Eugene Frankel, “Corpuscular Optics and the Wave Theory of Light: The Science and Politics of a Revolution in Physics,” *Social Studies of Science* 6 (1976): 141–84; and Eugene Frankel, “The Search for a Corpuscular Theory of Double Refraction: Malus, Laplace, and the Prize Competition of 1808,” *Centaurus* 18, no. 3 (1974): 223–46.

<sup>2</sup> Jed Z. Buchwald, *The Rise of the Wave Theory of Light: Optical Theory and Experiment in the Early Nineteenth Century* (Chicago: University of Chicago Press, 1989), 41–110.

<sup>3</sup> It would be in the work of Malus’s colleagues, François Arago and Jean-Baptiste Biot, where polarity was extended from light to color. See François Arago, “Mémoire sur une modification remarquable qu’éprouvent les rayons lumineux dans leur passage à travers certain corps,” *Mémoires de la classe des sciences mathématiques et physiques* (1811): 92–134 and J. B. Biot, “Mémoire sur de nouveaux rapports qui existent entre la réflexion et la polarisation de la lumière par les corps cristallisés,” *Mémoires de la classe des sciences mathématiques et physiques* (1811): 134–280.

<sup>4</sup> Thomas Seebeck, “Einige neue Versuche und Beobachtungen über Spiegelung und Brechung des Lichts,” *Journal für Chemie und Physik* 7, no. 3 (1813): 261. All translations are my own unless otherwise noted. In his copy of Seebeck’s essay, Goethe would underline the final word “hervor” in this sentence, and then remark in the bottom margin, “zur Erscheinung” with the words underneath, “mit dem Lichte der ein und dasselbe.” Goethe’s copy is not contained in his library, but in his notes to entoptic studies housed in the *Goethe- und Schiller-Archiv*: GSA 26/L 4a.

<sup>5</sup> François Arago, “Mémoire sur une modification remarquable.”

<sup>6</sup> For Seebeck, all transparent bodies could be understood as doubly refractive, the only difference being that the double images of simply refractive crystals were turned in opposing directions and thus canceled each other out so one only saw one image. Thomas Seebeck, “Einige neue Versuche und Beobachtungen über Spiegelung und Brechung des Lichtes,” 281–82.

<sup>7</sup> Thomas Seebeck, “Einige neue Versuche und Beobachtungen,” 294.

<sup>8</sup> Johann Ritter, *Fragmente aus dem Nachlasse eines jungen Physikers* (Heidelberg: Schneider, 1969), 31.

<sup>9</sup> Johannes Müller, *Ueber die phantastischen Gesichterscheinerungen. Eine physiologische Untersuchung* (Coblenz: Hölscher, 1826), 44.

<sup>10</sup> Goethe and Seebeck's use of entoptics is not to be confused with its use by later researchers like Johannes Müller or Hermann von Helmholtz who used the term to stand for the physiological vision that had been so integral to the opening portions of Goethe's *Farbenlehre* (Müller's so-called "fantastic visions"). For Seebeck and Goethe, entoptics was part of a broader suite of chromatic phenomena that corresponded to objects in the world. These included catoptrics (color on the surface of a body), dioptrics (color produced when light passes through a colorless medium like a prism), paraoptrics (color produced when light passes along an outline of a body, such as a shadow), and eoptics (colors produced by thin layers such as oil on water or through pressure by squeezing two bodies together).

<sup>11</sup> Frederick Burwick's work is the decisive entry point to entoptic studies. See Frederick Burwick, *The Damnation of Newton: Goethe's Color Theory and Romantic Perception* (Berlin: de Gruyter, 1986); and "Goethe's 'Entoptische Farben' and the Problem of Polarity," *Goethe and the Sciences: A Reappraisal*, ed. Frederick Amrine et al. (Dordrecht: Reidel, 1987), 29–44.

<sup>12</sup> Crucial to my understanding of entoptics will be attention to the apparatus and the place of technologically aided viewing in Goethe. In this I am interested in opening a new line of inquiry that differs from attention to the pure corporeality of Goethean phenomenology, perhaps best represented in the work of Gernot Böhme, as well as attention to a more transcendental model of vision, what Joseph Vogl calls "ein pures Sinnliches," in which color transcends "die Welt der empirischen Dinge." Entoptics is not only about a new form of technologized vision in the nineteenth century; it is also a methodology for the visualization of a material interiority, a science of observing the "within" of objects, but one that depends on a variety of categories of interference, such as *Widerstand*, *Brechung*, or *Hemmung*. Color is interference or mediation and thus necessitates both object and apparatus. See Gernot Böhme, "Ist Goethes Farbenlehre Wissenschaft?" *Studia Leibnitiana* 9, no. 1 (1977): 27–54; "Goethes Farbenlehre als Paradigma einer Phänomenologie der Natur," in *Durchgeistete Natur*, ed. Alfred Schmidt and Klaus-Jürgen Grün (Frankfurt am Main: Peter Lang, 2000), 31–40; and Joseph Vogl, "Der Weg der Farbe (Goethe)," in *Räume der Romantik*, ed. Inka Mülder-Bach and Gerhard Neumann (Würzburg: Königshausen & Neumann, 2007), 157–68.

<sup>13</sup> For a discussion of the experimental situation in these terms, see Hans-Jörg Rheinberger, "Experiment, Difference, and Writing," *Studies in History and Philosophy of Science* 23, no. 2 (1992): 305–31; and part 2 in *Studies in History and Philosophy of Science* 23, no. 3 (1992): 389–422. For discussions of a range of experimental paradigms around 1800, see Nicolas Pethes, *Literarische Experimentalkulturen: Poetologien des Experiments im 19. Jahrhundert* (Würzburg: Königshausen & Neumann, 2005); and Sabine Schimma and Joseph Vogl, eds., *Versuchsanordnungen 1800* (Zürich: diaphanes, 2009).

<sup>14</sup> From a draft to a letter to Christoph Ludwig Friedrich Schultz, 11 March 1816. *Goethes Werke* (Weimar: Böhlau, 1902), sect. 4, vol. 26, par. 7330. All subsequent references to this edition will be made parenthetically in the text as WA, followed by the section, volume, book (when relevant) and paragraph number.

<sup>15</sup> For another way that entoptics is understood to inform Goethe's literary work during this period, see Karl Richter, "Wiederholte Spiegelungen im

‘West-östlichen Divan’: die Entoptik als poetologisches Paradigma in Goethes Alterswerk,” *Scientia Poetica* 4 (2000): 115–30.

<sup>16</sup> Where the scientific and the autobiographical have been brought together, it has usually been to show Goethe’s insistence on the autobiographical dimension of scientific inquiry, according to which the scientific self matters to the history of science. See Bernhard Kuhn, *Autobiography and Natural Science in the Age of Romanticism: Rousseau, Goethe, Thoreau* (Burlington: Ashgate, 2009), 63–96; Robert Richards, *The Romantic Conception of Life: Science and Philosophy in the Age of Goethe* (Chicago: University of Chicago Press, 2002), 325–502; and Stephan Koranyi, *Autobiographik und Wissenschaft im Denken Goethes* (Bonn: Bouvier, 1984).

<sup>17</sup> As Goethe himself would write in *Zur Morphologie* (1823), “In dem gegenwärtigen wie in den früheren Heften, habe ich die Absicht verfolgt: auszusprechen, wie ich die Natur anschau, zugleich aber gewissermaßen mich selbst, mein Inneres, meine Art zu sein, in so fern es möglich wäre, zu offenbaren.” J. W. Goethe, *Schriften zur Morphologie. Sämtliche Werke*, vol. 24, ed. Dorothea Kuhn (Frankfurt am Main: Deutscher Klassiker, 1987), 595. All subsequent references to this edition will be made parenthetically in the text as FA, with the volume, book (when relevant), and page number.

<sup>18</sup> In a letter to Cotta on 6 December 1815, Goethe writes, “Wegen der Schrift Kunst und Altertum in den Rhein- und Mayngengenden ist mit Herrn Frommann alles in Ordnung [. . .] In der Folge kann es einen Teil meiner Biographie ausmachen” (FA 16:845). Studies on Goethe’s autobiography concentrate overwhelmingly on the two works *Dichtung und Wahrheit* or the *Italienische Reise*, usually taken out of the context of the whole autobiographical enterprise. Even Carsten Rohde’s magisterial study that attempts to account for “all” of Goethe’s autobiographical writing leaves out *Ueber Kunst und Alterthum*. See Carsten Rohde, *Spiegeln und Schweben. Goethes autobiographisches Schreiben* (Göttingen: Wallstein, 2006).

<sup>19</sup> In a planned, yet never published preface to the third volume of *Dichtung und Wahrheit*, Goethe would write, “Ehe ich diese nunmehr vorliegenden drei Bände zu schreiben anfang, dachte ich sie nach jenen Gesetzen zu bilden, wovon uns die Metamorphose der Pflanzen belehrt” (FA 14:971). And yet what he eventually did publish as part of the volume’s opening were the more pessimistic words, “Es sind wenig Biographieen, welche einen reinen, ruhigen, steten Fortschritt des Individuums darstellen können” (FA 14:522).

<sup>20</sup> Here I want to take Fritz Breithaupt’s inspired suggestion of Goethe’s late turn to a polyphonic ego quite literally—not as a metaphorical or narratological construct within the literary work, but as an actual medial construction. See Fritz Breithaupt, “Goethe and the Ego,” *Goethe Yearbook* 11 (2002): 77–109.

<sup>21</sup> Essential to theorizing this idea of the “ecological ego” is Guattari’s work on ecosophy and the environmentalism of the self. See Félix Guattari, *The Three Ecologies*, trans. Ian Pindar and Paul Sutton (New Brunswick: Athlone, 2000).

<sup>22</sup> See Jane Brown’s marvelous essay on the emergence of Goethe’s objective style after Italy, the way “language takes on its own independent existence.” “The Renaissance of Goethe’s Poetic Genius in Italy,” in *Goethe in Italy, 1786–1986*, ed. Gerhart Hofmeister (Amsterdam: Rodopi, 1988), 77–93. For my essay on

Goethe and vertiginous poetics, see Andrew Piper, “Vertiginous Life: Goethe, Bones, and Italy,” in *Marking Time: Romanticism and Evolution*, ed. Joel Faflak (Toronto: Toronto University Press, forthcoming).

<sup>23</sup> In *Zur Morphologie* Goethe writes, “Aufgeregt nun durch eben diese Betrachtungen fuhr ich fort, mich zu prüfen und fand daß mein ganzes Verfahren auf dem Ableiten beruhe” (FA 24:598).

<sup>24</sup> For a discussion of the relationship between Goethe’s literary and scientific publishing practices, see Dorothea von Mücke, “Goethe’s Metamorphosis: Changing Forms in Nature, the Life Sciences and Authorship,” *Representations* 95 (Summer 2006): 27–53.

<sup>25</sup> As Goethe writes in “Entoptische Farben”: “Ist die Materie durchscheinend, so entwickelt sich in ihr, im Helldunkeln, Trüben, in Bezug aufs Auge, das was wir Farbe nennen” (FA 25:687). See also his poem of the same name, where he writes, “Spiegel hüben, Spiegel drüben / Doppelstellung, auserlesen; / Und dazwischen ruht im Trüben / Als Kristall das Erdewesen” (FA 25:1318).

<sup>26</sup> For a discussion of these two discoveries and the discrepancy between nomenclature and phenomenon, see Kenneth L. Caneva, “‘Discovery’ as a Site for the Collective Construction of Scientific Knowledge,” *Historical Studies in the Physical and Biological Sciences* 35, no. 2 (2005): 175–291.

<sup>27</sup> Conversation with Riemer, December 1806. Woldemar Freiherr von Biedermann, ed., *Anhang an Goethes Werke: Abtheilung für Gespräche*, vol. 2 (Leipzig: F. W. v. Biedermann, 1889), 272.

<sup>28</sup> For Dennis Sepper, it is this serially cumulative aspect of the methodology of the *Farbenlehre* that is central to Goethe’s contribution to the history of science. See Dennis L. Sepper, “Goethe, Colour and the Science of Seeing,” in *Romanticism and the Sciences*, ed. Andrew Cunningham and Nicholas Jardine (Cambridge: Cambridge University Press, 1990), 189–98.

<sup>29</sup> See Judith Ryan, “‘Pfeile mit Widerhaken’: On the Aphorisms in Goethe’s *Wahlverwandschaften* and *Wanderjahre*,” *Goethe Yearbook* 16 (2009): 1–10; and Andrew Piper, *Dreaming in Books: The Making of the Bibliographic Imagination in the Romantic Age* (Chicago: University of Chicago Press, 2009), 36–45.

<sup>30</sup> As Frederick Burwick argues, such additivity is also a form of complexification in Goethe, as the polarity of light (the arrow) turns into a form of bipolarity (the grid), from a binary structure to a tetractys. See Frederick Burwick, “Goethe’s ‘Entoptische Farben’ and the Problem of Polarity.”

<sup>31</sup> See Thomas Seebeck, “Einige neue Versuche und Beobachtungen über Spiegelung und Brechung des Lichts,” 284. Also see Hilmar Dressler, “Chladnis Klang- und Seebecks Farbfiguren in Goethes Vergleich und einige Widerspiegelungsaspekte der Farbe-Ton-Analogien in der Ästhetik der Goethe-Zeit,” *Jahrbuch des Wiener Goethe-Vereins* 100/101 (1996–97): 55–68.

<sup>32</sup> It is this translational aspect of natural phenomena that is then central to Goethe’s understanding of their connection to Oersted’s breakthrough concerning electromagnetism. As Goethe would write in his *Tag- und Jahreshäften* for 1820, “Der sich immer mehr an den Tag gebende, und doch immer geheimnißvollere Bezug aller physikalischen Phänomene auf einander ward mit Bescheidenheit

betrachtet und so die Chladni'schen und Seebeckischen Figuren parallelisirt, als auf einmal in der Entdeckung des Bezugs des Galvanismus auf die Magnetnadel, durch Prof. Oersted, sich uns ein beinahe blendendes Licht aufthat" (FA 17:307).

<sup>33</sup> My aim here is to situate the entoptic apparatus within Jonathan Crary's argument about "a nineteenth-century modulation in the relation between eye and optical apparatus" that shifts from a metaphorical relationship (the microscope is like the eye) to a metonymic relation (the eye is now part of the apparatus). Although Crary does not discuss the entoptic apparatus, the eye and apparatus can be seen as co-constitutive. Even more interestingly, this metonymic apparatus assumes a secondary metaphorical meaning in the way it stands for *another* eye, the way it marks out a process of social visualization at the heart of Goethe's project (the "eye in the eye" of Goethe's entoptic poem). See Jonathan Crary, *Techniques of the Observer* (Cambridge, MA: MIT Press, 1990), 129.

<sup>34</sup> See Clark Muenzer's excellent analysis of chromogenesis in the *Farbenlehre* for the way color itself is theorized by Goethe as generative. Goethe would then argue for the continuity of this theory to entoptics (FA 25:687). Thus the appropriate apparatus for the understanding of color would be generative rather than penetrative. See Clark Muenzer, "Fugitive Images and Visual Memory in Goethe's Discourse on Color," in *The Enlightened Eye: Goethe and Visual Culture*, ed. Evelyn K. Moore and Patricia Anne Simpson (Amsterdam: Rodopi, 2007), 219–37.

<sup>35</sup> David Brewster, *The Kaleidoscope: Its History, Theory and Construction*, 2nd ed. (London: Murray, 1858), 18.

<sup>36</sup> See Hendrik Birus, "Der Entzug des Hier und Jetzt: Goethes *Ueber Kunst und Alterthum* an der Schwelle zum Zeitalter der technischen Reproduzierbarkeit des Kunstwerks" (22 January 2004): [http://www.goethezeitportal.de/db/wiss/goethe/birus\\_kunst.pdf](http://www.goethezeitportal.de/db/wiss/goethe/birus_kunst.pdf). Accessed 27 May 2011.

<sup>37</sup> Goethe's project thus provides an interesting case that reconfigures the notion of "automediality" put forth by Jörg Dünne and Christian Moser. For Goethe automediality is always interspersed with practices of intermediality. See Jörg Dünne and Christian Moser, eds., *Automedialität* (Munich: Fink 2008).

<sup>38</sup> Georg Moller, *Bemerkungen über die aufgefundenene Originalzeichnung des Domes zu Koeln* (Darmstadt 1818). Catalogued in Goethe's library as Ruppert #2356. It was received by Goethe on 6 December 1817.

<sup>39</sup> Hans-Jörg Rheinberger, "Experiment, Difference, and Writing."

<sup>40</sup> See both Wilhelm Meister's exclamation in the *Lehrjahre*, "Ich habe nichts zu erzählen als Irrtümer auf Irrtümer" (FA 9:823) and a note to *Dichtung und Wahrheit* in which Goethe writes about the individual life, "Eben soviel wahre als falsche Tendenzen / Deshalb ewige Marter ohne eigentlichen Genuss" (FA 14:1055).