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A Matter of Visibility—
G. Chr. Lichtenberg's Art and
Science of Observation

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ABSTRACT: German scholar Georg Christoph Lichtenberg found in the 1770s dust formations on his *electrophorus*, a new device for electrical experiments. These *Lichtenberg Figures* became famous as earliest visualizations of electricity. Their beauty captivated popular audiences, but they simultaneously aided the transformation of electricity from a scientific curiosity into a technology that would dominate the nineteenth century. This paper contrasts Lichtenberg's observations of surfaces in arts and sciences with Johann Caspar Lavater's practice of studying profiles in his new physiognomical "science" of which Lichtenberg was very critical. Lichtenberg's discovery became possible by a careful distinction of artistic and scientific observation (one that Lavater fundamentally ignored), and an approach to the latter with a new eye for what would be called "scientific objectivity." As a result, Lichtenberg's practice and findings formed a matrix for emerging sciences and technologies in the early nineteenth century.

In the 1770s a dispute arose between German experimental physicist Georg Christoph Lichtenberg and Swiss physiognomist Johann Caspar Lavater regarding the scientific reading of visual evidence.¹ It was based on disagreements over the readability of certain inscriptions, which at their heart concerned what Derrida would later de-

1. I will be using the term physiognomy for this science since this seems to be the most commonly used English translation, even though the German makes a more pronounced difference between *Physiognomie* (the outer features of a person's face, and sometimes body) and *Physiognomik* (the science concerned with the former).

scribe as a questioning of the primacy of logos over the materialities of the trace. Ostensibly an argument regarding visual perception, their dispute evolved to include more fundamental questions of scientific practice. This debate transpired at the crossroads of what is philosophically and literarily understood as the transition from Enlightenment to Romanticism, and it foreshadows major shifts in the history of visibility,² particularly as it relates to science and scientific observation. In Lichtenberg and Lavater's conflict over what could be termed the "intelligibility of visibility,"³ a fundamental change in "the act of scientific seeing"⁴ is similarly preconfigured as a "crucial systemic shift [in the makeup of vision],"⁵ which in Lichtenberg's case acknowledges "that there is no origin, that is to say simple origin."⁶ Lavater exemplifies a type of Enlightenment scholar fully committed to the *logos*,⁷ to the belief in a fully revealable truth, whose validity is being questioned by Lichtenberg the skeptic, who exhibits sensibilities commonly associated with Romanticism. A surprising result of this juxtaposition is that Romanticism and a pre-configuration of what will later be termed scientific objectivity end up on the same side, namely Lichtenberg's, whose approach to experimentation and reading shows Romantic receptivity, while also embodying modern sensibilities in regard to observational objectivity.

Approaching a Mysterious Matter

Lichtenberg's most famous contribution to the interrelated fields of science and visibility began with his acquisition of a recently in-

2. Visibility is understood here as referring to sight as a cultural practice and a social fact. For the background of this concept, see Hal Foster, ed., *Vision and Visibility* (Seattle, WA: Bay Press, 1988), esp. Foster's preface; also W. J. T. Mitchell's assessment of the state of the field in "Showing Seeing: A Critique of Visual Culture," *Journal Of Visual Culture* 1:2 (2002): 165–181.

3. Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, MA: MIT Press, 1990), p. 3.

4. Lorraine Daston and Peter Galison, *Objectivity* (New York–London: Zone Books, 2007), p. 10.

5. Crary, *Techniques* (above, n. 3), p. 5.

6. Jacques Derrida, *Of Grammatology*, trans. Gayatri Chakravorty Spivak (Baltimore: Johns Hopkins University Press, 1976), p. 74.

7. As understood in Derrida's critique of Western logocentrism, where he associates the idea "with Plato in particular but which is present nearly everywhere in Western philosophy, of the possibility of unmediated presence of the truth/logos, and of an originary, unitary source of truth, a 'transcendental signified.'" Cf. Timothy Lenoir, *Inscribing Science: Scientific Texts and the Materiality of Communication* (Stanford, CA: Stanford University Press, 1998), p. 4.

vented device for electrical experiments, called an *electrophore*, or *electrophorus*. As Lichtenberg reports, the *electrophorus* was first constructed in glass by Swedish professor Johan Carl Wilcke, but it was fundamentally improved by the Italian Alessandro Volta, who introduced resin as a “much more suitable material” and thereby elevated the device to the rank of the “*machinae electricae*.” Volta also baptized this new and surprising “continuous carrier of electricity” with the Greek-Latin name *elettroforo perpetuo*.⁸ It was a device for the production of high voltages through the separation of electric charges, based on the principle of electrostatic induction. This meant rubbing two suitable materials against each other to create friction and thereby static electricity, which remained the only way to produce electricity until Volta’s construction of a chemical battery in 1800.

The new *electrophorus* delighted researchers for many reasons: it did not need a separate frictional electrical machine for charging, it could hold a charge for a long time, and it could be discharged gradually in multiple little sparks. All of these were substantial advances over the Leyden Jar, which had been the storage medium for electricity up until that point.

The first time Lichtenberg saw one of the new machines, he was impressed by the simplicity and effectiveness it combined, and he immediately decided to build an enlarged version, hoping to magnify the observable facts. Lichtenberg admired the *electrophorus* not only for the phenomena it produced, but just as much for the enthusiasm it created among physicists exploring the qualities of the “*materiae electricae*” (electrical matter). Historian of science Hans Jörg Rheinberger described this effect of a “basic unit of experimental activity combining local, technical, instrumental, institutional, social, and epistemic aspects” as an “experimental system.”⁹

Ultimately the extra-large *electrophorus* not only amplified known phenomena; but, as the microscope did for earlier experimenters,¹⁰ it also enabled Lichtenberg to see “appearances hitherto wholly unknown to [him].”¹¹ In 1777, Lichtenberg found dust formations on his *electrophorus* that emerged inconspicuously and came to affect

8. Georg Christoph Lichtenberg, *Observationes: Die lateinischen Schriften*, ed. Dag Nikolaus Hasse (Göttingen: Wallstein, 1997), pp. 142–143.

9. Hans-Jörg Rheinberger, *Toward a History of Epistemic Things: Synthesizing Proteins in the Test Tube* (Stanford, CA: Stanford University Press, 1997), p. 238.

10. Cf. J. A. Bennett et al., *London’s Leonardo—The Life and Work of Robert Hooke* (Oxford: Oxford University Press, 2003); Jutta Schickore, *The Microscope and the Eye: A History of Reflections, 1740–1870* (Chicago: University of Chicago Press, 2007).

11. Lichtenberg, *Observationes* (above, n. 8), p. 147.

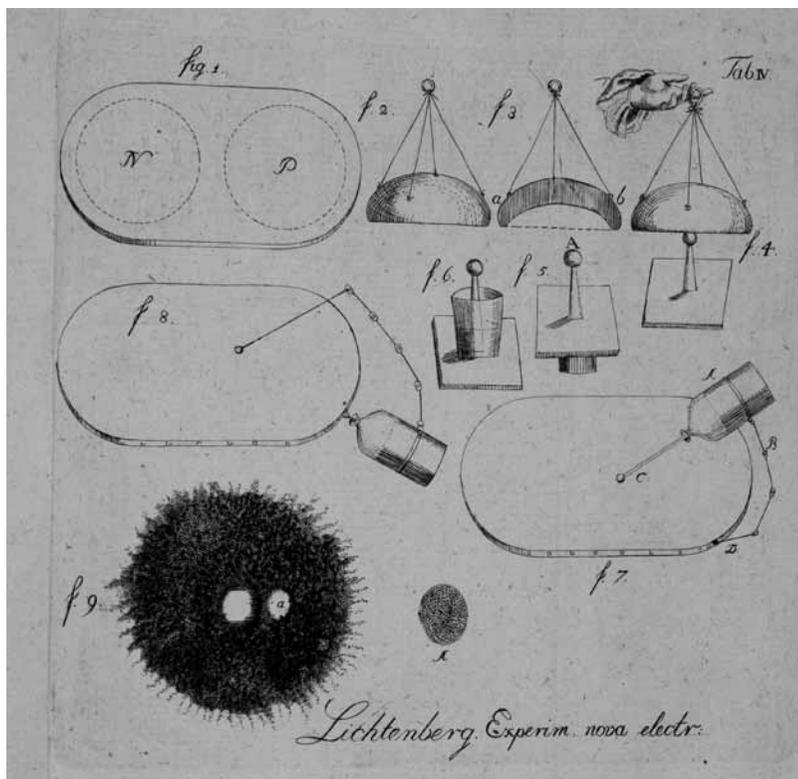


Figure 1. Lichtenberg's illustration showing the schematics of the electrophorus. See Geo. Christ. Lichtenberg, "De nova methodo naturam ac motum fluidi electrici investigandi. Comment. prior, experimenta generaliora continens," in *Novi commentarii Societatis Regiae Scientiarum Göttingensis. Commentationes physicae et mathematicae classis* (Göttingae: Dieterich, 1778), vol. 8, pp. 168–180, image insert following p. 180. Digitized by SUB Göttingen from signature 4 PHYS MATH IV 356.

the science of electricity and subsequent perceptions of nature in revolutionary ways.¹² Electrical matter—still understood to be largely mysterious and impossible to pin down—suddenly inscribed itself in lasting visible traces, which offered themselves to be read. These unexpectedly detectable images and Lichtenberg's openness in welcoming them offer a first glimpse of "a new kind of observer" who directed his attention toward "the action of physical and chemical agents on a sensitized surface,"¹³ and found "an image understood

12. Cf. Haru Hamanaka, *Erkenntnis und Bild: Wissenschaftsgeschichte der Lichtenbergschen Figuren um 1800* (Göttingen: Wallstein, 2015).

13. Crary, *Techniques* (above, n. 3), pp. 6 and 92.

to be 'drawn by nature,' an image which could then be analyzed and interpreted."¹⁴ The analysis and interpretation of these first nature-inscribed images were not unproblematic, though, as it remained unclear what precisely they were representing, or making visible. In their innovative role, Lichtenberg's dust figures not only demonstrated the crucial function of visualizations in scientific development,¹⁵ but also the emerging position of a scientific observer who approached the critical epistemic problem of visualizing the invisible. This act of making visible differs from the Enlightenment method of illuminating the obscure, and instead produces visibility for something that previously had no visual status. Rheinberger points to this step, which became decisive in the modernization of science: "It is probably not too far-fetched to postulate that making visible something that does not manifest itself directly and therefore is not immediately evident—that is, does not lie before our eyes—is the foundation and at the same time the foundational gesture of the modern sciences."¹⁶

This gesture of "making visible" had begun in a different sense with the experimental disposition instituted by the British Royal Society in the seventeenth century. At that time it gave the scientist the acting role: observations during an experiment were translated into human-made narratives and images, with the main purpose of enabling other scientists to repeat the experiment in question. Now, in a pivotal shift, on Lichtenberg's *electrophorus*, a "technological momentum" left a visible trace that represented "a form of manifestation that has not yet become either writing or picture in their traditional forms."¹⁷ The dust figures appeared as images that hinted at readability, and nevertheless remained largely illegible. In that mysterious capacity, these figures created a flurry of investigations marking the beginning of not only a new dynamic science, but also a new poetics and the confluence of the two in Romanticism.¹⁸

14. Chitra Ramalingam, "Fixing Transience: Photography and Other Images of Time in 1830s London," in *Time and Photography*, ed. J. Baetens, A. Streitberger, and H. Van Gelder (Leuven: Leuven University Press, 2010), pp. 3–26, quote on p. 4.

15. Cf. Bruno Latour, "Visualisation and Cognition: Drawing Things Together," in *Knowledge and Society: Studies in the Sociology of Culture Past and Present*, volume 6, ed. H. Kuklick and E. Long (Greenwich, CT: JAI Press 1986), pp. 1–40.

16. Hans-Jörg Rheinberger, "Making Visible: Visualization in the Sciences—And in Exhibitions?," in *Publications of the Max Planck Institute for the History of Science*, no. 399 (Berlin: MPI für Wissenschaftsgeschichte 2010), pp. 9–23, quote on p. 9.

17. Rheinberger, "Making Visible" (above, n. 16), p. 9.

18. Unfortunately there is no room in this paper to further explore Lichtenberg's connection to and influence on Romanticism. I am studying the role of Lichtenberg and

The Visibility of Science

According to Bruno Latour, “No scientific discipline exists without first inventing a visual and written language which allows it to break with its confusing past.” And every new visual culture “redefines both what it is to see, and what there is to see.”¹⁹ In Lichtenberg’s figures, something previously unseen appeared that initiated “a scientific fascination with fixing transience.”²⁰ The rendering visible of something invisible—which may have been the rendering permanent of something fleeting, but which was not yet decided in Lichtenberg’s experiments—created the foundations for what English physicist Charles Wheatstone later described in his own experimental setups: “It is possible by the means I have indicated to reduce to actual measurement some of the most transient phenomena . . . and it is not improbable that [this] may assist the progress of physical philosophy in as great a degree as the Microscope and the Telescope have already.”²¹ Lichtenberg himself was little inclined to make big claims of progress; nevertheless, his dust formations mark not only the beginning of making visible a whole new world of formerly invisible phenomena—they also become part of the transition that Christoph Hoffmann describes in his study of the role of sense apparatuses in scientific observation: the transition from “*Empfindungssachen*” [perceptions] to “*Tatsachen*” [facts], that is, the transition from writing through/with senses to writing about senses.²² Lichtenberg’s figures instated a possibility to tap into the unknown directly, bypassing the scientist’s sensory perceptions.

Lichtenberg practiced a comparably detached form of recording in his *Waste Books*, which “focused the writer on the registering of individual phenomena below the usual threshold of attention and selection . . . turning him into a recording apparatus.”²³ In a me-

other figures for Early German Romanticism’s explorations of poetics and science in a forthcoming book, *Printing the Invisible*.

19. Latour, “Visualisation and Cognition” (above, n. 15), p. 14.

20. Ramalingam, “Fixing Transience” (above, n. 14), p. 3.

21. Wheatstone, quoted after Ramalingam, “Fixing Transience” (above, n. 14), p. 13.

22. Cf. Christoph Hoffmann, *Unter Beobachtung: Naturforschung in der Zeit der Sinnesapparate* (Göttingen: Wallstein, 2006), pp. 7–8. Hoffmann’s juxtaposition of *Tatsachen*—literally: things of/related to action—and *Empfindungssachen*—literally: things of/related to perception—cannot be recreated in English.

23. Rüdiger Campe, “‘Unsere kleinen blinden Fertigkeiten’: Zur Entstehung des Wissens und zum Verfahren des Schreibens in Lichtenbergs Sudelbüchern,” in *Lichtenberg-Jahrbuch* 2011 [2012]: 7–32, quote on p. 10.

ticulous and multifaceted praxis of examining subjects of all kinds, Lichtenberg had trained his senses to record observations near-automatically, proving the fact that “observation has always been a form of knowledge that straddled the boundary between art and science,”²⁴ and that entailed “the possibility of going from one type of visual trace to another.”²⁵ After developing his visual expertise in astronomy—the oldest art of observation—Lichtenberg exercised his skills as much on experimental physics, meteorology, physiognomic representations, theater performances, and artworks. Two journeys to England offered much opportunity for the kind of observation Lichtenberg also referred to as “active reading.”²⁶ He was a diligent reader of minute details, engaged in “a highly . . . disciplined form of experience that requires training of the body and mind,”²⁷ a practice, in fact, “aimed to compel the body and being of the . . . scientist to donate [themselves] to its cause”²⁸ entirely. Lichtenberg’s determined adherence to meticulous observational practice is documented in many letters and notes that present him as a passionate observer and witty descriptor in various circumstances. Apart from the close scrutiny he paid to all the sciences, Lichtenberg also commented on everyday impressions like London faces that gave him the pleasures of much more variety than anything he had ever seen in his hometown of Göttingen, “where always one face rhymes with the other,”²⁹ and he marveled at artists and performers such as painter and engraver William Hogarth or actor David Garrick.

But while describing visual impressions of the most diverse kinds in abundant detail, Lichtenberg drew a strict line when it came to interpreting these impressions. In his commentaries to Hogarth’s artworks, he had cheerfully claimed “I may well have added this and that in my interpretation, but what does it matter as long as I haven’t subtracted anything that is to be found there.”³⁰ Appreciating art meant being creative as an observer as well. However, that kind of

24. Lorraine Daston and Elizabeth Lunbeck, introduction to *Histories of Scientific Observation*, ed. Daston and Lunbeck (Chicago: University of Chicago Press 2011), pp. 1–9, quote on p. 7.

25. Latour, “Visualisation and Cognition” (above, n. 15), pp. 30–31.

26. Georg Christoph Lichtenberg, *Schriften und Briefe*, 5 vols., ed. Wolfgang Promies (Frankfurt am Main: Zweitausendeins, 1994), vol. 1, Sudelbuch E 266, p. 408.

27. Daston and Lunbeck, “Introduction” (above, n. 24), p. 3.

28. Avital Ronell, *The Test Drive* (Urbana-Champaign: University of Illinois Press, 2007), p. 94.

29. Lichtenberg, *Schriften* (above, n. 26), vol. 1, Sudelbuch E 289, p. 413.

30. Lichtenberg, *Schriften* (above, n. 26), vol. 3, p. 665.

artistic freedom did not apply to the sciences. Lichtenberg cautioned gravely against Johann Caspar Lavater's fashionable physiognomic method, which purportedly could read the invisible character of a person entirely from his or her visible facial profile. This practice was dubious for Lichtenberg, because in science exclusive "reading on the surface is the source of our delusions, and, in some cases, of our utter ignorance."³¹ He continued mockingly, "Objective readability of everything in everything may take place everywhere, nevertheless it is not for us who have so little concept of the Whole, we do not even understand most of the intents of our own body."³² Lichtenberg here hints at a complex connection of subject and vision that seems to mobilize one of Jonathan Crary's arguments. In Crary's understanding, the *camera obscura* model of vision clearly separated the two realms assigned to observer and observed, which implied a similarly clear distinction of who observed what, and to which extent. While Lichtenberg did not quite question the functioning of his senses—as did later psychophysicists (e.g., Gustav Theodor Fechner, to use Crary's example)—he was certainly critical of the capacities of those senses. Lichtenberg ridiculed the physiognomist Lavater's proposal of "absolute readability," which seemed to allow him to draw direct conclusions "from the visible to the invisible."³³ As an avid observer and reader of visual traces, he rejected the possibility of an unfettered causal relationship between the visible and the invisible. Lavater, on the other hand, stylized himself as the *Aufklärer* par excellence, who claimed to be able to look into the soul of anyone by merely studying the person's profile.

In Lichtenberg's view, the scientific observer was not free to expand capriciously from superficial visual cues. In the sciences, conjectures had to be founded on careful scrutiny and repeatable methods, something he saw missing in Lavater's approach. Both investigators dealt with newly described visual forms for which they claimed scientific relevance, but Lichtenberg's reading of his approached the modern rules of scientific conduct, specifically regarding the role and form of scientific observation, whereas Lavater's remained rooted in eighteenth-century methodologies, such as the reliance on a preconceived system of the science in question that used visual evidence exclusively to confirm its fixed structure.

31. Georg Christoph Lichtenberg, "Über Physiognomik; wider die Physiognomen. Zu Beförderung der Menschenliebe und Menschenkenntnis (1778)," in *Schriften* (above, n. 26), vol. 3, p. 265.

32. Lichtenberg, "Physiognomik" (above, n. 31), p. 290.

33. Lichtenberg, "Physiognomik" (above, n. 31), p. 265.

Nature Writes Itself

The care Lichtenberg gave to his experimentations is spelled out in the narrative describing the discovery of the electrical figures. In 1778 the manuscript was published as *De nova [sic] methodo naturam ac motum fluidi electrici investigandi* [On a New Method for the Study of the Nature and Movements of Electrical Matter]. Lichtenberg began by drawing attention to the *electrophorus* as the newly invented device that had sparked the latest interest in the understanding of electricity. In that function as a new “experimental system,” it is “a device to materialize questions,”³⁴ which produced not just “epistemic things,” but more than anything else, narratives about itself. And it always contained “more stories than the experimenter at a given moment [was] trying to tell with it.”³⁵ The predominant scientific practice was then, as it is now, to try to eliminate these surplus stories, these unwanted effects of any experimental system. It was and is a practice that often disregards that “there was no guarantee that what was eliminated as background might not eventually prove relevant to the problem under investigation in the future.”³⁶

In the case of the *electrophorus*, the electrical figures were one of the stories surprising Lichtenberg, and for the same reasons that made him record any number of seemingly mundane and minor details in his *Waste Books*, these dust formations were not eliminated. The figures came to be examples for what Rheinberger describes as “specific responses to the analytical powers of these instruments” that took “shape at the intersection between research object and instrument. They are, in a way, solidified in-betweens, objects that owe their existence to the medial spaces created by the instrument-driven experiment.”³⁷ The figures were side-effects appearing in an epistemic field prepared to show better versions of previously known phenomena.

After an extensive and enlightening contextualization in the history of electrical research, Lichtenberg’s narrative finally arrives at the discovery of the figures, and it becomes obvious that, with the electrical spark, something else enters the picture. After the sober

34. Hans-Jörg Rheinberger, “Experiment, Difference, and Writing: Tracing Protein Synthesis,” in *Studies in History and Philosophy of Science* 23:2 (1992), pp. 305–441, quote on p. 309.

35. Hans-Jörg Rheinberger, *Experiment, Differenz, Schrift: Zur Geschichte epistemischer Dinge* (Marburg/Lahn: Basiliken-Press, 1992), pp. 64–65.

36. Rheinberger, “Experiment, Difference” (above, n. 34), p. 317.

37. Rheinberger, “Making Visible” (above, n. 16), p. 17.

enumeration of previous achievements and relevant predecessors, the poetic description of Lichtenberg's epiphany moment reads like a romantic fragment:

In the beginning of Spring 1777 the construction of my electrophorus had just been completed. The room was still full of resin-dust that had accumulated when the cake was being polished. It covered all walls and books and with every little whiff it was stirred and then, to my great disappointment, often collected on the cover of the electrophorus. Only after I had started to pull up the cover to the ceiling it happened once that the dust fell onto the cake. Suddenly it did not cover the surface evenly but, to my great joy, formed little starlets in certain places. In the beginning these were faint and hardly visible but when I deliberately sprinkled more dust on the surface they became clear and beautiful and appeared embossed. At times countless stars, milky ways and larger suns became visible. The arcs on their concave side were plain, on their convex side they were adorned with manifold spouts. Exquisite little branches developed, similar to those the frost creates on windows.³⁸

Suddenly there are stars and suns and milky ways that appear even more gracefully and almost musically in the Latin—*stellae sere innumerae, viae lacteae, ac soles majores, nubes porro varia sua forma ac diversis umbrae gradibus spectabiles*—and we can virtually see how they develop near-magically before Lichtenberg's eyes.

After recognizing them, Lichtenberg became intrigued by the figures because they seemed to point toward the solution of a problem he and other experimenters encountered when studying electrical matter. As Lichtenberg put it, this object of observation either eluded, just like magnetism, any visual access, or it was only visible “with such speed, and, undoubtedly, accompanied by significant invisible aspects . . . so that usually nothing but the position and form of the spark—which I am convinced is only a small part of the entire phenomenon—can be observed clearly.”³⁹ Electricity had been experienced as essentially invisible; its brief sparks overwhelmed the capabilities of the human senses, or, as Christoph Hoffmann described the general dilemma of observation at the time, exceeded “the limited acuity of the senses.”⁴⁰ Physicists had previously tried to study visual remnants of this intangible “matter” through analyzing the results of lightning strokes, stains on polished plates, and little holes in paper hit by discharges of a Leyden Jar or an electrical machine. Lichtenberg's new findings belong to this category of visible

38. Lichtenberg, *Observationes* (above, n. 8), p. 151.

39. Lichtenberg, *Observationes* (above, n. 8), p. 149.

40. Hoffmann, *Unter Beobachtung* (above, n. 22), p. 52.

traces of electricity, but, in his own assessment, they “surpass . . . the ones identified above both in beauty and versatility.”⁴¹ As he saw it, his dust stars would allow researchers to study the nature of electrical matter in the same way magnetic “matter” had been studied by sprinkling iron filings on a magnet. He stated his hope that the figures would show hidden changes in electrified bodies that were previously inaccessible.

Lichtenberg’s focus on this very practical convenience understates the power of the figures that was acknowledged by later admirers: the dust formations appear through a “technique of ‘inscription,’” which prefigures a “Lichtenberg-effect” that Rüdiger Campe diagnosed for literary writing one century later: “an authorship of writing.”⁴² Independent of an author instance outside of the inscription itself, signs with “a stable repertoire of form” are being written even when they are “not transparent in their meaning.”⁴³

In their automaticity and self-writing power, in the way they produce themselves as images, independent of human interference—a quality that Lichtenberg’s immediate followers already recognized more fully than he did⁴⁴—they also embody an early instance of the shifts in visuality described by a number of historians of science and art that were to change “the act of scientific seeing”⁴⁵ altogether by introducing “radically different notions of what an observer was and of what constituted vision.”⁴⁶ In Daston/Galison’s analysis of the emergence of a new concept of scientific objectivity, the major shift toward scientific objectivity occurred in the mid-nineteenth century as a shift toward what they call “blind sight,”⁴⁷ a kind of seeing “unmarked by prejudice or skill, fantasy or judgment, wishing or striving,”⁴⁸ which implied openness to the unwanted, the unintentional, and the excessive stories. Lichtenberg’s observational practice

41. Lichtenberg, *Observationes* (above, n. 8), p. 149; it is interesting to read that beauty was a relevant quality in the eyes of a scientist.

42. Campe, “Unsere kleinen blinden Fertigkeiten” (above, n. 23), p. 12.

43. Campe, “Unsere kleinen blinden Fertigkeiten” (above, n. 23), p. 20.

44. Cf. Ernst Florens Friedrich Chladni, *Entdeckungen über die Theorie des Klanges* (Leipzig: Weidmanns Erben und Reich, 1787); or Johann Wilhelm Ritter, *Fragmente aus dem Nachlasse eines jungen Physikers: Ein Taschenbuch für Freunde der Natur* (1810), ed. Steffen Dietzsch and Birgit Dietzsch (Hanau: Müller & Kiepenheuer, 1984).

45. Daston and Galison, *Objectivity* (above, n. 4), p. 10.

46. Jonathan Crary, “Modernizing Vision,” in *Vision and Visuality*, ed. Hal Foster (Seattle: Bay Press, 1988), p. 30.

47. Daston and Galison, *Objectivity* (above, n. 4), p. 16.

48. Daston and Galison, *Objectivity* (above, n. 4), p. 17.

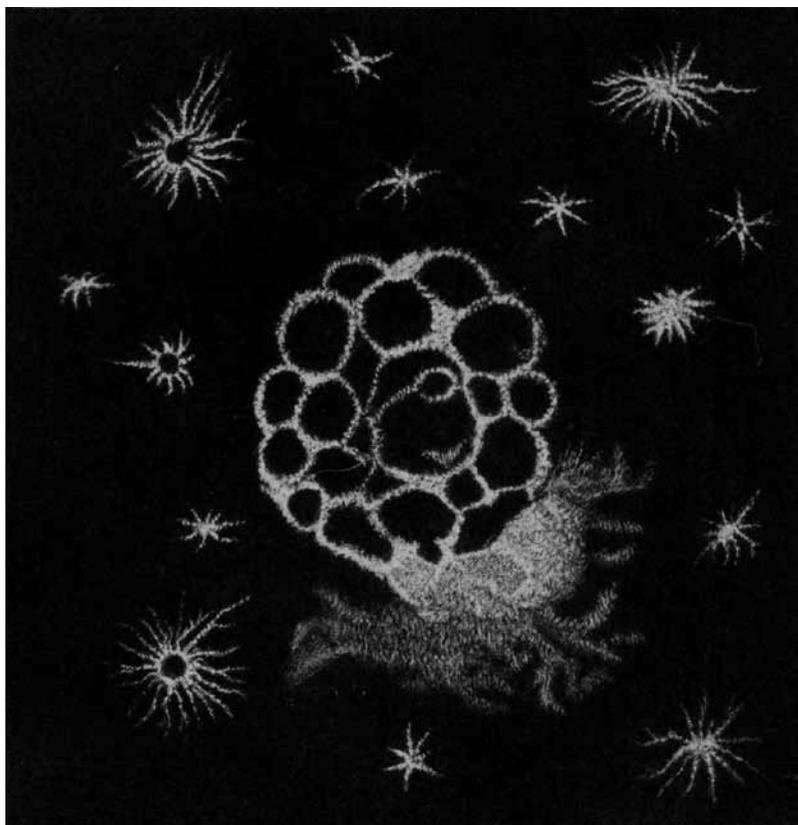


Figure 2. Lichtenberg's illustration showing some of the earliest electrical figures he found. See Geo. Christ. Lichtenberg, "De nova methodo naturam ac motum fluidi electrici investigandi. Comment. prior, experimenta generaliora continens," in *Novi commentarii Societatis Regiae Scientiarum Gottingensis. Commentationes physicae et mathematicae classis* (Gottingae: Dieterich, 1778), vol. 8, pp. 168–180, image insert following p. 180. Digitized by SUB Göttingen from signature 4 PHYS MATH IV 356.

took place on the experimental forefront of "remaking the visual field . . . into a surface of inscription on which a promiscuous range of effects could be produced."⁴⁹ Suddenly the dust in the laboratory was no longer something bothersome that obscured "a 'true' perception"; instead it became "an irreducible component"⁵⁰ of visibility. Instead of exclusively looking for confirmation of a pre-established order of nature, the attention of the new "objective" experimenter

49. Crary, *Techniques* (above, n. 3), p. 96.

50. Crary, *Techniques* (above, n. 3), p. 97.

welcomed, or at least accepted the possibility of, irregularities that might even have the power to unsettle preconceived systems. In that spirit, Lichtenberg was able to not only see the dust formations—a highly irregular, promiscuous effect—but also to identify them as visual appearances related to electricity.

In the beginning, Lichtenberg had to rely on coincidence for the figures to appear—and, after the initial excitement over the figures' existence, that became rather exasperating. After long hours of testing and recalling experiments he had conducted on the *electrophorus* prior to their emergence, he was eventually able to produce the figures at will. They seemed to appear in places where sparks had either exited or entered the surface. In Latin, he called the dust stars "*projectiones*" of the electrical sparks. In other words, the spark projected its own image onto the sensitive surface of the *electrophorus* and fixed this image on that same surface in an invisible way so it could subsequently be made visible by the dust falling onto it. It is almost uncanny how closely this process seems to resemble the processes of early photography—the effect of light projections onto a sensitive surface.⁵¹

Reading Nature

In December of 1778, Lichtenberg published a second paper on the figures in which he presented one of the crucial insights he attained during months of laborious testing: "Figures created by positive electricity differ from those produced by negative current like a sun from a moon."⁵²

By referring to positive and negative electricity, Lichtenberg used Benjamin Franklin's nomenclature, even if he did not entirely agree with Franklin's views.⁵³ But the visual evidence of the figures made him acknowledge "two types of electricity, or two modes of one electrical matter, that cancel each other out according to the rules of positive and negative values;" and he continued, "I am convinced that this proposition has to take the first place among the few propo-

51. Cf. Joseph Nicéphore Niepce, "Memoire on the Heliograph," in *Classic Essays on Photography*, ed. Alan Trachtenberg (New Haven: Leete's Island Books, 1980), p. 6.

52. Georg Christoph Lichtenberg, *Über eine neue Methode, die Natur und die Bewegung der elektrischen Materie zu erforschen* ("Lichtenbergsche Figuren" 1777), Ostwald's Klassiker der exakten Wissenschaften, ed. Herbert Puppe (Leipzig: Geist & Portig, 1956), p. 29.

53. Franklin had claimed that there was only *one* electricity that could have a positive and a negative state (i.e., be in excess or have a shortage). Contrary to Franklin, but together with many of his contemporaries, Lichtenberg tended more to the assumption of two different kinds of electrical matter.

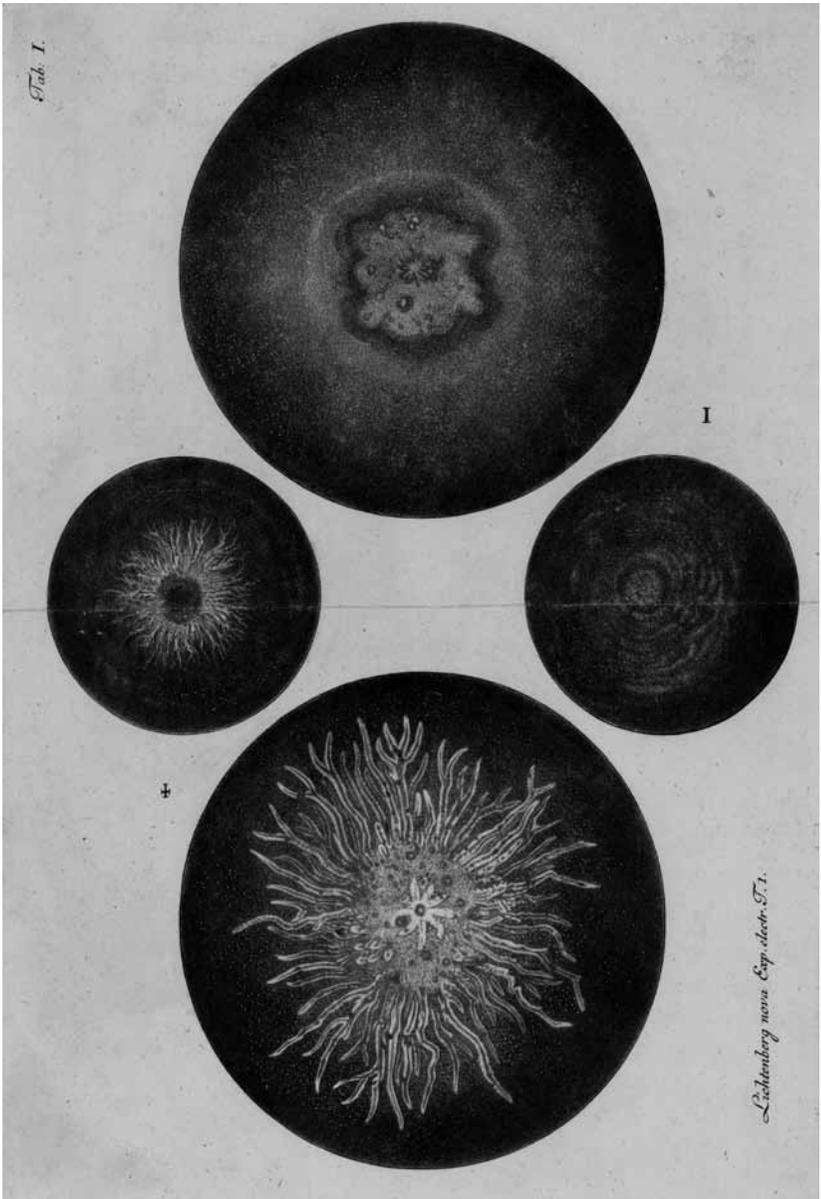


Figure 3. Lichtenberg's illustration showing the different electrical figures created by positive or negative discharges. See Georg Christoph Lichtenberg, "De nova methodo naturam ac motum fluidi electrici investigandi. Pars posterior," in *Commentationes Societatis Regiae Scientiarum Gottingensis recentiores* (Gottingae: Dieterich, 1779), pp. 65–79, image insert following p. 79. Digitized by SUB Göttingen from signature 4 PHYS MATH IV 356.

sitions in this field that can be considered a mathematical fact."⁵⁴ To cement this fact, Lichtenberg introduced the algebraic signs "+" and "-" for Franklin's positive and negative terms with the explicit goal of claiming the study of electricity as a field for mathematicians instead of apothecaries, that is, to reinforce the break of the experimental study of electricity from any alchemical tradition, and to support more generally the modernization of science.

Lichtenberg modestly claimed to be interested neither in defending or refuting existing theories about electrical matter, nor in wanting to create new theories. If we take him at his word, he mainly wrote to show some select examples of how his improved experimental method could be useful for the further exploration of electricity. It is a typical Lichtenberg move: he concentrated on details and avoided generalizing claims. His scientific earnestness led him to find the figures; it also prevented him from speculating about them and from drawing conclusions he could not sufficiently support. This restraint set him apart from experimenters in new sciences like physiognomist Johann Caspar Lavater, and this led to their debate revolving around the question of proper scientific conduct in observations and interpretations of images.

Lichtenberg's goal of moving the study of electricity into the realm of mathematical truth, in spite of the many uncertainties that remained, referred first and foremost to the insistence on exactitude, as no actual mathematical calculations were possible at this point. He made sure to note that the mathematical operators "+" and "-" did not necessarily refer to an excess or shortage of electrical matter. It is apparent that for both Lichtenberg and his contemporaries, "electrical matter" remained an elusive object of study, being both difficult to observe and more difficult to arrest in any definition or description. The hope was that further experimentation with the dust figures "written" by electricity itself would disclose hitherto unknown properties of the obscure "*materiae electricae*." So far it remained unclear what these figures actually represented: Were they traces left by electricity? Signatures for present electricity? Were they an end-product, a temporary state, or an instrument to study either of the former? While Lichtenberg had no problem adding creative interpretations to Hogarth's engravings, he was extremely guarded in his interpretation of the electrical figures. Despite the fact that they could be practiced with largely similar skill-sets, exegeses of art or science belonged to different worlds for him.

54. Lichtenberg, *Observationes* (above, n. 8), p. 181.

Physiognomic Debate

Around the time of his discovery of the dust figures, while highly sensitized to questions of visual interpretations, Lichtenberg entered into the debate with Swiss physiognomist Johann Caspar Lavater. Physiognomy, that is, the reading of character from the physical features and specifically the facial profile of a person, had become a highly fashionable topic following the publication of Lavater's "Physiognomische Fragmente zur Beförderung der Menschenkenntnis und Menschenliebe" ("Physiognomic Fragments For the Promotion of Knowledge and Love of Mankind") in four volumes, starting in 1775. In fact, Lichtenberg had first seen one of these enormous and lavishly illustrated books at the king's palace during one of his visits to London.

With the essay "Über Physiognomik, wider die Physiognomen" ("On Physiognomy, against Physiognomists") (1778), Lichtenberg opened a public dispute over the value and conduct of physiognomic practice. He interrogated what could or could not be seen in certain types of images, and his main criticism targeted Lavater's reckless (over-)interpretation of superficial signs. While claiming not to be interested in "refuting a well-known copious opus"—Lichtenberg did not even need to name Lavater, whose "Physiognomische Fragmente" were so renowned that every reader would have understood the allusion—his essay was clearly directed against the scientific credibility of physiognomy. Lichtenberg's next sentence, however, ironically undermined his assertion of non-rebuttal. Referring to the physical dimensions of their respective publications, Lichtenberg compared Lavater's weighty tomes with his own modest almanac and declared that someone who wanted to contest Lavater "better shouldn't try in *sextodecimo* with an audience that takes large *quarto* for proof."⁵⁵ In contrast to Lichtenberg's pocket-sized calendar, Lavater's "Physiognomische Fragmente" were published in large, leather-bound, gold-stamped volumes containing abundant illustrations by Germany's and Switzerland's best engravers. A physiognomically inclined audience would take the outside form not only as representative but also as the only reference for the content of a book, and would read superior outer dimensions as superiority in substance. Lichtenberg, on the other hand, knew that not all outwardly visible appearances had a knowable source and so declined to

55. Lichtenberg, "Physiognomik" (above, n. 31), p. 257. The book formats referred to the different physical sizes of the two publications. (See, in more detail, Lichtenberg, *Schriften* [above, n. 28], commentary accompanying vol. 3, p. 111.)

judge a book by its cover, just as he preferred not to judge a person by his or her profile.⁵⁶

Lavater responded to Lichtenberg's article in the first and longest fragment, "Anmerkungen zu einer physiognomischen Abhandlung" ["Remarks on a Physiognomical Treatise"]⁵⁷ at the beginning of his fourth and final volume of the *Physiognomical Fragments*. Because Lichtenberg's article had appeared anonymously, or rather unsigned in an almanac, Lavater was not aware of the identity of the author⁵⁸ and made it a point to emphasize the relevance of the small article in a modest publication, as if to counter his own obsession with outer appearances. He praised the anonymous writer effusively and humbled himself: "Far be it from me to compare myself with the excellent author."⁵⁹ His proclaimed self-effacement, however, was not without a subtle spite. When Lavater, a pastor in Calvinist Switzerland, doubly accented the "*Zierlichkeit*," (daintiness, ornament) as well as the author's "*auspolirten Geist*" (polished intellect) and "*eleganten Geschmack*" (elegant taste), while lamenting his own "*Trockenheit*" (dryness/plainness), this should be taken with a grain of salt. Anything but the plainest truth was likely to rouse suspicion in a strictly Protestant setting, and Lavater had no doubt that the truth was on his side. He opened the volume with the declamation: "He who knows that he is writing the truth—useful truth that will increasingly reveal itself, and the more it is revealed the more it glorifies the father of truth—can suffer dissent."⁶⁰

Lavater accepted Lichtenberg's critique as an occasion to engage in an exchange about "our mutual sentiments concerning nature

56. In a sarcastic warning of the dangers of physiognomy, Lichtenberg predicted, "If physiognomy ever becomes what Lavater hopes it will be, then we will begin to hang children before they commit the crimes that deserve the gallows; a new kind of confirmation ritual will be practiced every year. A physiognomic auto-da-fé" (Lichtenberg, *Schriften* [above, n. 28], vol. 1, p. 532).

57. Johann Caspar Lavater, *Physiognomische Fragmente, zur Beförderung der Menschenkenntniss und Menschenliebe*, 4 vols. (Leipzig and Winterthur: Weidmann & Reich, 1775), vol. 4, pp. 3–38.

58. In the English translation from 1789, the title of this fragment acknowledges Lichtenberg ("Remarks on an Essay upon Physiognomy, by Professor Lichtenberg") while the rest of the text keeps addressing the unknown author.

59. Johann Caspar Lavater, "Remarks on an Essay upon Physiognomy, by Professor Lichtenberg," in Lavater, *Essays on Physiognomy; for the Promotion of the Knowledge and the Love of Mankind*, trans. Thomas Holcroft (London: Whittingham, 1789), vol. 2, p. 265.

60. Lavater, *Fragmente* (above, n. 57), vol. 4, p. VII. This passage does not seem to have been translated in the English version.

and truth."⁶¹ What he did not see was that their sentiments were far from mutual concerning either nature or truth. The conviction of being in full possession of the truth marks Lavater, in contrast to the much more skeptical Lichtenberg, as a somewhat simplistic representative of the Enlightenment, and it places his science in the realm of a "truth-to-nature" approach, as Daston and Galison have called it.⁶² Where Lichtenberg painstakingly described his detailed observations and his hesitation to draw conclusions, much less make truth claims, Lavater took truth as his starting point under which nature had to submit. In full accordance with most of the naturalists of his time, Lavater had developed a framework that he had recognized as true. Once this structure was established, it always preceded the specific example, which would be selected to fit the position to which it was assigned:

The nature they sought to portray was not always visible to the eye, and almost never to be discovered in the individual specimen. . . . Seeing was an act as much of integrative memory and discernment as of immediate perception. . . . These images were made to serve the ideal of truth—and often beauty along with truth—not that of objectivity, which did not yet exist.⁶³

No doubt about the purpose and value of his endeavor existed for Lavater. While being accepting of criticism regarding an occasional error,⁶⁴ he never considered questioning his overall persuasion: "There are convictions that are impossible to change. And I will never alter my general belief in physiognomy."⁶⁵ His relationship to physiognomy was, appropriately enough for a clergyman, dominated by belief. So even if some details were wrong—even if all the details were wrong—no one and no experiment would be able to unsettle Lavater's belief in his system and the truth of his science.⁶⁶ This belief was so ingrained, he did not even need to see a profile to know how it looked, as he declared in an adulatory passage directed at Lichtenberg:

61. Lavater, "Remarks" (above, n. 59), p. 266.

62. Cf. Daston and Galison, *Objectivity* (above, n. 4), pp. 55–113.

63. Daston and Galison, *Objectivity* (above, n. 4), p. 104.

64. Not just deluded disciples but also Lavater himself offered (in)famous physiognomic misreadings that apparently did not deter his passionate followers. Cf. Wolfram Groddeck and Ulrich Stadler, *Physiognomie und Pathognomie: Zur literarischen Darstellung von Individualität* (Berlin: De Gruyter, 1994), pp. 120f.

65. Lavater, *Fragmente* (above, n. 57), vol. 4, p. VII.

66. Cf. Avital Ronell's reading of Nietzsche's "On Convictions and Justice," in Ronell, *Test Drive* (above, n. 28), pp. 310–311.

I have not the pleasure to know you, have never seen any picture, any shade, of you; yet, I am as certain as if I had known, had seen, that the mere shade of your profile, or a three quarter drawing of your countenance, would, without further proofs, be a new demonstration, to me and all my readers, of the truth, that talent and genius may, with certainty, be known by the firm parts of the countenance.⁶⁷

For Lavater, the visual image was an illustration of a truth he had previously established, and his epistemological model is what Jonathan Crary described as the *camera obscura* perspective. This approach embodied “man’s position between God and the world” and created “an orderly projection” of that world “for inspection by the mind.”⁶⁸ Lichtenberg, on the other, hand sought a truth in the images he found, and he was cautious and provisional in his interpretations. As Karl Popper has diagnosed this shift,

The old scientific ideal of episteme—of absolutely certain, demonstrable knowledge—has proved to be an old idol. The demand for scientific objectivity makes it inevitable that every scientific statement must remain tentative for ever. It may indeed be corroborated, but every corroboration is relative to other statements which, again, are tentative. Only in our subjective experiences of conviction, in our subjective faith, can we be “absolutely certain.”⁶⁹

Lichtenberg’s compulsively scrupulous and endlessly questioning method operates much closer to the standards of this scientific objectivity as it would be established in the nineteenth century, while Lavater’s certainty assigns him to an older order of faith.

Visuality and Objectivity

One of Daston and Galison’s examples for the changing approach to scientific imaging in relation to the establishment of a concept of scientific objectivity is the story of English physicist Arthur Worthington, who examined fluid flow in droplets as “a physical system marked by the beauty of its perfect symmetry.” For the longest time, the fact that his experiments did not just show symmetrical beauty posed no problem for him. Who would be interested in “the accidental specificity of this or that defective splash? Worthington, like so many anatomists, crystallographers, botanists, and microscopists [and physiognomists] before him, had set out to capture the world in its types and regularities—not a helter-skelter assembly of

67. Lavater, “Remarks” (above, n. 59), p. 294.

68. Crary, *Techniques* (above, n. 3), pp. 46–48.

69. Quoted after Ronell, *Test Drive* (above, n. 28), p. 41.

peculiarities."⁷⁰ In the Enlightenment spirit of recognizing an order of nature by establishing a system of classification, "exceptions" could, no, *had* to be excluded. "All those asymmetrical images had stayed in the laboratory—not one appeared in his many scientific publications. In this choice he was anything but alone."⁷¹

Lichtenberg, by comparison, was ahead of his time, in that he directed his attention to the phenomena before his eyes without attempting to sort them into a preexisting scheme. He was first and foremost a skeptic, and in that spirit a true Romantic *avant la lettre*. Lavater's volumes were compiled in the Enlightenment tradition of atlases that could catalogue "the world" and intended "to standardize the observing subjects and observed objects of the discipline by eliminating idiosyncrasies—not only those of individual observers but also those of individual phenomena."⁷² Lichtenberg, on the other hand, was first of all interested in individuals and idiosyncrasies. He ridiculed a reductionist, simplistic worldview when he wrote ironically,

No one will deny that in a world in which everything is related through cause and effect, and where nothing happens by miracle, every part is a mirror of the whole. If a pea is shot into the Mediterranean sea, an eye much sharper than ours but still much more obtuse than the eye of the One who sees everything, could sense the effect on the Chinese coast.⁷³

The pea story reminds today's readers of Edward Lorenz's butterfly-effect,⁷⁴ one of the most highly popularized concepts of chaos theory. But while Lichtenberg's figures have what we would call chaotic structures, chaos could not have been further from the mind of Enlightenment scientists like Lavater. Their dogma was the divine order of nature.

On the Limits of Readability

In his response, Lavater used select parts of Lichtenberg's critique and tried to turn them against the author. He praised the passage about cause and effect (taking it literally and not understanding the irony), "this very excellent passage," until just before the pea story and noted, seemingly in agreement with Lichtenberg, "We are often

70. Daston and Galison, *Objectivity* (above, n. 4), p. 11.

71. Daston and Galison, *Objectivity* (above, n. 4), p. 15.

72. Daston and Galison, *Objectivity* (above, n. 4), p. 63.

73. Lichtenberg, "Physiognomik" (above, n. 31), p. 264.

74. Catherine Rouvas-Nicolis and Gregoire Nicolis, "Butterfly effect," *Scholarpedia* 4, no. 5 (2009): 1720. http://www.scholarpedia.org/article/Butterfly_effect.

able to conclude from what is near to what is distant, from what is visible to what is invisible, from the present to the past and the future."⁷⁵ Then, skipping a passage that would have been hard to read other than ironically,⁷⁶ he resumed with the following Lichtenberg quote:

Thus the history of the earth is written, in natural characters in the form of each tract of country, of its sand hills, and rocks. Thus each pebble on the sea-shore could tell this history to a soul that was as attached to it as ours is to our brain. . . thus, also, might the internal of man be expressed, by the external.⁷⁷

Lavater agreed quite enthusiastically with the parts of Lichtenberg's text he selected and thereby demonstrated his way of conducting science, which was not only common but predominant at the time: a scientist chose the details that supported his argument(s) and classified others as aberrations. Lavater was not only selective in regard to what he wanted himself and others to see in physiognomies, but also in how and what he read. Unable to ignore Lichtenberg's passage about the pea and the Chinese coast entirely, he declared the utter perplexity it caused him, voicing disapproval: "Never in my life have I met with any thing more contradictory to nature, and to each other."⁷⁸ Altogether, he was left puzzled: "But, read the work as often as I will, I cannot discover whether the author does or does not grant the reality of physiognomy."⁷⁹ The self-styled master reader, who claimed to be able to read every individual's character from his or her silhouettes alone, failed in his attempt to read Lichtenberg's text.

This incomprehensibility illustrates once more the proximity of Lichtenberg's ideas to Romantic thinking, in contrast to Lavater's entanglement with the Enlightenment. Friedrich Schlegel ironically declared irony to be a key factor in incomprehensibility: "A great part of the incomprehensibility of the *Athenaeum* is unquestionably due to the *irony* that to a greater or lesser extent is to be found everywhere in it."⁸⁰ Paul de Man, in his wonderfully ironic essay "The Concept of Irony," began (and, in a way, ended) his argument instan-

75. Lavater, "Remarks" (above, n. 59), p. 274.

76. "As the cuts on the bottom of a tin plate tell the story of all the meals it has attended" (Lichtenberg, "Physiognomik" [above, n. 33], p. 265).

77. Lavater, "Remarks" (above, n. 59), p. 270.

78. Lavater, "Remarks" (above, n. 59), p. 274.

79. Lavater, "Remarks" (above, n. 59), p. 273.

80. Friedrich Schlegel, "On Incomprehensibility," in Schlegel, *Lucinde and the Fragments*, trans. P. Firchow (Minneapolis: University of Minnesota Press, 1971), pp. 259–271, quote on p. 265.

taneously by quoting Schlegel: “‘The one who doesn’t have it (irony), to him it remains, even after the most open disquisition, an enigma.’ You will never understand—so we can stop right here, and all go home.”⁸¹ In that sense, Lavater should have gone home. He would never understand Lichtenberg’s critique of physiognomy because he only knew to read literally and was entirely unable to recognize irony. Lichtenberg, on the other hand, was a master of the Socratic irony Friedrich Schlegel described: “In this sort of irony, everything should be playful and serious, guilelessly open and deeply hidden. It originates in the union of *savoir vivre* and scientific spirit.”⁸² This scientific spirit of Romanticism conducted, like Lichtenberg, experiments with unexpected and ambiguous endings. “Both irony and testing involve a certain tolerance for risk-taking . . . both produce novel experiences of breakdown and disruption.”⁸³ When Lichtenberg refers to the connection (“that *no one will deny*”⁸⁴) of everything to everything else through cause and effect and playfully illustrates it with a rather outlandish example about a pea in the ocean, we can be sure he had some serious doubts about this connection. De Man left no doubt that “irony in itself opens up doubts as soon as its possibility enters our heads.”⁸⁵ Lavater, in contrast, was a stranger to doubt and, on the contrary, a firm believer in the necessary correlation of “natural cause and effect.”⁸⁶ It seems occasionally unclear in Lavater’s depiction of physiognomic “facts” which direction this cause and effect relation takes: does the character form the profile, or do the features influence the character of a person? Lavater was not too concerned with such minor details. Who cared about “helter-skelter . . . peculiarities”?⁸⁷ Types and regularities were desired, “individual experiments composed into an argument to support a hypothesis or theory, and generate a proof that deceives, to a greater or lesser degree,”⁸⁸ as Johann Wolfgang Goethe put it sarcastically.

81. Paul De Man, *Aesthetic Ideology*, ed. Andrzej Warminski (Minneapolis: University of Minnesota Press, 1996), pp. 163–164.

82. Schlegel, “Incomprehensibility” (above, n. 80), p. 265.

83. Ronell, *Test Drive* (above, n. 28), p. 16.

84. Lichtenberg, “Physiognomik” (above, n. 31), p. 264, my italics.

85. De Man, *Aesthetic Ideology* (above, n. 81), p. 166.

86. Lavater, “Remarks” (above, n. 59), p. 272.

87. Daston and Galison, *Objectivity* (above, n. 4), p. 11.

88. Johann Wolfgang von Goethe, “Der Versuch als Vermittler von Objekt und Subjekt,” in *Goethe: Gedenkausgabe der Werke, Briefe und Gespräche*, ed. Ernst Beutler (Stuttgart, Zürich: Artemis, 1948–1954), vol. 16, p. 853.

Scientific Images

It was Lavater's goal to establish physiognomy as science, and he found many supporters for this project. His charismatic personality (which shows up in his writing style⁸⁹), combined with the ability to build connections to influential figures of his time, assured his popular success. He marketed physiognomy as a new science, even if it could not be a mathematically exact discipline:

Physiognomy is as capable of becoming a science as any one of the non-mathematical sciences. As capable as experimental philosophy, for it is experimental philosophy; as capable as physic, for it is a part of the physical art; as capable as theology, for it is theology; as capable as the belles lettres, for it appertains to the belles lettres. Like all these, it may, to a certain extent, be reduced to rule. . . . At present it hasn't quite developed yet determinate signs and rules.⁹⁰

In his disregard for mathematics Lavater was as committed to an old system of science as in his imprecise treatment of visuality. Where Lavater was merely interested in scientific rules "to a certain extent," Lichtenberg not only regarded images differently but also made mathematics the touchstone for scientific seriousness. Lichtenberg in his own work was confronted with comparable issues of justification. Matters related to the field of electricity were also in a transitional state and in need of definitions and nomenclature. A knowledge base had to be built, and not everyone accepted electrical research as serious science. With that in mind, and fully understanding the problems at hand, Lichtenberg nevertheless questioned physiognomy's scientific legitimacy. He considered it, at best, a pseudo-science, a mere gamble at truth.⁹¹ Lichtenberg did not exclude the possibility that there might be some higher being who could see all the direct causal connections, who could read every trace with complete understanding. Lichtenberg was not an atheist. However, for the human, and even more so the scientific realm, he fundamentally doubted the possibility of simple connections between cause and effect, and the complete interpretability of signs. He

89. Lavater writes quite vividly with many exclamation marks, bold face and other textual embellishments.

90. Lavater, "Remarks" (above, n. 59), p. 37 (translation slightly altered).

91. "Physiognomists err so terribly in their judgment of people from mere profiles they don't know otherwise at all, that if we would compare the hits and misses, everyone would recognize the game of luck immediately. But they do just like the lottery players: publish sheets of lucky numbers and keep the volumes of misses to themselves" (Lichtenberg, "Physiognomik" [above, n. 31], p. 288).



Figure 4. One of the profiles Lavater analyzed was this “*Christus nach Holbein*” (“Christ after Holbein”). See Johann Caspar Lavater, *Physiognomische Fragmente, zur Beförderung der Menschenkenntnis und Menschenliebe*, 4 vols. (Leipzig and Winterthur: Weidmann & Reich, 1775), vol. 1, following p. 82. Digitized by Bibliothèque numérique patrimoniale du Service Commun de la Documentation de l’Université de Strasbourg.

warned against assuming a god-like position: “Once you get to create, or paint a world, make sure to create or paint the vices deformed and all poisonous animals hideous, so you can better command it. But don’t judge God’s world according to yours. Cut your boxwood as it pleases you and plant your flowers matching the shades you understand, but don’t judge the garden of nature according to your

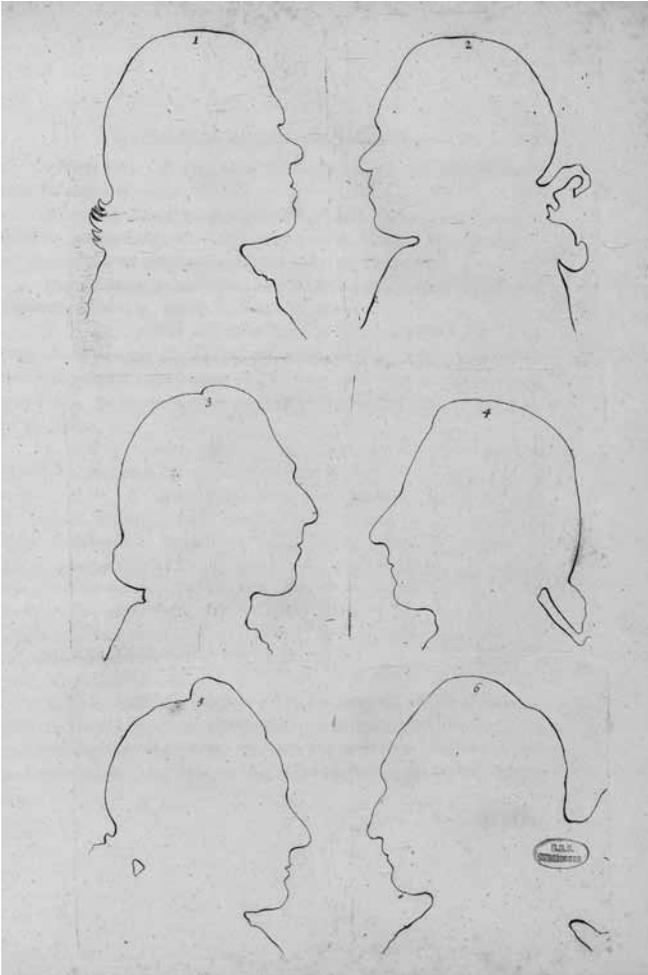


Figure 5. Here is Lavater's example of "*Sechs leere Umrisse von männlichen Silhouetten*" ("Six Empty Outlines of Male Silhouettes"). See Johann Caspar Lavater, *Physiognomische Fragmente, zur Beförderung der Menschenkenntniss und Menschenliebe*, 4 vols. (Leipzig and Winterthur: Weidmann & Reich, 1775), vol. 2, following p. 100. Digitized by Bibliothèque numérique patrimoniale du Service Commun de la Documentation de l'Université de Strasbourg.

little flower patch."⁹² In Lichtenberg's understanding, a human observer can conceivably have full access to an artistically, or artificially, produced world. The natural realm, on the other hand, goes beyond man's comprehension and can only be approached, never entirely grasped. Lavater did not even grant a distinction between

92. Lichtenberg, "Physiognomik" (above, n. 31), p. 273.

these two domains: his physiognomic fragments interpreted profiles of “Christ after Holbein”⁹³ and of several of Hogarth’s engravings right next to “*Sechs leere Umrisse von männlichen Silhouetten*” (“Six Blank Outlines of Male Silhouettes”)⁹⁴ that were presumably created by himself or his contemporaries.

The difference between a painted or etched historical character or type and the face of an actual living being was not relevant for Lavater, yet it marked the decisive distinction between the practices of art and science for Lichtenberg. Having no problem associating freely with Hogarth’s works, he was more than hesitant to respond to scientific questions of visibility: what, or how much, can you learn about electricity from an image that seems to have been left behind by its action?

Lichtenberg’s cautious attempt at reading the visual clues that nature presented to him acknowledged the primacy of the trace and was a first step on a new trajectory of scientific observation. It is no coincidence that this novel observation was introduced by way of electricity, which was to determine the nineteenth century in the sciences and beyond. Lichtenberg’s work contributed crucially to making this “matter” more scientifically accessible than it had ever been before. Lichtenberg’s figures introduced a new way of seeing that followed an epistemological model of subjective vision⁹⁵ and led to a new concept of scientific objectivity. Scientists’ observing minds became “metaphors of passive receptivity—minds as mirrors, soft wax, and, eventually, photographic plates,”⁹⁶ and their objects were allowed to assert “another logic of truth, one that subjects itself to incessant questioning while reserving a frame, a trace, a disclosive moment to which it refers.”⁹⁷ In this way, Lichtenberg’s electrical dust figures developed a life of their own that would inscribe itself into the science of the future.

93. Lavater, *Fragmente* (above, n. 57), vol. 1, p. 83–84.

94. Lavater, *Fragmente* (above, n. 57), vol. 2, pp. 100–101.

95. Cf. Crary, *Techniques* (above, n. 3), pp. 46–48.

96. Daston and Galison, *Objectivity* (above, n. 4), p. 96.

97. Ronell, *Test Drive* (above, n. 28), p. 5.