

# Editorial

## An Electrified History of Photography or a Photographed History of Electricity

fig. 1  
Arthur von Hippel, *Lichtenberg Figure*, Negative charge in Nitrogen gas, positive print from original glass plate negative, c. 1938. Courtesy von Hippel family.

This issue of *PhotoResearcher* explores photographic and electrical experiments by bringing together art practice research with photohistorical discourse, science studies and image histories, phenomenological and epistemological concerns. Each essay treats materials as central to the connection between photography and electricity, inviting readers to flow back and forth from one essay to another, collectively and responsively, to find the synergies amidst the nineteenth, twentieth and twenty-first centuries, reinvigorating their concept of the photographic and its histories.

Investigating electricity was always noisy and spectacular. The curling or branching tendrils of the Lichtenberg Figure, rising out of the dark or impressed where lightning struck grass, human skin, resin dust or a photographic emulsion, were only the quieter visual part of what was a full-body experience [fig. 1]. This experience included the humming of electromagnetic engines and overhead high-voltage wires, the banging and zapping of Leyden jars and Van de Graaff generators and the after-images of sparks flying high in demonstration halls. Coaxing electricity into the realm of human senses involved a series of extraordinary electrophores, batteries, engines, magnets and generators that were part of the spectacle and remain dominant in the telling of electrical history [fig. 2]. Fixing that spectacle in place, sometimes only temporarily, were clay tablets, gigantic wheels of resin, vacuum tubes, dust and photographs of every kind. Behind the spectacle was also a network of powerful forces, some geographical, some material and some political. Influence flowed in a curiously non-linear manner, with information running back and forth from electricity to materials to photographs and back to electricity in ways that were sometimes difficult to follow but always interdependent.

As a subject, this volume began years ago at the Photographic History Research Centre at De Montfort University in Leicester, through a series of in-person and online discussions and seminars. Jo Gane, Petra Trnková, Carolin Lange, Mark Kasumovic, Francesca Strobino, Martin Jürgens and I had noticed that working on nineteenth-century materials, science and photography also meant paying close attention to the materials and infrastructure of electricity. Since our initial meetings, some research specifically on the topics addressed in this volume has been published, most notably by Petra Trnková and Martin Jürgens in their respective articles on the daguerreotype and the phototype.<sup>1</sup> Their work was instrumental in our

1 — Petra Trnková, 'Electrifying Daguerreotypes: On Correlations between Electricity and Daguerreotypy around 1840', *History of Photography*, vol. 45, no. 2, London 2021, 111–127; Martin Jürgens et al., 'Joseph Berres's Phototyp: Printing Photography in the Service of Science', *The Rijksmuseum Bulletin*, vol. 66, no. 2, 2018, 144–169, <<https://doi.org/10.52476/trb.9752>> (07.04.2026).

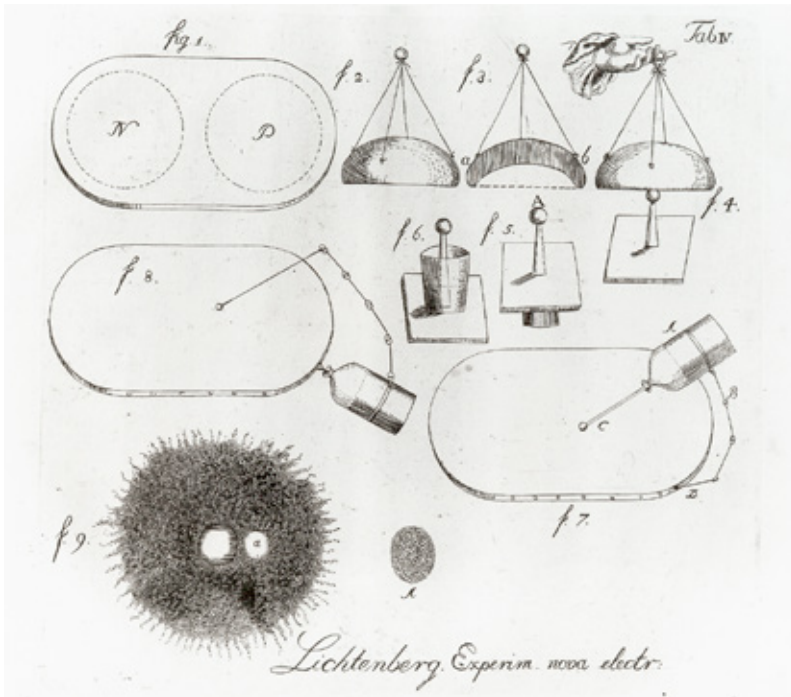
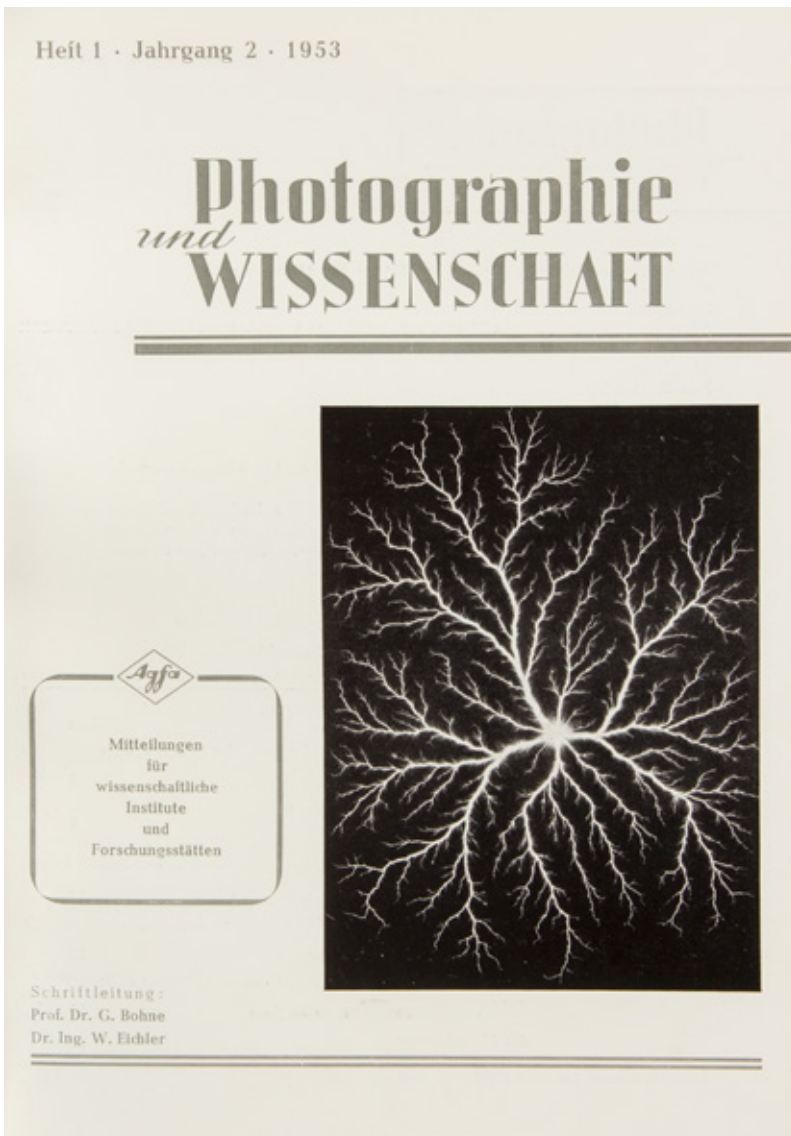


fig. 2  
 Georg Christoph Lichtenberg, Electrophore, in G. C. Lichtenberg, 'De Nova Methodo Naturam ac Motum Fluidi Electrici Investigandi', Novi commentarii Societatis Regiae Scientiarum Gottingensis, Göttingen, 1778, 168–180, Table IV.

fig. 3  
 Photographie und Wissenschaft, Agfa's promotional magazine, cover with a Lichtenberg Figure from research of Christoph Meyer, in: Christoph Meyer, Untersuchungen elektrischer Gleitendladungen mit photographischen Emulsionen, Heft 1, Jahrgang 2, 1953, 20–26.



discussions because it recognized the shared materials and methods of photography and electricity, especially in the nineteenth century. The initial authors are accompanied by Chitra Ramalingam, whose publications address the visual cultures, especially the photographic cultures, of electricity and who has been a central reference point from the outset.<sup>2</sup> These synergies unfold against the current backdrop of scholarship that often pits analogue and digital photography against one another. Much like the two cultures of art and science articulated by English chemist and novelist Charles Percy Snow back in the 1950s and repeatedly discussed and challenged since, analogue and electronic photography often appear more separate than they actually are.<sup>3</sup> The proximity of the two is not surprising: photography and electricity, the two experimental powerhouses of the nineteenth century, lay at the heart of many scientists' inquiries into unexplained natural forces. These phenomena shared laboratories, materials and supply lines; they were made or demonstrated by the same individuals; and often they were applied to one another, creating iconic and much-reproduced imagery [fig. 3]. What surprised us was the extent to which photography and electricity complimented and complicated one another, or where their experimental and theoretical edges converged in productive ways, suggesting a more focused study might reveal interesting and nuanced synergies.

Photography was and is, not merely a tool for recording electrical phenomena and 'pretty pictures'. It is itself an inherently electrical and electrochemical process. From the nineteenth-century silver salts and 'galvanic' batteries to twentieth-century electron clouds and contemporary integrated circuits, the movement of charges also moved images. In this volume, scientific and photographic overlaps are presented not as a series of isolated 'discoveries', but as a social process of co-production and intellectual friction.

The authors in this special issue build upon the previous scholarship and expand it to address this curiously intertwined relationship of photography and electricity from the nineteenth century to the first quarter of the twenty-first century. They argue for a more flexible approach to investigating the ways electricity and photography were always intertwined materially, culturally and experimentally, as well as the ways they continue to inform one another. They also position electricity as a full-body experience of the more spectacular variety and as an engine of contemporary artistic practice. For example, Mark Kasumovic's work in this journal, both the essay and the photographs, encourages us to see a multidirectional flow of data, and to carry his analogy further, a multidirectional rather than a linear history, an *electricified* photographic history, if you will.

### Recognizing Electricity in Photographic and Scientific History

The history of electricity has a voluminous literature, as one might expect, and it is far too large to survey here. Approaches to such a vast subject vary widely in scale and method. There are countless biographies about individual inventors like Alessandro Volta, Thomas Edison and Michael Faraday.<sup>4</sup> They are joined by fascinating social and cultural histories of electricity and its infrastructures.<sup>5</sup> There is also a long and especially lively tradition of research into the display and demonstration of electricity, since the public spectacle of electric experiments was consumed around the world.<sup>6</sup>

2 \_\_\_\_ Chitra Ramalingam, 'Natural History in the Dark: Seriality and the Electric Discharge in Victorian Physics', *History of Science*, vol. 48, nos. 3–4, 2010, 371–398; Chitra Ramalingam, 'Dust Plate, Retina, Photograph: Imaging on Experimental Surfaces in Early Nineteenth-Century Physics', *Science in Context*, vol. 28, no. 3, 2015, 317–355, <<https://doi.org/10.1017/S0269889715000125>> (07.04.2026).

3 \_\_\_\_ C. P. Snow, *The Two Cultures and the Scientific Revolution*, Cambridge 1959.

4 \_\_\_\_ Frank A. J. L. James, *Michael Faraday: A Very Short Introduction*, Very Short Introductions 253, Oxford 2010; Paul Israel, *Edison: A Life of Invention*, New York

1998; Giuliano Pancaldi, *Volta: Science and Culture in the Age of Enlightenment*, second edition, and first paperback edition, Princeton, 2005.

5 \_\_\_\_ David E. Nye, *Electrifying America: Social Meanings of a New Technology, 1880–1940*, sixth edition, Cambridge, MA 2001; Iwan Rhys Morus, 'The Two Cultures of Electricity: Between Entertainment and Edification in Victorian Science', *Science & Education*, vol. 16, no. 6, 2007, 593–602, <<https://doi.org/10.1007/s11191-006-9023-0>> (07.04.2026).

6 \_\_\_\_ Ewan Rhys Morris, 'Currents from the Underworld: Electricity and the Technology of Display in Early Victorian England', *Isis*, vol. 84, no. 1, 1993, 50–69.

All these approaches illuminate aspects of electricity that are critical to our essays in this volume.

Crucially, electricity and photography came together with the maturing of “... the rather new epistemic genre of observing”,<sup>7</sup> as it had grown from the seventeenth to the nineteenth century. Explanations for these experiences varied widely, and by the 1890s some attributed the emanations to spiritual causes – as William Crookes did so briefly, and William Armstrong with more conviction – while others sought physical foundations. It was also a decade when Henry Peach Robinson considered the greyscale of photographic materials to be divinely proscribed, only to be severely disappointed by the prosaic discovery of individual films’ characteristic curves.<sup>8</sup> Developing a common language for such diverse beliefs, even while discoveries and inventions appeared almost monthly, was no easy task.

This study also involves terminological difficulties, the nature of electricity being at the juncture of the material and the spiritual, and the question of what infrastructures are and what they do. To make this back-and-forth movement between photography and electricity easier for those not used to the more technical details of producing daguerreotype plates or detecting particles in microphysics, it is perhaps useful to begin with a clarification about the people, materials and processes that came to be intertwined in research on electricity and photography in the mid-nineteenth century. For me, it all begins with the imponderable forces: light, magnetism and electricity. Writing over the centuries, based on theorization and observation of the physical workings of the world around us, emerged in the nineteenth century in an increasingly connected international cohort of scientists, or, as they were called at the time, natural philosophers. In 1830, Sir John Herschel solidified scientific practice in what would become the century’s definitive handbook on experimental science, *A Preliminary Discourse on the Study of Natural Philosophy*.<sup>9</sup> He described practices that were already standard and recommended how to standardize those that were not. He was preoccupied with regularizing both language and general laws of nature, as well as democratizing the practising of science.<sup>10</sup> Even as the concept of the ‘scientist’ emerged over the course of the century, so too the distinct branches of science became clearer, encouraging professionalization and identification with one field or another as scientists struggled to bring order and clarity to the bewildering array of experimental results emerging from an expanding catalog of observational and experimental methods.

Carolyn Lange’s article on Robert Hunt in this volume clarifies that light, magnetism and electricity were fluid concepts in the nineteenth century, not always easily distinguishable from one another. The lack of clarity leached into the terminology used to not only describe but also to classify and contextualize concepts, sometimes only fleetingly. These concepts were fluid. It is important also to remember Jennifer Tucker’s assertion that photographic knowledge in the sciences was not taken for granted. Indeed, it was not only discussed and contested, but it was highly constructed at many levels.<sup>11</sup> The photographers and scientists discussed in this volume not only simply made phenomena visible; they also made that visibility meaningful.<sup>12</sup> William Armstrong constructed his spark images by building a camera out of his laboratory rather than photographing vacuum tubes as his predecessors had. He then embedded them in a publication that argued for their divine origins. George Shaw brought the forces of magnetism, light and chemistry together so an audience could

7 \_\_\_\_ Lorraine Daston, ‘The Empire of Observation, 1600–1800’, *Histories of Scientific Observation*, Chicago 2011, 92–93.

8 \_\_\_\_ Kelley Wilder, *Photography and Science*, Exposures, London 2009.

9 \_\_\_\_ John F. W. Herschel, *A Preliminary Discourse on the Study of Natural Philosophy*, with Arthur Fine, Chicago 2010.

10 \_\_\_\_ Stephen Reid Case and Lukas M. Verburgt, *The Cambridge Companion to John Herschel*, Cambridge 2024.

11 \_\_\_\_ Jennifer Tucker, *Nature Exposed: Photography as Eyewitness in Victorian Science*, Baltimore 2005.

12 \_\_\_\_ Tucker 2005 (reference 11), 240.

make the connection between them. Arthur von Hippel and Fred Merrill tuned their pressure tank to elicit the backfigures so important to their findings about molecular arrangement and rearrangement. Robert Hunt rendered the forces of electrochemistry and electromagnetism visible in clay and sometimes photography. He gave these visualizations meaning by embedding them in a category of actino-chemistry. The process of making sense of visualizations is what Kasumovic's photographs do in his *Human Laboratory* series, showing us the elaborate and sometimes depopulated machinery, alongside their very human workspaces around it. Humans leave traces where they have been actively remaking knowledge.

In the nineteenth century, everything was up for reevaluation, from Newton's mathematical notations and theories of light to the nature of time.<sup>13</sup> The periodic table was still in its infancy. New materials were being extracted from mines, but they were also being manufactured through refining methods, some of them powered by electricity. Not only did photography and electricity connect to some of the most mysterious 'invisible' physical forces, but they also both became tools for observing and conceptualizing those forces. As tools that appeared to make images spontaneously, they joined a host of autopoietic imaging tools. They were deeply implicated in what Lorraine Daston has called 'new forms of reasoned experience'.<sup>14</sup> In a looping fashion, some of those electrically manufactured materials then powered new batteries that led to more refining in the rise of electrometallurgy. As Trnková points out, photography and electricity used similar materials such as copper and silver, bringing those material markets together.<sup>15</sup>

Across the essays, the authors understand infrastructure as a key, sometimes invisible, framework that sustains both scientific inquiry and visual culture, manifesting in different ways across centuries and among scientists. It appears in the materials of electricity, such as hydroelectric turbines at Cragside, high-voltage generators, telegraph networks, and the 'Defense Department Funding' that built the MIT laboratories, as well as through supply-chain logistics for specialized chemicals and metals (silver nitrate, platinum and potassium ferricyanide) that made electroplating, actino-chemistry and photography possible. The idea of infrastructure is tied to the 'unseen universe' of the ether, the subatomic 'octopus trails' of data and the 'breadboard' as a theoretical space for prototyping both circuits and ideas.

Space can also be less theoretical, and much more physical. In the town of Como, Alessandro Volta is honored by his birthplace with a temple [fig. 4], the Quadro Voltiano, for his invention of the first continuous-current battery, which led to so many breakthroughs. It seems ironic that just an hour's boat ride away is the Villa Melzi, where William Henry Fox Talbot first began thinking of fixing the sun's rays as an image. The geographical proximity is more than just a coincidence. The industrial and intellectual hub of Milan and the surrounding Lombardy region, including Como, had attracted scientists and artists since Leonardo da Vinci spent twenty years at the Sforza Court. Talbot had already visited on his Grand Tour in 1821, drawn by the opportunity to collect botanical specimens in the mountains and take in the picturesque lakes.

Jo Gane's essay demonstrates how important the burgeoning industrial cities like Milan and, in Gane's case, Birmingham, were in shaping nineteenth-century industrialist-practitioners such as George Shaw into metallurgists and daguerreotypists. The same is true for Robert Hunt, whose relocation to London moved him from a regional network to a metropolitan center, where he could meet others and discuss his work as well as find publishing outlets for his results. Perhaps the most powerful

13 \_\_\_\_ Jimena Canales, *A Tenth of a Second: A History*, Chicago 2009.

14 \_\_\_\_ Daston 2011 (reference 7); Trnkova 2021 (reference 1), 93.

15 \_\_\_\_ Trnková 2021 (reference 1).





fig. 4  
Anonymous, *Quadro Voltiano*, The bust of Alessandro Volta surrounded by photographs of his instruments, silver print, late nineteenth century, National Museum of Science and Technology Leonardo da Vinci, MUST Photographic Archive, Milan.



fig. 5  
Jo Gane, Self portrait in Packington  
Park, near Birmingham,  
16 December 2021.

example in this volume is Cragside, where the performance of industrial dominance and British ingenuity unfolded through the house and the laboratory, with its many distinguished visitors, as well as the experiments it contained.

Infrastructure, Kasumovic tells us, can and perhaps should be seen as inter-operable. The data flow runs both ways. Electricity was both examined by photography and helped to produce it, much as the power grid supports the production and dissemination of digital photography, while photography itself serves as a model for digitally generated images.<sup>16</sup> Or consider the way von Hippel's and Merrill's Lichtenberg Figures were part of a research plan to design new materials, including those that would transform light into energy through photovoltaic cells. Kasumovic's essay encourages us to take seriously the image infrastructure of server rooms and power grids, that shape our knowledge economy and the power infrastructure through which it, and many other essential services, flow.

Power infrastructures at the intersection of photography and electricity, and the funding behind them, are perhaps the most difficult to account for. They can be political or geographical, but sometimes power simply means money for research and publications, as in Armstrong's case or von Hippel's at MIT's Insulation Laboratory. The fact that monetary and materials infrastructure are deeply tied to conflict and war is well known, and it is important to note that it carries implications back to the image that is so foundational to photographic history studies.

Photographs are indeed laden with electricity, and the authors demonstrate this in various ways:

*Carolyn Lange* investigates the convergence of chemical experiments with light, electrochemistry and electromagnetism in the work of one of the most prolific writers on early photography, Robert Hunt. By delving into Hunt's lesser-studied experiments, she demonstrates that understanding photography was part of trying to understand the physical forces governing the world. At stake was not just the concept of photography or photographic reactions, but also the identification of photography as an important tool for visualizing natural forces and categorizing them. Lange shows that the nineteenth-century project to make photography produce scientific knowledge was inseparable from the language invented to describe it.

*Jo Gane's* historical intervention through research and art practice argues for a deep understanding of the industrial city of Birmingham as a space of electromagnetism and electrometallurgy demonstrations and practices. Through the activities of the early photographer, lecturer and patent agent George Shaw in the 1840s, coupled with Gane's walking and photographing practices in nearby Packington Park, readers are invited to experience electricity and photography through their networks in industrial electrometallurgy [fig. 5]. Gane demonstrates how practice-based research helps to make sense of historical events in a dialogue between a contemporary photographer and her nineteenth-century counterpart.

*Chitra Ramalingam* shows how entangled spark-discharge research was in the industrial infrastructure and modern industrial vision of fin-de-siècle Britain. Through William Armstrong's *Electric Movement in Air and Water with Theoretical Inference*, Ramalingam demonstrates how industrial politics intertwined with Armstrong's anti-materialist worldview in his construction of the house and laboratory at Cragside. At a moment when physics was beginning to consolidate its views, stepping into the twentieth-century world of big science, Armstrong emerges as a compelling figure of the wealthy and well-connected industrialist-scientist seeking to assert his beliefs.

*Kelley Wilder's* essay takes the Lichtenberg Figure [fig. 6] as an introductory investigation into new materials construction in the Insulation Laboratory of MIT,

16 — Estelle Blaschke and Armin Linke, *Image Capital*, <<https://image-capital.com/>> (07.04.2026).

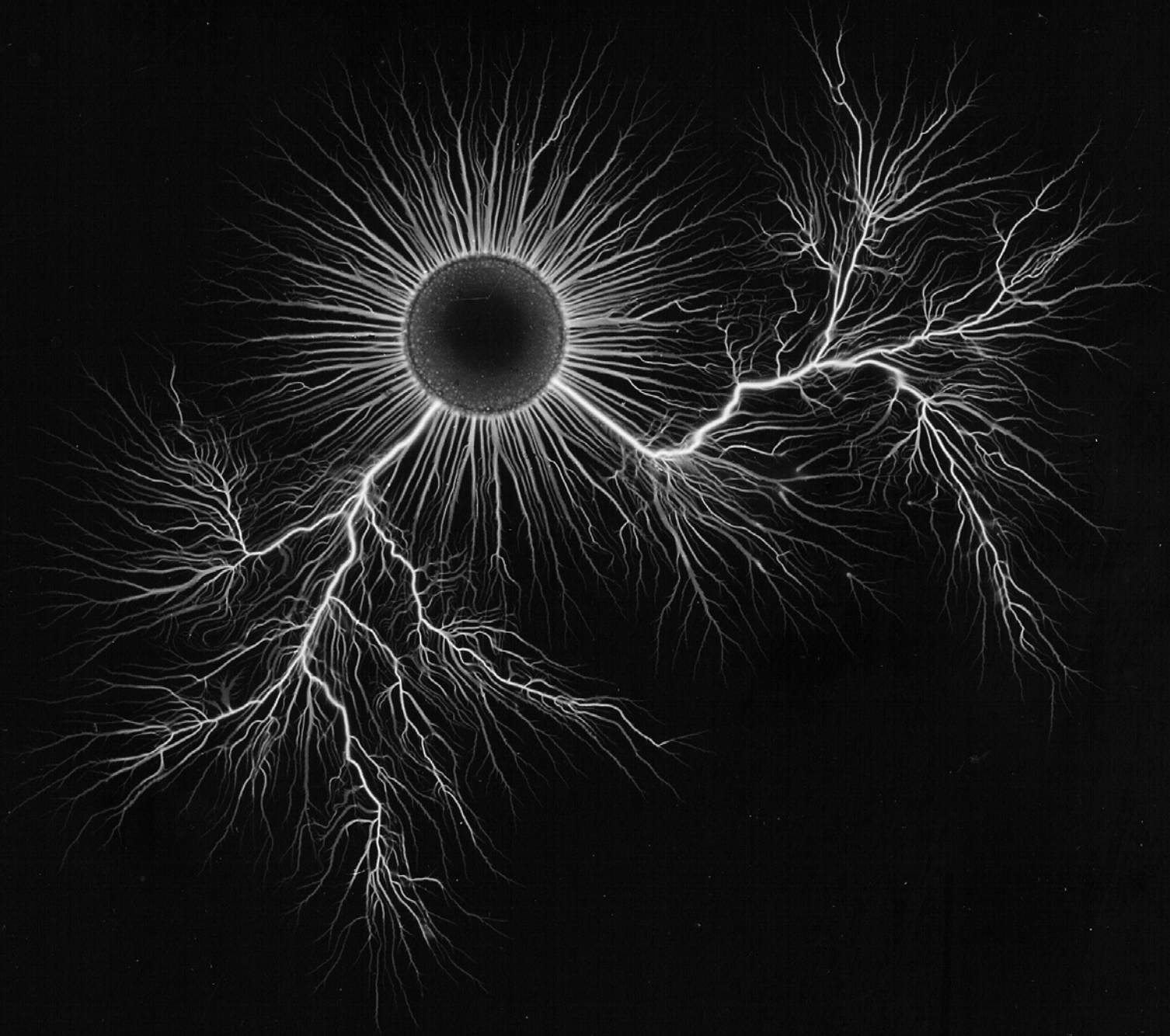


fig. 6  
Arthur von Hippel, Lichtenberg  
Figure used in multiple publications,  
Positive charge in Nitrogen, positive  
photograph from glass plate negative.  
Courtesy von Hippel family.

run by Arthur von Hippel. Taking the Figures' research – mostly conducted by Fred Merrill – and its aims as a guide, Wilder demonstrates that the Figures were not just 'pretty pictures' but also fundamental research that contributed to the emerging field of materials science. Its entanglement with essential war research in World War II, and the flow of funding from the US Defense Department budget, reiterates the close ties among photographic materials, money and politics.

*Mark Kasumovic's* artwork and essay questions the linear nature of knowledge construction through electronic interfaces by positing the idea of the breadboard. In it, or on it, the electronic camera recodes the notion of the indexical chemical trace, replacing it with a series of choices, reroutings and multidirectional flows of data. The essay approaches the photograph not as a recording device of electric circuits, but as an interpretive device. Through three bodies of work, *A Human Laboratory*, *I Can Hear You Humming* and *Picture Perfect*, Kasumovic suggests a circuitry that connects everyday photographic actions with infrastructure and with the gaining and amplifying of knowledge.

Kelley Wilder  
*Leipzig, April 2026*