FRANK KESSLER
SABINE LENK

The Emergence of the Projected Image as a Teaching Tool in Higher Education (1860–1914)

Prologue

On 18 April 1900 Antonie Ewoud Jan Holwerda, who held the chair of classical archaeology at Leiden University, gave a keynote lecture at the Second Dutch Philology Convention. He announced he was not going to discuss a specific issue in his field of research, but rather talk more generally about his discipline saying, '[…] however tempting it might be to talk about a question concerning Greek art, it is virtually impossible to do so for a large audience if one is unable to produce a whole series of slides'.[1]

On 22 November of that same year, Willem Vogelsang gave his inaugural lecture as *Privaat-Docent* in Art History at the University of Amsterdam. Summarizing his lecture, he explained that he was obliged to give the audience a rather ragtag collection of art-historical remarks than he would have preferred. 'But without slides it would have been impractical to do so for a large audience […]'.[2]

* This chapter was written as part of the research project 'B-magic. The Magic Lantern and Its Cultural Impact as Visual Mass Medium in Belgium (1830–1940)'. 'B-magic' is an Excellence of Science project (EOS-contract 30802346, 2018–2023), supported by the Research Foundation Flanders (FWO) and the Fonds de la Recherche Scientifique (FNRS). It is also part of the research project 'Projecting Knowledge — The Magic Lantern as a Tool for Mediated Science Communication in the Netherlands, 1880–1940', project number VC.GW17.079 / 6214, financed by the Dutch Research Council (NWO). We would like to thank Nelleke Teughels and Kaat Wils for their very helpful suggestions. We are particularly grateful to Nathalie Blancardi for generously sharing primary source material on the Art and Archaeology department at *Université de Lausanne* with us, as well as a course listing she established on the basis of Lausanne course catalogues. Thanks are also due to Sjaak Boone for pointing us to sources on early Dutch lens makers.

1 Holwerda, Antonie Ewoud Jan, *De betekenis der archeologie voor de studie der oudheid* (Leiden: E. J. Brill, 1900), p. 7. 'Hoe verleidelijk het toch ook is over een onderwerp van Grieksche kunst te spreken, voor een grooter gehoor is dat, wanneer men niet in staat is eene gansche reeks van lichtbeelden te produceren zoo goed als ondoenlijk.' Unless stated otherwise, all translations are ours.

2 Vogelsang, Willem, *Kunstwetenschappelijke opmerkingen* (Amsterdam: Scheltema en Holkema's Boekhandel, 1900), p. 38 'Doch dit was voor een groot gehoor zonder lichtbeelden ondoenlijk geweest […].'

Frank Kessler • Utrecht University, F.E.Kessler@uu.nl

Sabine Lenk • University of Antwerp, S.Lenk@uu.nl

Learning with Light and Shadows: Educational Lantern and Film Projection, 1860-1990, ed. by Nelleke Teughels and Kaat Wils, TECHNE-MPH, 8 (Turnhout, 2022), pp. 27-49

10.1484/M.TECHNE-MPH-EB.5.131493

These statements dating from 1900 allow us to make three observations: first it would seem that the optical lantern had by that time become a relatively common device for lectures in at least the academic fields of archaeology and art history and perhaps one that was more or less taken for granted. Second, that the lantern was considered particularly suitable for presenting visual material when addressing a large audience. Third, that such illustrations were deemed more or less a necessity for some types of scholarly lectures and that it was thought 'impractical' to discuss certain topics before an auditorium full of people without the ability to project slides. In other words we may assume that by 1900 the lecture illustrated with lantern slides as a form of knowledge transmission was an established form of communication in some scholarly fields thanks to the ability, made possible by the lantern, to present visual information simultaneously to a large audience. In turn the use of the medium allowed the speaker to discuss issues that without the support of the projected image were better not addressed as one could do so only in an unsatisfactory and inadequate manner.

Using this as our point of departure, we will address the following questions in this chapter: who or what were the driving forces that sought to introduce the projection lantern into academic teaching; what obstacles had to be overcome to do so; were there disciplines that were more inclined than others to adopt this didactic tool and for what reasons; and finally we will briefly address the question of how academics using projection could procure slides and what infrastructure was available for supply.

Our study is based on primary sources and archival research in lantern slide collections.[3] We start with a brief historical overview to explain the problematic reputation lantern projections had acquired and then focus on the period between 1860 and 1914, when the developments we want to examine took place. As might be expected, pictures played an important role in disciplines such as geology, zoology, botany, medicine, and astronomy as well as in theology and of course art history.[4] We must therefore limit our observations to just a few cases. We want in particular to demonstrate the crucial role of transnational networks in the dissemination of projection in academic teaching. An important figure in this context is the French Abbé Moigno, generally considered a pioneer of lantern pedagogy. As we will argue, despite his immense contribution to popular science communication, his influence on academic teaching was nonetheless limited; a point largely neglected in earlier studies of Moigno.

---

3 As archival research has been seriously hampered by the current pandemic, we have not been able to systematically investigate the use of the projected image in university teaching. We had no access to materials such as course catalogues, lecture notes or personal records that make it possible to reconstruct in more detail the way in which projected images were adopted by academic teachers in their day-to-day practice. Access to such documents provided insights, for example, into Willem Vogelsang's use of the lantern in his art history lectures. Cf. Notebaard, Jamilla, 'De Kunst van het geprojecteerde beeld. De didactische waarde van de projectielantaarn voor de kunsthistorische lessen van Willem Vogelsang (1875–1954)', *De Moderne Tijd*, 4.1–2 (2020), pp. 88–107; cf. also de Klerk, Nico, 'Art Historian Willem Vogelsang', *Projecting Knowledge Working Papers*, 1 (2021, revised version) <https://projectingknowledge.sites.uu.nl/wp-content/uploads/sites/482/2019/11/Working-paper-1.Vogelsang.January-2021–1.pdf> [accessed 1 March 2021].

4 See for example for the natural sciences, Daston, Lorraine, and Peter Galison, *Objectivity* (New York: Zone Books, 2007); for theology, e.g., Saint-Martin, Isabelle, 'Du vitrail à la lanterne magique, le catéchisme en images', in *Lanternes magiques, tableaux transparents*, ed. by Ségolène Le Men (Paris: Réunion des Musées Nationaux, 1995), pp. 105–20. The lantern as teaching tool is conspicuously absent in, e.g. Dorsman, Leen, and Peter Jan Knegtman, eds, *Van Lectio tot PowerPoint. Over de geschiedenis van het onderwijs aan de Nederlandse universiteiten* (Hilversum: Verloren, 2011).

The Lantern's Reputation, or Obstacle no. 1

The introduction of lantern projections into academic lecture halls was not at all a matter of course even though the lantern had been born in the laboratory. The lantern bore a blemish from the very start as Christiaan Huygens, a mathematician interested in optics and watchmaking, and who constructed the apparatus for his father in 1659, apparently did not want his reputation as a scientist tarnished by being associated with an instrument of entertainment. An instrument which, as Deirdre Feeney mentions, demanded long hours of the lens maker's craft. In a letter to his brother he declared that he was '[…] ashamed that people will know that [such trifles] came from me'.[5]

In his widely read writings on the magic lantern the Jesuit Athanasius Kircher associated it with demonic and fantastic apparitions, and the lantern's dissemination by itinerant scholars such as the Dane Thomas Rasmussen Walgenste(i)n added to the instrument's general negative reputation as a 'lantern of horror'.[6] Instead of using it as a teaching tool as Johannes Zahn had proposed in 1685–1686, it fell into the hands of itinerant showmen who in the following century earned their living by showing crude self-painted pictures of foreign countries or the Seven Wonders of the World.[7] The same goes for the commercial exploitation of phantasmagoria spectacles by 'physicists' such as Paul de Philipstal and Étienne-Gaspard Robert aka Robertson.[8] From *c.* 1800 onward, toy lanterns made of tin with poor lighting systems and mediocre lenses produced by manufacturers such as Johann Wolfgang Rose in Nuremberg turned the device into an entertainment for children.[9]

After two centuries, during which the projection lantern mainly served popular entertainment, it slowly gained a new reputation.[10] By the mid-nineteenth century science-themed shows for large audiences were being organized by, among others, Henri Robin in Paris and

---

5 Quoted in Feeney, Deidre, 'The Magic Lantern as a Creative Tool for Understanding the Materiality and Mathematics of Image-Making', in *The Magic Lantern at Work. Witnessing, Persuading, and Connecting*, ed. by Martyn Jolly and Elisa deCourcy (New York, London: Routledge, 2020), pp. 16–31 (pp. 25–26). On the construction of the 'first' Dutch telescope in 1608 and the role of lens makers such as Evert Harmansz and Johan van der Wyck, cf. van den Berg, Rob, 'Het geheim van de Delftse brillenmaker', *NRC*, 16–17 May 2015, quoting historian Huib Zuidervaart from Huygens Instituut (KNAW) in The Hague.

6 Walgensten showed terrifying images which were believed to have caused the sudden death of the Danish king in 1670.

7 For more on the lantern's history, cf. chapter IV of Ruchatz, Jens, *Licht und Wahrheit. Eine Mediumgeschichte der fotografischen Projektion* (München: Wilhelm Fink, 2003). See also Vermeir, Koen, 'The Magic of the Lantern (1660–1700): On Analogical Demonstration and the Visualization of the Invisible', *The British Journal for the History of Science*, 38.2 (2005), pp. 127–59.

8 See, for example, the report by David Brewster on the effect of Robertson's show: Brewster, David, *Letters on Natural Magic, addressed to Sir Walter Scott, Bart. By Sir David Brewster, K. H.* (London: John Murray, 1832), pp. 80–82.

9 On the Rose workshop, see Scholze, Bernd, 'The Beginning of the Modern Toy Industry in Germany: Peter Friedrich Catel and the First Toy Lanterns', *The Magic Lantern*, 1 (December 2014), pp. 1–10 (pp. 1, 8–10). David Brewster in his letters to Walter Scott confirms this and gives as main reason the badly executed images whose flaws appear clearly when enlarged on the screen. Cf. Brewster, *Letters on Natural Magic*, pp. 78, 85.

10 Attested educational use of the lantern occurred at the court of the Freemason Louis XVI where the dauphin was taught with the aid of slides, cf., e.g., Mannoni, Laurent, *Le Grand art de la lumière et de l'ombre. Archéologie du cinéma* (Paris: Nathan, 1994), pp. 86–88; as well as in the pedagogical practice of Madame de Genlis around 1780, cf. Ruchatz, *Licht und Wahrheit*, pp. 155–57.

Brussels[11] and at respectable venues such as the Royal Polytechnic Institution in London with its famous large-size slides.[12] Despite their educational aspirations, however, these were commercial ventures that first and foremost sought to entertain.

Later on educational lectures again often served commercial interests, albeit driven by a pedagogical vocation. Between the 1880s and the 1920s a wave of travelling performers (often presenting medical topics) travelled North America, Australia and New Zealand, Southeast Asia, South Africa, and the United Kingdom.[13] For Belgium this occurred between 1890 and 1930.[14] They toured with slides and a narrative, stayed only for one or two lectures, employed an agent to rent the biggest premises[15] and advertised their visits in advance in the local newspaper like circus people. This contributed to a discrediting of the medium in the eyes of the academic elite,[16] who regarded such performers as little better than hucksters. Even so serious travelling lecturers needed self-promotion to assure their income, an activity which, as Joe Kember noticed in respect of the lecturing physician Anna Mary Longshore Potts, '[…] created frictions with the dignity and formality customarily accorded to the latter [as medical professional]'.[17] Besides, the sheer number of touring lecturers[18] could discredit the medium, as Elias Barker, an experienced lanternist and distributor of slides from Salisbury, complained in 1898, 'Third and fourth-rate exhibitions […] have no doubt more than anything else brought the lantern into disrepute.'[19] His hope was that the lantern would be used for the dissemination of science and 'become a distinctive feature in the educational routine of the future'.[20]

This quick look back at the period between 1659 and 1900 points up the optical lantern's association with (itinerant) showmanship, (children's) entertainment and, the problematic popularization of knowledge for the masses. The resulting reputation was a

---

11 On Robin cf. Vanhoutte, Kurt, and Nele Wynants, 'On the Passage of a Man of the Theatre Through a Rather Brief Moment in Time: Henri Robin performing Astronomy in Nineteenth Century Paris', *Early Popular Visual Culture*, 15.2 (2017), pp. 152–74.

12 Cf. Brooker, Jeremy, *The Temple of Minerva: Magic and the Magic Lantern at the Royal Polytechnic Institution, London 1837–1901* (London: The Magic Lantern Society, 2013). Cf. also Ruchatz, *Licht und Wahrheit*, p. 164.

13 Cf. Kember, Joe, 'Anna Mary Longshore Potts and the Anglophone Circuit for Lantern Lecturing in the Late Nineteenth Century', in *The Magic Lantern at Work. Witnessing, Persuading, and Connecting*, ed. by Martyn Jolly and Elisa deCourcy (New York, London: Routledge, 2020), pp. 138–56 (pp. 138–39).

14 Cf. Buelens-Terryn, Margo, Iason Jongepier, and Ilja Van Damme, 'Shine a Light: Catholic Media Use, Transformations in the Public Sphere, and the Voice of the Urban Masses (Antwerp and Brussels, *c.* 1880 — *c.* 1920)', in *Faith in a Beam of Light*, ed. by Sabine Lenk and Natalija Majsova (Turnhout: Brepols Publishers, 2022).

15 According to Angela G. Ray, after 1850 in the US a 'popular lecturing system' began with 'the "creation of public lecturer" as an occupational category'. Ray, quoted in Kember, Joe, 'The Lecture-Broker: The Role of Impresarios and Agencies in the Global Anglophone Circuit for Lantern Lecturing, 1850–1920', *Early Popular Visual Culture*, 17.3 (2019), pp. 279–303 (p. 282).

16 For an illustrative example of 'infotainment' for the masses, cf. Kember, 'Anna Mary Longshore Potts', pp. 148–49.

17 Kember, 'Anna Mary Longshore Potts', p. 142.

18 Kember, 'The Lecture-Broker', p. 284, speaks of 'thousands of engagements across the United States' for the 1890s.

19 Barker, E[lias], 'The Lantern as an Educator', in *The Magic Lantern Journal and Photographic Enlarger, Almanac & Annual, 1898–9*, ed. by J. Hay Taylor (London: Magic Lantern Journal Company Ltd, [1898]), pp. 92–94 (p. 92).

20 Barker, 'The Lantern as an Educator', p. 93.

considerable obstacle to overcome if the lantern was to be deemed worthy to enter the hallowed halls of academe.

The Lantern's Power to Enchant and Educate as Pretence, or Obstacles no. 2 and no. 3

As Jens Ruchatz observed, since its inception the projection lantern was positioned between the two poles of magic and illusion on the one hand and its potential for science and education on the other, '[…] the sober description of the Laterna magica as an instrument of teaching and enlargement does not ignore the power of the projected image to fascinate'.[21]

The fascination produced by the picture on a screen in a dark environment on any kind of audience could work against the lantern's use as a teaching tool, as magic and sobriety are hardly compatible (obstacle no. 2). Even scientific representations such as an immensely enlarged drop of water, to show what is invisible to the naked eye, often appeared as a spectacle of curiosity.[22]

The same goes for the exoticizing representations of geographical, botanical, or zoological phenomena that were presented in venues ranging from fairgrounds to public lecture halls. Mid-nineteenth century showmen presented (often self-made) painted slides and dissolving views. Similarly from the 1820s onwards the catalogue of the British manufacturer of scientific instruments Carpenter & Westley[23] offered depictions of animals in vivid colours that appeared fantastic rather than drawn from nature (Fig. 1.1). Mass audiences were no doubt delighted and fascinated by them (until public zoos made it possible to see what the animals really looked like) and the accompanying talk may indeed have provided correct information. The zoologist would, however, have felt such illustrations to be nothing short of offensive (obstacle no. 3) and incompatible with the maxim widely applied to teaching children at the time that says, 'He who sees correctly, reasons well.'[24]

The problem was one of accuracy, not the fact that these were hand-drawn images. In the 1920s, for example, biologists used photographic images alongside drawings showing an idealized version of the plant.[25] (Fig. 1. 2) Photography provided the opportunity to create a new repertory offering the audience a different kind of magic: the illusion of being 'true to the original'.

---

21 Ruchatz, *Licht und Wahrheit*, p. 124.

22 Micro-cinematography, too, still fascinated the audience, e.g., The Unseen World (Charles Urban Trading Co., UK, 1903) was praised as 'The Micro-Bioscope Series is undeniable interesting and of real educational value, and should draw crowds wherever exhibited.' <https://www.scienceandmediamuseum.org.uk/what-was-on/when-camera-beats-eye-f-percy-smith-archive#&gid = 1&pid = 3> [accessed 25 May 2021]. Cf. also Gaycken, Oliver, '"The Swarming of Life": Moving Images, Education, and Views through the Microscope', *Science in Context*, 24.3 (2011), pp. 360–81.

23 Carpenter & Westley started mass producing slides, but the process was not yet entirely mechanized. Cf. Roberts, Philip, 'Philip Carpenter and the Convergence of Science and Entertainment in the Early-nineteenth Century Instrument Trade', *Sound and Vision* (spring 2017), no pag.

24 'Qui voit juste raisonne bien.' This maxim is quoted in the book by the French zoologist and minister of education, Paul Bert, *Premières notions de zoologie. Lectures à l'usage des élèves des établissements d'enseignement secondaire, des écoles normales primaires et des écoles primaires supérieures, 4th ed.* (Paris: G. Masson, 1885), p. vii.

25 Cf. the slide collection at the *Université libre de Bruxelles*. Cf. also Daston and Galison, *Objectivity*, pp. 161–72.

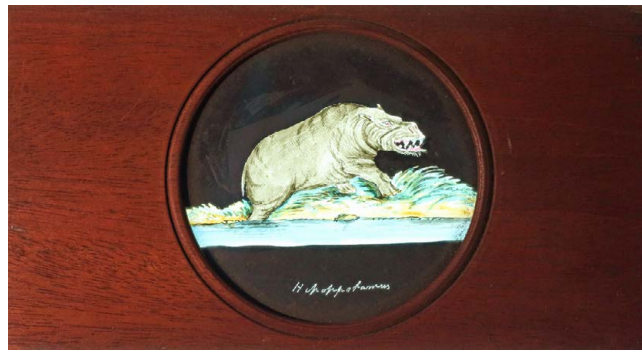

Fig. 1.1. 'Hippopotamus', possibly Carpenter & Westley, *c.* 1850. Robert Vrielynck Collection, courtesy of MuHKA.

Fig. 1.2. 'Le Coquelicot', Léon Roup, *c.* 1925–1926. Fonds Léon Roup, courtesy of Archives, Patrimoine et Réserve précieuse, Université libre de Bruxelles.

As long as manufacturers such as Carpenter & Westley considered their product as 'a desirable consumer object' and, as Philip Roberts remarks, associated the lantern with education solely for marketing reasons and as a means of making it 'acceptable' to their 'middle class' clients,[26] the fascinating aspect of the screen image would take precedence over its potential for science and education.

26 Roberts, 'Philip Carpenter and the Convergence of Science'. The catalogue for 1850 contained series entitled 'Natural History, & c.' and 'Astronomical Diagrams'.

The Academic Habitus, or Obstacle no. 4

One of the problems in Western European countries such as Germany, Austria, Switzerland as well as the United Kingdom[27] lay in the attitude of the potential users: a professional snobbishness — in German *Standesdünkel* — that had to be overcome before a serious discussion of the possibilities offered by the lantern could take place. The prefix 'Standes-'[Standesdünkel] refers to a closed social group, defined by common social functions and externally perceptible distinguishing characteristics. […] An example of the intellectual demarcation of a professional group [… is] the seclusion of the higher civil service […].' According to Christoph Pazdzior, to keep a group exclusive requires 'processes of closure, segregation and selection' ('ständischen Schließungs-, Segregations- und Ausleseprozessen', p. 226) and a compliant behaviour as well as a 'deliberate demarcation towards the lower levels of society' ('gewollte Abgrenzung nach unten', p. 304).[28] This is an adequate characterization of the general mentality of the academic world around 1900.

The self-image and *habitus* of many teachers at institutions with long-standing traditions and the value attributed to their hierarchical position often outweighed pedagogical insights that were critical of traditional teaching methods and favoured forms of visual instruction.

> Overall, habitus is described as 'a stable system of interiorized rules of action that not only serve to enable adjustment to practical requirements but also self-interpretation and the interpretation of social relations'. [Rehbein] Such patterns of action acquired through learning and education are essential for the communication with one's social peers, i.e. representatives of the same habitus, when choosing and practicing a profession.[29]

One good example of the hierarchical difference in *habitus* is the so-called German 'Kinodebatte', which first started in the 1900s. Whereas numerous teachers familiar with the sciopticon and active in primary education (*Volksschule*) saw the potential of film as

---

27 The exclusive Royal Society (which admitted new members only by election) was for instance much less interested in photography than the BAAS which was open to 'generalists and specialists', according to Tucker, Jennifer, 'Magical Attractions: Lantern Slide Lectures at British Association for the Advancement of Science Annual Meetings, ca 1850–1920', in *The Magic Lantern at Work. Witnessing, Persuading, and Connecting*, ed. by Martyn Jolly and Elisa deCourcy (New York, London: Routledge, 2020), pp. 67–87 (p. 68).

28 'Das Präfix "Standes" verweist auf eine geschlossene soziale Schicht, definiert durch gemeinsame gesellschaftliche Funktionen und nach außen wahrnehmbare Distinktionsmerkmale. […] Ein Beispiel für die dünkelhafte Abgrenzung einer Berufsgruppe [… ist] die Abgeschlossenheit der höheren Beamtenschaft […].' (p. 23–24). Pazdzior, Christoph, *Understatement oder Standesdünkel? Hanseatisches Selbstverständnis und Kaufmannsbildung im 19. Jahrhundert. Ein Beitrag zur berufspädagogischen Regionalgeschichte* (doctoral thesis, University of Hamburg, 2016; online version at http://opus.ub.hsu-hh.de/volltexte/2017/3151/pdf/Dissertation_Pazdzior.pdf [accessed 8 March 2021]), pp. 23–24, 226, 304. Cf. also Pierre Bourdieu's theory of habitus in his *Outline of a Theory of Practice* (Cambridge: Cambridge University Press, 1977).

29 'Der Habitus wird insgesamt als "stabiles System verinnerlichter Handlungsregeln, die nicht nur der Anpassung an die Arbeitsanforderungen, sondern auch der Selbstinterpretation und der Deutung gesellschaftlicher Verhältnisse dienen" [Rehbein] beschrieben. Für Ergreifen und Ausübung eines Berufs sind diese in Erziehung und (Aus-)Bildung erworbenen Handlungsmuster, die die Kommunikation mit sozial Gleichgestellten, damit Vertretern des gleichen Habitus, erleichtern, unerlässlich. 'Pazdzior, *Understatement oder Standesdünkel*, p. 51, with a quotation by Rehbein, Boike, *Die Soziologie Pierre Bourdieus* (Konstanz: UVK, 2006), p. 128.

a didactic tool and favoured *Anschauungsunterricht* both and inside and outside schools,[30] secondary school teachers (*Gymnasium*, *Lyceum*) insisted on front-of-class teaching, knowledge from books and 'pedantische Zucht und äußeren Drill' (strict school discipline and external drill), as the reformer Konrad Lange critically remarked.[31] After World War I, *Volksschulen* and *Realschulen* were the first to introduce film into the classroom. By virtue of their 'Herkunft und Berufsfunktion' (origin and professional position)[32] teachers in the *Volksschulen* were close to the working class and saw teaching as a vocation with the aim of giving children a chance to improve their position in society.[33] The social status of *Lyceum* teachers in Germany was much higher: since 1810 they had been expected to pass university examinations (*Staatsexamen*), which made them part of the 'aristocracy of the educated' (*Bildungsaristokratie*).[34] Their status was close, but not equal, to university professors who for a long time stood 'in unerreichbarer Höhe über der Welt' (at an unattainable height above the world).[35]

Switzerland, too, had a strictly hierarchical school system.[36] Institutions such as the Art Academy in Lausanne or secondary schools such as the Lausanne 'Gymnasium' were open to new methods whereas the introduction of the sciopticon met with some resistance in the university. Although more research is required, we see indications that this was due above all to the academic hierarchy of professorial ranks. Aloys de Molin, a young teacher of archaeology and Latin, who had studied with Jakob Burckhardt and Herman Grimm,[37] used slides when he lectured on the history of Roman Art in 1886 at the Academy. When he taught the same subject as 'Privat-Docent' in the Department of Art and Archaeology (ex-Art Academy) in the winter of 1890–1891 he did so without

---

30 Cf. Kessler, Frank, and Sabine Lenk, 'The Kinoreformbewegung in Germany: Creating an Infrastructure for Pedagogical Screenings', in *The Institutionalization of Educational Cinema*, ed. by Marina Dahlquist and Joel Frykholm (Bloomington: Indiana University Press, 2019), pp. 36–54; cf. also Ruchatz, *Licht und Wahrheit*, pp. 400–01.

31 Lange, Konrad, 'Das Wesen der künstlerischen Erziehung', in *Kunsterziehung. Ergebnisse und Anregungen des Kunsterziehungstages in Dresden am 18. und 19. September 1901*, 2nd edn. (Leipzig: R. Voigtländers Verlag, 1902), pp. 27–38 (p. 34).

32 Wilkending, Gisela, 'Volksbildung und Pädagogik "vom Kinde aus"' (1980), quoted in Schmerling, Alice, *Kind, Kino und Kinderliteratur. Eine Untersuchung zum Medienumbruch in der Kinderkultur der Kaiserzeit und der Weimarer Republik* (unpublished doctoral thesis, University of Cologne, 2007), p. 32.

33 On the self-image of *Volksschullehrer*, cf. the talk by teacher Pretzel (Berlin) in [Anon.], *Kunsterziehung. Ergebnisse und Anregungen des Kunsterziehungstages in Dresden am 18. und 19. September 1901*, 2nd edn (Leipzig: R. Voigtländers Verlag, 1902), pp. 22–24. On the role of *Volksschullehrer* and their professional association in the acceptance of living pictures as a didactic tool, cf. Schmerling, *Kind, Kino und Kinderliteratur*, p. 61.

34 Cf. Siegert, Paul Ferdinand, *Bürgerliches Selbstverständnis, Kinoreform und früher Schulfilm. Eine kulturwissenschaftliche Analyse* (unpublished doctoral thesis, Leuphana University Lüneburg, 1995), pp. 39–41, 101.

35 Lichtwark, Alfred, 'Der Deutsche der Zukunft', *Kunsterziehung. Ergebnisse und Anregungen des Kunsterziehungstages in Dresden am 18. und 19. September 1901*, 2nd edn (Leipzig: R. Voigtländers Verlag, 1902), pp. 39–57 (p. 44). Lichtwark describes the hierarchical organization of German society as a 'caste system', p. 50.

36 Cf., e.g., the list of the different types of schools in Lausanne, their various orientations and the diplomas to be obtained in the *Programme des Cours de l'Université de Lausanne. Semestre d'hiver 1905–1906* (Lausanne: Ch. Pache, 1905, and other editions).

37 Burckhardt still worked with photographic paper prints while Herman Grimm used projection. Cf. Schlick, Wilhelm, 'Herman Grimm (1828–1901) Epigone und Vorläufer', in *Aspekte der Romantik. Zur Verleihung des 'Brüder Grimm-Preises' der Philipps-Universität Marburg im Dezember 1999*, ed. by Jutta Osinski and Felix Saure (Kassel: Brüder-Grimm-Gesellschaft, 2001), pp. 73–93.

projection, although he continued to teach successfully with the apparatus at *Gymnase* and the museum he directed.[38]

At the Lausanne Arts Faculty (*Faculté des Lettres*), the first to lecture with the aid of the lantern seems to have been Ernest Chatelanat in the winter term of 1905–1906. Formerly teaching Latin before he was promoted to 'Privat-Docent' in the same Department, Chatelanat had also been the first to take the students on an archaeological excursion in 1897–1898.[39] Although De Molin had become *professeur extraordinaire* in Art and Archaeology by 1906, according to the course catalogue it was only in the winter of 1916–1917 that Albert Naef, also a *professeur extraordinaire*, taught two classes with the aid of projection.[40] Other departments adopted the lantern earlier: in 1904, Henri Meylan-Faure, professor of Greek and Antiquity, showed his own slides of a trip to the Aegean.

With respect to the Art and Archaeology department of Lausanne University, our preliminary conclusion is that, although lecturers received some money from the Faculty for the purchase of slides and the existence of a photographic laboratory for photography classes,[41] only a few lecturers used the lantern as teaching tool prior to 1916. Despite the fact that slide manufacturers had built a large catalogue of slide series on art historical and archaeological topics since the 1860s, and even though De Molin had a slide collection at his disposal[42] and used it outside the university,[43] there seems to have been little motivation to use the lantern for academic teaching. Further studies are required if our assumption that this is due to academic *habitus* is to be disproved or confirmed. In some respects, there may have been little difference between scientist Huygens being ashamed of his association with the lantern in the 1660s and the resistance of certain academics to the medium two centuries later.[44]

Abbé Moigno — A 'Change Agent' for Popular Visual Instruction, Not a Role Model for Academic Teaching

According to several studies of media history, the French former Jesuit and mathematician Abbé François-Napoléon-Marie Moigno (1804–1884) played a significant role in establishing

38 On Aloys de Molin, cf. Blancardi, Nathalie, 'Archives de verre. La Photothèque d'art et d'archéologie de la Faculté des Lettres de Lausanne', *Monument vaudois*, 6 (2015), pp. 45–55 (pp. 45–46).

39 On the art department and Chatelanat, cf. Blancardi, 'Archives de verre', p. 47. Information on the lectures comes from a list established by Blancardi based on the course catalogs of the Art History Department since 1890.

40 As his colleague, Naef organized an excursion in summer 1917. We still have to examine whether this combination is accidental or indicates an openness to other teaching methods.

41 Photography classes started in 1895. A photographer from Lausanne had offered his services in 1894, however a competitor (possibly one with an academic diploma) was appointed Privat-Docent for this position. Cf. Dossier Début Fonds, PV_CU_1880–1910 Chatelanat and Molin, pp. 57–58, 62–64.

42 Cf. Blancardi, 'Archives de verre', p. 49.

43 Cf. *Journal de Genève* 5 March 1907, p. 4; 8 March 1903, p. 4; 13 July 1907, p. 4. His talk at the *Société de Géographie* was highly praised as were the slides taken by his brother-in-law, J.-J. Mercier, on their joint trip along the Nile.

44 Preliminary research in the Netherlands indicates that the Polytechnical School in Delft and the Veterinary School in Utrecht adopted the lantern as a teaching tool earlier than the universities. Cf. *Verslag van den Staat der Hooge, Middelbare en Lagere Scholen in het Koninkrijk der Nederlanden* for the years 1896–1901 <https://www.dbnl.org/titels/tijdschriften/tijdschrift.php?id = _ver042vers01>.

the lantern as an efficient instrument of knowledge transmission. Laurent Mannoni considers him the importer of British projection techniques to France and stresses his influence on numerous French manufacturers.[45] According to Jacques Perriault, Moigno was, along with Jacques Dubosq and François Soleil, one of the founders of a 'pédagogie des projections lumineuses' (pedagogy of light projection) around 1839.[46] Jens Ruchatz identifies him as one of the 'change agents' who in the mid-nineteenth century paved the way for the educational projection of photographic slides.[47] We will show that this is the case only to a certain extent. As far as popular education in and around Paris was concerned, Moigno was indeed an early popularizer and an efficient organizer of illustrated lectures. He had, however, no influence on academic teaching at all.

Moigno was a fervent advocate of the educational value of the lantern, stating that it had allowed him to capture the attention of an audience of 'plus de deux milles [*sic*] personnes, de toutes les classes de la société' (more than two thousand people of all social classes) when lecturing at the *Salle de Bal Mérot* in Saint-Denis just outside Paris.[48] In his handbook *L'Art des projections*, Moigno detailed his ideal programme for an instructional evening as follows:

1. Opening — a musical masterpiece to initiate the audience into the world of melody and harmony.
2. Overview of scientific innovations with models, slide projections, and explanations.
3. Illustrated science demonstration (*c.* one hour).
4. Interlude (fifteen minutes) with songs, recitals from literary works or music.
5. Illustrated lecture on a historical or geographical subject.
6. Optical entertainments (chromatrope, fantascope, eidotrope, etc.)
7. Audience leaves to the accompaniment of patriotic music and the songs of various peoples.[49]

Moigno thus aimed at presenting a balanced combination of listening and watching, intellectual concentration and relaxation, technology (projector) and human performance (lecturing, physical demonstrations, music), and of education and entertainment. The total duration of such a programme would probably have been about two hours. The *Matinées scientifiques* that he had planned to organize in his *Salle du Progrès* for specific target groups, including school children, might have been shorter.[50]

Although Moigno advocated illustrated science teaching with the aid of experiments and projections[51] and was aware of how to use didactic instruments to the learner's best advantage, he does not appear to have studied pedagogical theory. He makes no mention of

---

45 Cf. Mannoni, *Le Grand art*, p. 249. Although Moigno's earliest attempt in 1852 failed, he succeeded in 1864. For more on Moigno' activities, cf. Mannoni, *Le Grand art*, pp. 253–57; Mannoni, Laurent, 'The Magic Lantern Makers of France', *Optical Magic Lantern Journal*, 5.2 (August 1987), pp. 3–7 (p. 5).

46 Perriault, Jacques, *Mémoires de l'ombre et du son. Une archéologie de l'audiovisuel* (Paris: Flammarion, 1981), p. 94.

47 Cf. chapter V.3.1. 'Change Agents' in Ruchatz, *Licht und Wahrheit*, pp. 209–25.

48 Moigno, François-Napoléon-Marie, *Enseignement de tous. L'Art et la pratique des projections. Les sciences, les industries, les arts enseignés et illustrés par quatre mille cinq cents photographies sur verre. Catalogue des tableaux et appareils* (Paris: Bureau du Journal Cosmos-Les-Mondes, Billon-Daguerre, [1882]), p. iii.

49 Cf. Moigno, *L'Art des projections*, pp. ix–x.

50 Cf. Moigno, *L'Art des projections*, p. xii.

51 Cf. numerous examples in *L'Art des projections*.

any (classic) texts on visual education although he could have encountered such when he had lived in Switzerland and travelled to England, Germany, Belgium, and the Netherlands.[52] One reason might be that Moigno was mainly concerned with adult education (which at the time meant from the age of thirteen and above) and theories about 'object lessons' were primarily addressed to the teachers of children. Also '[…] Moigno's mind was of a very practical cast and he was not immersed in the consideration of theories to the neglect of what is more useful'.[53] He apparently preferred to prepare boxed sets containing fifty to a hundred slides with an accompanying lantern reading which could then be rented from the Paris headquarters of his organization,[54] to writing a treatise on education.

Although he became a corresponding member of the international British Association for the Advancement of Science (BAAS) in 1855 and translated or edited the writings of numerous scientists, he seems to have conducted his practical educational work in relative isolation. Given the tensions between the Catholic Church and secular political forces in France, Moigno did not seek contact with the *Ligue de l'Enseignement*, which had been founded in 1866 by Jean Macé.[55] The *Ligue* was seen by the Catholic Church as a competitor in the struggle for the minds and the souls of young adolescents. Even more so, as the *Ligue* had a strong influence on the policies of the French Ministry of Education.[56]

As a mathematician of high repute and supporter of BAAS's mission to popularize the results of scientific research,[57] Moigno must have felt at home in the ranks of the organization's membership of academic researchers and specialized amateurs. Reading about BAAS's annual meetings, where lectures with projection were relatively common in the second half of the nineteenth century,[58] may have served to confirm his ideas. Thanks to his connections and his editorial work for the popular science journals *Cosmos* and *Les Mondes*, Moigno was well-aware of international scientific developments, but he was a savant, not an academic. His aversion to positivism,[59] his violent attacks on freethinkers, his diatribe on the 'Splendours of Faith' attacking Enlightenment conceptions of science[60] as well as his radical Catholicism in an age of secularization led to him making many enemies.[61]

---

52 Cf. [Anon.], 'L'abbé Moigno', *Nature* (24 July 1884), p. 291.

53 [Anon.], 'L'abbé Moigno', p. 292.

54 Cf. Moigno, *L'Art des projections*, pp. xi–xii.

55 Macé was a Freemason and as such was undoubtedly considered an 'enemy' by Moigno. Cf. Deshogues, Yannick, 'Jean Macé, un Franc-maçon' <http://yannickdeshogues.free.fr/pdf/7MACON.pdf> [accessed 9 November 2020].

56 On this point, cf. Quillien, Anne, 'Les plaques photographiques du Musée pédagogique. Constitution et diffusion d'un fonds pour l'enseignement', in *La plaque photographique. Un outil pour la fabrication et la diffusion des savoirs (XIX^e — XX^e siècle)*, ed. by Denise Borlée and Hervé Doucet (Strasbourg: Presses universitaires de Strasbourg, 2019), pp. 40–54. Unfortunately, Quillien does not say when the *Ligue*'s first illustrated lecture took place.

57 Cf. Tucker, 'Magical Attractions', p. 68.

58 Cf. Tucker, 'Magical Attractions', pp. 70–73.

59 The anonymous author of the obituary in *Nature* also mentioned Moigno strictly rejecting the positivist approach of a BAAS fellow (p. 291).

60 Cf. Moigno, François-Napoléon-Marie, *Les Splendeurs de la Foi. Accord parfait de la révélation et de la science, de la foi et de la raison, par M. l'abbé Moigno, Chanoine de Saint-Denis, Fondateur — Directeur du Journal KOΣMOΣ — LES MONDES*, 5 vols (Paris: Blériot Frères, 1879), I: *La foi* (1879).

61 Cf. Mannoni, *Le Grand art*, p. 254; cf. also lemma 'Moigno' in *Encyclopedia of the Magic Lantern*, ed. by David Robinson, Stephen Herbert, and Richard Crangle (London: Magic Lantern Society, 2001), pp. 196–97.

Moigno saw himself first and foremost as a '*prêtre de Jésus-Christ*' (priest of Christ).[62] Faith and science were to him but one, 'Science, like faith, can only reach a young soul when it passes through a docile ear, *fides ex auditu* […].'[63] If he really was a model of teaching as Perriault argues, it was a model primarily adopted by Catholic educators and teachers. The publishing house *Maison de la Bonne Presse* was to follow his lead later on by establishing a projection service.[64] A fervent popularizer of knowledge, Moigno wanted to reach a broad audience that encompassed all ages, social backgrounds and levels of education but was not interested in teaching the academic elite.

It is his 1882 slide catalogue, however, that reveals Moigno as a visionary. Although he saw himself firmly within the tradition of the Magic Lantern,[65] his catalogue, as Mannoni notes, may be regarded as a model for subsequent commercial slide manufacturers. It covered astronomy, physics, mechanics, obstetrics, anatomy, pathology, geology, chemistry, zoology, botany as well as photomicrography, not to forget art and architecture, literature, history, and of course religion. All of these incidentally were fields in which slides were used in academic teaching.

Moigno had the pictures for the slides taken by the photographer Armand Billon.[66] Billon explicitly stated that 'as certain publishers did not want to grant us the right to reproduce their illustrations […] we were obliged to make a large number of drawings'.[67] Photographic reproductions of drawings or diagrams from books were already being used for popularizing science in the early 1880s and by the 1890s the practice was adopted by academics as well.[68]

The Optical Lantern and Photography, or 'Fidelity Truly Astonishing'

According to Jens Ruchatz, 'Photography played an important part in rendering projection a rational medium'.[69] It became technically feasible in the mid-nineteenth century and contributed to overcoming the problem of inaccurate representation. Neither Daguerreotypes

---

62 Moigno, *Enseignement de tous*, p. vi.

63 'La science, comme la foi, ne peuvent pénétrer dans une jeune âme que par une oreille docile, *fides ex auditu* […].' 'M. L'Abbé Moigno à l'éditeur' in *La Clef de la science ou Les phénomènes de tous les jours expliqués par le Dr E. C. Brewer, membre de l'Université de Cambridge, du Collège des Précepteurs de Londres, etc. auteur de plusieurs ouvrages littéraires, historiques, scientifiques, mathématiques, etc.*, 3rd edn, rev. by Abbé Moigno (Paris: Vve Jules Renouard, 1858), pp. vii–ix (p. ix).

64 Cf. on this point Mannoni, 'The Magic Lantern Makers', p. 7.

65 Moigno, *Enseignement de tous*, p. v: 'Tel que je l'ai créé, l'enseignement par les projections n'est qu'une exhibition à la lanterne magique.' (As I created it, teaching by means of projection is simply a magic lantern performance.)

66 The catalogue does not distinguish between slides that were photographically produced and those that were reproduced by photographic means.

67 'Quelques éditeurs n'ayant pas voulu nous accorder le droit de reproduction de leurs illustrations […] nous avons été obligés de faire faire un grand nombre de dessins […].' Billon in Moigno, *Enseignement de tous*, p. 9.

68 Cf. the slide collections of professors at the university's *Cité scientifique*, preserved at the *Université libre de Bruxelles*.

69 Ruchatz, Jens, 'The Magic Lantern in Connection with Photography: Rationalisation and Technology', in *Visual Delight: Essays on the Popular and Projected Image in the 19th Century*, ed. by Simon Popple and Vanessa Toulmin (Trowbridge: Flicks Books, 2000), pp. 38–49 (p. 41). Another important aspect, which we cannot discuss in this chapter, was the development of lighting systems that made it possible to show slides in large

(in use *c.* 1840–1865) nor Ambrotypes (1855–1895) were practicable for projection: the former were opaque and the latter were collodion negatives that needed to be viewed against a black background. According to most histories of photography the wet collodion process was predominant from 1851 into the 1890s but required a skilled photographer to handle the plates. From 1871 on the dry plate slowly started to displace the earlier processes.[70] The brothers William and Frederick Langenheim first projected photographs in 1849 on the basis of a process developed by Abel Niépce de Saint-Victor two years earlier, patenting their own process under the name 'hyalotype'.[71] Projected photographs thus offered an unparalleled richness in detail as the Langenheims made clear in 1851:

> […] to throw the old style of magic lantern slides into the shade, and supersede them at once, on account of the greater accuracy of the smallest details which are drawn and fixed on glass from nature […] with a fidelity truly astonishing […] omitting all defects and incorrectness in the drawing, which can never be avoided in painting a picture on the small scale required for the old slides.[72]

Like the cinematographic images that appeared less than half a century after the Langenheims' demonstration, projected photographs were seen as a way of creating new possibilities for the exploration of nature, including microscopy, which now could be made visible in all its details. The idea that photography was faithful to nature was echoed in many treatises by scientists during the second half of the nineteenth century.[73] It referred to 'reproduced patterns of texture', but 'not to colour or depth', as Scott Curtis emphasizes,[74] for the Lumière autochrome plate only became commercially available after the turn of the century.[75]

The Optical Lantern and Photography, or Commercial and Self-Made Slides

The emergence of photography for scientific purposes set off another international discussion: which of the available processes was the most practical? This was of interest to those who practiced photography and concerned their preferences, which in turn was of key importance to the progressively developing photographic industry, which was to turn the photographic slide into a mass-market product in the 1880s.

---

auditoriums. A newspaper article announcing the inauguration of Moigno's *Salle du Progrès*, for instance, specifies that the slides were to be projected by electric or oxyhydrogen light (*La Petite Presse*, 17 October 1872).

70 Cf. Kennel, Sarah, Diane Waggoner, and Alice Carver-Kubik, *In the Darkroom. An illustrated Guide to Photographic Processes before the Digital Age* (London: Thames & Hudson, 2010).

71 Cf. Ruchatz, *Licht und Wahrheit*, pp. 73–75.

72 Langenheim brochure quoted in Ruchatz, *Licht und Wahrheit*, p. 75.

73 On the complex and ambivalent role of photography as a faithful recording of the real in scientific discourse, cf. Daston and Galison, *Objectivity*, pp. 125–38.

74 Curtis, Scott, *The Shape of Spectatorship. Art, Science, and Early Cinema in Germany* (New York: Columbia University Press, 2015), p. 179.

75 Lumière autochromes could be projected, but the process was not well-suited to teaching, because it was expensive compared to black and white glass positives and because its materiality (thousands of coloured non-transparent grains) meant that the slides absorbed too much light.

Paper manufacturer and amateur astronomer Warren de la Rue,[76] member of BAAS and who lectured with the lantern on astronomical photography, stated in 1872: 'It has been proposed […] to use the Daguerréotype instead of the collodion process. The former, however, is so little practiced and, moreover, so much more troublesome that it does not seem to be advisable to adopt it […].'[77] De la Rue also referred to attempts to work with dry plates in astronomy, which signals a gradual shift towards this process, although the speaker himself declared that he believed 'that the wet collodion is preferable'.[78]

The quality of the photographs depended on the equipment and materials used, as both emulsions and lenses could cause distortion[79] as could the glass plate.[80] Those wishing to make slides themselves had to pay attention to numerous details until the launch of the Kodak camera in 1888 under the famous slogan, 'You Press the Button, We Do the Rest'. Capturing images on a photographic plate required time, skill, patience, and money with no guarantees regarding the results. Professional photographers could be employed to take pictures, but many scientists documenting their own discoveries in the field or in the laboratory elected to acquire the necessary knowhow. Courses in photography had been available since the 1860s.[81] By the end of the nineteenth century, when slide makers had built up catalogues based on standard curricula, it was possible to use commercially produced slides for academic lectures for introductory and general courses. By contrast when Warren de la Rue presented the photographs he had taken of the solar eclipse in Spain, he had to turn to professionals to have them made into slides.[82]

In this context an important role was played by the numerous photographic societies and their publications, which served as forums for the discussion of technical developments and useful practices, including how to make photographic slides. Companies selling equipment and accessories advertised their products in specialized journals and handbooks. Optical lanterns were also part of this equipment, because photographers used projection to present their work to other members and the general public.[83] In the last quarter of the nineteenth century information on photographic techniques, cameras and projection equipment, light sources, etc. as well as information about where to obtain

---

76 'Astro-photography' started with De la Rue, cf. Coppens, Jan, Laurent Roosens, and Karel van Deuren, *'… door de enkele werking van het licht… '* (n.p. [Brussels]: Gemeentekrediet, 1989), pp. 254–55.

77 Address by Warren de la Rue in *Report of the Forty-Second Meeting of the British Association for the Advancement of Science held at Brighton in August 1872* (London: John Murray, 1873), 'Notices and Abstracts', section 'Mathematics and Physics', p. 4, footnote <https://www.biodiversitylibrary.org/item/94434#page/519/mode/1up> [accessed 8 March 2021].

78 De la Rue, 'Address', p. 3.

79 'The distortion of a photographic image, if such exist, may be either extrinsic or intrinsic — that is, either optical or mechanical. The instrumental apparatus for producing the image may produce optical irregularities before it reaches the sensitive plate: or an image optically correct may by irregular contraction of the sensitive film in the process of drying, and other incidents of the process, present a faulty delineation on the plate.' De la Rue, 'Address', p. 4.

80 Cf. Coppens, Roosens, and van Deuren, *'… door de enkele werking van het licht… '*, p. 268.

81 Cf. Coppens, Roosens, and van Deuren, *'… door de enkele werking van het licht… '*, p. 275.

82 Cf. Tucker, pp. 70–71.

83 Cf. Ruchatz, *Licht und Wahrheit*, pp. 272–90.

such equipment was easily available. Those interested could build their own collections and show their own slides.[84]

Membership of these societies was not restricted to professional photographers, many amateurs, including scientists, swelled their ranks. One example is the Utrecht professor of Physical Chemistry, Ernst Cohen, who as an adolescent discovered photography and became a member of a photographic society. During his studies he worked as a laboratory assistant for the Amsterdam professor of physics Johannes Diderik van der Waals. In this capacity and thanks to his knowhow he took photographs of liquid jets. In 1889 Cohen published a short article in the *Revue Scientifique*, in which he gave details of his procedure. Later on he was to use these photographs in an illustrated lecture on the scientific applications of photography.[85] Cohen thus had acquired his photographic skills as an amateur, applied them to scientific research and shared his knowledge in the pages of a scientific publication. Other scientists may have followed a similar trajectory, leading them to use the optical lantern for science communication and perhaps also for teaching.

Like many other universities the *Université de Lausanne* and the *Université libre de Bruxelles* established their own photographic labs around 1895 to produce graphic materials for their teaching staff. (Fig. 1.3) Another option was to turn to the professional photographic firms to reproduce graphic material from books, postcards, photographs, or glass negatives. A third option was to have a photograph taken of an object, event, phenomenon, etc. and have it transferred to a glass slide. Yet another possibility was to draw or paint with special ink or paint on glass plates pre-processed for that purpose.[86]

The Optical Lantern and the Academics: Astronomy, Photomicrography, Art History

The question remains of how academics adopted the optical lantern as an instrument for research and lecturing and how knowledge of the possibilities offered by photography for research and teaching circulated. We will now look at three academic fields that were 'early adopters' of lantern projection. Our hypothesis is that learning from examples and the formal and informal communication networks between scholars and scientists were crucial to this process.

Astronomy

As we have seen, the BAAS offered a forum for encounters between savants and academics. Membership of a learned society and even more so a leading position in one was a mark of

84 This included collections for teaching and lecturing. Cf., for example, the numerous articles on collections in *La plaque photographique. Un outil pour la fabrication et la diffusion des savoirs (XIX^e — XX^e siècle)*, ed. by Denise Borlée and Hervé Doucet (Strasbourg: Presses universitaires de Strasbourg, 2019).

85 Cf. Cohen, Ernst, *Na driekwart eeuw. Levensherinneringen* (Utrecht: Matrijs, 2013), p. 40. See also Cohen, Ernst, 'La photographie des jets de liquides', *Revue Scientifique*, 7 (1889), pp. 252–53; and 'Natuurkundige voordrachten. Prof. dr. Ernst Cohen: De fotografie en haar toepassingen in de wetenschap', *De Nieuwe Courant*, 602 (1902).

86 About eight hundred items of this kind can be found in the ULB biology collection.

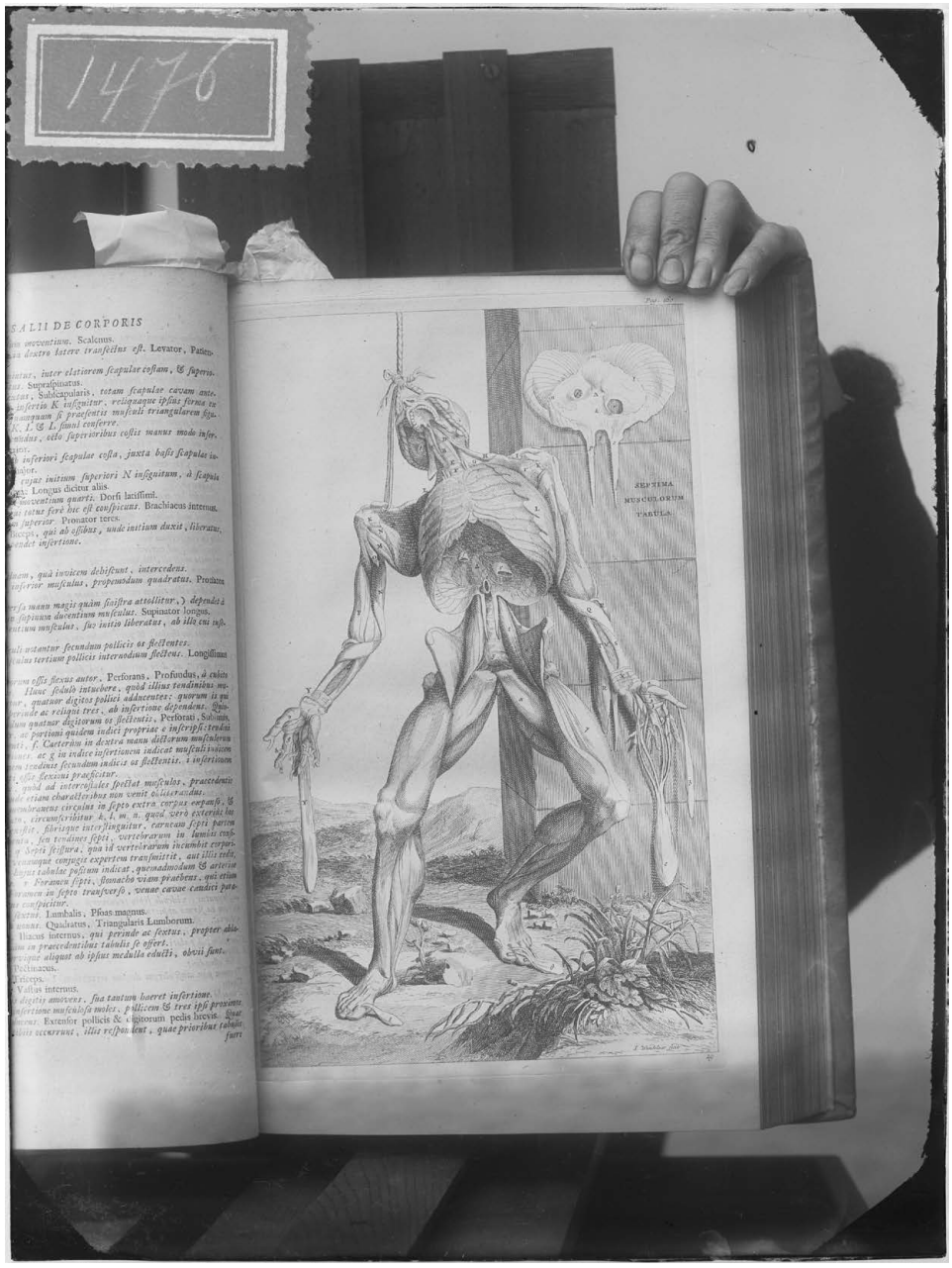

Fig. 1.3. Scan of a positive for a lecture in physiology, probably by Paul Héger, *c.* 1895–1899. Massaert Collection, courtesy of Archives, Patrimoine et Réserve précieuse, Université libre de Bruxelles.

distinction and often listed in publications. Warren de la Rue, for instance, was introduced in the BAAS report of 1872 as F. R. S. (Fellow of the Royal Society), Vice President of the Chemical Society (V. P. C. S.), Vice President of the Royal Astronomical Society (V. P. R. A. S.), and President of the Section Mathematics and Physics at the BAAS. The

regular use of slide projections at BAAS meetings and the academic standing of its members could thus indeed help overcome the obstacle of the lantern's problematic reputation. Astronomy is a case in point.

The aforementioned address to the Mathematics and Physics section by Warren de la Rue at the 1872 BAAS meeting indicates that astronomers were among the first to adopt photography as a tool for their research. In contrast to the use of slides in popular science performances such as those by Henri Robin or the long tradition of rackwork slides illustrating the revolution of the planets — maintained over a period of more than 150 years from Adam Walker's Eidouranion in 1770 well into the twentieth century — photographs such as those taken by De la Rue had an epistemic rather than a demonstrative function.[87] We follow Lorraine Daston's definition of an 'epistemic image' as an image,

> […] made with the intent not only of depicting the object of scientific inquiry, but also of replacing it. A successful epistemic image becomes a working object of science, a stand-in for the too plentiful and too various objects of nature, and one that can be shared by a dispersed community of naturalists.[88]

In his address, Warren de la Rue referred to photographs as epistemic images that became objects of analysis and which made it possible to confirm hypotheses. De la Rue had obtained a collodion print of the moon in 1851 using a reflecting telescope, and later used photography to document the 1860 solar eclipse.[89] He was well aware of similar initiatives elsewhere:

> It will be recollected that in 1860, for the first time, the solar origin of the prominences was placed beyond doubt solely by photography, which preserved a faithful record of the moon's motion in relation to these protuberances. The photographs of Tennant at Guntour, and of Vogel at Aden, in 1868, and also those of the American astronomers at Burlington and Ottumwa, Iowa, in 1869, under Professors Morton and Mayer, have fully confirmed those results.[90]

Those attending this section of the BAAS meeting thus learned about various options for the use of photography in their scientific studies and also about the results of such photography-based studies at the international level. De la Rue's lecture did not explicitly mention the possibility of projecting photographic glass slides, although he had done so himself at, for instance, the 1861 BAAS meeting with his photographs of the 1860 eclipse. Moigno's catalogue, published a decade later, listed about forty slides representing solar

87 On popular astronomy presentations, cf. Bush, Martin, 'The astronomical lantern slide set and the Eidouranion in Australia', *Early Popular Visual Culture*, 17.1 (2019), pp. 9–33.

88 Daston, Lorraine, 'Epistemic Images', in *Vision and Its Instruments. Art, Science, and Technology in Early Modern Europe*, ed. by Alina Payne (University Park: The Pennsylvania State University Press, 2015), pp. 13–35 (p. 17).

89 Cf. Rothermel, Holly, 'Images of the Sun, Warren de la Rue, George Biddell Airy and Celestial Photography', *The British Journal for the History of Science*, 26.2 (1993), pp. 137–69 (pp. 143, 154–58).

90 De la Rue, 'Address', p. 6. Moigno knew the article, because he published a French translation as 'Discours d'ouverture par le président, M. Warren de La Rue, D. C. L., R. R. S.', in the section 'Association britannique pour l'avancement des sciences. Réunion de Brighton', *Les Mondes. Revue hebdomadaire des sciences et leurs applications aux arts et à l'industrie par Abbé Moigno*, 29.1 (Paris: Bureaux des Mondes, September-December 1872), pp. 12–34 (p. 17, footnote) <https://babel.hathitrust.org/cgi/pt?id = hvd.hn4k8g&view = 1up&seq = 40>.

phenomena, although from the catalogue titles it is difficult to say whether these were actual photographs or photographic reproductions of drawings based on photographs or observation. They were nonetheless quite distinct from the rackwork slides of popular astronomy presentations and might be seen as signalling a shift to epistemic images in the teaching of astronomy. As Holly Rothermel argues, photography established itself as an 'integral part of astronomical work' in the last two decades of the nineteenth century.[91] By then, it had become easy to reproduce photographs on glass slides and use them for academic teaching as well, as is demonstrated for instance by the surviving lantern slide sets preserved in the former Sonnenborgh observatory at Utrecht University.[92] Photographs of astronomical phenomena thus became a standard form of research in the field of astronomy and the same goes for the projection of slides for the international presentation of the results of this research, as well as for teaching.

Photomicrography[93]

As early as 1866, Albert Montessier, a member of the Faculty of Medicine at Montpellier, published a book on photography applied to micrographic studies.[94] The Berlin chemist Paul Jeserich stated in his 1888 book on photomicrography that the parallel progress of photography and microscopy had led to the introduction of this new technology in a number of branches of science. When it became possible to reach the same photographic quality with the dry plate as with the wet collodion process and British, French, and German scientists published the results of their photomicrographic research, 'it was obvious that microphotography [*sic!*] was *destined* to serve medicine and the sciences as an *important* aid'.[95] The rapid technical developments along with the numerous manuals published by scientists in various countries boosted the adoption of this new tool. In the 1880s the 'drop of stagnant water magnified on the screen' was no longer a spectacular curiosity but an educational image to be shown in class.[96]

Photomicrographic slides were already available in the early 1870s. In 1872 Jules Girard published a book on photomicrography in Moigno's book series, which listed a

---

91 Rothermel, 'Images of the Sun', p. 138.

92 Twenty-five of these sets can be consulted at 'Lucerna — The Magic Lantern Web Resource' <http://lucerna.exeter.ac.uk/index.php> [accessed 8 March 2021]. The slides range from images of astronomical phenomena to portraits of famous astronomers and photographs of expeditions by Utrecht astronomers.

93 The term 'photomicrography' refers to microscopic phenomena reproduced by means of photography, which then could be projected, not to the projection of specimen by means of an optical lantern or a projection microscope. The word 'microphotography' generally denotes the process of reducing the size of pictures and documents to a microscopic scale, and to then project them in order to read them, as practiced during the Franco-Prussian War 1870/71.

94 Montessier, Albert, *La Photographie appliquée aux recherches micrographiques* (Paris: J.-B. Baillière et Fils, 1866).

95 '[…] wurde es auf's Deutlichste ersichtlich, dass die Mikrophotographie *berufen* sei, der Medizin und den Naturwissenschaften als *wichtiges* Hilfsmittel zu dienen […].' Jeserich, Paul, *Mikrophotographie auf Bromsilbergelatine bei natürlichem und künstlichem Lichte unter ganz besonderer Berücksichtigung des Kalklichts* (Berlin: Verlag von Julius Springer, 1888), p. 6. (Emphasis in the original text).

96 Thomson, John, 'The Magic Lantern', in *Science for All*, II, ed. by Robert Brown (London, Paris, New York: Cassell, Petter, Galpin & Co., 1883), pp. 208–14 (p. 214).

hundred slides that could be acquired.[97] A year later, Gustave Le Bon, who had lectured at the *Salle du Progrès* in November and December 1872 respectively on physiology and the 'microscopic' world, wrote a brochure for the same series, which also listed, among other things, photomicrographic slides that were available for purchase.[98] By 1880 Alfred Molteni's catalogue listed over four hundred and fifty photomicrographs, including some from Le Bon's collection, covering a variety of scientific domains such as medicine, zoology, entomology, botany, geology, etc.[99]

Interestingly, in the case of photomicrography, Moigno's *Salle du Progrès* and his book series seem to have acted as an interface between knowledge popularization and academia in France. Both Girard and Le Bon's books addressed first and foremost academic circles and encouraged them to use slides for their teaching. Le Bon explicitly addressed the problem facing histology lecturers, limited by the fact that a tissue sample viewed with a microscope could only be seen by one person at a time, whereas Le Bon had been able to lecture three hundred people at once. According to Le Bon each and every one of them could see all the details of the photomicrographic slides that he projected during his lecture.[100] Given the wide-spread adoption of photomicrographic slides, the promotion of this method of teaching appears to have been successful, arguably because on the one hand photomicrography became an important part of research in several fields and because projection allowed the efficient organization of the teaching material of the subject concerned.

Art History

Art history was among the disciplines to proceed to the wholesale adoption of the projected image relatively early on. Heinrich Dilly remarked on the interesting role it played even in 1975.[101] The improvement in photographic quality made it possible to obtain reproductions of paintings in black and white of such quality that they were judged acceptable, even by the artists themselves.[102] In a parallel development that first started in the 1840s, increasing numbers of photographers like Adolphe Braun in Dornach and the brothers Giuseppe, Leopoldo, and Romualdo Alinari in Florence had been reaching agreements with museums on the photographic reproduction of works of art and were often granted exclusive rights.

---

97 Cf. Girard, Jules, *Photomicrographie en cent tableaux pour projection* (Paris: Au bureau des *Mondes*, Gauthier-Villars, 1872).

98 Le Bon, Gustave, *L'Anatomie et l'histologie enseignées par les projections lumineuses* (Paris: Au bureau des *Mondes*, Gauthier-Villars, 1873).

99 Cf. section 'Photomicrographies', in *Vues sur Verre pour Projection* (Paris: A. Molteni, 1880), pp. 50–54 <http://archive.org/details/MolteniCatalogue32VuesSurVerre/page/n. 49/mode/2up?view = theater> [accessed 26.2.2021]).

100 Cf. Le Bon, Gustave, *L'Anatomie et l'histologie enseignées par les projections lumineuses*, pp. 8–9.

101 Cf. Dilly, Heinrich, 'Lichtbildprojektion — Prothese der Kunstbetrachtung', in *Kunstwissenschaft und Kunstvermittlung*, ed. by Irene Below (Giessen: Anabas, 1975), pp. 153–72.

102 'Von Jahr zu Jahr hat die Zahl der Künstler, welche ihre Erlaubniß zum Copiren gegeben, zugenommen […].' ('Every year the number of artists, who give permission for their work to be copied, increases […].') [Anon.], 'Die photographische Gesellschaft in Berlin', *Die Gartenlaube*, 2 (1878), p. 40 <https://de.wikisource.org/wiki/Die_photographische_Gesellschaft_in_Berlin> [accessed 8 March 2021]).

Nonetheless the process of building slide collections for academic institutions was slow and often hampered by a lack of finance. One early, albeit rare example was the German art historian Bruno Meyer (1840–1917) who used the lantern at the *Polytechnische Hochschule* in Karlsruhe for a decade between 1874–1884 and published on his experiences.[103] Art history collections in universities were created somewhat later, for instance in 1890 for Bordeaux and Naples.[104] The first illustrated lectures at Lausanne for example were given in 1887 and its first budget for the acquisition of slides was granted in 1903.[105] Strasbourg (then: *Kaiser-Wilhelms-Universität*) followed suit only during the winter term of 1902–1903.[106] The aforementioned Willem Vogelsang, who worked in the Netherlands, was one of the proponents of the use of the lantern in the lecture hall.

An invaluable contemporary source on lantern practice comes from the reflections of the German art historian Herman Grimm, published originally as a series of articles entitled, 'The transformation of university lectures on modern art history through the use of the sciopticon' of 1892 and subsequently included in Grimm's *Beiträge zur Deutschen Culturgeschichte*.[107] Grimm paid particular attention to the didactic changes that the use of the lantern occasioned.

First he emphasized the fact that the projected image could be seen from everywhere in the auditorium, 'die zu nahe gelegenen beiden ersten Sitzreihen vielleicht ausgenommen' (except perhaps for the too closely positioned first two rows of seats).[108] Furthermore, whereas photographs, etchings, and drawings generally reduce the size of a painting (without this giving rise to pause), lantern projection enlarges the image. Second Grimm described the possibilities offered by the sciopticon for a comparative approach, by showing two paintings representing the same subject side by side. (Fig. 1.4) He declared that 'As the images appear simultaneously, comparative examination takes place immediately.'[109] He particularly stressed how much he could now show to a large auditorium in only a brief period of time, which made the optical lantern a most efficient teaching aid.[110]

---

103 Cf. Männing, Maria, 'Bruno Meyer and the Invention of Art Historical Slide Projection', in *Photo-Objects: On the Materiality of Photographs and Photo Archives*, ed. by Julia Bärninghausen and others (online version at <http://mprl-series.mpg.de/studies/12/>), pp. 275–90 (p. 277). Cf. also Meyer, Bruno, 'Die Photographie im Dienste der Kunstwissenschaft und des Kunstunterrichts', *Westermanns illustrierte deutsche Monatshefte*, 47 (1879), pp. 196–209.

104 Cf. Miane, Florent, 'L'enseignement de l'histoire de l'art à Bordeaux', in *La plaque photographique*, ed. by Denise Borlée and Hervé Doucet (Strasbourg: Presses universitaires de Strasbourg, 2019), pp. 73–91 (p. 73); on Napoli Frederico II in 1890, cf. Rossella Monaco, 'Les plaques photographiques des archives Giovanni Previtali de l'université de Naples Frédéric II', in *La plaque photographique*, ed. by Denise Borlée and Hervé Doucet (Strasbourg: Presses universitaires de Strasbourg, 2019), pp. 93–105 (p. 95).

105 Cf. Blancardi, 'Archives de verre', p. 46.

106 Cf. Borlée, Denise, and Hervé Doucett, 'Les plaques de projection de l'Institut d'Histoire de l'Art de l'Université de Strasbourg. Un objet de recherches', in *La plaque photographique*, ed. by Denise Borlée and Hervé Doucet (Strasbourg: Presses universitaires de Strasbourg, 2019), pp. 108–22 (p. 113).

107 Grimm, Herman, 'Die Umgestaltung der Universitätsvorlesungen über Neuere Kunstgeschichte durch die Anwendung des Skioptikons', in *Beiträge zur Deutschen Culturgeschichte*, ed. by Herman Grimm (Berlin: Verlag von Wilhelm Hertz, 1897), pp. 276–395.

108 Grimm, 'Die Umgestaltung der Universitätsvorlesungen', p. 281.

109 'Indem die Bilder zu gleicher Zeit sichtbar gemacht werden, tritt die vergleichende Betrachtung sofort in Wirksamkeit.' Grimm, 'Die Umgestaltung der Universitätsvorlesungen', p. 282. Here Grimm may be referring to slides on which two paintings were reproduced side by side.

110 Grimm, 'Die Umgestaltung der Universitätsvorlesungen', pp. 283–85.

Fig. 1.4. Three busts, self-made slides in the collection of Alfred A. Schmidt, professor of art history in Fribourg, possibly 1960s. Courtesy of Diathèque, Section d'histoire de l'art, Université de Lausanne.

Of greatest interest perhaps is Grimm's stated view that before the introduction of the projected image, the lecturer's words were authoritative but as a result of the encounter with the art works themselves [*sic!*] students could get to know the masters by looking at them. Their own judgments now became part of the lecture, and they could check for themselves, whether the lecturer's observations were correct.[111] According to Grimm, the focus on the works, which the lantern had made possible, relegated the biographical dimension of art history instruction to the background and fostered the contemplation and examination of the individual works.[112] The optical lantern thus made a work-centred approach to art history possible.

Although commercial distributors offered a wide choice of art history slides, lecturers would still not always find the requisite image and would have a slide made from a reproduction in a book or another source by the university's photographic service. This applies to about 90 per cent of the slides preserved at the University of Bordeaux.[113] 65 per cent of the items in the database of the *Diathèque* at the *Université de Lausanne* (UNIL) lack a manufacturer's label, which indicates a large proportion of self-made slides.[114]

The diverse provenance of slides is reflected in particular in the collections held in countries such as Belgium and Switzerland, which lacked large producers or distributors of slides, in contrast to Britain, France, and Germany. Illustrative is the study made by the UNIL *Diathèque* of 10,000 glass positives acquired between *c.* 1900–1940 by different institutes within the university. Apart from the 65 per cent of unlabelled slides from the section on art history, archaeology, and architecture, about a quarter came from the German firm of Dr Franz Stoedtner (23.2 per cent), the others from E. A. Seemann, Germany (3.7 per cent), Fratelli Alinari, Italy (2.1 per cent),[115] Projections Molteni, France (1.9 per cent), and Lichtbeelden Instituut Amsterdam, the Netherlands (1.2 per cent). UNIL's lecturers thus ordered slides mainly from neighbouring countries. The presence of Swiss firms such as Fred. Boissonnas & Cie in Geneva and the Zurich-based company of J. Ganz & Co. is negligible. Furthermore the art historians at UNIL apparently preferred the larger firms such as Stoedtner, Seemann, and Molteni, while for example the smaller company of Ad. Braun et Cie,[116] which in 1920 offered only 543 items, is all but absent in the UNIL collection.

A study of existing slide collections can thus further our understanding of the material infrastructures that facilitated the adoption of the optical lantern. The UNIL case shows that commercial suppliers of slides did play an important role but that the ability to have images reproduced locally broadened the range of illustrations available for use by lecturers.

---

111 Cf. Grimm, 'Die Umgestaltung der Universitätsvorlesungen', pp. 307–08.

112 Cf. Grimm, 'Die Umgestaltung der Universitätsvorlesungen', p. 318.

113 Cf. Miane, 'L'enseignement de l'histoire de l'art à Bordeaux', p. 79.

114 It is possible that in a certain number of cases the label was covered or removed.

115 After being taken over in 1920, the company's name was changed to Fratelli Alinari I. D. E. A. (Istituto di Edizione Artistiche), slides from a later period were labelled 'Istituto Micrografico Italiano'. Cf. also Paoli, Silvia, 'Fratelli Alinari', in *Encyclopedia of Nineteenth-Century Photography*, ed. by John Hannavy, 2 vols (New York: Routledge, 2008), pp. 23–27.

116 Cf. Kempf, Christian, 'Les vues de projection et la maison Braun de Dornach', in *La plaque photographique*, ed. by Denise Borlée and Hervé Doucet (Strasbourg: Presses universitaires de Strasbourg, 2019), pp. 177–85 (p. 181).

Conclusion

For the optical lantern to be adopted as an academic teaching tool, an adequate technical infrastructure (including electricity as a safe light source for the projection lantern), practical knowhow and the availability of visual material for projection were undoubtedly a necessary but not in all cases a sufficient condition. Furthermore the discipline itself, supported by its institution status and its financial resources, had to take an active part in the implementation of the medium. Scott Curtis's observations concerning the introduction of moving pictures as a didactic tool in Germany after 1900 are no doubt equally applicable to the optical lantern, for which it took

> […] the correspondence and mutual accommodation between the logic of a discipline — its problem-solving pattern, its investigatory methods, its ideological assumption — and [the medium's] characteristics [as well as the] match — between the formal features of the representational technology and the investigatory presumptions […] because it provides the researcher, community, or discipline with the reassuring sense that the tool will fit the task to which it was assigned.[117]

To put it otherwise: the introduction of the optical lantern as a didactic tool was rather improbable when in a given discipline traditional teaching methods were not questioned and photography did not seem to contribute anything to resolving the problems on which the discipline was working. In 1897 *Photographische Mitteilungen* referred to the rejection of the projected image by 'ein berühmter Professor für Maschinenlehre' (a famous professor of practical mechanics) as a curiosity. The professor had stated that 'solche hingezauberten Bilder könnten das vor dem Zuhörer gezeichnete Bild des Lehrenden nie ersetzen' (pictures that are conjured up in this way could never replace a drawing made by the lecturer before the eyes of the audience). To follow this process was considered more effective for the student 'als […] das plötzliche Erscheinen des fertigen Bildes auf dem Schirm' (than the sudden appearance of the completed picture on the screen).[118]

During the second half of the nineteenth century the projection lantern succeeded in overcoming its more or less exclusive association with travelling showmen and phantasmagoria performances. It gradually entered academic teaching after having been adopted for popular education by secular organizations and a group of enthusiasts within the Catholic Church. As we have shown, apart from considering the infrastructural and technological premises that made these developments possible, it is important to delve deeper into the specific conditions in which this process took place in a variety of disciplines to understand why in 1900 the archaeologist Holwerda and the art historian Vogelsang felt obliged to apologize for the absence of projected images in their lectures.

---

117 Curtis, *The Shape of Spectatorship*, p. 23.

118 Quoted in Vogel, Hermann Wilhelm, 'Über die Bildlaterne', *Photographischen Mitteilungen*, 1 (April 1897), pp. 1–3 (p. 2).