Zeitschrift: Kunstmaterial
Herausgeber: Schweizerisches Institut für Kunstwissenschaft
Band: 4 (2017)

Artikel: Ernst Berger and his role in the Munich tempera controversy
Autor: Kinseher, Kathrin
DOI: https://doi.org/10.5169/seals-882600

Ernst Berger and his role in the Munich tempera controversy

Kathrin Kinseher

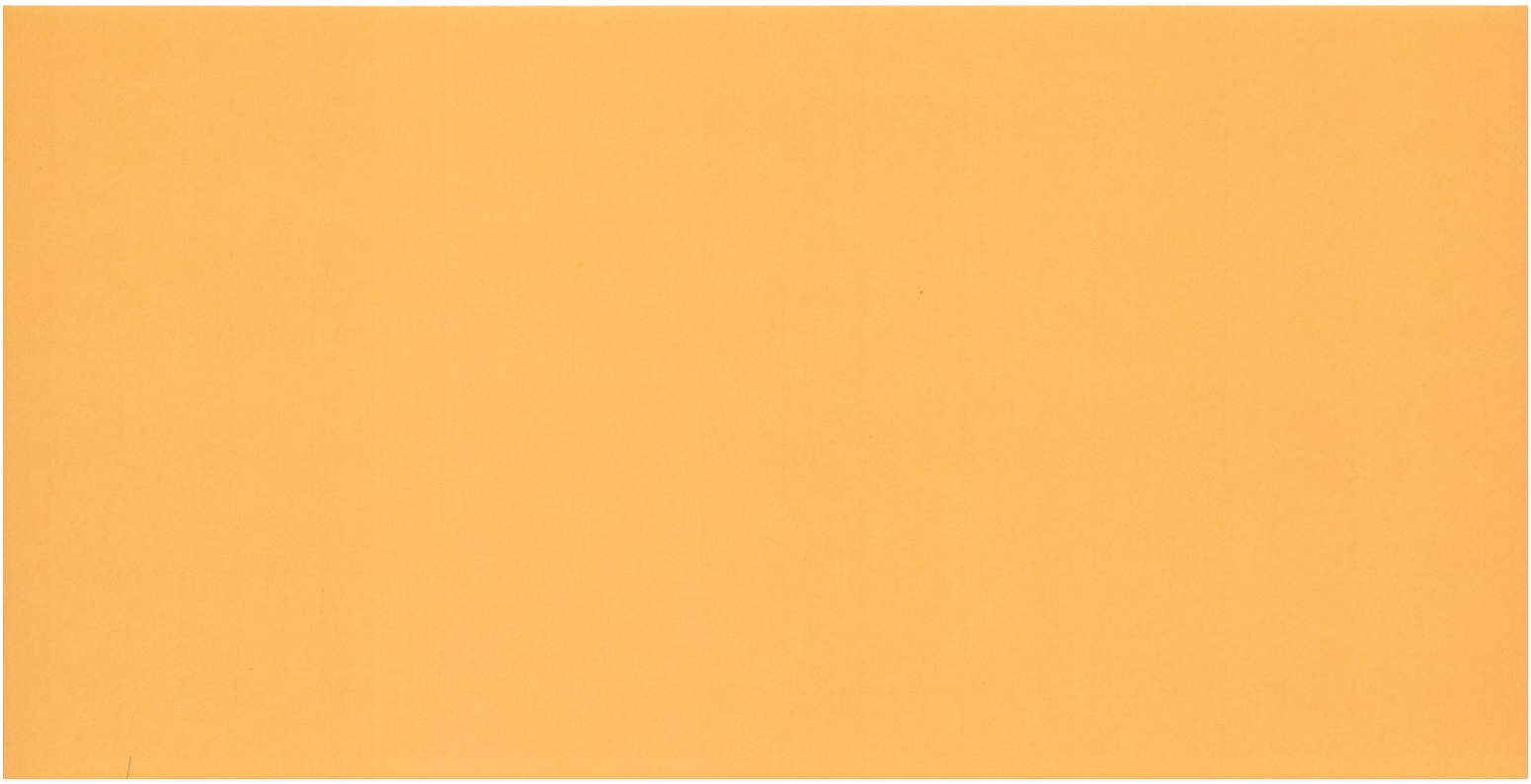


Fig. 1 Carl Teufel, *Ernst Berger in his studio in Kaulbachstrasse, Munich*, 1889.

FROM PAINTING IN VIENNA TO RESEARCH IN MUNICH

Ernst Berger (1857–1919), the youngest son of a well-to-do Jewish merchant family in Vienna, decided to become a painter against the wishes of his parents (Fig. 1). Although today he is virtually unknown as an artist, this decision was to have far-reaching consequences as instead of a famous painter, Berger became a pioneer in the field of painting technology research.

In 1874 he enrolled at the Vienna art academy to study with Karl Wurzinger (1817–1883), Christian Griepenkerl (1839–1916) and August Eisenmenger (1830–1907) (Fig. 2). Subsequently, when Hans Makart (1840–1884) was appointed as a professor at the academy, Berger transferred to his class in the winter semester of 1879/1880 (Fig. 3). Makart was a controversial figure; his painting was met with both condemnation and euphoric enthusiasm in equal measure. While his virtuosity was admired, his painting technique was heavily criticised, as it was thought that his extravagant employment of bitumen glazes and siccatives meant that his work would not last for long. Berger later reported how during his time as a student, the long drying time of oils was regarded as a major nuisance and that as a result, many students frequently added resins and siccatives to their paints (Berger 1908a; Berger 1909b, p. 70).

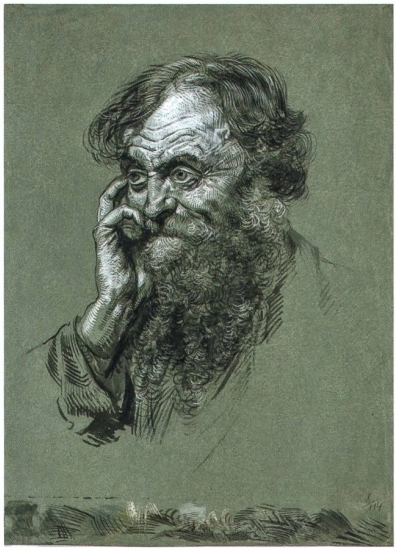


Fig. 2 Ernst Berger, *Bärtiger Mann (Kopfstudie)* (*Bearded Man*, head study) c. 1875, gouache on paper, 48.5 × 36 cm, Kupferstichkabinett der Akademie der Bildenden Künste, Vienna, inv. no. HZ 18218. This study was made by the young Berger while a student at the art academy in Vienna.

In April 1882 Berger matriculated at the art academy in Munich (Fig. 4), where Makart's former teacher Carl Theodor von Piloty (1826–1886) was director, and enrolled in the class of Ludwig von Löfftz (1845–1910), who at the time was one of the academy's most popular professors and 'a technical genius in the field of oil painting' (Jooss 2012, p. 41). In Munich, the Viennese still-life painter Ludwig Adam Kunz (1857–1929) introduced Berger to Franz von Lenbach (1836–1904). Like Makart, Lenbach worked fast, but in a manner new to Berger: he employed an underpainting of quick-drying egg tempera, coated this with a paint consisting of mastic, copaiba balsam and linseed oil, and finished off the work with oil paints (Berger 1906d, p. 107; Berger 1915, p. 96; Berger 1919, p. 70; Reinkowski-Häfner 2014, pp. 157–173). Lenbach's methods, while still allowing a painting to be rapidly worked up, promised greater durability.

The exposure of such different techniques as those employed by Makart and Lenbach (although both had studied under Piloty), may have inspired Berger to pursue his own investigations into the technical foundations of painting and their historical contexts. Although a painter, documentary research and scientific experimentation were familiar to him through his family: his brother Emil (1855–1926) was a respected ophthalmologist and professor at the Sorbonne in Paris, while his sister Betti (1859–1933) was married to the leading Austrian musicologist Professor Guido Adler (1855–1941). According to Berger himself, his decision to explore historical painting technology was made around 1890, spurred on by the conceited boasts of his fellow countryman Baron Alfons von Pereira-Arnstein (1845–1931). Pereira claimed to have 'rediscovered' the painting technique of the Renaissance (Berger 1919, pp. 74–75) and his new system had been reported in 1890 in the Munich journal *Technische Mitteilungen für Malerei* (*Technical Communications on Painting*, abbreviated herein as *TMM*) (Zechmeister 1890). The technique, which Pereira patented in 1889 (German patent DE54511, 17 November 1889), consisted of an animal-glue-bound underpainting that was finished in resin-based paints and varnishes. This, he stated, would change the course of contemporary painting (see the contribution by Beltinger, in this volume).

Fig. 3 Ernst Berger, *Study for Cleopatra's upper body*, 1879/1880, pastel on paper, 49 × 68.6 cm, Kupferstichkabinett der Akademie der Bildenden Künste, Vienna, inv. no. HZ 18340. The study betrays the influence of Berger's teacher Hans Makart's *Death of Cleopatra*.

Berger first met Adolf Wilhelm Keim (1851–1913), a sought-after and influential expert in painting technology, in 1892 or 1893 and recorded the meeting in his essay of 1919 '25 Jahre Münchner Maltechnik' ('25 years of painting technique in Munich') (Berger 1919, p. 81). Keim was highly regarded both in Munich and abroad. His reputation was due not only to his introduction of a popular weatherproof paint system for outside murals and facades, the *Keimsche Mineralfarben* (Keim's silicate mineral paints), but also to his position as head of the Munich-based Versuchsanstalt für Maltechnik (Research Institute for Painting Technology), which had been founded in 1882. From 1884, Keim was also active as the editor of the journal *TMM*, a position which provided a prestigious platform for his views. As will be shown, his work found broad support through the Deutsche Gesellschaft zur Beförderung rationeller Malverfahren (German Society for the Promotion of Rational Painting Methods, abbreviated herein as the German Society for PRPM), founded in 1886 (Kinseher 2014). Keim, more so then than Berger, was the leading expert in matters of painting technology in Munich and at that time enjoyed recognition outside of Munich.

The first results of Berger's researches into historical painting technology are documented in a lecture that he presented in Rome in April 1893, entitled 'Die technische Ausführung der enkaustischen Malerei der Griechen und Römer' ('The technical execution of the encaustic painting of the Greeks and Romans') (Berger 1893a). In the same year, as a member of the organising committee (which included Keim), Berger played an active role in the conception and planning of a major initiative promoting the study of historical and contemporary painting materials initiated by the German Society for PRPM. It took place in Munich and consisted both of an exhibition, *Ausstellung für Maltechnik* (*Exhibition on Painting Technology*, referred to herein as the *Maltechnik Exhibition*), and an accompanying congress with speakers, *Kongress für Maltechnik* (*Congress on Painting Technology*, referred to herein as the *Maltechnik Congress*). The *Maltechnik Exhibition* enabled Berger to present his technical reconstructions for the first time to a wider audience. His presentation focused on the 'historical development of the painting techniques of the ancients down to the end of the Roman Empire' ('*historische Entwicklung der Maltechnik des Altertums bis zum Ausgang des römischen Reiches*') and was well reviewed (Munich 1893, pp. 85–88; Kinseher 2014, pp. 198–214).

Fig. 4 The new art academy building in Munich, 1883, reproduction (P. Meurer, X. A., Berlin) after a drawing by the architect Gottfried von Neureuther, in *Deutsche Bauzeitung* 17(6), 1883. Photographic paper mounted on board, 16.3 × 23.9 cm, Architectural Museum of the Technical University, Munich, inv. no. neur_g-213-51.

THE MUNICH TEMPERA CONTROVERSY

The promotion of oil painting by the German Society for PRPM

The *Maltechnik Exhibition* was held from July to October at the Royal Glass Palace in Munich in 1893 and was accompanied by a catalogue (Fig 5; Munich 1893), which gives a good insight into the products available from art supply stores at the end of the 19th century (Kinseher 2006). Alongside the price lists and sales catalogues, most of which are in company archives or private hands and are often difficult to access, the exhibition catalogue is an important source for the product ranges offered by German paint dealers. It also documents the experiences of the exhibiting artists with these products and associated techniques. Particularly interesting in the present

context is the fact that Keim's editorial selection of these artists' commentaries reveals his unambiguous preference for oil paints. While tempera paints were also exhibited, Keim seems to have made sure they received no real positive reviews, let alone admiring comments similar to those related to oils.

Keim occupied himself not only with mineral paints. Urged by some members of the Munich artists' association, including the academy professors Alexander (Sándor) von Wagner (1838–1919) and Alexander von Liezen-Mayer (1839–1898), he began, in 1884, to develop durable paints for easel painting. The German Society for PRPM, which had emerged from a small group of Munich painters and was chaired by the academy professor and history painter Wilhelm von Lindenschmit Jr. (1829–1895), supported Keim and his Research Institute.

Although the statutes of the society that were drawn up when it was founded provided for a technical commission whose remit was to investigate 'tempera, animal-glue and casein painting' (*TMM* 1886, p. 11), the main priority of Keim's research soon became the technology of oil paint. Like Berger, Keim also presented the results of his research at the *Maltechnik Exhibition* including the 'Keim standard oil paints' produced by the Munich-based paint manufacturer H. Schött; these paints were distinguished by their use of durable pigments (*Normalfarben* – 'standard colours') suited to oil painting (Munich 1893, pp. 81, 114, 117). In addition to this, Keim's Research Institute was represented in the *Maltechnik Exhibition* with a series of test panels of essential oils, organic oils and resins (Munich 1893, pp. 90–91, 95). The fact that two German manufacturers had only recently brought new oil paints onto the market (H. Schmincke & Co. the *Mussini-Ölfarben* and Dr. Fr. Schoenfeld & Co. the *Ludwigsche Petroleumfarben*[1]) – which were said to possess more advantageous working properties, less tendency to yellow and generally better durability than traditional oil paints – had incited Keim to carry out these tests.

As a rule, manufacturers of artists' paints did not specialise in just one product line: alongside various kinds of oil paint, their ranges would commonly also include temperas. This open attitude towards paint technology was not officially shared by the German Society for PRPM. As a group, it accepted only oil paints as being intrinsically durable, and made this preference well known. For example, it made the chemist Max von Pettenkofer (1818–1901) an honorary member in honour of his research into the properties and drying of oil paints (Pettenkofer 1870/edn 1902). In Pettenkofer's opinion, oils were superior to temperas because in the latter, the aqueous component of the binder evaporated during the drying process, causing a change of hue, while in the case of oils, 'the paints were still just as permeated and filled out by the binder at the end of the painting process as they had been when they were applied' (Pettenkofer 1870/edn 1902, p. 4).[2] Also, the society's journal *TMM* devoted itself explicitly to the promotion of research into oil paints by printing articles by the German painter Heinrich Ludwig (1829–1897), the Russian chemist Th. Petrushevski and by Keim himself. After Keim's death, the society started the book series *Monografien der Maltechnik* (*Monographs on Painting Technique*) as a riposte to Berger's extensive work *Sammlung maltechnischer Schriften* (*Collection of Writings on Painting Technique*, see below). The *Monographs* included not only an eulogy in honour of Max von Pettenkofer, written by his former assistant Rudolf Emmerich (1852–1914), but also some of the numerous studies on oil paints by Alexander Eibner (1862–1935), Keim's successor as head of the Research Institute, now renamed Research Institute and Information Centre for Painting Technology (Versuchsanstalt und Auskunftsstelle für Maltechnik).

Tempera paints and tempera painting at the *Maltechnik Congress*

In September 1893 in Munich, the German Society for PRPM held, concurrently with its *Maltechnik Exhibition*, the four-day *Maltechnik Congress*. One of the items on the congress agenda was 'tempera painting'. Participants reported on their experiences with modern, ready-to-use tempera paints made by various manufacturers. In

Deutsche Gesellschaft
zur Beförderung rationeller Malverfahren.
(Anerkannter Verein.)

Ausstellung für Maltechnik

veranstaltet von der
Deutschen Gesellschaft
zur Beförderung rationeller Malverfahren (A. V.)
in
MÜNCHEN
im kgl. Glaspalaste
1893.
Vom 20. Juli bis 15. Oktober.

Offizieller Katalog.

II. Auflage.

Redaktion: Adolf Wilh. Keim.

Preis 70 Pfg.

Druck von E. Mühlthaler's k. Hofbuchdruckerei in München.

Fig. 5 *Catalogue of the Exhibition on Painting Technology, Munich*, 1893, title page (Munich 1893). The catalogue is an extraordinarily important source for the products available from German artists' paint manufacturers and retailers at the time. Among the interesting features are the comments of the exhibiting artists on these products and the techniques that would accompany them.

contrast to the exhibition and its catalogue, the assessments expressed at the congress were altogether positive: painters such as Josef Hoffman (1831–1904), Friedrich Pondel (1830–?) and Rudolf von Seitz (1842–1910) praised the colours, saturation and depth of the various tempera products that they were using which, they said, were comparable to oils. They also commented on the good handling properties of tempera paints produced by such manufacturers as Richard Wurm, Haase & Brandt, Ernst Friedlein (1841–1919) and Alfons von Pereira-Arnstein (Kongress 1893, pp. 469, 474, 511). The young inventor of *Syntonosfarben* (Syntonos paints), Wilhelm Beckmann (1871–?), addressed the audience and noted that prominent painters such as Lenbach and Franz von Stuck (1863–1928) were using his products and rated them highly (Kongress 1893, pp. 508–510). Soon after the congress, Franz von Stuck painted the large-format canvas *Der Krieg* (*War*)[3] for the *Munich Secession Exhibition* using Beckmann's Syntonos paints (see also the contributions by Neugebauer and Dietemann *et al.*, in this volume). He was quite vocal about his choice of materials thereby lending them a degree of publicity, which soon turned to notoriety as the picture began to show signs of alteration soon after its completion (Kinseher 2014, pp. 69–72, 171–173).

At the congress, the disadvantages of the use of tempera were barely mentioned. This was clearly the result of the influence of Lenbach who, as chairman of the German Society for PRPM, also presided as the chairman of the congress and the exhibition selection committee. Although Keim repeatedly attempted to address his concerns regarding the durability of Pereira tempera paints, his efforts were rejected by Lenbach (Kongress 1893, pp. 475, 512).[4] Only the casein paints made by the Düsseldorf manufacturer Anton Richard received negative reviews at the congress, specifically because they became paler as they dried and contained ammonia (Kongress 1893, p. 474).

The approach taken at the *Maltechnik Congress* was therefore the polar opposite to the critical attitude towards temperas expressed in the *Maltechnik Exhibition* catalogue. Interestingly, one of the rare positive endorsements of temperas at the exhibition was also given by Lenbach, who displayed a trial piece in which he had used both Syntonos and Pereira paints (Munich 1893, p. 94). Lenbach had participated in the composition of a euphoric testimonial in favour of the Pereira products that was then used for advertising purposes by their manufacturer, Stuttgart-based J.G. Müller & Co. The testimonial declared that 'a momentous advancement and new development' ('*eine bedeutsame Förderung und neue Entwicklung*') was sure to happen in the arts through Pereira's technique (Müller & Co. 1893; see also the contribution by Beltinger, in this volume). In his pronouncements concerning the advantages of tempera paints at both the exhibition and the congress, Lenbach blithely ignored all of Keim's reservations regarding their use. Given his fame as a painter and the prominence of his position as chairman of the German Society for PRPM, publicly adopting a statement contrary to Keim's was a highly provocative act.

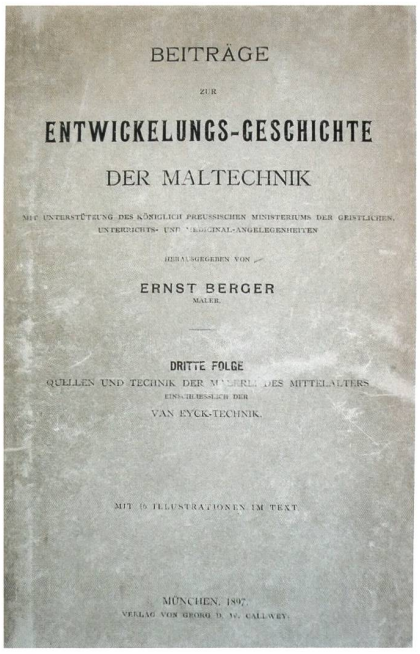
After the congress, Keim was then free to criticise temperas once again: in his capacity as editor of the journal *TMM* he took the opportunity to print critical reports of the Pereira tempera system written by the chemists Friedrich Linke and Leon Borucki, thus reinforcing his position concerning the superiority of oils (Borucki 1894; Linke 1894).

Berger's expulsion from the German Society for PRPM

Berger's participation in the *Maltechnik Exhibition* marked his debut as a researcher in the field of painting technology; in contrast, for Keim, the exhibition represented the culmination of many years of work and was one of the high points of his career. Keim hoped that the exhibition would impress the Bavarian government and thereby secure the provision of long-term funding for the Research Institute.

Relations between Keim and Berger were very quickly characterised by differences of opinion. Berger's publications on the painting techniques of the ancients appeared to have had considerable publicity and critical acclaim (Berger 1893b; Berger 1893c). Equally, they triggered a controversy regarding the original techniques employed on the murals in Pompeii: while Berger believed that they had been painted in encaustic, Keim and others vehemently disagreed, claiming they had been created in fresco (Kinseher 2012, p. 161). Adding fuel to the fire, for the *Maltechnik Exhibition* Berger had made reconstructions of Egyptian mummy sarcophagi, shrouds and portraits, which in his opinion had originally been executed in tempera, thus underscoring his position concerning its early use and durability (Munich 1893, pp. 85, 86; Kinseher 2014, pp. 198–213).

Keim perceived Berger as a rival. The success enjoyed by Berger, who was both wealthy and hard working, clearly unsettled Keim. When the Bavarian government withdrew financial support for the Research Institute, dashing Keim's ambitions, he held Berger personally responsible. The increasing acrimony between Berger and Keim resulted in Berger's expulsion from the German Society for PRPM in January 1894 (PRPM 1903).[5] The expulsion, however, did not harm Berger's career: his expertise was acknowledged by institutions outside of the local Munich society's sphere of influence. Although he was based in Bavaria, much of Berger's research and publications on the developmental history of painting technology were in fact supported by the Prussian ministry of educational, medicinal and religious affairs, and by the senate of the Royal Academy of Arts in Berlin. In addition, in 1912 the government of the Grand Duchy of Saxony (formerly Saxe-Weimar-Eisenach) bestowed on him the title of professor at the Grossherzoglich Sächsische Hochschule für Bildende Kunst (Saxon-Grand Ducal Art School) in Weimar. The following year, he was proposed for honorary membership in the British Society of Mural Decorators and Painters in Tempera, founded in 1901 by the painter Marianne Stokes (1855–1927) and the painter and graphic artist Walter Crane (1845–1915). This was the first time that the British Society had awarded such an honour;


BEITRÄGE

ZUR

ENTWICKELUNGS-GESCHICHTE

DER MALTECHNIK

ERNST BERGER

MALER.

DRITTE FOLGE

VAN EYCK-TECHNIK.

MÜNCHEN. 1897.

Fig. 6 Ernst Berger, *Quellen und Technik der Fresko-, Oel- und Tempera-Malerei des Mittelalters*, 1897, title page. This is the third volume in Berger's important series *Beiträge zur Entwickelungs-Geschichte der Maltechnik*.

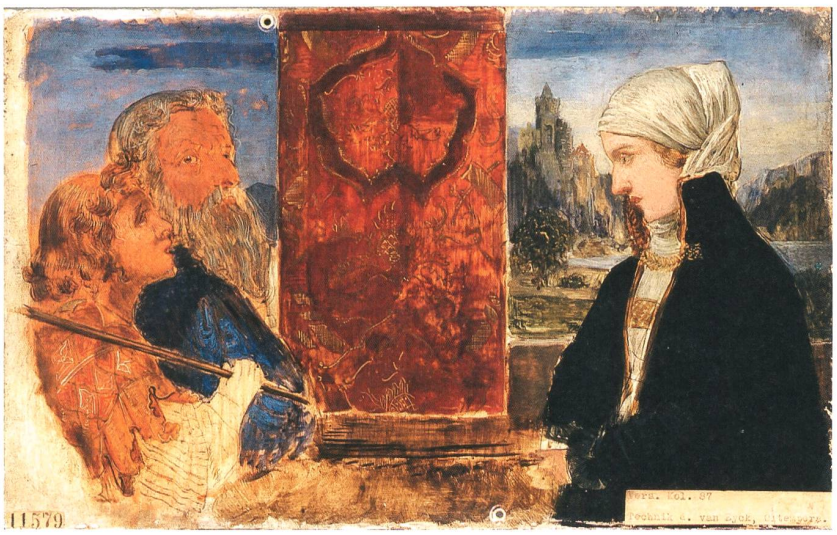


Fig. 7 Ernst Berger, trial painting to test Van Eyck's technique. Trial painting no. 87, 21 × 34 cm, Deutsches Museum, Munich, inv. no. 11579. Berger himself reported that he had made 'trial paintings using the technique of the 16th century emulsion tempera' ('*Malproben in der Technik der XVI. Jhs.* [*sic*] *Emulsionstempera*') (Berger 1897, p. 264).

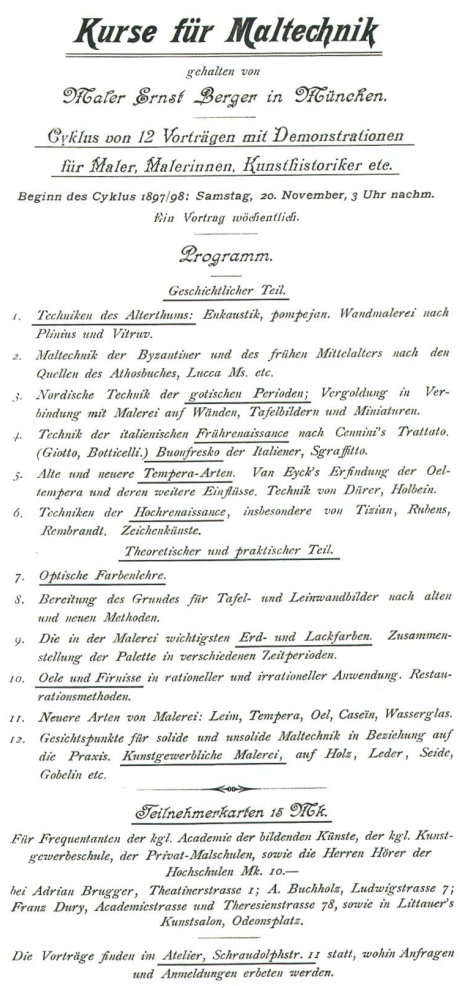
as noted by the society's secretary, the painter and illustrator John Dickson Batten (1860–1932), Berger was awarded the position for his meritorious services to art, 'particularly to those forms of art which it is the object of our Society to promote' (Batten 1913). The nature of these services will be examined in more detail below.

BERGER'S ADVOCACY OF TEMPERA PAINTING

Berger's *Quellen und Technik der Fresko-, Oel- und Tempera-Malerei des Mittelalters*, 1897

In the preface to her translation of *Il libro dell'arte* by Cennino Cennini (Cennini c. 1390/edn 1899), the founder of the British Tempera Society, Christiana Herringham (1852–1929) states that her desire to learn tempera painting was stimulated by an intense study of the literature on 15th-century techniques. Berger's 1897 volume *Quellen und Technik der Fresko-, Oel- und Tempera-Malerei des Mittelalters* (*Sources and Technique of Fresco, Oil and Tempera Painting of the Middle Ages*) (Fig. 6; Berger 1897) provided a major source of inspiration and information.

In *Quellen und Technik...*, Berger had collected numerous sources on the painting techniques employed from the 11th to the 15th century (e.g. Strasbourg Manuscript, *Liber illuministarum*, Cennino Cennini's treatise), which included recipes for aqueous binder systems and examples of their application. In addition, Berger appended an additional chapter in order to put forward a new hypothesis regarding the painting technique employed by Jan Van Eyck. While the general opinion hitherto had been that Van Eyck's innovation had consisted in using a medium based on oil and resin or in the use of a layered system utilising tempera underpainting followed by finishing in oils, Berger maintained that he had used an oil tempera that could be mixed with water – in other words, an emulsion. In numerous trial paintings that he added to his growing collection of tests and reconstructions (Fig. 7; Berger 1897, pp. 247–248, 264–265), he investigated the various emulsions that could be created on the basis of egg or gum arabic mixed with oils, boiled oils or resin balsams in order to form egg yolk/oil or gum/oil temperas. In 1895 the senate of the Berlin Academy had indicated its strong interest in Berger's experiments on the reconstruction of the Van Eyck emulsion, and provided him with funding for the continuation of his research (Proceedings 1895; Berger 1895b). In the journal *TMM*, by contrast, Berger's thesis that Van Eyck's paint had been an emulsion was immediately rejected (Lang 1895).



Kurse für Maltechnik 6

gehalten von

Maler Ernst Berger in München.

Cyklus von 12 Vorträgen mit Demonstrationen
für Maler, Malerinnen, Kunsthistoriker etc.

Beginn des Cyklus 1897/98: Samstag, 20. November, 3 Uhr nachm.
Ein Vortrag wöchentlich.

Programm.

Geschichtlicher Teil.

1. Techniken des Alterthums: Enkaustik, pompejan. Wandmalerei nach Plinius und Vitruv.
2. Maltechnik der Byzantiner und des frühen Mittelalters nach den Quellen des Athosbuches, Lucca Ms. etc.
3. Nordische Technik der gotischen Perioden; Vergoldung in Verbindung mit Malerei auf Wänden, Tafelbildern und Miniaturen.
4. Technik der italienischen Frührenaissance nach Cennini's Trattato. (Giotto, Botticelli.) Buonfresko der Italiener, Sgraffito.
5. Alte und neuere Tempera-Arten. Van Eyck's Erfindung der Oeltempera und deren weitere Einflüsse. Technik von Dürer, Holbein.
6. Techniken der Hochrenaissance, insbesondere von Tizian, Rubens, Rembrandt. Zeichenkünste.

Theoretischer und praktischer Teil.

7. Optische Farbenlehre.
8. Bereitung des Grundes für Tafel- und Leinwandbilder nach alten und neuen Methoden.
9. Die in der Malerei wichtigsten Erd- und Lackfarben. Zusammenstellung der Palette in verschiedenen Zeitperioden.
10. Oele und Firnisse in rationeller und irrationeller Anwendung. Restaurationsmethoden.
11. Neuere Arten von Malerei: Leim, Tempera, Oel, Caseïn, Wasserglas.
12. Gesichtspunkte für solide und unsolide Maltechnik in Beziehung auf die Praxis. Kunstgewerbliche Malerei, auf Holz, Leder, Seide, Gobelin etc.

Theilnehmerkarten 15 Mk.

Für Frequentanten der kgl. Academie der bildenden Künste, der kgl. Kunstgewerbeschule, der Privat-Malschulen, sowie die Herren Hörer der Hochschulen Mk. 10.—
bei Adrian Brugger, Theatinerstrasse 1; A. Buchholz, Ludwigstrasse 7; Franz Dury, Academiestrasse und Theresienstrasse 78, sowie in Littauer's Kunstsalon, Odeonsplatz.

Die Vorträge finden im Atelier, Schraudolphstr. 11 statt, wohin Anfragen und Anmeldungen erbeten werden.

Fig. 8 Announcement and schedule of the courses in painting techniques that Ernst Berger gave in his studio in Schraudolphstrasse in Munich in 1897/1898: 'Old and new kinds of tempera. Van Eyck's invention of oil tempera and its wider influences. Technique of Dürer, Holbein'. Thüringisches Hauptstaatsarchiv Weimar, Großherzoglich Sächsische Hochschule für Bildende Kunst 92, folio 6r.

Despite the unrelenting opposition to his theories that he encountered in Munich, one can only assume that the great popularity that painting in tempera came to enjoy there must have been due (at least in part) to his influence. Particularly for the Russian painters working in Munich – mutual friends Igor Grabar (1871–1960), Dmitri Kardovsky (1866–1943), Alexej von Jawlensky (1864–1941), Marianne von Werefkin (1860–1938) who had been based in Munich since 1896, and Wassily Kandinsky (1866–1944) who had joined them the following year – Berger's writings and also possibly his courses in painting technique (see below) must have provided important sources of information and inspiration. After their joint trip to Italy in 1897, these artists developed an intense interest in ancient painting techniques and textual sources; Berger's work, published that very year, was read with great interest. The exact citation provided by Kandinsky, for a varnish recipe from the Tegernsee *Liber illuministarum*, demonstrates its direct utility: 'Lib. Ill. (183 B.) S. 113a' (Kandinsky GMS 346; see also Berger 1897, p. 183; Winkelmeyer 2014, pp. 61 and 72–73; and the contribution by Neugebauer, in this volume). The book was also essential reading for the Swiss painter Cuno Amiet (1868–1961), a student in Munich from 1886 to 1888, who developed an enthusiasm for tempera painting at the end of the century; he also recommended it to his friend, the painter Giovanni Giacometti (1868–1933) (Beltinger 2015, pp. 39–40).

Courses in painting technique

Berger also maintained a presence in Munich through the courses in painting technique that he offered as a 12-part lecture series in 1897/1898 at his studio on Schraudolphstrasse. Tempera painting was addressed on a number of occasions, above all in the fifth teaching module (Fig. 8). In the winter semesters 1902/1903 and 1903/1904, he also gave a series of 12 lectures at the city's art academy on the 'technique of painting'. The programme survives in the form of a letter to Hans Olde (Berger 1907f), the director of the Grand-Ducal Academy of Fine Arts in Weimar, where a course was also planned. Eight lectures (1. General principles; 2. Optical characteristics of the paints; 3. & 4. History of easel painting; 5. & 6. Modern oil techniques; 7. Mural painting; 8. Fresco technique), were followed by one on tempera in the ninth week (9. Tempera painting) and finished with technique and colour (10. Applied art techniques; 11. & 12. The colours: properties, allocation, constitution of the palette).

Berger's lecture on tempera painting (Berger 1907g; see also Berger 1909/edn 1938) was structured as follows:

9. Tempera painting

What is tempera?
Lean and fat (natural and synthetic) tempera.
Types of solutions:
a. by emulsion, b. by saponification.
Animal glue, gum, egg-yolk, casein, oil and varnish emulsions.
Resin and wax tempera.
Differences regarding the purpose.
Mural or easel painting, stage-sets
Methods of using tempera
1. as underpainting
2. for finishing paintings
Commercially available tempera paints and their properties.
Peculiarities of casein.

Possible links between Berger and Russian artists in Munich

As noted above, in their search for alternatives to commercial tube paints, Kardovsky, Grabar and Jawlensky all experimented with tempera recipes (Wackernagel 1997; Fischer *et al.* 2006; Jagudina 2008). In Munich it was rumoured that Grabar had discovered a paint recipe to rival that of the Van Eyck brothers. According to Grabar himself, the 'best-known paint producer'[6] had even offered to manufacture his paints (Jagudina 2008, p. 42). In a notebook from Kandinsky's Paris studio, now in the archives of the Centre Pompidou (Kandinsky 188-e), notations are found that suggest a possible connection between Berger's research and the Russian avant-garde artists in Munich. The notebook contains more than 30 paint and binder recipes recorded in an unknown hand,[7] which are dated sequentially from 3 March to 19 June 1900 (Wackernagel 1997, pp. 115–118). In many cases these recipes include egg yolk together with resin solutions and balsams; they are therefore based on the oil-tempera model described by Berger (1897, pp. 257–260). Despite the marked resemblances between the receipts in the notebook and Berger's formulations, it cannot be proved that Berger was the inspiration behind this little collection of recipes,[8] nor can it be confirmed that the unknown person with whom Grabar, Kardovsky and Rudolf Treumann (1873–1933) were photographed in Munich in 1897 was Berger (Fig. 9).[9] It is certain, however, that Kandinsky later placed special emphasis on Berger's importance: in the work *Punkt und Linie zur Fläche* (*Point and Line to Plane*), written in 1923 while he was a professor at the Bauhaus, he underscored Berger's contributions to the rediscovery of old recipes and their influence on paint development and research into painting technology in Germany (Kandinsky 1964, pp. 15–16, note 1). Kandinsky's own library also included a copy of Berger's

Fig. 9 Unknown photographer *(from left to right)*: Dmitri Kardovsky, unknown, Igor Grabar, Rudolf Treumann, Munich, 1897. Whether the unknown person is Ernst Berger is uncertain, in spite of extensive research. (Reproduced from Grabar 1997.)

MÜNCHNER KUNSTTECHNISCHE BLÄTTER

3. Okt. 1904. | Beilage zur „Werkstatt der Kunst". — Erscheint vierzehntägig unter Leitung von ERNST BERGER, München. | Nr. 1.

Inhalt: Zur Einführung. — Ueber die Lichtbeständigkeit unserer Malerfarben. Von Ernst Berger (München). — Für die Praxis: Casein-Fixiermittel für Pastellfarben. — Materialienkunde: Alaun und seine Anwendung in der Farben- und Maltechnik. — Anfragen und Beantwortungen.

Fig. 10 *Münchner kunsttechnische Blätter* 1, Munich 1904, title page, detail. The first issue of the journal appeared in October 1904 under the editorship of Ernst Berger as a supplement to the journal *Werkstatt der Kunst*.

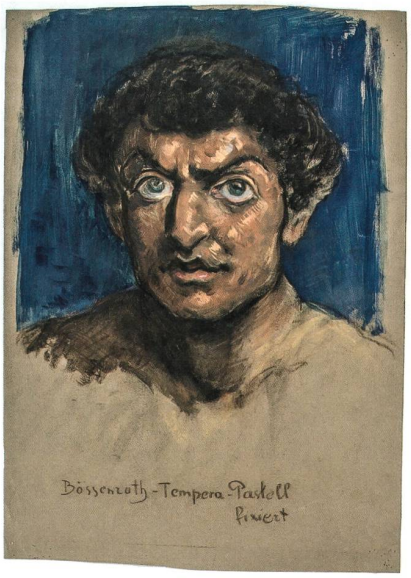


Fig. 11 Ernst Berger, *Head study (beardless man)*, c. 1914, Bössenroth tempera pastel on paper, 50.9 × 36.4 cm, Kupferstichkabinett der Akademie der Bildenden Künste, Vienna, inv. no. HZ 18344. C. Bössenroth's tempera in pastel stick form (Patent AT63368, 31 December 1912), the material which Berger used for this study, was a further development of the tempera paints in tubes invented by the same man.

Katechismus der Farbenlehre (*Catechism for Colour Studies*) (Berger 1898; Wackernagel 1992, p. 21; Wackernagel 1995, p. 555, note 52; Wackernagel 1997, p. 101), and Berger was also known to him through the journal *Die Werkstatt der Kunst* (*The Workshop of Art*), as he was the editor of its supplement *Münchner kunsttechnische Blätter* (*Munich Art Technology Newssheets*), which appeared from October 1904 (Pohlmann 2006, p. 57). Although unproven, it is by no means far-fetched to imagine that Kandinsky and Berger (who was only nine years his senior) may have become acquainted while both were living just a few houses apart on Munich's Friedrichstrasse in 1901–1904 (PMB B 201; Wackernagel 1995, p. 548, note 15).

The *Munich Art Technology Newssheets*

In his *Art Technology Newssheets* (Fig. 10), Berger found a forum in which to oppose the views expressed in the journal *TMM*, which was heavily influenced by Keim. The controversy surrounding the technique used for the paintings in Pompeii (Berger 1893b) had become increasingly heated, and while opposing opinions were indeed printed in *TMM*, they were not debated rationally but immediately subjected to vitriolic attack.

Berger became editor of the *Art Technology Newssheets* in 1904, at a time when his difficulties were coming to a head with Keim and the German Society for PRPM

concerning the Pompeian murals. The *Art Technology Newssheets* provided Berger not only with a platform for his own articles and for rebuttals of the polemics directed against him by the society, but also allowed him to change the subject of discussion. On a number of occasions, the *Art Technology Newssheets* addressed the question of modern tempera painting, for example in the series of articles entitled 'Neue Malerfarben' ('New artists' paints'). For these articles, Berger tested and reviewed a number of commercially available tempera paints (Fig. 11; Berger 1907a; Berger 1907b; Berger 1908b; see also the contribution by Pohlmann *et al.*, in this volume).

The Department of Painting Technology at the Deutsches Museum

After two exhibitions of reconstructions of historical painting techniques from Berger's experimental collection – held in 1897 at the Kunstsalon Rudolf Bangel in Frankfurt and in 1903 in the Kunstverein in Munich – a more expansive opportunity for showcasing his work presented itself. The establishment of a Department of Painting Technology at the newly opened Deutsches Museum in Munich (Fig. 12) in 1906 provided a platform for Berger to present his research into the history of painting technology to the wider public, including his thesis on Van Eyck's technique. The stated goal of the museum was to represent 'the development of Science and Technology through originals and models of typical masterworks and their characteristic developmental stages' (Kinseher 2014, p. 218): painting was viewed as technology and Berger's reconstructions clearly fulfilled this aim. His work was recommended to the museum planners by Wilhelm Ostwald (1853–1932), who was responsible for the exhibitions in the chemistry section of the museum. In addition to Berger's reconstructions, examples of art technology, documentary sources and other useful materials were gathered to provide a foundation for the collection, a task to which Berger enthusiastically devoted himself until his death in 1919.

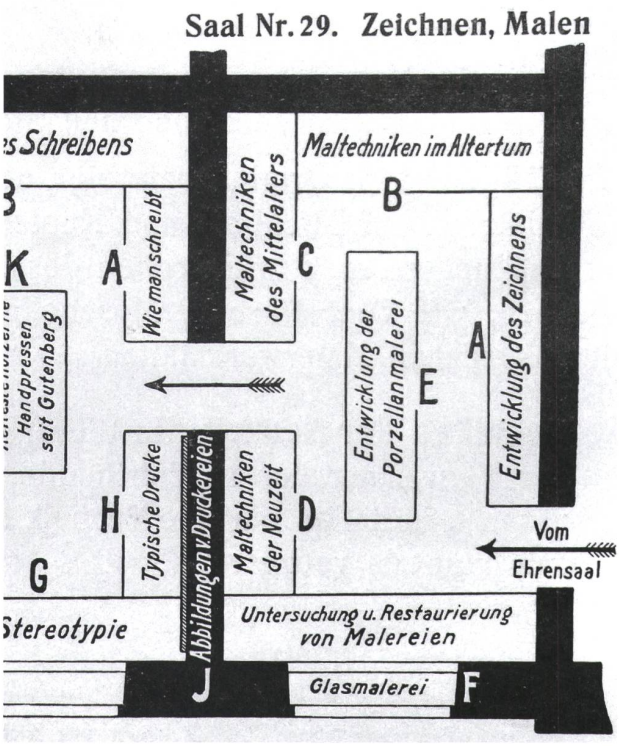


Fig. 12 Plan of Room 29 with the Department of Painting Technology in the building then occupied by the Deutsches Museum, Munich, in Maximilianstrasse, which was entered from the main hall. (Reproduced from Deutsches Museum 1907.)

This unique department won international acclaim and led to the establishment of a similar initiative on painting technology abroad: while visiting Berger in Munich in 1914, Edward Waldo Forbes (1873–1969), director of the Fogg Museum in Boston, noted: 'He [Berger] took me to one of the museums where he had a technical show, which gave me the idea of starting a similar exhibition at the Fogg Museum' (Forbes c. 1955). Forbes's European trips and indeed this particular visit to Berger, who gave him a 'crash course on emulsions' (Bewer 2010, p. 267, note 19), were to bear fruit: back in Boston Forbes assembled a collection relating to painting technology, now housed at Harvard's Straus Center for Conservation and Technical Studies, and offered courses nicknamed 'egg and plaster' on the techniques employed in early Italian mural and easel painting (Bewer 2010, p. 57–59).

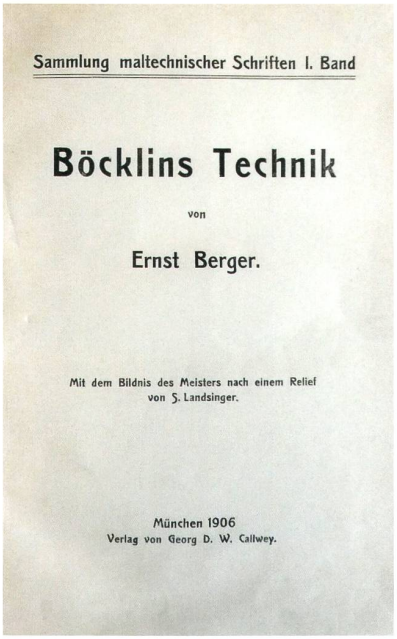


Fig. 13 Ernst Berger, *Böcklins Technik*, Munich: Callwey, 1906, title page. This is volume 1 in the series, edited by Berger, *Sammlung maltechnischer Schriften*.

Editor of the *Sammlung maltechnischer Schriften*

The publication of the book series *Sammlung maltechnischer Schriften* (*Collection of Writings on the Technology of Painting*) was a further initiative on Berger's part that had a significant effect on the dissemination of tempera painting. This series, published in Munich by Callwey between 1906 and 1939 (i.e. continuing long after Berger's death), comprises 22 volumes on art technology. The first two volumes were of particular importance for the dissemination of knowledge on tempera painting. The first, written by Berger himself, deals with the technique of Arnold Böcklin (1827–1901) (Fig. 13; Berger 1906d), a great innovator in the context of tempera painting. His importance as a role model and the extent to which Berger's writings contributed to the reception of his technique have been demonstrated for German, Italian and Swiss artists (Schwabe 2013a, p. 37; Reinkowski-Häfner 2014, p. 198; Vacanti 2006, pp. 444, 454–455; Beltinger 2015, pp. 40, 41, 46). The second volume, written by the pharmacist Ernst Friedlein, was entitled *Tempera und Tempera-Technik* (*Tempera and Tempera Technique*) (Fig. 14; Friedlein 1906).

Personal conflicts with Keim

Ernst Friedlein was an active member of the German Society for PRPM from the moment he joined the society in 1891 (*TMM* 1891, p. 5). Friedlein had a keen interest in the manufacture of tempera paints and contributed regularly: for example in 1893 in the context of both the *Maltechnik Exhibition* and *Congress*, he presented studies and sketches executed in emulsion tempera 'varnished and unvarnished on a variety of grounds' (Munich 1893, pp. 43–44). In 1904 the material that was chosen for the facade painting of the new Munich court building was not the eponymous mineral paint developed by Keim (*Keimsche Mineralfarben*), but rather a casein tempera known as 'Odin' paint that was developed by Friedlein (Lettenmayer 1923, p. 250). If it had not been the case before, with this victory, Friedlein, like Berger, came to be regarded as a rival by Keim. Friedlein's emulsion tempera must have been very well known in Munich's artistic circles. The New York painter Florine Stettheimer (1871–1944), who paid regular visits to Munich between 1906 and 1914, even immortalised '*Herr Apotheker F.*' in a poem ('Casein was once milk/And then it was cheese/And now it is pictures [...]') (Mühling *et al.*, 2014, pp. 20, 176). The fact that Berger provided Friedlein with the opportunity to publish his tempera recipes (Fig. 14) was yet another affront as far as Keim was concerned.

Berger not only attracted Keim's animus at almost every opportunity, he also became the target for every attack on tempera painting in general. This can be seen for example in a heated discussion in the Bavarian parliament: the question at issue was who was responsible for repairing the damage suffered by Franz von Stuck's tempera painting *Der Krieg* shortly after its purchase by the Bavarian State Painting Collections: the artist himself, or the museum's conservation staff? This debate

Fig. 14 Ernst Friedlein, *Tempera und Tempera-Technik*, Munich: Callwey, 1906, title page. Like the first, this second volume in the series *Sammlung maltechnischer Schriften* was also important for the reception and dissemination of tempera painting at the turn of the 20th century.

was initially concerned only with Stuck and his painting, but it rapidly veered off-topic to Berger's temporary teaching post at the art academy, which he had occupied in the winter semesters 1902/1903 and 1903/1904, and then to the question of whether Berger was the right person for the post (Minutes 1902). In this case Keim and the German Society for PRPM triumphed. Stuck was ordered to assume responsibility for his choice of materials and to repair his damaged painting himself, while the academy subsequently terminated Berger's teaching contract.

Notwithstanding this injustice and the ongoing rows with Keim and the German Society for PRPM, Berger continued to live in Munich (from 1907 in Adalbertstrasse) next to the art academy. From here, he built up an international network, took on new tasks, became the expert on painting technology at the Deutsches Museum and continued with his research and ceaseless publishing. His residence in Munich ended in tragedy: in 1919, during the violent unrest that accompanied the Munich 'soviet', he was interned as a hostage and, on 30 April, shot. Sadly, the negative influence of Keim and the German Society for PRPM extended to the period after Berger's death. Due to the animosity towards Berger's work exhibited by Alexander Eibner and Max Doerner (1870–1939), Berger's popular exhibition on painting technology in the Deutsches Museum was later closed as sniping and political manoeuvring ensued when a new building was proposed to house the museum in the early 1920s (Kinseher 2014, p. 219, which also discusses the later fate of Berger's collection).

CONCLUSION

The painter and scholar Ernst Berger, born in Vienna and active in Munich from 1882, was a pioneer in the field of painting technology. He gathered a great many documentary sources on the subject, which he tirelessly edited and interpreted for use in his own attempts at reconstructions. His publications in the series *Beiträge zur Entwickelungs-Geschichte der Maltechnik* (*Contributions on the Developmental History of Painting Technology*), which appeared between 1893 and 1912 (Berger 1893c; Berger 1895a; Berger 1897; Berger 1901; Berger 1904; Berger 1909a; Berger 1912a), are now among the standard works for original research into painting technology. They triggered further investigations into painting materials and techniques and had considerable influence on the development of new artists' paints. Heated debates erupted between Berger and fellow researcher Adolf Wilhelm Keim concerning the techniques employed in the Pompeian murals and by the Van Eyck brothers. One of the most intense topics of dispute was whether or not contemporary artists should paint in oils or in tempera; two opposing camps formed in Munich, led by Berger (who advocated tempera) and Keim (who unreservedly preferred oils). Despite Keim's best efforts, the widespread use of tempera in Munich in the early 20th century must be credited to Berger's influence.

ACKNOWLEDGEMENTS

The author would like to thank Karoline Beltinger (Swiss Institute for Art Research, Zurich), Dagmar Blaha (Thüringisches Hauptstaatsarchiv Weimar), Francesca Bewer (Harvard Art Museums), Winfrid Glocker (Deutsches Museum), Fabienne Huguenin (Deutsches Museum Archiv Projekt DigiPortA), Karina Jagudina, Jilleen Nadolny (AA&R London), René Schober (Department of Engravings at the Akademie der Bildenden Künste, Vienna) and Anja Schmidt (Architekturmuseum, Technical University of Munich).

1 After an attempt at cooperation between Keim and the painter Heinrich Ludwig (1829–1897) failed, the production of Ludwig's petroleum paints passed to Dr. Fr. Schoenfeld & Co. in Düsseldorf (Kinseher 2014, pp. 150–170).

2 '*[...] die Farbstoffe auch nach Vollendung des Gemäldes ganz so vom Bindemittel durchdrungen sind und erfüllt bleiben, wie sie aufgetragen werden [...]*'.

3 *Der Krieg* (*War*), 1894, paint on textile support, 245.5 × 271 cm, Bavarian State Painting Collections, Munich, Neue Pinakothek, inv. no. 7941.

4 Before the congress Pereira had written a letter to the organising committee in which he complained about the poor showing of his tempera paints in the exhibition (Kongress 1893, pp. 474–475; see also the contribution by Beltinger, in this volume). Keim, who was clearly responsible for this, read Pereira's letter to the assembly in the hope that the majority would take his (Keim's) side, but his hope was not realised.

5 A letter from the German Society for PRPM to Eugen Stieler (PRPM 1903) contains an excerpt from the minutes of the meeting held by the society on January 1894, in which Berger's expulsion was decided.

6 The identity of the paint producer remains unclear.

7 So far, only Kandinsky's and Berger's hands have been eliminated from the range of possible attributions.

8 An alternative source of inspiration is work of the pharmacist Ernst Friedlein who developed numerous recipes for tempera emulsions (Friedlein 1906).

9 In spite of extensive research in photographic archives, no confirmed photograph of Berger was found that could be used for comparison.