

Innovation or replacement? Investigating Willi Baumeister's painting materials and technique using art technological research

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ABSTRACT The Stuttgart based artist Willi Baumeister (1889–1955) is one of the most important representatives of abstract modernism in Germany. Constantly searching new forms of artistic expression, he became known for his unconventional painting techniques and materials. The Baumeister research project is now investigating whether the artist was not only innovative in his abstract compositions, but also in his use of newly developed synthetic and semi-synthetic resins during the mid 20th century, and in the way he exploited them to reach his artistic goals. This paper focuses on the painting *Roter Horizont (mit Marmorierung)* / *Red horizon (with marbling)* dating from 1946. The case study exemplifies the influence of two experiences which shaped Baumeister's technical means of artistic expression: his apprenticeship as a decorative painter (1905–1907) as well as his experiments with synthetic and semi-synthetic resins as an employee of the Dr. Kurt Herberts & Co. paint factory between 1937 and 1945. This paper combines hints from a variety of written and material sources including his own writings, the technical examination of *Roter Horizont (mit Marmorierung)* as well as the analysis of paint samples, using in particular Fourier transform infrared (FTIR) microscopy. The case study shows how Baumeister's painting techniques and his material choices can be traced and linked to these experiences.

Introduction: “First and foremost always (feeling) like a craftsman”¹

Willi Baumeister is known for his unconventional use of painting materials (Baumeister 1926, 179; Grohmann 1963, 13; Scheiger, Wallner and Goetz 2020), which was important to the artist (Fig. 1): “*Der Künstler will etwas ausdrücken, also greift er zu dem entsprechenden Material, manchmal ist es aber auch das Material, das ihn dirigiert.* (The painter wants to express something, thus he uses the appropriate material, but in some cases it's the material that leads him.)” (Schmitt and Baumeister 1955, 35). Equally important for the artist were painting techniques, as he wrote: “*Jede Technik spricht ihre eigene Sprache. (...) Der Künstler muß dem Rechnung tragen, um seinen Absichten Gestalt zu verleihen* (Every technique has its own expression. (...) The artist has to take this into account to accomplish his intentions)” (Baumeister 1967, 138).



Fig. 1 Unknown 1949. *Willi Baumeister in his studio at Diemershaldenstr.* (Image: unknown) Stuttgart, April 1944, CC-BY-NC-SA 3.0 Archiv Baumeister at Kunstmuseum Stuttgart.

This view on painting materials and techniques was shaped by two experiences, the first being Baumeister's apprenticeship as a decorative painter (1905–1907), which the artist completed before he studied at the Royal Württemberg Academy of Fine Arts in Stuttgart (1905–1912 and 1920–1922) (Böhm 1995, 179–187). Equally important for Baumeister's *oeuvre* were his experiments with newly developed products of the German chemical industry as an employee of the Dr. Kurt Herberts & Co. paint factory in Wuppertal (1937–1945) (Ackermann 2007a, 11). Company owner Kurt Herberts gave Baumeister the opportunity to earn a living after having been dismissed from his teaching post at the *Städelschule* in Frankfurt and having been denounced as an *entarteter Künstler* (defamed artist) by the National Socialists (Grimm *et al.* 1992, 200–202). Although as a defamed artist he was forbidden to continue producing art, Baumeister continued to work on his art secretly. After 1945, he emerged as a prominent exponent of abstract painting in Germany (Fastert 2013, 67). The artist also accepted a professorship of painting at the Stuttgart State Academy of Art and Design (Staatliche Akademie der Bildenden Künste, today known as the ABK Stuttgart). In 1955, Baumeister died while working on a painting (Böhm 1995, 242).

The Baumeister project: research questions and methods

The ongoing research project *Innovation oder Ersatz? Kunsttechnologische Forschungen zu Gemälden Willi Baumeisters zwischen 1930–1955* (*Innovation or replacement? Art technological investigations of Willi Baumeister's paintings between 1930 and 1955*) explores which synthetic and semi-synthetic binders Baumeister used in his late paintings. There are three research questions: Were his material choices mainly due to war-time shortages caused by the Second World War? Or were they rather motivated by his interest in new products from the German chemical industry? How are the artist's material choices reflected in his painting techniques and which other influences can be discovered?

Using Baumeister and his paintings as an example, the aim of the project is to gain a better knowledge of the newly developed synthetic and semi-synthetic binders that existed in Germany during this time, their composition and the way that German artists perceived and actually used these new materials.

In order to obtain a comprehensive understanding of the artist's painting technique and materials, the research combines extensive source research with techni-

cal examinations of 25 paintings and further reference materials (e.g. an historic synthetic binder collection, and paint tubes from the artist's estate). For a thorough interpretation of the results, the project fosters a trans-disciplinary scholarly debate between all members of the research group which includes conservators, conservation scientists and archivists from different institutes, museums and universities in Germany².

The sources

Material sources

The examination of paintings is possible thanks to the *Willi Baumeister Stiftung*³, which administers the artist's estate and owns over 250 paintings dated between 1930 and 1955. In addition to the visual examination of 92 paintings, the binding media of 20 paintings have been analyzed using Fourier transform infrared FTIR microscopy.

During the archival research at the *Willi Baumeister Stiftung*, we found various paintings which had been overpainted or cut up by the artist and which consequently were not included in his catalogue raisonné (Baumeister and Beye 2002). As these paintings were discarded, they are particularly suited for sampling. Fourteen of them date between 1930 and 1950⁴. Further resources are the painting materials held by the artist's estate as well as contemporary retail samples of synthetic binders available in Germany which were collected by Kurt Wehlte between 1948 and 1963 when he was head of the Institut für Technologie der Malerei at the ABK Stuttgart, where they are still held. As Wehlte and Baumeister were both holding positions at the ABK Stuttgart at the same time shortly after the Second World War, it seems particularly relevant to compare Baumeister's paint samples with Wehlte's synthetic binder sample collection.

Written sources

The interpretation of the analytical results requires a thorough understanding of the materials Baumeister used. Therefore, the other important part of the research project is the study of different contemporary written sources. An important resource is, especially, the *Archiv Baumeister* at Kunstmuseum Stuttgart with its extensive holdings of sources on the life and work of the artist⁵. The archive preserves written material such as Baumeister's written comments and diaries in addition to his correspondence with artist friends, gallery owners and art historians. The archive holdings also include newspaper articles as well as photographs, e.g. of the artist himself, his friends and exhibitions.



Fig. 2 Willi Baumeister, *Roter Horizont (mit Marmorierung)* 1946. 44,5x53 cm. CC-BY-NC-SA 3.0 Willi Baumeister Stiftung © VG Bild-Kunst, Bonn 2024.

Historic film/sound recordings and oral sources

The artist's daughter Felicitas Baumeister is an excellent connoisseur of her father's oeuvre. She has already proven to be very helpful for dating the discarded paintings. There are also film and sound recordings of Felicitas Baumeister (Hoppe 2014) and the artist himself (Domnick 1954) as well as interviews (e.g. Schmitt and Baumeister 1955) and reports from Baumeister's students (Galerie Schlichtenmeier 1989; Kermer 1992, 178–197).

The following case study will show how combining these different sources can shed light on how Baumeister connected both technical influences stemming from his apprenticeship as a decorative painter as well as his experiences gained at the Herberts paint factory. He painted *Roter Horizont (mit Marmorierung)* in 1946 shortly after the Second World War and after he completed his stay at the factory.

Case study *Roter Horizont (mit Marmorierung)*

The abstract depiction of *Roter Horizont (mit Marmorierung)* / *Red horizon (with marbling)*⁶ (Fig. 2) illustrates Baumeister's search for new pictorial means and visual experiences (Beye and Osterwold 1979) as well as his "[...] *Lust, eine Form oder Formen entstehen zu lassen (was) den unerklärlichen Grund zur Kunst bildet.* ([...] lust to create a form or forms, which builds the inexplicable reason for art.)" (Baumeister 1947, 79).

The painting is executed on fibreboard which is primed with a thin, off-white layer. The multi-layered application of paint then varies between thick impasto – as can be seen in the black paint areas – and thin red glazes on top of a white local underpainting in the upper part. The painting is covered with a matt coating.

Influences of Baumeister's apprenticeship as decorative painter (1905–1907)

Application techniques

A special feature of Baumeister's painting technique is his use of a steel comb to manipulate the freshly app-

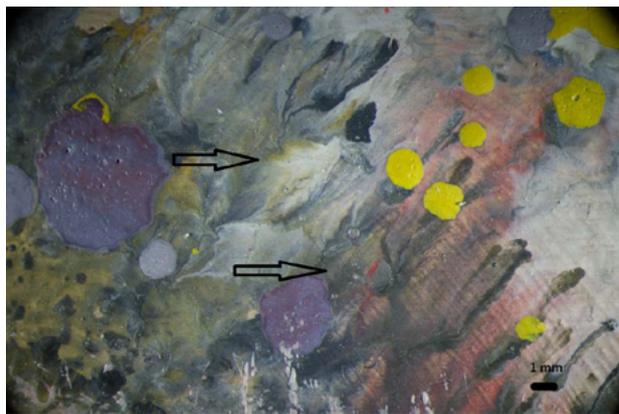


Fig. 3 *Roter Horizont*, detail at x25, showing the marbling effect created using a steel comb. (Image: Ulrike Palm)

lied paint (Beerhorst 1992, 63). In *Roter Horizont (mit Marmorierung)* he partially scraped the paint and even created marbling effects, to which the painting's title refers (Fig. 3). Baumeister had learned to produce patterns and ornaments for wall decorations with a special metal comb during his apprenticeship as a decorative painter. As the artist pointed out in an interview, he later went on to use this tool in many ways in his paintings (Schmitt and Baumeister 1955, 37). The steel combs, as well as several brushes and other painting materials, are preserved in the Willi Baumeister Stiftung (Fig. 4).

Material choices

Roter Horizont (mit Marmorierung) is partially covered with a matt, transparent coating that shows a fine, closely-meshed network of cracks with a tendency to form patches and which – where applied more thickly – has a whitish appearance (Fig. 5). When illuminated with ultraviolet light, it exhibits a bluish-white fluorescence.

Several written sources provide crucial information on its possible material composition: already in technical notes dating from his apprenticeship, Baumeister

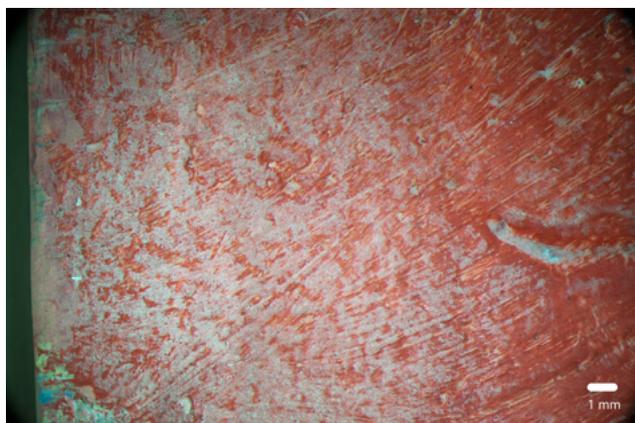


Fig. 5 *Roter Horizont*, detail of the upper part. The matt coating tends to be patchy. (Image: Ulrike Palm)



Fig. 4 One of Baumeister's steel combs, from the artist's estate (Willi Baumeister Stiftung). (Image: Hadwig Goetz, reproduced with permission)

noted down buttermilk as being useful for matting surfaces⁷. Later in his life, the painter repeatedly mentioned buttermilk coatings, as in a letter to Heinz Rasch, representative of the Herberts factory:

“Der Likörschrank ist jetzt seit Wochen fertig gemalt. (...) Ich versuche nun, ihn mit Butter-Milch zu mattieren. Jetzt steht die Malerei zum zweiten Mal unter einem Überzug von Butter-Milch (...) und ich hoffe morgen früh die Sauce weg zu waschen.”

“The liqueur cabinet has been painted for weeks (...) I am now trying to matt it with buttermilk. Now the painting is covered with buttermilk for the second time (...) and I hope to wash away the sauce tomorrow morning.”

(Archiv Baumeister, file R4_19391116).



Fig. 6 Willi Baumeister in his studio at Gänsheidestr. 26. Image: Johannes Schubert, Stuttgart c. 1954, CC-BY-NC-SA 3.0 Archiv Baumeister at Kunstmuseum Stuttgart.



Fig. 7 *Roter Horizont*, detail showing dripped paint. (Image: Ulrike Palm)



Fig. 8 Willi Baumeister, *Versuchstafel* 1943. Dripped lacquer on aluminum sheet, 20 x 30 cm. Image reproduced from Herberts, K. 1989, 177. Archiv Baumeister at Kunstmuseum Stuttgart © VG Bild-Kunst, Bonn 2024.

There is even a photograph of the artist's studio which shows a bottle on a table that might have contained buttermilk (Fig. 6).

This written and photographic evidence is supported by recent analytical findings for *Roter Horizont (mit Marmorierung)* and two further paintings that showed visually comparable coatings: The FTIR spectrum for the fragment *V_010* (1942) shows the presence of lactose and protein (presumably deriving from casein). Casein (milk protein) was detected in *Roter Horizont (mit Marmorierung)* and in *Ideogramm*⁸, in both cases by using enzyme-linked immunosorbent assay (ELISA) (Egeler 2018, 65).

Influences of the experiments at the Maltechnikum (painting technology center) at the Herberts paint factory

Equally important for Baumeister's unconventional painting technique and choice of materials are the experiments he conducted on materials for artistic purposes at the *Maltechnikum* at the paint factory (Matyssek 2001, 37–19). The factory produced synthetic and semi-synthetic resins and industrial lacquers for military purposes (Gibiec 2010, 13). However, company owner Herberts also had a private and sincere interest in research into the history of painting techniques for the fine arts. Therefore, he gave Baumeister and three further artists⁹ the opportunity to earn their living experimenting with painting materials and techniques at his *Maltechnikum* (Painting technology center). The artists contributed to several publications covering the company's research, for example, *Modulation und Patina (Modulation and Patina)* (Dern 2003, 10–11; Herberts 1989a, 7–8). For this purpose, the artists created a series of so-called *Versuchstafeln* (experimental panels) (Ackermann 2001b, 21–27). They experimented with various materials such

as sand, ink, nitrocellulose lacquer or putty on hard and soft fibreboard, cardboard, paper and metal panels. They also used a variety of application techniques: for instance, they dripped the paint after thinning it with solvents, used decalcomania, or scraped the paint with a palette knife directly on the support (Herberts 1989b, 78–165). The Kunstmuseum Stuttgart holds 171 of these experimental panels. These practical experiments further deepened Baumeister's understanding of craft and painting techniques and extended his knowledge about new and non-traditional painting materials. The artist used the knowledge he gained there in his later work (Aust 1989, 152, 155–156). These new experiences and his experimental approach to painting techniques and materials can be recognized when investigating Baumeister's technique in *Roter Horizont (mit Marmorierung)* which was created one year after he completed his stay in Wuppertal.

Application techniques

The painting shows a variety of application techniques that create subtle and differentiated painterly effects: Baumeister used brushes of different sizes and modulated the wet paint with his fingertips. As shown in Fig. 2, for the big black dots in the middle of *Roter Horizont (mit Marmorierung)*, the paint was applied as *impasto* and *alla prima*, while in the upper part the artist used thin glazes of red on a white dabbled underpainting. He even dripped the paint from a distance onto the surface, creating accidental patterns of drops and splatters in various colors (Fig. 7), also contributing to the “marbling” effect that is referred to in the title. Baumeister had always liked to use his paint in an unconventional manner, but dripped paint applications like this occur only after his time at the *Maltechnikum* and relate to the experiments that inspired him (Fig. 8).

Material choices

One of the main research questions is whether Baumeister replaced his proven, traditional painting materials due to war-time shortages with some of the new synthetic materials he got to know in his experiments at the paint factory. According to the sources, this is indeed the case. Several letters prove that the paint company supplied the artist with materials during the period when a shortage of materials was caused by the Second World War, and even for some years after that (e.g. Archiv Baumeister, file R4_19460124 and Archiv Baumeister, file R4_19460106). These materials were urgently needed, since Baumeister mentioned several times that he couldn't buy the materials he desired anymore. For example, in 1941 the artist wrote in his diary: "*Da ich keine Leinwand mehr bekommen kann, male ich auf Pappe kleine Formate.* (Since I can't get canvas anymore, I draw on small sized cardboard.)" (Archiv Baumeister, diary_10.03.1941), and: "*Ölfarbe kaum mehr zu bekommen.* (Oil paint is almost impossible to get.)" (Archiv Baumeister, diary_02.03.1941). To find out which alternatives Baumeister used, the analysis of paint samples is crucial. The FTIR analysis of *Roter Horizont (mit Marmorierung)* suggests that the paint is oil-based. However, initial FTIR analyses of the fourteen fragments now dated to 1942–1955 indicate that the artist also used binding media based on polyvinyl acetate¹⁰, cellulose nitrate¹¹ and alkyd resin¹².

The question arises whether these newly introduced materials were seen as not only a temporary replacement or a simple substitute, but as a possible enrichment of Baumeister's material palette. Several statements like the following dating from 1955 show Baumeister's open-mindedness towards these new products: "*Ich glaube, [...] daß damit nur gewonnen werden kann, wenn durch die Industrie und die Chemie neue Produkte aufkommen.* (I believe [...] that it can only be to our advantage if there are new materials thanks to industry and chemistry.)" (Schmitt and Baumeister 1955, 36). In the same interview he stated that these materials can be used to the advantage of the painter (*Ibid.* 34). Consequently, the holdings of the Archiv Baumeister include several bills which indicate that Baumeister bought – and thus most likely used – products based on synthetic and semi-synthetic materials. An invoice dating from 1954 and issued by the Lechler company in Stuttgart, is one of many examples which show that Baumeister actually bought "*Spezial-Kunstharz-Emulsion aus feinsten Stoffen hergestellt* (special synthetic resin emulsion made from the finest materials)" (Archiv Baumeister, Chronik_1954) even after he stopped receiving material deliveries from the Herberts company and after the period from 1940 till 1949, where he repeatedly men-

tioned the shortage of materials such as oil paint and canvas in his diaries and written conversations.

Conclusion and perspectives

The study of the written sources as well as the art technological examination of *Roter Horizont (mit Marmorierung)* clearly show the influences of Baumeister's apprenticeship even in his late works: the use of the steel comb to create marbling effects exemplifies his long-term engagement with certain tools and working practices that he constantly developed throughout his life.

At the same time, *Roter Horizont (mit Marmorierung)* reflects Baumeister's open-mindedness towards new materials and application techniques, and their potential use for artistic purposes that he experienced while working for the Herberts company. The creative manner in which Baumeister used paints and probably even his material choices can be linked to this experience, as the example of dripped paint application shows. Thus, it can be concluded that Baumeister's approach to painting material and techniques was clearly formed by both experiences: his painting technique is on the one hand rooted in solid craftsmanship of the early stages in his career and on the other hand clearly benefited from his experimental, open-minded approach to explore new materials and their painterly qualities. This special combination broadened Baumeister's view on painting techniques and the materials he was familiar with. Consequently, it enabled the artist to develop the new forms of artistic expression he was continuously searching for and to create his unique visual language (Adriani 1971, 8). It was Baumeister's aim to visualise the formerly unknown, namely depicting his internal reality, (*Selbstdarstellung*, meaning inner self) (Baumeister 1967, 132. Cf. v. Maur 1979, 15–16) and "to discover new zones of seeing that were previously nonexistent that were suspended in the unknown, and now can be grasped by their values and thus moved into the visual repertoire of mankind" (Tilgner and Hariton 2013, 43)¹⁴. It seems a natural consequence that the painter used unconventional techniques and materials to reach these goals.

The combination of extensive source research with the art technological examination of a painting and a number of surviving fragments of paintings provided a better understanding of his painting materials as well as of his techniques, and thus will be continued. Next steps will include further material analyses using pyrolysis-gas chromatography-mass spectrometry to deepen the knowledge of binding media that Baumeister used between 1930 and 1955. Besides that, further sources regarding the history of technology and materials such as recipes and contemporary technical literature will be

investigated. Combining these results will foster our understanding whether Baumeister saw synthetic and semi-synthetic binders as replacements, or if he welcomed them as an opportunity to achieve special effects on his quest to visualise “the elemental creation” (Baumeister 2013, 115) where “the artist summons the forming impulse of the material” (*Ibid.* 115).

Baumeister was probably the only artist working at the *Maltechnikum* of the Herberts factory who used the inspiration from these materials and techniques in his art after 1945 – his colleague Oskar Schlemmer died in 1943, Franz Krause saw himself primarily as an architect and worked as a lecturer, and Carl Schlemmer worked as a carpenter. However, the question remains whether or not Baumeister’s personal approach and attitude towards these new materials and painting techniques were typical of the time and whether they were possibly also inspired by other contemporary artists as for example Jackson Pollock or Max Ernst, who were also using experimental techniques like dripping or decalomania at the same time. Furthermore, future research will shed light on how these new materials were regarded in the contemporary literature on painting techniques, and whether and when other German artists of the time also started using them. Although there is evidence that many of his contemporaries seem to have been at best timid about using synthetic painting materials (Renz 2010, 357), the extent to which they nevertheless experimented with them and gathered knowledge from the house paint sector will have to be the subject of future research¹⁵. Last but not least, future research will also examine the extent to which Baumeister passed on his technical and material knowledge to his students and thus informed subsequent generations of post-war German artists.

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Notes

1. German original: *In allererster Linie (fühlte er sich immer als Handwerker* (Schmitt and Baumeister 1955, 34). Here as well as in the following quotations, all translations are by the authors.
2. Archivist: Hadwig Goez (Archiv Baumeister). Partners for material analyses are the University of Applied Sciences Cologne (Prof. Dr Ester Ferreira), the Doerner Institut Munich (Dr Patrick Dietemann and Ursula Baumer), the Deutsches Museum Munich (Dr Marisa Pamplona) and the Technical University of Munich (Dr Clarimma Sessa).
3. Located in Stuttgart. Contact: Sabine Wilhelm. URL: <https://willi-baumeister.org/en> (accessed 7 February 2023).
4. The fragments which were not dated by the artist were dated by Baumeister’s daughter Felicitas Baumeister and archivist Hadwig Goez by stylistic means. The discarded paintings are inventoried with the consecutive numbers V_001 – V_014, where “V_” means: *Verworfen* (discarded).
5. URL: <https://willi-baumeister.org/en/content/archiv-baumeister> (accessed 7 February 2023).
6. Catalog raisonné no. 1483, oil on fibre board, dated 1936, 44.5 x 54.7 cm. Private collection. Cf. Baumeister and Beye 2002, 582; Böhm 1995, 172.
7. Baumeister’s file box with technical notes is in the Willi Baumeister Stiftung.
8. Dated 1944. Oil, synthetic resins on soft fibreboard, 45 x 53 cm. Willi Baumeister Stiftung, BB. 1101.
9. Architect Franz Krause, painter Oskar Schlemmer, and from 1943 onwards also Carl Schlemmer.
10. On this topic, see also Beerhorst (1992, 66) and Pedde (2013, 71).
11. Detected in V_012 (1954) and V_13 (1955).
12. Detected in V_006 (1942).
13. Detected in V_009 (1949).
14. Originally published in 1947 as *Das Unbekannte in der Kunst*, Baumeister’s art theoretical book was translated into English and published in 2013 by Tilner and Hariton as *The Unknown in Art*. It is one of the most important writings on German art in post-war Europe (Skrypzak 2013, 13–15).
15. On this topic, see also Renz-Zink 2015, 12–15 and Renz-Zink 2021, 93–94.

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