

The background of the entire slide is a photograph of the turbine assembly hall in Berlin-Moabit. The building features a large, arched roof with a grid of dark panels and a prominent inscription 'LEO TURBINENFABRIK' on the upper part of the facade. The sky is a clear, bright blue.

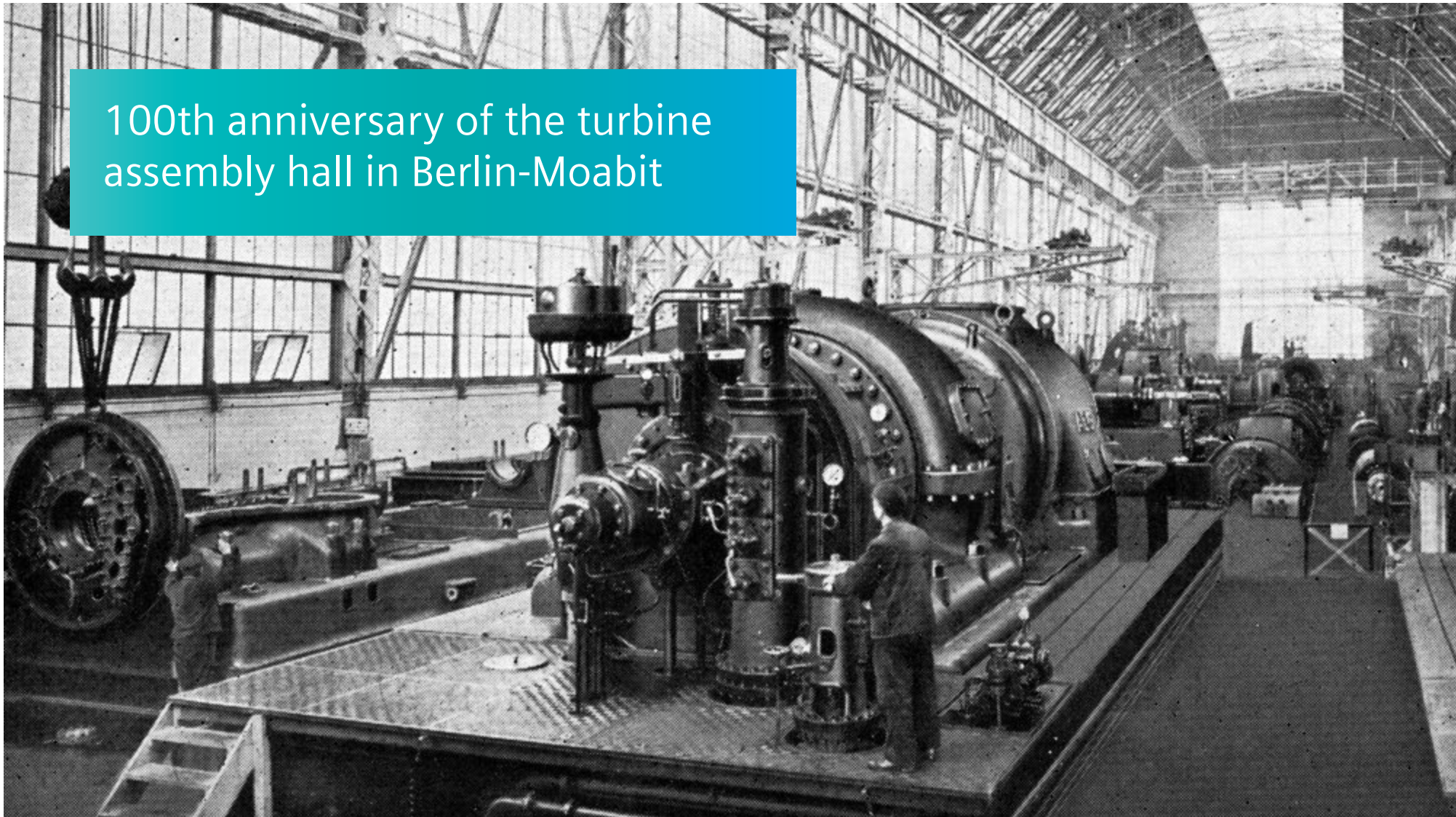
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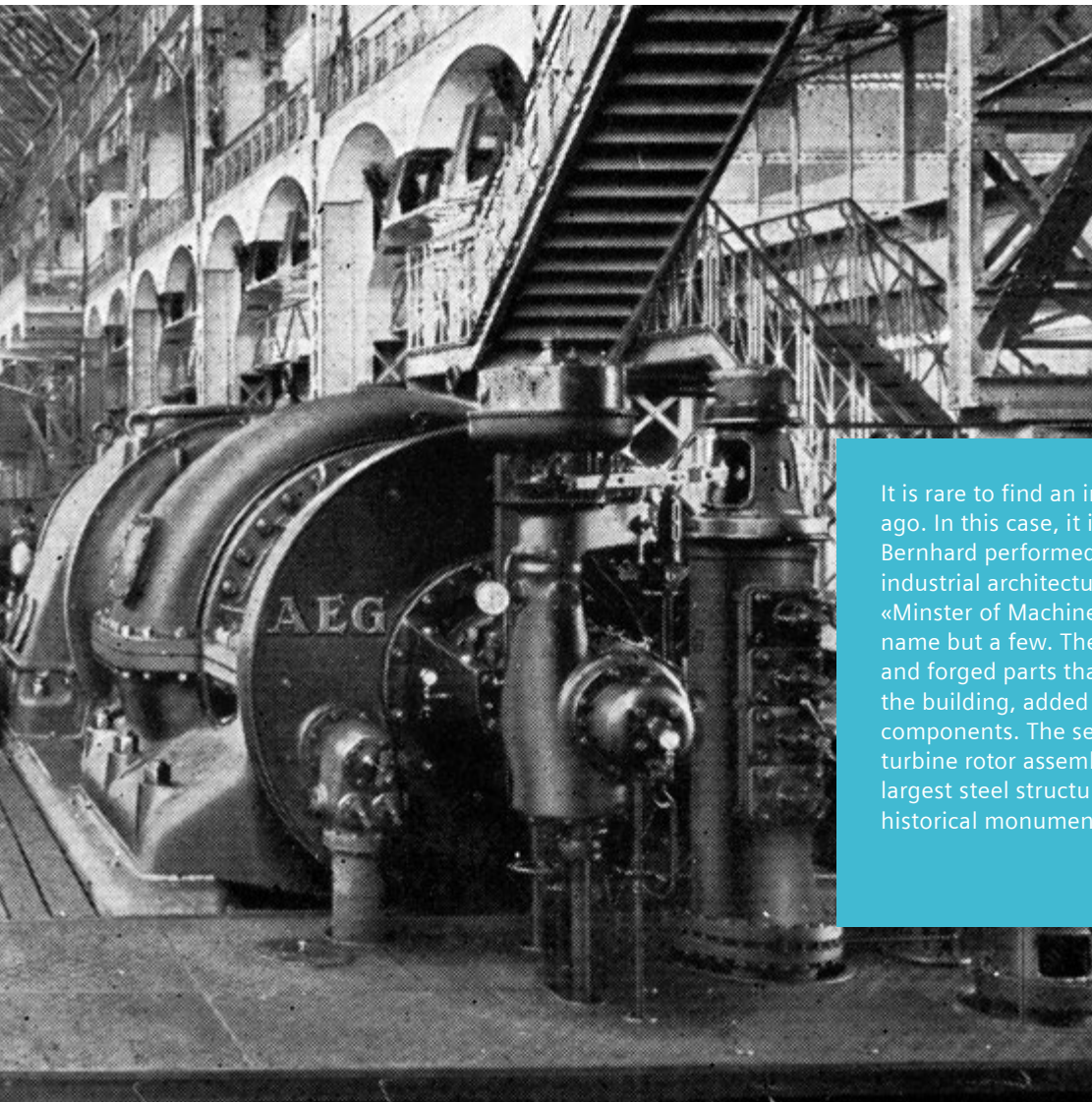
Ingenuity for life

100th anniversary of the
turbine assembly hall in
Berlin-Moabit

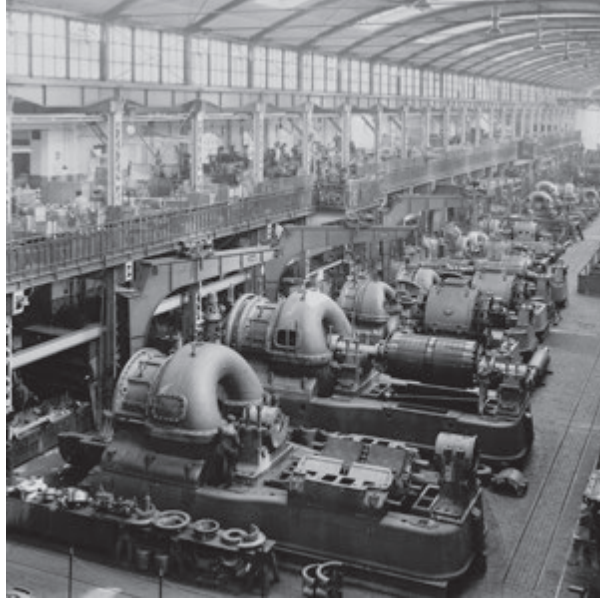
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100th anniversary of the turbine assembly hall in Berlin-Moabit

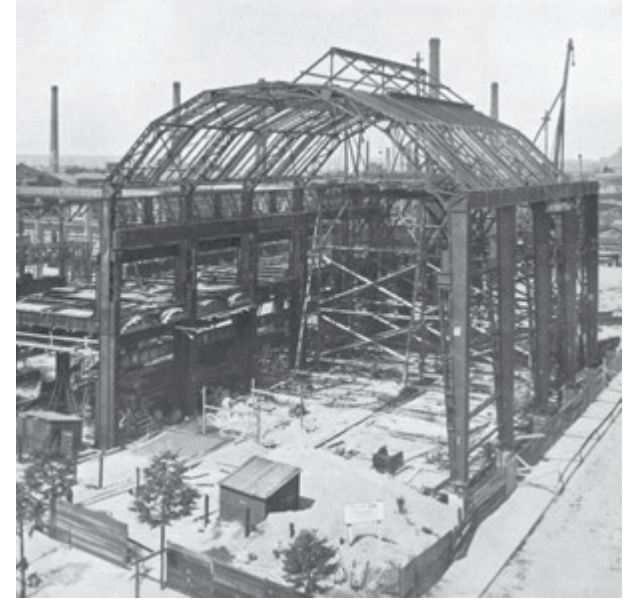




It is rare to find an industrial building still used for the same purpose it was built for 100 years ago. In this case, it is the steam turbine factory hall designed by Peter Behrens and for which Karl Bernhard performed the structural analysis. Celebrated in its day as a milestone of modern industrial architecture, it has been given many nicknames including the «Cathedral of Work», the «Minster of Machinery», the «Iron Church» and the «Festival Hall of Mechanical Engineering», to name but a few. The main factory hall is still being used today by Siemens AG for machining cast and forged parts that go into fabricating gas turbines used in power plants. The first extension to the building, added between 1939 and 1941, is also used today for producing large mechanical components. The second extension of the building, erected in 1968 and 1969, now houses gas turbine rotor assembly as well as bays for turbine balancing and overspeed testing. Hailed as the largest steel structure in Berlin when first erected, the factory building was declared a protected historical monument in 1956.



Early days of the turbine factory



Construction of the turbine assembly hall

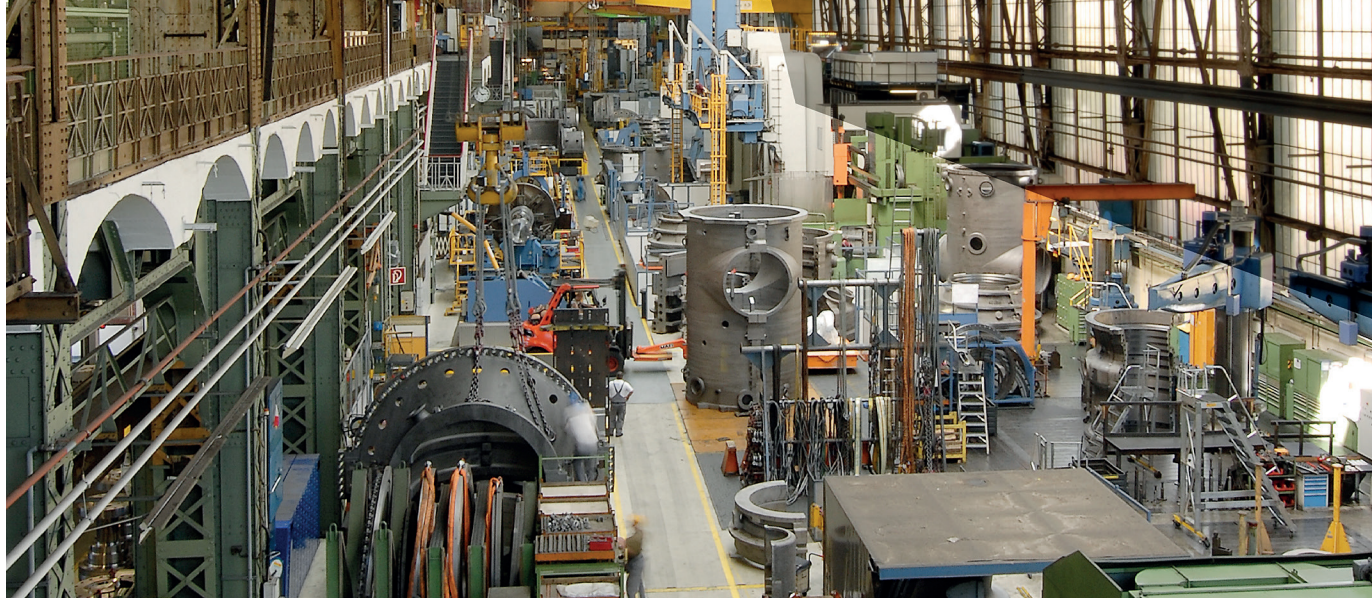
Content

- 6 AEG's new construction project goes on the record
- 8 Early days of the turbine factory
- 10 AEG's public relations work and product design between 1887 and 1907
- 11 An experiment crowned with success
- 12 Construction and design features of the turbine assembly hall
- 16 The turbine assembly hall through contemporary eyes – a cross section
- 17 Artur Fürst
- 18 Karl Scheffler
- 19 Oskar Lasche
- 21 Karl Bernhard



Contemporary opinions

16



Structural changes since the 1970s

38

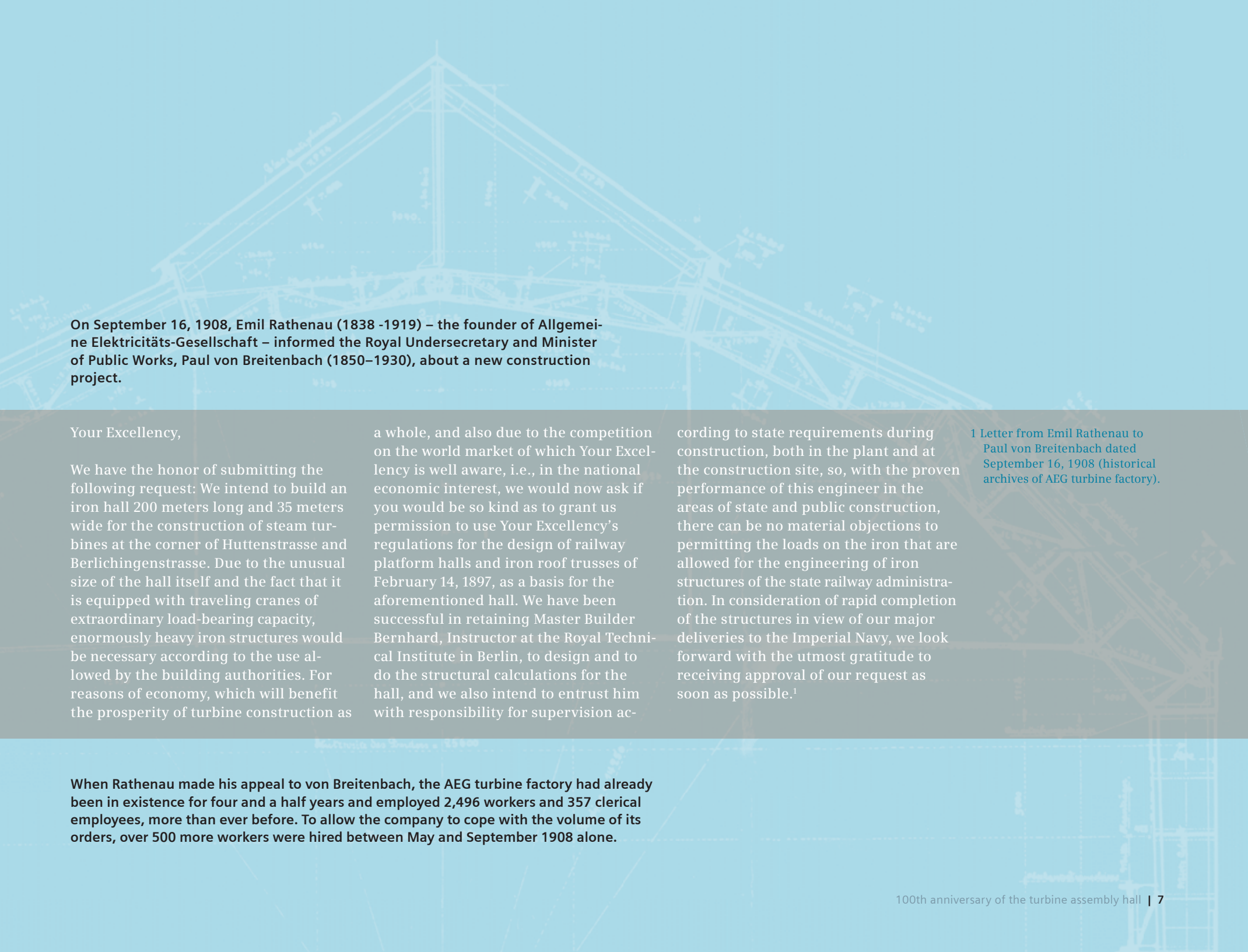
- 22 Erich Mendelsohn
- 23 Adolf Behne
- 24 Franz Hessel
- 26 Other buildings by Peter Behrens for the AEG turbine factory
- 26 Power plant
- 27 Annex A / Building 3
- 28 Munitions workshop
- 30 First expansion of the turbine assembly hall (1939–1941)
- 34 Destruction during the World War II
- 36 A hopeful new beginning
- 38 Structural changes since the 1970s

*AEG's new construction project
goes on the record*

— A.G.G. —

— Neue Halle der Turbinenfabrik. —

— Maßstab 1:50. —



On September 16, 1908, Emil Rathenau (1838 -1919) – the founder of Allgemeine Elektrizitäts-Gesellschaft – informed the Royal Undersecretary and Minister of Public Works, Paul von Breitenbach (1850–1930), about a new construction project.

Your Excellency,

We have the honor of submitting the following request: We intend to build an iron hall 200 meters long and 35 meters wide for the construction of steam turbines at the corner of Huttenstrasse and Berlichingenstrasse. Due to the unusual size of the hall itself and the fact that it is equipped with traveling cranes of extraordinary load-bearing capacity, enormously heavy iron structures would be necessary according to the use allowed by the building authorities. For reasons of economy, which will benefit the prosperity of turbine construction as

a whole, and also due to the competition on the world market of which Your Excellency is well aware, i.e., in the national economic interest, we would now ask if you would be so kind as to grant us permission to use Your Excellency's regulations for the design of railway platform halls and iron roof trusses of February 14, 1897, as a basis for the aforementioned hall. We have been successful in retaining Master Builder Bernhard, Instructor at the Royal Technical Institute in Berlin, to design and to do the structural calculations for the hall, and we also intend to entrust him with responsibility for supervision ac-

cording to state requirements during construction, both in the plant and at the construction site, so, with the proven performance of this engineer in the areas of state and public construction, there can be no material objections to permitting the loads on the iron that are allowed for the engineering of iron structures of the state railway administration. In consideration of rapid completion of the structures in view of our major deliveries to the Imperial Navy, we look forward with the utmost gratitude to receiving approval of our request as soon as possible.¹

¹ Letter from Emil Rathenau to Paul von Breitenbach dated September 16, 1908 (historical archives of AEG turbine factory).

When Rathenau made his appeal to von Breitenbach, the AEG turbine factory had already been in existence for four and a half years and employed 2,496 workers and 357 clerical employees, more than ever before. To allow the company to cope with the volume of its orders, over 500 more workers were hired between May and September 1908 alone.

Early days of the turbine factory

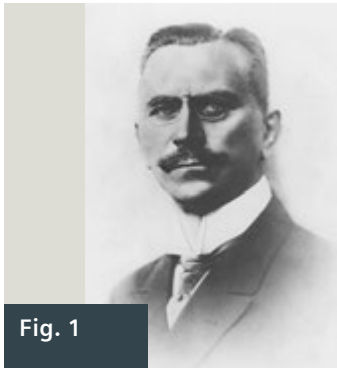


Fig. 1

AEG, which was created in 1887 from the Deutsche Edison Gesellschaft, started its first test series of individual turbine parts in Berlin around 1900. This was in line with other leading European and American manufacturers of what were then known as «power engines». Professionals and employees were informed about AEG's new area of activity in the 1902 annual report. The report mentioned experiments on three turbines with capacities between 20 and 1,500 horsepower.

However, the space available in the AEG factories on Ackerstrasse and Brunnenstrasse was soon found to be too limited: Given the continuation of test series on turbines and the progressive launch of series production, an alternative location had to be found. Earlier workshops situated in the Moabit district of Berlin that belonged to Union Elektrizitäts-Gesellschaft, a company founded in 1892 and a subsidiary of Ludwig Loewe & Co. AG, were acquired in early 1904 when Ludwig Loewe and AEG merged on February 27, 1904 – the official founding date of the turbine factory. Some of the afternoon and evening editions of the Berlin papers reported at great length and critically about the «memorable» extraordinary general meeting of AEG held that morning, during which the merger with Union through acquisition of its assets was announced.

In contrast, the February edition of the «AEG-Zeitung» merely announced under the heading «Organization» that the «manufacturing of steam turbines, turbodynamos, condensers, pumps, and other non-electric manufactured objects [would move] to the Huttenstrasse factory»².

The factory grounds stretched from Huttenstrasse in the south up to the northern perimeter at what was to be an extension of the Wittstocker Strasse planned in the late 19th Century, crossing the Berlichingenstrasse to the Wiebestrasse, but which ultimately was never constructed due to the factory structures. On its eastern side the site bordered the Berlichingenstrasse, extending westward to the machine tool factory of Ludwig Loewe & Co. AG along the western perimeter.

Turbine manufacturing operations began in February 1904 with a workforce numbering just under 400, most of whom – from the first factory director, the well-known engineer Oskar Lasche (1868–1923) (Fig. 1), to the head of development, design engineers, and representatives of the individual trades – had originally worked in the Brunnenstrasse machine factory. The order books were well filled from the outset, requiring continual increases in the number of employees, up to 1,269 workers and 210 clerical employees in December 1904.



Fig. 2

A hall 200 meters long, designed by architect Theodor Rönne for Ludwig Loewe & Co. AG, was available for production (Fig. 2). Constructed in 1897, the building featured brick cladding, segmented arched windows and Gothic motifs that echoed the historicism of the late 19th century. One year later the structure was expanded by adding four more attached or «comb» buildings, denoted annex A, B, C and D. Each included a cellar, a ground floor, and two upper floors. The hall was divided into a nave and two side naves (covered by the lateral head-end structures). The nave was 81 meters wide and 13 meters high, and the two wings were each nine meters wide and five meters high. The height of the galleries or lateral balconies was four meters. While the nave was aesthetically influenced by the segmental arched iron roof, the galleries were enclosed by a flat single-pitch roof or a very slightly slanted flat roof. Contemporary observers were very impressed by the quality of the equipment in the hall and the perfect organization of the work processes: "I will never forget the sight of it. Opening a door from the factory's counting house, one of the technical directors showed me the large factory hall from a high gallery. He led me into the enormous hall just as one would invite someone into their parlor.

The hall seemed very tidy, clean, and festive, and well arranged. You could see into the farthest corner. No nooks and crannies, no partition walls, no cells. Like the trees along an avenue, the work stands with their machine tools and the dynamos, turbines, and other machines in the process of being built were lined up to the left and right of the scrupulously clean aisles. Traveling cranes rolling along rails on the ceiling handle transportation through the hall. They take the finished machine to the testing station under the gallery on which we stood. After testing, the giant crane grabs it, lifts it up, and takes it through the hall to the exit. No transport impedes traffic throughout the entire space"³ (Fig. 3).

The first turbines built in the hall had a capacity of up to 1 MW. By 1906, that capacity had grown to 6 MW. Increasing capacities meant that individual turbine components such as casings and rotors – as well as the generators driven by them, and the auxiliary machines like condensers and pumps – grew bigger and heavier causing problems with respect to space limitations and the carrying capacity of the traveling cranes.

These difficulties were reflected in serious discrepancies between the advertised MW capacity and the MW capacity that was delivered – that is, the capacity that could actually be supplied under the given conditions. Increasing the number of employees could provide only limited relief. It was urgently necessary to build a second assembly hall.

2 AEG-Zeitung. – Berlin 6 (1903/1904) 8 – page 93.

3 Dorn, Wolf: «Das Vorbild AEG.» – Cited in: Buddensieg, Tilman: Industriekultur. Peter Behrens und die AEG 1907–1914 – Berlin: Gebr. Mann Verlag, 1979 – page D 296.



Fig. 3



AEG's public relations work and product design between 1887 and 1907

With the founding of AEG, Emil Rathenau achieved his ambitious goal of establishing an independent company that could assert itself against foreign competitors such as Siemens & Halske and General Electric Company. Member of the Board Felix Deutsch (1858–1928) described the meteoric rise of the new company – from initiator of the Berlin power plant, builder of the Central Station, and producer of incandescent bulbs to a worldwide electrical conglomerate – as «like a fairy tale.» This was the result of a business policy that was at once successful, visionary, and based on a willingness to take risks, and that also recognized and accepted the need for intensive public relations work, commonly referred to at the time as «propaganda».

During the company's early years, AEG followed common practice in presenting areas of operation and products to as many members of the industry and the public at large as possible. They published catalogs, brochures, and information sheets, placed advertisements, delivered speeches, took advantage of opportunities to exhibit, and opened up sales offices. Beginning in 1894, AEG's printed materials and stationery were given their distinctive graphic character through the use of the «Goddess of Light» figure, which was registered as the official AEG trademark in May of the next year. In 1898, the «Goddess of Light» was replaced by the «AEG» logo, which was redesigned several times over the next 20 years. The abbreviation AEG had been used for the first time in 1896 at the officials' entrance to the Brunnenstrasse machine factory.

Draftsmen and foremen were responsible for the external design of industrially manufactured technical products at AEG, as they were at other companies. Their personal taste determined the appearance of the products, with machine fabrication usually being concealed – in line with the prevailing trend – by decoration suggesting craftwork done by hand. All in all, AEG's public relations work and product design in the late 19th and early 20th centuries was well within normal standards. AEG moved beyond those standards in a spectacular way in 1907 when they began working with the painter, graphic artist, and industrial designer Peter Behrens (1868–1940).

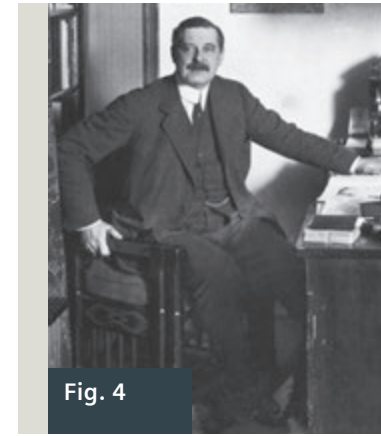


Fig. 4

An experiment crowned with success

The «Berliner Tageblatt» reported on July 28, 1907, that Professor Peter Behrens (Fig. 4), the director of the Düsseldorf Industrial Art School, would leave his position because he had accepted a call to move to Berlin as artistic advisor to AEG. Many readers no doubt overlooked the brief announcement, no more than six lines long, or considered it irrelevant. However, it was sufficient reason for the editors of the newspaper, who understood the unusual nature of the engagement, to ask Behrens what artistic tasks he would perform for the company. His answer appeared in the paper on August 29, 1907, under the headline «Art in Technology»: He was, first, expected to give the company's products an external aesthetic style that would not deny their origins in industrial mass production. Second, he was to give all of AEG's publications an unmistakable appearance with regard to artistic typography, and, third, he was to participate in developing exhibitions. Architectural work was not included in the appointment, but an exhibition pavilion designed by Behrens in 1908 paved the way for more architectural commissions.

«What began as a design assignment to elevate our products above the confusingly diverse array of very different arc lamps through the quality of their shape soon expanded to include the entire outward appearance of AEG all the way to the configuration of its factories.»⁴ In summary, the «AEG Behrens experiment»⁵ that the contemporary press viewed with such high expectations gave rise to the first modern industrial designer, who, insisting on a synthesis of technology and art, gave his client a creative aesthetic of modernity by subjecting its products, structures, and documents to the principle of (industrial) objectivity.

4 Selle, Gert: Design-Geschichte in Deutschland. Produktkultur als Entwurf und Erfahrung. – Cologne: DuMont Buchverlag, 1987 – page 117.

5 Buddensieg, Tilman: Introduction. – In: Buddensieg: Industriekultur. Peter Behrens und die AEG 1907–1914 (Note 3) – page 6.

Construction and design features of the turbine assembly hall

6 Letter from the turbine factory to the Royal Police Headquarters dated February 23, 1909 (historical archives of AEG turbine factory).

7 «Aus der Reichshauptstadt. Schneefall.» – In: Berliner Lokalanzeiger of April 2, 1909.

8 «Lokales und Vermischtes. Teures Obst.» – In: Berliner Tageblatt und Handelszeitung of July 8, 1909.

9 «Lokales und Vermischtes. Dieser Juli!» – In: Berliner Tageblatt und Handelszeitung of July 22, 1909.

10 «Lokales und Vermischtes. Der verregnete Juli.» – In: Berliner Tageblatt und Handelszeitung of August 25, 1909.

The request for authorization to build the new assembly hall was submitted to the Royal Police Headquarters on December 17, 1908. After patiently awaiting a decision for nine weeks, the turbine factory asked for a provisional building permit, citing the following reason: «Large orders with very short deadlines for delivery force us to enlarge our workshops immediately, and we would be most grateful to the Royal Police Headquarters for granting a building license that would allow us to begin construction work.»⁶ This obvious attempt by the turbine factory to get the process moving did not fail: The building license was granted on March 17. Construction, that is, the start of excavation work, began on March 30.

The weather in Berlin that day, at 20° Celsius, was particularly springlike. Two days later, temperatures were not above 10° Celsius throughout the day, and there was also an «incessant ungentle rain»⁷. It snowed on April 2, there was a slight frost that night, and by mid-April showers of rain, snow, and hail were falling all day long. The next month started off with winter weather, too. There was a snowstorm at around 11 p.m. on May 1, a Saturday. That day one of the few surviving photographs of the construction of the new turbine hall (Fig. 5) was

taken showing its iron skeleton, which at that time extended from the first to the fifth structural supports. If the pace of construction did not change markedly over coming weeks, the main supporting structure would be completed by the second half of June.

What the press referred to as «abnormal weather this spring»⁸ was followed by a summer that was just as unsatisfactory. It started with a severe thunderstorm on June 27 that was reported by the press as causing repeated flooding that put paths, low-lying roads, cellars, gardens, and yards under water. July also produced some negative headlines. Typical representatives included «the leaden «cheese dome made of clouds» and «the stubborn trickles of liquid»»⁹. The end result was sobering: three real summer days, 16 cloudy days, 19 days with major precipitation, and 198 hours of sunshine, which, according to the «Berliner Tageblatt», was only «39% of what is possible»¹⁰. The coldest day was actually followed by the hottest day: The maximum temperature was 10° Celsius on July 3 and 27.8° Celsius on July 4. August was only slightly better than July, according to the papers. In spite of the vagaries of the weather, the iron and reinforced-concrete structure along with the wall filling was completed within five

months, by the end of August or early September. The structural work was accepted on October 22, and final acceptance of the building took place on November 12. After completion of the building, at that time the largest iron structure in Berlin, people in the company began to distinguish the two production halls by calling them the *New Hall* and *Old Hall*.

The *New Hall*, whose ground plan was laid out based on the existing path of the rail lines, is divided into a main hall and a slightly recessed lateral hall. The structure as originally planned was to have a total length of 207 meters, but the finished length in 1909 was 127 meters. The main iron supporting structure for the entire hall comprises a total of 28 three-hinged arches with a distance of 9.22 meters between them. The width and the apex height of the main hall are about 25 meters, with a saddle-shaped skylight over the apex to provide light and ventilation. Striking characteristics of the front elevation of this part of the building are the rounded corner elements made of concrete and divided horizontally by iron bands, the wall of windows 14.4 meters high surrounded by an iron framework, and the seven-cornered gable with the AEG logo and the word «Turbinenfabrik» (Fig. 6).

The most prominent feature of the facade along Berlichingenstrasse is the inclined glazed surface, also 14.4 meters high between the structural members, whose abutment hinge is above the concrete base.

The lateral hall (Fig. 7) is two stories high and has a skylight in the center roof area. The structure is almost 13 meters wide and has a ridge height of 17.5 meters. Its front elevation and the first four meters of the facade facing the yard are concrete, interrupted on the front elevation by two large windows surrounded by an iron framework. Facing the yard, an iron supporting structure with wide horizontal connectors adjoins the concrete construction, whose supporting trusses are also at a distance of 9.22 meters. This distance was chosen with more than the configuration of the space in the hall in mind: it also took into account the need for the rails to lead into the hall. In contrast to the main hall, the lateral hall had a cellar below it from the outset.

The windows were of clear glass (Fig. 8) and were tinted green, at least on the elevation facing Berlichingenstrasse. The question of whether the tinted glass was used for aesthetic-artistic reasons to harmonize with the color of the green iron supports, or for aesthetic-functional reasons to provide protection against the sun, cannot be answered at this point. If the glass on the other three elevations of the hall was untinted, then it is possible that the main purpose of the color was to prevent the residents on Berlichingenstrasse from gaining an unimpeded view into the hall.

The height of the main hall and the two floors of the lateral hall was required in order to accommodate the elevated position of the traveling cranes, while the ground floor of the lateral hall was adapted to the height of the typical railway freight car (Fig. 9). The main hall was equipped at the time with two traveling cranes, each with a carrying capacity of 50 metric tons, and each iron support held a swinging

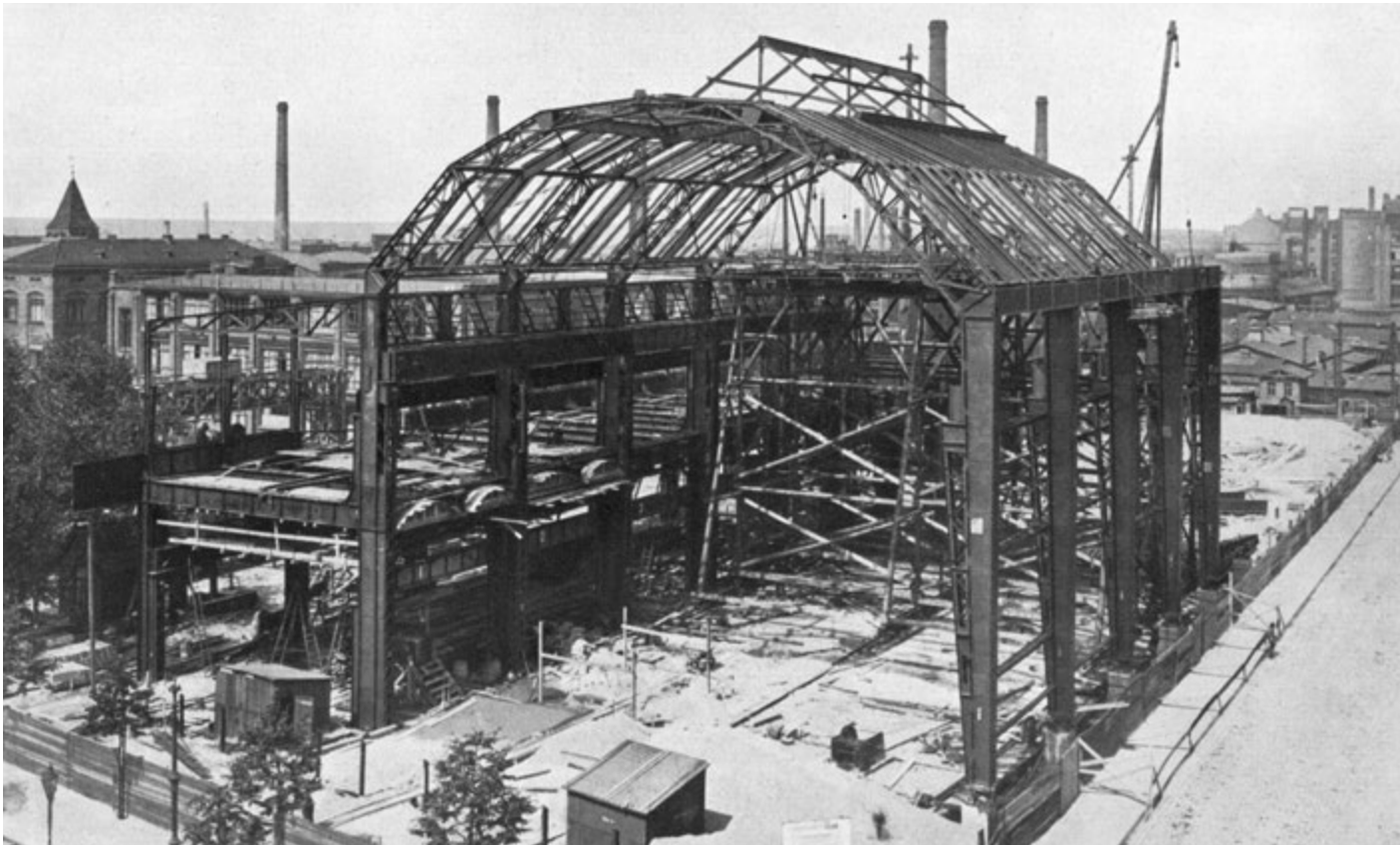


Fig. 5

crane with carrying capacity of two metric tons. The lateral hall had four traveling cranes: two with a capacity of 40 metric tons each on the ground floor and two with a capacity of 10 metric tons each on the upper floor. The floor of the building was made of wood-block paving, which was laid on a thin layer of concrete in the main hall and directly on the reinforced concrete structure of the ceilings in the lateral hall. From the upper story of the side nave, a connecting bridge spanning 18.4 meters led to the staircase of the building opposite

(Fig. 10). The bridge was not part of the original design and was requested for safety reasons during construction of the hall.

The final assembly of turbines and generators for power plants (Fig. 11) was performed primarily in the *New Hall* starting in November 1909. It was also used for machining of large components (Fig. 12) and final assembly of diesel engines for ships (Fig. 13) from the early 1920s at the latest. The final assembly of turbines for industrial applications and ship propulsion and of smaller oil

machines was concentrated in the *Old Hall*. The division into the fabrication of smaller-capacity machines in the *Old Hall* and larger-capacity machines in the *New Hall* was for the most part maintained until the early 1940s.

The final assembly of turbines and generators for power plants was performed primarily in the New Hall starting in November 1909.



Fig. 6

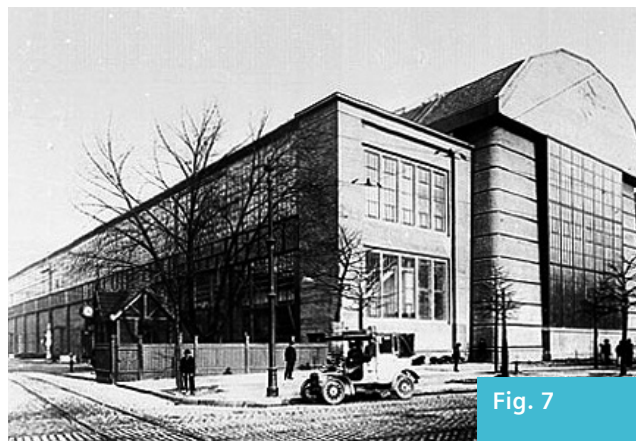


Fig. 7



Fig. 8



Fig. 9

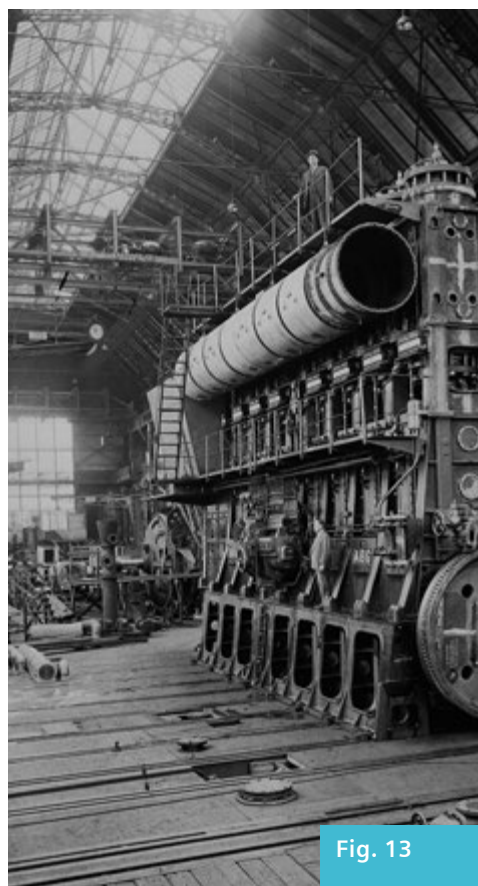


Fig. 13

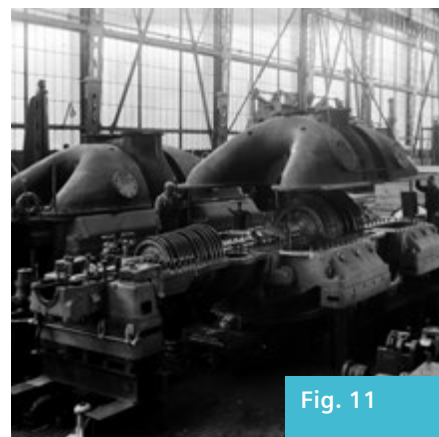


Fig. 11

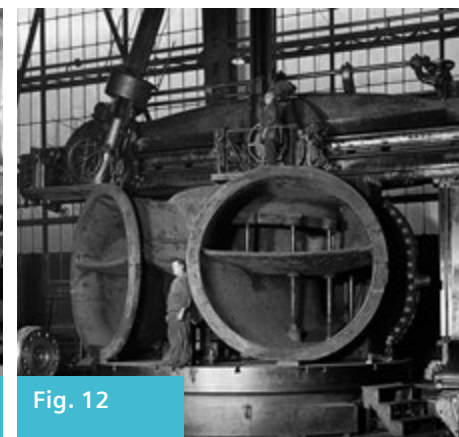


Fig. 12



Fig. 10



The turbine assembly hall through contemporary eyes: a cross section

Over the past hundred years, a great deal has been written about the *New Hall*, one of the most important works of modern industrial architecture. Hardly any of the major architects or architectural critics, particularly during the first half of the 20th century, refrained from praising or criticizing the building as a whole or its

individual architectural features. Of the many commentaries, a few that are rarely cited and in some cases have been forgotten are provided below.

Artur Fürst

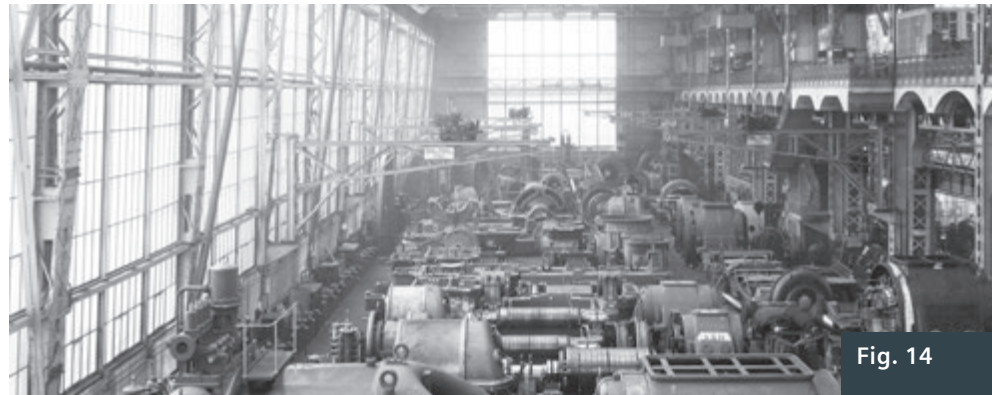


Fig. 14



Fig. 15

What is probably the first long discussion of the construction of the AEG turbine factory hall on Huttenstrasse was published in the «Local and mixed» section of the «Berliner Tageblatt» on November 4, 1909, just a few days before final acceptance of the building. Headlined «A modern iron hall», the article was written by the well-known technology historian Artur Fürst (1880–1926), who had followed the development of AEG with great interest and was acquainted with Emil Rathenau. According to Fürst, who did not mention the name of either the artist behind the design or the structural engineer, the hall showed that «[t]he will to build something beautiful has made its way even to the far north and to the master builders of factories». Interestingly, Fürst explained the decision to move away from the «traditional factory style» by citing the size of the «gigantic building», which would no doubt make it an «emblem for the entire district». Unlike his contemporaries, who explicitly emphasized the use of modern (!) building materials, Fürst said that given the available budget, «only humble materials, iron girders and compressed concrete, were used»,

although «a splendid artistic effect» had been achieved. Fürst was one of only a few writers who explicitly emphasized the «cheerful greenish color» of the glazing on the longitudinal elevation along the street, which he said gave the building «a merry countenance» and would provide a similar light inside the building. His description of the two elevations along the street, which expressed great approval, undergoes a marked emotional surge when he transitions to a description of the inside of the hall, which he felt had «something of a cathedral» about it. «The roof rises to dizzying heights and, although no effort has been made anywhere to conceal the highly functional structure, the impression of the coarse and heavy is happily avoided due solely to the suppleness of the entire supporting structure. At the same time, the truly dazzling abundance of light penetrating through the long window elevations and the roof, which is also almost completely made of glass, ensure that there is no impression of anything factory-like in this hall»¹¹ (Fig. 14). In a later assessment of Behrens' work for AEG, which was also

published in the «Berliner Tageblatt», he offered evidence of the ability of the «exemplary construction» to influence the mood of the people working in it by giving them a certain «personal feeling» that their «working capacity [was] increasing.» «In the interior one gets the feeling as if it were bright here inside and dark outside [...] This is truly a machine «hall» as they are so often spoken of without actually existing, a festive room for machine construction (Fig. 15). The dark factory gate, from which, after the bell had rung to stop work, a stream of oppressed humanity pushed into the light, has disappeared; the serene goddess of Art has sat down beside the gray specter of Work, and the low ceiling of the hall has risen to the high roof of the hall.»¹²

- 11 Fürst, Artur: «Eine moderne Eisenhalle.» – In: Berliner Tageblatt und Handelszeitung of November 4, 1909.
- 12 Fürst, Artur: «Blech, Beton und Kunst.» – In: Berliner Tageblatt und Handelszeitung of February 17, 1910.

Karl Scheffler

13 Scheffler, Karl: Das Turbinenwerk der A.E.G. - In: Ders.: Stilmeierei oder Neue Baukunst. - Berlin: Transit Buchverlag, 2010. - Page 53.

14 Ibid.

For architecture and art critic Karl Scheffler (1869–1951), the turbine building marked a clear departure from Behrens' prior architectural works for AEG. In contrast to the buildings he had previously designed, which tended to reflect the tradition of classicism, here «a spirit of mature modernism emerges so victoriously that the mere sight of the building, in contrast to the urban milieu surrounding it, makes an almost fantastical impact»¹³. To illustrate what Behrens as the artistic consultant of AEG had achieved with the turbine building

as well as his potential for the city of Berlin, Scheffler compared him to the architect Alfred Messel (1853–1909) who had drafted the designs for the company's main administration building erected from 1905 to 1906 on Berlin's Friedrich-Karl-Ufer. «His boldness above and beyond Messel's work needs to be emphasized, the thoroughness of artistic consistency by which he has transformed computational engineering analysis into pure calculus of art. His culture of objectivity on a grand scale, which in this case has elevated a profane industrial

building to a higher monumentality and dignity of style, and powerfully rhythmized the structural engineering, has created something truly symbolic.»¹⁴ Scheffler, calling the building a unique work of greatness, believed Behrens' turbine building had proven him a worthy successor to Messel, who passed away in early 1909.



Fig. 16



Fig. 17

Oskar Lasche

The director of the turbine factory concluded in 1910 that the turbine hall was «a complete success». He considered the «modern construction in its massive external forms» to be a «representation of the tremendous work being done inside the building». Lasche's pride in the *New Hall* was apparently accompanied by subsequent amazement at the construction of the building precisely at that location, when he admitted that «Huttenstrasse is not among the points of interest in Berlin».

The clear, unornamented architecture of the *New Hall* also led him to conduct a critical review of the older buildings at the site. As Oskar Lasche emphasized in a number of publications, this purportedly led to a reconfiguration of the eastern lateral wall and the north elevation of the *Old Hall*, where the production of steam turbines began in 1904. Before-and-after views of the north elevation also published at the time suggest that the traditional masonry of unplastered brick yielded in part to light-giving windows, and that all ornamentation was eliminated

(Fig. 18, Fig. 19). No surviving before-and-after views of the eastern outside wall have been found. As for the building's northern face, what Lasche maintained to have been a completed reconfiguration project was, at best, an ambitious, intended modification that was never actually executed, as recently discovered photos taken in 1955 confirm (Fig. 20). When he nevertheless underscores that, in his view, not only the *New Hall* but also the structural modifications to the *Old Hall* give proof of «how buildings today are being constructed (or, at least, ought to be



Fig. 18



Fig. 19

- 15 Lasche, Oskar: «Die Turbinenfabrikation der AEG.» – In: Zeitschrift des Vereins deutscher Ingenieure. – Berlin 55 (1911) 29 – page 1199.

constructed) distinctly more correctly, simply and even more cheaply, and» – strong words for a factory director – how many gimmicks were used previously to botch up buildings»¹⁵, then he certainly could only have meant those modifications to the *Old Hall* already implemented in 1907 to the Union's former storage and office building in front of the *Old Hall* to the south. Here, among other alterations, the window surfaces were enlarged and historical ornamental elements were removed.



Fig. 20

Karl Bernhard



Fig. 21

«... genuine and irrefutable work of art in iron construction, an artistic asset...»

Among the few contemporaries who were not absolutely gushing with praise following completion of the hall was Royal Master Builder Karl Bernhard, who was responsible for the structural calculations. However, his criticism was aimed exclusively at the gable front, which in his view contradicted «artistic truth». According to Bernhard, «during construction iron and glass were used as primary construction materials, but in unjustified contrast to that, concrete was unfortunately also used as filler material for large areas of the gable front on Huttenstrasse» (Fig. 21). «There, in the main gable, the continuation of the longitudinal elevation is entirely made of concrete and, simply to take away from those areas the appearance of being supporting corner pillars, they have also been given the incline of the glass areas in the long wall, and the concrete area is interrupted by the horizontal iron bands [...] In spite of this arrangement, it must be conceded that, to put it mildly, the architectural effect of the gable as a whole does not succeed in giving the intended impression of having the design of the corner appear only as cladding. Everyone sees the gable as an enormous concrete structure.» To put it more plainly: The concrete fillings suggest that they have

a supporting function, although they merely clad the iron structure. In contrast, Bernhard unreservedly praised the glass-iron elevation on Berlichingenstrasse, saying that it was a «genuine and irrefutable work of art in iron construction, an artistic asset»¹⁶, although this admiration did not extend to the gable front. It should be noted that Bernhard did not criticize the gable front at the outset, at least in his publications. His first article on the turbine hall was published in January 1910 in the «Zentralblatt der Bauverwaltung», a publication of the building administration, and contained no criticism (yet). The passage cited about the gable front is taken from an essay by Bernhard on the new turbine factory building published in the engineering publication «Zeitschrift des Vereins deutscher Ingenieure» in November 1911. The details of the two essays and a text about the *New Hall* that was also published by Behrens in 1910 strongly suggest that relations between the structural engineer Bernhard and AEG's artistic advisor Behrens had deteriorated considerably over time. For instance, Bernhard said in January 1910 that he designed the turbine hall «in collaboration» with Behrens «according to his aesthetic principles»¹⁷. Behrens qualified

that statement two months later, indicating that the company had retained him to design «both the architectural exterior silhouette and the interior configuration of the space», whereas Bernhard had been responsible for the «structural implementation»¹⁸ of his ideas. Bernhard in turn claimed in 1911 that he had designed the hall «according to fundamental architectural concepts» of Behrens «in their structural engineering design»¹⁹. Independent of what form the collaboration of the two men took during the project, Bernhard appears to have felt slighted – and in two ways. First, he probably knew that AEG had originally intended to have him both design (!) and perform the structural calculations for the hall. It is also likely that he was annoyed when reports about the hall in daily newspapers and the technical press generally mentioned only Behrens by name.

- 16 Bernhard, Karl: «Die neue Halle für die Turbinenfabrik der Allgemeinen Elektrizitäts-Gesellschaft in Berlin.» – In: Zeitschrift des Vereins deutscher Ingenieure. – Berlin 55 (1911) 39 – pages 1629–1630.
- 17 Bernhard, Karl: «Die neue Halle für die Turbinenfabrik der Allgemeinen Elektrizitäts-Gesellschaft in Berlin.» – In: Zentralblatt der Bauverwaltung, 1910, No. 5 – page 26.
- 18 Behrens, Peter: «Die Turbinenhalle der Allgemeinen Elektrizitätsgesellschaft.» – In: Mitteilungen des Rheinischen Vereins für Denkmalpflege, 1910, vol. 1 – page 29.
- 19 Bernhard, Karl: «Die neue Halle für die Turbinenfabrik der Allgemeinen Elektrizitäts-Gesellschaft in Berlin.» – In: Zeitschrift des Vereins deutscher Ingenieure (Note 16) – page 1625.

Erich Mendelsohn

20 Mendelsohn, Erich: Briefe eines Architekten. Ed. Oskar Beyer. – Munich: Prestel-Verlag, 1961 – page 27.

The briefest words of praise for the *New Hall* probably come from the architect Erich Mendelsohn (1887–1953). In March 1914 he wrote to his future wife, the cellist Luise Maas (1894–1980):

«Come through Berlin so you don't forget to see the AEG turbine building by Peter Behrens before we go to Florence. You've got to see it!»²⁰



Fig. 22

Adolf Behne

Early in his decades-long career as an architecture critic, Adolf Behne (1885–1948) divided the representatives of modern industrial construction into three groups embodying three very different styles: Romantics, Emotionalists, and Rationalists. He considered Behrens to be an Emotionalist par excellence: «It is exceedingly captivating to observe how he struggles for the expression of the industrial soul! No edge is modulated, no harshness is smoothed. Behrens absolutely avoids adding any motif from the outside. Form can hardly be simple enough for him. He wants size, force, and power. Simplification seems to him to be the purest means for achieving them. [...] I think Peter Behrens somewhat overemphasizes the element of the heavy, the huge, and the powerful. His simplifications verge from time to time on ungainliness. He wants to show industry as Cyclopes, as giants whose only utterances are thundering and roaring. [...] In his opinion, only moments of blustering and stamping live.»²¹ In an article written in 1922 Behne clearly shows that this general assessment of Behrens' industrial buildings also applied specifically to the turbine hall: "With the turbine factory on Huttenstrasse, there was suddenly an industrial structure there that was no longer a



«house», no longer a shelter, no longer convention, and no longer a hybrid of any historical types but rather a new type, a new life. For the first time, industry has built its work space solely according to its working requirements, not as an insignificant make-shift structure but instead with self-confident strength – using new materials: iron, concrete, and glass. For the first the architect's gift has rendered a building without literary or art-history ambition, seizing the substance, pointing to the future and no longer to the past – an imposing, exciting type was the fruit. What was new about this was the stronger unification of a powerful body. [...] Plaster, ornamentation, and form were swept away. The structure was the form, and it needed no forms. From the velleities of the facade ballast, creative force was thrown into the design, into fulfillment of

«With the turbine factory on Huttenstrasse, there was suddenly an industrial structure there that was no longer a «house», no longer a shelter, no longer convention, and no longer a hybrid of any historical types but rather a new type, a new life.»

the purposes, into bringing the new materials to life [...] materials that naturally had already been used, but with a few exceptions had not been recognized for their ability to form a style. Certainly one could still complain of shortcomings and incompleteness in the turbine hall. The large assembly hall became purer, more objective, and stronger in 1912. That first turbine hall ultimately had a residual stylistic intent in the external sense, went «stylizing» toward a certain Cyclopean enormity, toward a heroicification that was not completely convincing, as the prerequisites for it are lacking in this case.»²²

21 Behne, Adolf: «Kunst. Romantiker, Pathetiker und Logiker im modernen Industriebau.» – In: Behne: Architekturkritik in der Zeit und über die Zeit hinaus. Texte 1913–1946. Ed. Haila Ochs. – Basel, Berlin, Boston: Birkhäuser Verlag, 1994 – pages 19–20.

22 Behne, Adolf: «Die deutsche Baukunst seit 1850.» – In: Behne: Architekturkritik in der Zeit und über die Zeit hinaus. Texte 1913–1946. (Note 21), – pages 106–107.

Franz Hessel

23 Hessel, Franz: Ein Flaneur in Berlin. – Berlin: Das Arsenal, 2007 – page 14.

When the man of letters Franz Hessel (1880–1941) took long walks through Berlin during the late 1920s, he had to concede that the *joie de vivre*, the pleasure, and the amusements in other cities were much more remarkable. What distinguished Berlin from other cities was «its particular visible beauty, when and where it works. One must seek that beauty in its temples of machines, its churches of precision.» Hessel identified one industrial structure as his favorite: «There is no more beautiful building than the monumental hall of glass and reinforced concrete that Peter Behrens created for the turbine factory in Huttenstrasse. And no cathedral choir offers a more impressive picture than what one sees from the side gallery of that hall, at eye level with the man seated high in the air, moving with the cranes as they grab and transport heavy loads of iron» (Fig. 23). «Even before one understands how the metal monsters that are stored below are used to create similar and different monsters, one is impressed merely by the sight: castings and housings, unfinished sprocket drums and wheel shafts, half-finished

pumps and generators, boring mills and toothed gears ready for installation, gigantic and miniature machines on the test bench, parts of turbogenerators in the concrete overspeed testing pit.»²³ Hessel's remarks are impressive and poetic, but they have nothing to do with the reality of the organization of production and the division of work there, which cannot be verified by the normal reader. To give just one example, by the «gigantic and miniature machines» he probably meant steam turbines for power plants or diesel engines for ships (Fig. 24) and small turbogenerators (Fig. 25), and these were never tested at the same time in the same assembly hall. If Hessel actually visited the turbine factory, he probably took his overall impression of several workshops and combined them into the descriptions cited here to produce a more aesthetic effect.





Fig. 23

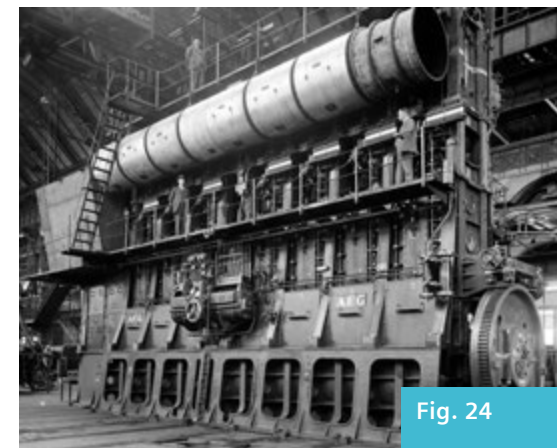


Fig. 24



Fig. 25

Other buildings by Peter Behrens for the AEG turbine factory

Power plant

24 Lasche, Oskar: «Das Kraftwerk der AEG Turbinenfabrik in Berlin.» – In: Zeitschrift des Vereins der deutschen Ingenieure. – Berlin 53 (1909) 17 – pages 648–650.

At the start of Behrens' architectural work for AEG, a draft design was in place for a power plant intended to ensure the electricity supply for the turbine factory as well as AEG's adjacent light bulb factory on Sickingenstrasse. Factory director Lasche was delighted with the two-story brick building (Fig. 26) erected between September 1908 and April 1909 on the Union's former grounds, northeast of the *Old Hall*: «The power plant is small but noteworthy for its simplicity and clear layout. There are two turbodynamos of 2,000 kVA each, which is 3,000 horsepower (Fig. 27), half a story

above the ground. [...] The turbo-driven auxiliary machines, i.e., the air, condensation, and cooling water pumps, are located half a story below ground level. The same auxiliary machine room also includes the turbo-driven boiler supply pumps and an additional turbopump that sends the heated condensation water to the cooling tower. The previous arrangement of the condensation equipment in the deep, dark, dirty «cellar» was confusing, having been taken over from the piston machines solely out of necessity, since the condensation system was always treated like the poor stepchild

of the power plant. [...] The present arrangement of the power plant allows bright light to come into the auxiliary machine room through wide, deep windows. The cellar became a fullfledged machine room that is clearly arranged, thanks to the small dimensions of the turbo-driven pumps.»²⁴ In the early 1980s, the existing building was declared to be no longer worth retaining, and was torn down.



Fig. 26

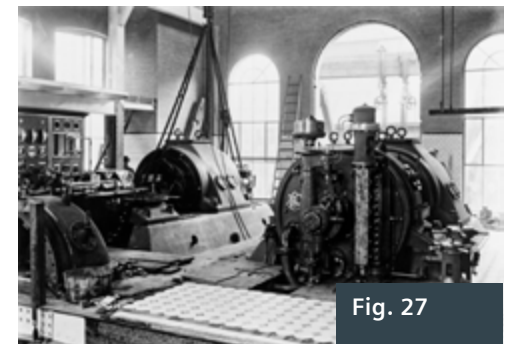


Fig. 27

Annex A / Building 3

The third architectural project that Behrens completed for the turbine factory was an addition of stories to Annex A of the *Old Hall* in 1913–14, known as Building 3, which took on the character of a new construction. Originally, as previously mentioned, Annex A consisted of a cellar, a ground floor, and two upper floors and was to be expanded to include two additional floors and two attics that would be used as storage space, without overloading its supporting walls. Two «tower

gables» to accommodate the technical equipment for the elevator and paternoster (cyclic elevator) were planned, but only the one on the east side of the building was completed (Fig. 28). Prior to adding its new stories, Annex A most likely looked similar to Building 4, still extant today, which earlier was called annex B to the *Old Hall* (Fig. 29).



Munitions workshop

While Behrens' contract with AEG officially ended in 1914, the following years saw a number of collaborative efforts between the company and its former artistic advisor. During World War I, for example, AEG used designs drafted by Behrens as a basis for erecting a munitions workshop on the hitherto undeveloped northeast grounds of the turbine factory to fill production orders from Germany's military administration. Two buildings were constructed for this purpose between December 1915 and March 1916: a long, nave-like building with axis laid out parallel to Berlichingenstrasse and – presumably directly adjoining that building – a second, transept structure comprised of a

main hall and side hall oriented parallel to the aforementioned planned but not implemented «extension» of Wittstocker Strasse. It is rather unlikely, however, that an expansion to the munitions workshop planned in early 1916 and likewise designed by Behrens in the form of a double hall, each with a paired side hall, was ever realized. At the time there was only one undeveloped area on the factory grounds left: the lot bordered on its northern and eastern sides by the two buildings of the munitions workshop, and to the west by Fahrstrasse which ran in front of the factory's power plant.. Any shifting of building area to the south was no longer possible, as

interior and courtyard views of the *New Hall* published in 1911 reveal that, by then, the factory hall already had a brick structure set back from the street that measured some 85 meters in length, ending just about at the point of the *Old Hall's* Annex D. (It is worth noting, too, that the south elevation of this building blocked about one third of the windows in the north-facing wall of the *New Hall*, which would have noticeably diminished the light entering the «Minster of Machinery».) When, exactly, construction on the afore-noted undeveloped ground was carried out is unknown. What is certain, however, is that as early as 1926 an infill structure referred to as a workshop (Fig. 30) occupied that slot. Even after its tearing down, the



Fig. 30



Fig. 31

contours of this workshop remain clearly marked on the south elevation of the one-time transept of the munitions workshop (Fig. 31) as well as the north facade of the brick annex to the *New Hall* (Fig. 32).

The introduction of armaments production is also reflected in the facility's employment numbers. Whereas the number of people working at the factory in March 1916, all told 2,684, marked the smallest workforce since the outbreak of World War I, the number of personnel increased dramatically beginning in April 1916, rising to 2,950 over several months. The turbine factory ultimately saw the highest number of employees in its

history reached in November 1917, with a total of 6,841 shop floor workers and office employees.

Evidently, there are no extant interior or exterior photographs of the munitions workshop halls from the time of the World War I. Research to date has revealed that such images were not published in the decades following World War I. Yet, this gap in surviving records can at least be bridged to some extent, as a number of photographs from the 1930s and 1960s have been found in the historical archives of the AEG turbine factory. From these pictures, certain structural details can be ascertained, particularly with respect

to the workshop transept. As the architectural execution of the two unplastered brick production halls on the street side matched the design by Behrens (Fig. 33), it can be presumed that the same was true on the interior courtyard side. The main hall of the transept was approximately twice as tall as the long nave building, which was roughly the height of the annex to the *New Hall*. Noteworthy are the window walls predominantly girded by iron frames on the eastern and western ends of the transept's main hall (which is also topped with a saddle-shaped skylight), bringing to mind the front elevation of the *New Hall* (Fig. 34).



Fig. 32



Fig. 33



Fig. 34

First expansion of the turbine assembly hall (1939–1941)

On August 20, 1938, AEG factory management informed the Tiergarten district building authority of its intention, at the special request of the Reichsstelle für Wirtschaftsausbau (Reich center for economic development), to build an addition to the *New Hall* with the same outlines as the existent hall. The turbine factory requested a significant increase in its number of employees at the same time. Both the construction project and the need for more manpower led to inquiries from the district office, which the turbine factory answered on August 30, 1938: «The planned addition to the large machine hall will not enlarge the developed factory floor space. The construction is necessary in order to facilitate the manufacturing of a number of large machines that is greater than the current limits, for which the old halls, which must be torn down, were too small. Construction is to be carried out in

1939. The 241 skilled and 80 unskilled workers (i.e., a total of 321 workers) that we have requested are already needed at the present time in order to make better use of the existing facilities. This increased need for personnel is unrelated to construction of the addition [to *New Hall*].»²⁸ However, according to data on employee numbers that were provided internally, there was no increase in staffing levels between August 1938 and the beginning of the World War II to the requested extent. Nonetheless, the turbine factory delivered almost 10 percent more MW capacity in the fiscal year 1938/1939 compared to the previous fiscal year.

Architects Jacob Schallenger (1882–1955) and Paul Schmidt (1889–1959) drafted the building expansion, which is distinguished from the Behrens model for



example by the stiffer design of the structural framework and by dispensing with the tilt of the window surfaces on the building front facing Berlichingenstrasse. As planned, construction began in 1939. However, it was not finished the same year, as stated in the technical literature, but instead two years later.

Construction works began in summer 1939 with the demolition of the brick annex to the *New Hall* that had been in place since 1911 (latest), the long nave building of the munitions workshop erected in 1916, and the previously mentioned infill structure. Whether any building modifications were made to these structures between 1911 and 1939 or 1916 and 1939, respectively, remains unknown. These spaces did, however, see some changes to their specific uses and production functions assigned to them.



Fig. 35

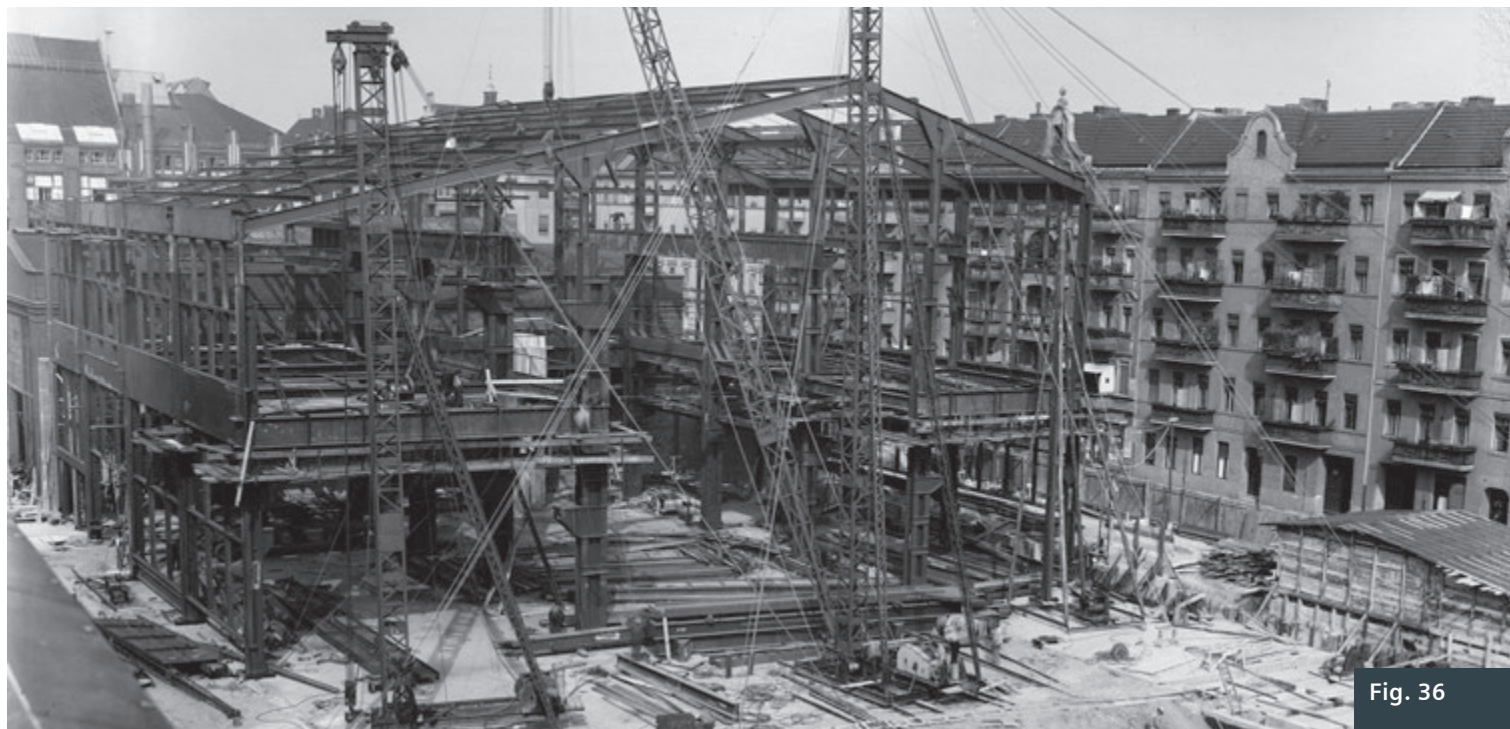


Fig. 36

A site plan from 1926 shows the brick annex building housing the condenser plant connected to the *New Hall* through a door, an otherwise unspecified workshop in the gap structure, and a mechanical engineering laboratory in the transept of the one-time munitions plant, connecting finally to an iron warehouse. It is unclear whether the parallel long nave building of the munitions plant also belonged to this workshop. According to a site plan from 1934, the brick annex by that time housed oil machinery fabrication operations, while the gap building no longer served as a workshop, but rather as a storage shed. In the transept, the mechanical engineering laboratory had cleared space for the blade workshop and

– presumably separated by a wall – the shop for rough machining work. Only the iron warehouse remained in its original location.

The only useful picture of the rear elevation of the nave of the *New Hall* (Fig. 35) that has been found so far is the fortunate result of the fact that the relatively unspectacular demolition was photodocumented. It offers an impressive illustration that it was «merely» the first phase of a construction project that ended in autumn 1909 and that – if necessary (due to space requirements) – a second or even a third phase would follow to extend the hall to its initially designed length of 207 meters. Assuming an immedi-

ate continuation of the construction project, the rear elevation might have been a creative interim solution in which the aesthetic style used on the front elevation was repeated to the greatest extent possible in the interest of the overall architectural concept, and would also have to be subdivided. Therefore, it is striking that the saddleshaped skylight rising above the apex of the nave – which begins about 10 meters behind the gable at the front of the building, extends to its end in the first version of the hall and, as a result, is supported by the concrete cladding – leads to a tapering of the rear elevation in the form of a peaked roof. It is also striking that, in contrast to the front, neither the horizontal subdivision of the

28 Letter from the AEG Turbine factory to the Tiergarten district building authority dated August 30, 1938 (historical archives of the AEG turbine factory).



Fig. 37

concrete filling by iron bands nor the surface treatment of the concrete cladding were copied at the rear of the building. After the demolition of the building, in 1939 and 1940 an iron framework structure was built along the entire width of the Behrens construction starting at the height of 207 meters, thus running parallel to Berlichingenstrasse toward the *New Hall* in the direction of Huttenstrasse (Fig. 36, 37). As a result of this approach, or the decision against first breaking through the rear of the assembly hall, it was initially possible to continue manufacturing turbines and generators relatively undisturbed by the construction work. Production was to be suspended in 1941 at the latest, when the *New Hall* and the addition would be connected by iron girders (Fig. 38). No historical pictures have survived of the massive concrete walls separating the two buildings, which could be seen both from Berlichingenstrasse and from the interior of the hall. Because the addition by Schallenberger and Schmidt had two galleries, the hall – which had a full cellar beneath it – was divided into a nave and two side naves that were already equipped for machining parts while construction work continued on the ground floor. The accusation that the architects decided not to install a skylight analogous to Behrens' work can be refuted at this juncture. The roof structure with its large expanse of glass had to be blacked out during completion of the project. It must be assumed that the rear elevation of the addition, following Behrens' example, had a large window elevation that also had to be blacked out from the beginning of construction (Fig. 39).

In terms of aesthetics, the building expansion significantly harmonized the overall impression, in particular from the interior courtyard perspective. Due to the construction materials used and the comparatively low height of the brick annex to the *New Hall* and the infill building, these structures gave the impression of having been erected in times long past, thus appearing to be considerably older than the *New Hall* or the transept of the one-time munitions workshop. Schallenberger and Schmidt, by designing the north elevation of the building expansion as a brick wall, created an artistic transition to the transept of what had been the munitions workshop. The two buildings were joined by a staircase, and the arrangement and size of the windows and window frames were designed in such a way that an intermediary function can be attributed to them (Fig. 40). It is conjectured that Behrens intended, at any rate when designing the east and west elevations of the transept, to have his window design create an architectural connection between the *New Hall* and the transept of the one-time munitions workshop. The selected width and spatial positioning of the transept are also indications that Behrens might have envisioned it as a (second) extension structure of the *New Hall*.

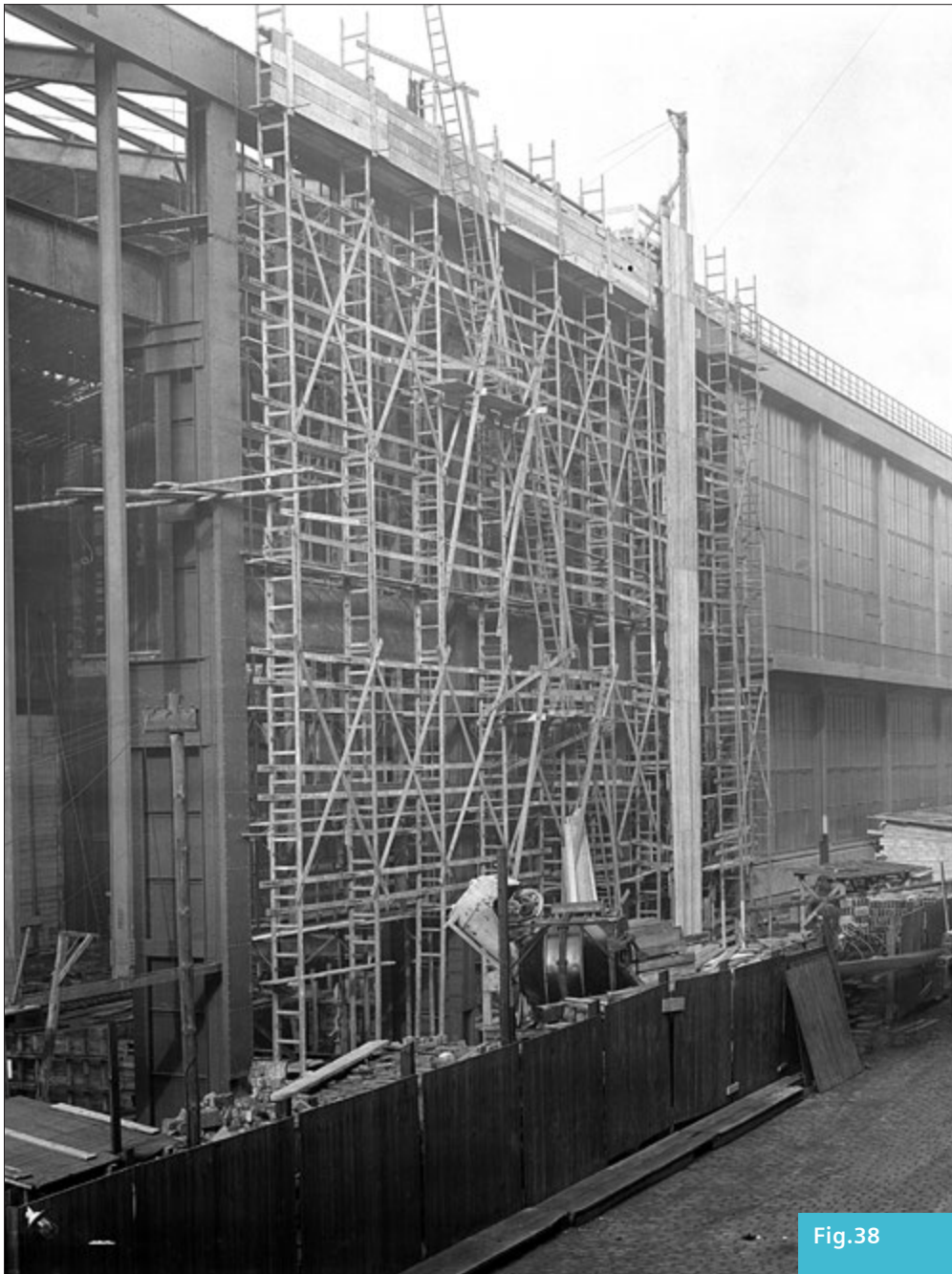


Fig.38



Fig. 39



Fig. 40

Fig. 41



Destruction during the World War II

²⁹ Bardorf, Wolfgang: *Meine Jugend in Moabit. 1930–1948.* – Berlin, 2003 – page 51.

The first bombs fell on the Moabit area of Berlin in September 1940. That part of the city was regularly targeted by air strikes from late summer 1943 to early 1945. The air strikes were particularly severe during the nights of September 3 and 4, 1943, and November 21 to 24, 1943. The last major air strikes took place between April 18 and 25, 1945. According to contemporary eyewitness, «large areas [of Moabit] consisted only of smoking rubble»²⁹ by the end of November 1943. Aerial photos thought to

have been taken immediately before or after the end of the war show the extent of the destruction: Almost all houses in the streets adjoining the turbine factory are severely damaged by bombing or shelling and are burned down (Fig. 41). In contrast, within the surrounding ruined landscape the turbine factory gives the impression of being a relatively intact site that was either intentionally or accidentally spared direct bomb hits. However, interior and exterior photographs put that impression into

perspective. The *Old Hall*, in which AEG began producing turbines and generators in 1904, was seriously damaged. Its blacked-out skylight was almost completely shattered, and the interior of the hall (covered by snow during the winter of 1944–45) also experienced massive damage to its gallery areas and traveling cranes (Fig. 42).



Fig. 42

Unlike in the *Old Hall*, production in the *New Hall* and the addition continued until the end of the war. The glass windows of the facades and in some cases their iron frames were severely damaged. While the *New Hall* still showed no signs of the war in spring 1943 (Fig. 43), beginning in 1944 makeshift solutions using many different materials affect the overall impression of the facades on the yard and street sides (Fig. 44). The damage resulting from dismantling of the factory equipment was

more serious than the damage from the war. When a request to reopen the turbine factory was submitted to the British military government on September 12, 1945, the site was considered to have been 75 percent destroyed.



Fig. 43

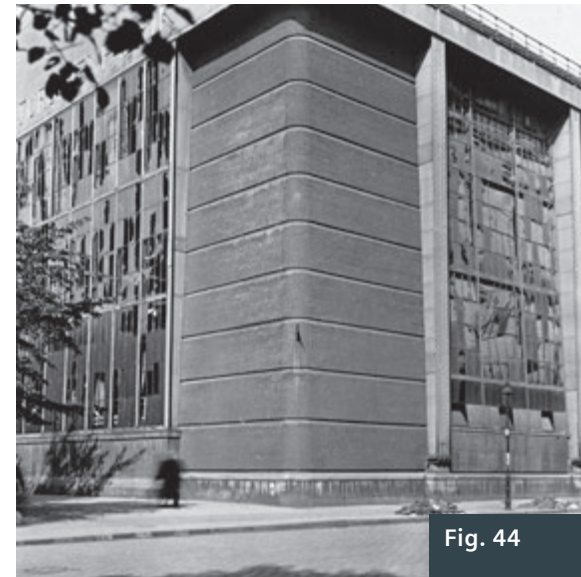


Fig. 44

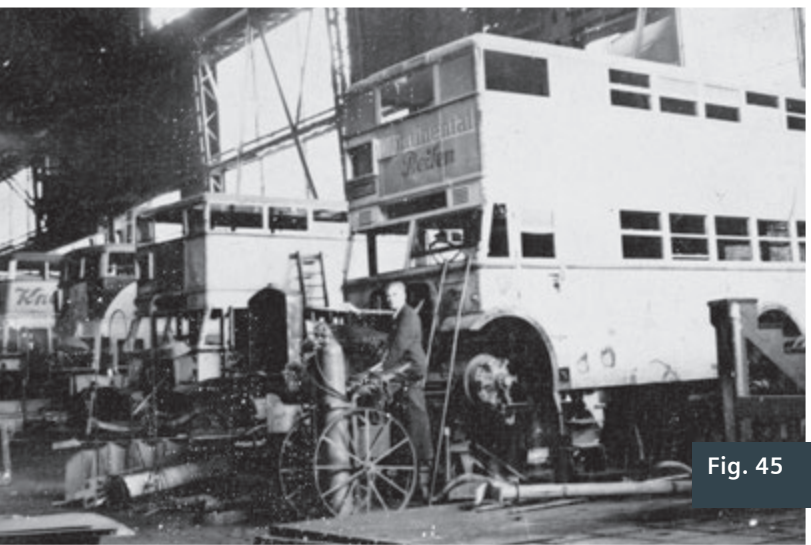


Fig. 45



Fig. 46

A hopeful new beginning





Fig. 47

On December 6, 1945, the British military government authorized the turbine factory and its 725 employees to begin repairing transport vehicles (Fig. 45), combined heating and cooking stoves, and turbines and generators. Eighteen months later, on July 1, 1947, the Magistrate of Greater Berlin issued a production permit for industrial plants to the turbine factory, allowing it to return to what was called its «original fabrication», making turbines and generators.

The return to «business as usual» was reflected not only in the production program, but also in various construction projects. The focus was initially on the *Old Hall*, whose rebuilding had been put off in

fall 1945. Most of the repair works were completed by 1950, with the building apparently first serving as a warehouse for turbine and condensation systems in the nave and for construction materials in the right side gallery (Fig. 47). In the early 1950s, a new entrance area that also served as an entry gate for motor vehicles was installed to the right and left of the railway tracks leading into the factory grounds (Fig. 46). The two low structures with their rounded roofs facing Huttenstrasse, whose simplicity recalls the bus shelters of that era, influenced the exterior appearance of the turbine factory for only a short time. The structure on the left had to yield to the six-story building constructed parallel to Huttenstrasse in 1956, while the one on the



Fig. 48

right was integrated into the new building as a projection from the main building (Fig. 48). The office building, matched to the height of the side nave of the *New Hall*, also continues what began with the low structure on the right: the concrete «cladding» of the facade on the yard side to a width of about 16 meters, which ruins the original overall impression of the building.



Fig. 49



Fig. 50



Fig. 51

Structural changes since the 1970s

In the fall of 1968, AEG and Siemens decided to merge their power plant activities, and the two companies created Kraftwerk Union (KWU) on April 1 of the following year. It was decided that the site on Huttenstrasse would also produce gas turbines for the new company. The new product made it necessary to build a balancing and overspeed test chamber, in which the turbine rotors could be balanced in a vacuum and undergo testing at critical speeds. Construction work began with the demolition of the transept of the munitions workshop designed by Behrens that was erected on the grounds of the AEG turbine factory in 1916 (Fig. 49). The expansion structure of the *New Hall* was subsequently extended from a length of 207 meters to 242 meters by adding a concrete annex that is fully insignificant from an architectural point of view.



Fig. 52



Fig. 53



Fig. 54

The structural work on the test chamber was accepted on August 19, 1970. It was designed for gas turbine rotors weighing up to 65 metric tons with a diameter of up to 3.45 meters and a maximum length of 12.5 meters. As gas turbines for power plants have grown steadily larger and heavier over the course of decades, their test-pit technology has undergone repeated innovation and replacement.

With the *New Hall* having been declared a protected historical monument in 1956, the facade of its front elevation was renovated in 1978, restoring its color scheme to the original design (Fig. 50). KWU originally considered removing the AEG company name – designed by Peter Behrens in 1908 in the form of a honeycomb hexagon – as part of the color restoration, but were persuaded otherwise by historians and architecture critics. Company management decided in 1979 to remove the gallery on

the eastern side of the addition. This allowed cranes to operate over the entire length of the hall without constraint. A relic of a past era that has been robbed of its function is the untouched «balcony» of the east gallery, which extends over multiple iron supports (Fig. 51). To summarize, the changes to the addition brought it aesthetically closer to the *New Hall* by continuing the interior architectural division into a nave and a two-story side nave. And in 1981 the *New Hall* and its expansion building were reroofed, work which – 36 years after the end of World War II – included removing the wooden and cardboard cladding on the roof of the *New Hall* and replacing it with glass (Fig. 52).

The first expansion building added to the *New Hall* by Schallenger and Schmidt was declared a protected historical monument in 1995.

To commemorate the 100th anniversary of the location, the entire original color design of the facade on the yard side was restored (Fig. 53), along with a portion of the original color design of the nave.

The largest construction project in the *New Hall* in recent times was the erection in 2012 of what is termed the XXL Cell – a drilling station which, at the time it was commissioned, was the largest boring mill of its kind in Europe, consisting of a vertical turret drilling machine for machining the large mechanical components of gas turbine casings (Fig. 54).

